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Arctic: Traditional Knowledge, Livelihoods and Community Engagement

Setting the Scene

David Romero Manrique
Thomas Völker
Jade Zoghbi
Ângela Guimarães Pereira

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Contact information

Name: Ângela Guimarães Pereira
Email: angela.pereira@ec.europa.eu
Tel.: +39 0332 78 5340

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Foreword

This report responds to the objectives of the Project ARCTIC (4856), in particular to the Work package ARCTIC-Coop (4915) with a study on traditional knowledge and its links with conventional science, for which Unit JRC.I.2 is responsible. The ARCTIC project responds to the joint communication “An integrated European Union policy for the Arctic” adopted on 27 April 2016 by the High Representative for Foreign Affairs and Security Policy and the European Commission. The communication in particular focuses on “enhancing international cooperation through engagement and dialogue with Arctic states, indigenous peoples and other partners” . Hence, the objective of this report is to set the scene for future useful dialogues that the JRC could foster, in particular with regards to adaptation strategies to climate change in the Arctic region, given the commitments to the Paris Agreement and the goals set in the United Nation’s 2030 Agenda for Sustainable Development.

Abstract

This report sets the scene for exploring further how the JRC could help with mobilising all relevant knowledge to tame climate change (and other environmental change) impacts in the Arctic that affect, not only the Arctic populations, but also many other populations of the planet. In that sense, the report maps communities, livelihoods, institutions and actors in the Arctic. Based on the reviewed academic literature the report offered a thorough discussion about traditional knowledge meanings, and investigates political and policy representations of traditional knowledge in different International and EU documents. Finally, it looked at instances of engagement of the Arctic people in the governance of the Arctic, identifying both institutional and substantial lacunas in mobilising experiential knowledge into governance processes characterised by high complexity and uncertainty.

Executive Summary

Context of this report

This report responds to the objectives of the Project ARCTIC (4856), in particular to the Work package ARCTIC-Coop (4915) with a study on traditional knowledge and its links with conventional science. The ARCTIC project responds to the joint communication “An integrated European Union policy for the Arctic” adopted on 27 April 2016 by the High Representative for Foreign Affairs and Security Policy and the European Commission. The communication in particular focuses on “enhancing international cooperation through engagement and dialogue with Arctic states, indigenous peoples and other partners”¹. Hence, the objective of this report is to set the scene for future dialogues that the JRC might organise, in particular about adaptation strategies to climate change in the Arctic region, given the commitments to the Paris Agreement and the goals set in the United Nation’s 2030 Agenda for Sustainable Development.

Report overview

The Arctic is an extremely complex region, not only because of its influence on the dynamics of the global climate change, but also due to its particular ecological conditions, unique biodiversity, magnificent geographical scale and location, the social and cultural heterogeneity, as well as, the international economic interests and the intricate political context. Within this multidimensional context, local communities have adapted throughout their history to change including to climatic changes, and economic and political ones.

This report provides a broad overview of engagement of Arctic communities in the governance of their environment and livelihoods. It examines to what extent communities’ ways of knowing including what is designated as “traditional knowledge” is taken into account in climate related policy documents. The report further explores the progresses made on the communities’ involvement in international policy-making processes and initiatives, analysing public recognition of their traditional knowledge and livelihoods as relevant valuable sources of information and knowledge for planning adaptation to environmental changes in the Arctic. Planning of different actors engagement in the activities envisaged by the project requires the study of context; hence, the report develops along the following themes:

- characterisation of the social and cultural heterogeneity of Arctic communities in order to contextualise how communities have adapted to changing conditions to cope with the Arctic environment and preserve their livelihoods and knowledge;
- organisation of local communities, namely political representation in order to be empowered at national and international policy spheres, assuming the status of ‘indigenous people’;
- overview of the policy context outlining the most pertinent documents published by relevant international and European institutions such as the Arctic Council and the European Commission, on Arctic policy and explores how different kinds of knowledge and different ways of knowing have been addressed over time;
- traditional knowledge as a way of knowing departing from the literature discussion about differences with other kinds of knowledge, such as the techno-scientific knowledge;
- review of initiatives that have been carried out in order to strengthen the voice and involve indigenous people in policy making processes, or increasing their engagement possibilities with researchers, non-governmental organisations (NGOs) and companies conducting activities in the Arctic.

Main outcomes and recommendations

¹ https://ec.europa.eu/environment/efe/themes/climate-action/integrated-eu-policy-arctic_en

1. There has been a progressive and increasing recognition of the needs and rights of Arctic inhabitants by European and international institutions, visible in policy documents and instruments which highlight the importance of supporting traditional means of livelihood of indigenous communities and with that the possible role of traditional knowledge, as these cannot be examined independently. Besides, the active involvement of indigenous representatives into international forums has also made visible the relevance of traditional knowledge in developing strategies to address climate change (and other changes) and safeguarding their effective participation in various phases of policy cycle.
2. The literature shows that the great divides with which different 'knowledge systems' or 'ways of knowing' are being differentiated, in particular between scientific and traditional knowledge are not easily uphold when put under scrutiny being often even simplistic and wrong. For example, the universality of science and many aspects of scientific practices as being dramatically different from traditional knowledge.
3. **The potential of traditional knowledge** for assessing, observing and monitoring environmental dynamics has been described in the scientific literature, for instance, its usefulness has been stressed on governance and planning activities, such as:
 - Fisheries planning and management
 - Climate adaptation and resilience strategies
 - Biodiversity
 - Invasive alien species
 - Marine protection

Yet, our review suggests that traditional knowledge is insufficiently considered in Arctic policy making; much more effort is needed in order to circulate effectively this knowledge within the wider knowledge base that informs policy making at all governance levels, since the mere representation of these groups at international forums is not enough to channel traditional knowledge to formulating, implementing, and monitoring strategies to deal with climate change impacts or other environmental change not attributable to climate.

4. There is evidence that traditional knowledge has been the communities' (often solely) valuable resource to cope with change over the years; this begs the question: why wouldn't it be valuable now? And, moreover in whose interest would debates about impacts and strategies to cope with environmental change in the Arctic disregard this body of knowledge and associated ways of knowing?
5. The academic literature is rich with examples of co-management institutional arrangements especially in the Canadian Arctic. The literature suggests that there is scope for partnerships and co-production of knowledge based on traditional and scientific ways of knowing; yet the models of cooperation are in the making and therefore there is scope to explore in participatory ways what partnership models could work.
6. In order to develop policies regarding traditional knowledge in the region, it is desirable to **reduce the gap between policy-makers and traditional knowledge holders**. To this end, the creation of closer communication channels through a dialogue with each relevant actor would allow the identification of obstacles hindering the development of a more openness policy and research. It is important that representatives, policy-makers and researchers develop more collaborative actions on the ground, that is, at the locations where traditional knowledge shows its significance and can be used together with other kinds of knowledge.

Hence, the following are preliminary recommendations emerging from the study presented here:

- Develop knowledge and information sharing platforms and sources. This means bringing closer scientists, researchers and Arctic communities in order to develop enhanced informed policies;
- Provide opportunities for bottom-up initiatives focused on the protection of Arctic livelihoods and traditional knowledge;
- Promotion, creation and supporting of **Local Observer Networks** in collaboration with techno-scientific Observations in the region;
- Integrate the perspectives from the local Arctic people into any studies that concern the governance of the region.

Finally, the main conclusion from the overview provided in this report is that **traditional knowledge is still underused and undervalued in policy or planning in the Arctic**. Therefore, the main recommendation in terms of follow-up research is to explore deeper how better cooperation with Arctic people can be sought. The European Commission could foster those partnerships, as well as include traditional knowledge across the policy cycle, but purposefully organised dialogue and collaboration with the knowledge-holders, i.e. engaging the local communities, need to be set up to explore best practices. The report has provided the context to move forward.

1 Introduction

“In the year 2093, the western civilisation is devastated by the effects of climate change: the disintegration of the ice cover of the Antarctic submerges great part of the capitals of the western world, and natural disasters cause massive migrations and the alteration of the world power order.”

This catastrophic scenario is displayed by Naomi Oreskes and Erik Conway in their book *The Collapse of Western Civilization: A View from the Future* (2013). We can simply suggest that this future image is a result of the incapacity of contemporary western civilisations to cope with complex societal and environmental issues.

The governance of the Arctic region is complex: multiple interacting actors, competing vested interests within a multi-scale policy context, within an emblematic region where impacts of climate change are expected to be more severe and emerging in a not so faraway future. This situation becomes more complicated since climate change and environmental variability are increasingly altering weather related conditions, resulting into substantial change, such as the opening of new important commercial routes, new possibilities for natural resources exploitation (oil, gas, fish, etc.), loss of a unique biodiversity, or impacts to traditional Arctic human settlements and infrastructures, among others.

Arctic indigenous people are intimately linked to their traditional knowledge since they depend on the land and sea for food and income. Traditional activities such as hunting and fishing are vitally important for native culture and are deeply linked to their traditional knowledge and ways of life (Inglis, 1993; ACIA, 2005). Traditional knowledge has been conceptualised as a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment (Berkes, 1993; Gadgil et al., 1993; Berkes et al., 1995). In practice, this kind of knowledge is vital and dynamic when developing strategies to adaptation to the local environment and a useful source of information to inform policy-making processes (Sutherland et al., 2014).

With ecological conditions rapidly changing, the role of traditional knowledge might be gradually unusable in some cases, for instance, in predicting safe ice conditions (Galloway et al., 2009). Traditional knowledge is shaped by the interaction with the ecological conditions in order to develop effective adaptation strategies at local level. It refers to the understanding of the local ecological system, having evolved over decades and for generations due to systematic observations of complex phenomena, such as the dynamics of sea tides and currents, the use of local materials, the weather and climatology, the local biodiversity and its behaviour, among others. Since this kind of knowledge is linked to complex local ecological conditions, each native community develops its specific traditional knowledge. Thus, engaging the communities into science and policy-making benefits further adaptation and mitigation strategies and policies, since traditional knowledge has become useful to anticipate natural changes and also to develop more adequate disaster preparedness actions (Failing et al., 2007; Gadgil et al., 2003; Pearce et al., 2009).

Critical consequences of rapid and/or uncertain environmental changes are for example, the displacement of entire communities from their historical settlements, leading in worst cases, to internal migration and complex relocation processes. Currently, the clearest example of this type of impact is seen in the case of Alaska Native villages, which have been affected by intense environmental changes, having initiated, several years ago, endless and very costly relocation processes.

Current policy systems are failing the communities' needs, expectations and interests. These rapid environmental changes are increasingly causing severe impacts in native communities. Policy making processes and engagement actions are conditioned by the way in which we understand how the world works, consequently, classic policies in the

Arctic have been oriented with a western perspective hopefully based on scientific framings. The work presented here explores the hypothesis that engaging an extended peer community facilitates the development of more effective and robust policy-making frameworks.

There are examples of policy initiatives that illustrate the suitability of implementing traditional knowledge policy frameworks at all levels in order to strengthen and promote the value of traditional knowledge for developing adaptation strategies and improve resilience capacity of native populations (Houde, 2007). For instance, the Kolarctic Salmon Project provided a knowledge-based framework for the common management of the Atlantic salmon stocks; other example is the Alaska Beluga Whale Committee, which integrated traditional knowledge to better manage Alaska's stock of Belugas. Nevertheless, in order to effectively consider the intangible value of traditional knowledge, it is important to understand its meanings and the ways in which it is produced and circulated.

Along this report we analyse the level of involvement of the local Arctic indigenous communities into European and international policies related to climate change adaptation, focusing the analysis on the use of traditional knowledge and its possible combination with the scientific and technical knowledge and tools. To this end, the content of this report is structured as follows:

In sections 2 and 3 we introduce broad aspects of human geography in the Arctic, including Arctic people distribution and the general outline of the international Arctic policy context. In section 4 we look into livelihoods in the Arctic and discuss their vulnerabilities vis. à vis. climate change and other pressures.

In section 5, an exercise of conceptualisation of Arctic traditional and indigenous livelihoods and knowledge is carried out from different perspectives trying to capture the relevance of these topics for policy making processes in the region. In this section, we look at the international Arctic policy context, focusing the analysis on the current conceptions of engagement and traditional knowledge and their integration on policy spheres.

In section 6, the engagement of local native communities into Arctic issues at all levels is analysed, including how traditional knowledge is circulated through the local representatives in the region. A review of the projects and policies in which these indigenous representatives have been involved is carried out in order to identify gaps and potential areas where community engagement could be relevant.

In the final section we present a series of recommendations and actions, based on the analysis done in the previous sections, in order to set a research agenda that explores the use of different kinds of knowledge to frame and act upon further environmental change in the Arctic.

2 Arctic People

Arctic communities are characterised by small and dispersed communities which have adapted to changing conditions in the past by producing relevant knowledge to cope with their environments and maintain their livelihoods (Ford et al., 2006). The Arctic people have moved through the land, navigated the sea, and crossed the ice, using knowledge about routes that was passed down through generations, allowing them hunting and fishing during the *accurate* seasons².

Safeguarding and adapting to the natural environment has been essential to Arctic communities for continuity of the ecosystem and livelihoods. Insights from these people are of global relevance to explore lasting livelihood futures resilient to environmental changes.

Seven of the eight Arctic nations have indigenous populations, except Iceland. Arctic indigenous people include for example Saami in circumpolar areas of Finland, Sweden, Norway and Northwest Russia; Nenets, Khanty, Evenk and Chukchi in Russia; Aleut, Yupik and Inuit (Iñupiaq) in Alaska, Inuit (Inuvialuit) in Canada and Inuit (Kalaallit) in Greenland (see figure 1).

In terms of indigenous population composition, the Arctic population is varied and large, numbering four million residents in the Arctic region. Of these, approximately 10 % are indigenous. However, this proportion varies greatly across the Arctic: for instance, Inuit comprise about 85% of the population of Nunavut, Canada, and the great majority of Greenlanders are indigenous as well, while in other areas, such as in the case of the Khanty-Mansi Autonomous Okrug of Siberia, indigenous people make up less than 2 % of the population (Fondahl et al., 2015).

The indigenous populations could change, not only due to climatic influences, or economic and geopolitical factors, but also due to processes of ageing and population growth (Emelyanova, 2015). A demographic lens needs to be considered when engagement activities are to be planned: thinking about who performs which livelihood activities based on what knowledge, and who seeks to remain or depart to search other livelihoods. Emelyanova (2017) furthermore points to demographic challenges such as, gender gaps in the Arctic indicating a majority of men in the North are active in the male dominated occupations leading to a higher male-female ratio. The Russian Arctic records predominantly elderly women living alone due to excessive death rates of Russian men. The author further highlights that since the late 1990s, young women have been increasingly pursuing higher education and working outside their homelands, while males tend to maintain traditional livelihood activities. These gender dynamics may also impact livelihoods.

² See: <http://paninuittrails.org/index.html>

Figure 1. Map: Demography of indigenous people of the Arctic based on linguistic groups
 GRID Arendal and Hugo Ahlenius, Nordpil. (source: <http://www.arcticcentre.org/EN/communications/arcticregion/Arctic-Indigenous-Peoples/Demography>)



The social, cultural and ecological heterogeneity, in addition to factors such as globalisation or industrial development (Lim, 2013), land claims and self-government (Vitebsky, 2005; Daoust et al., 2010), and others are shaping demographic dynamics, migration and mobility. For instance, the Arctic Human Development Report (2015) puts forth that the number of larger settlements is increasing while the smaller places tend to decline both in number and in size. Generally, several major trends have been identified within Arctic communities in the last years (Larsen and Fondahl, 2015, pp. 470):

- "The overall demographic trends in the Arctic indicate outmigration from smaller communities to urban areas, with an increasing divide between centres and periphery.

- *Mobility has been on the rise in the past decades within and between communities, and inside and outside the Arctic.*
- *Imported foods are on the rise in the Arctic, but in some areas, like Norway, interest in and demand for local food is rising.*
- *Community connections, such as to the environment or among people within communities are also being transformed by increasing globalization. Once again, responses vary widely across the Arctic, but there is a trend toward outmigration as people seek opportunities and alternatives. In particular, there is a trend, though not the same everywhere, for women to leave and men to stay, creating a gender imbalance.”*

These trends and other changes have to be adequately taken into consideration and understood in order to avoid paternalist approaches. The recognition of traditional livelihoods, practices and knowledge together with the recognition of the right of these communities to change is desirable at both research and policy levels. This recognition would be more easily achieved if a transparent dialogue between researchers and policy-makers were maintained. Global initiatives such as, the International Polar Year³ (2007-08) strengthen research relationships among natural scientists, social scientists, scholars in the humanities, and Arctic communities to prompt more complete understanding of Arctic change at diverse scales, increased awareness of the complementary aspects of local traditional knowledge and science, and improved methods for communicating Polar region research in communities and to the general public (Grimwood and Cuerrier, 2012).

The voices of the indigenous people are channelled in the Arctic Council by six representative organisations holding the status of Permanent Participants: Aleut International Association, the Arctic Athabaskan Council, Gwich'in Council International, the Inuit Circumpolar Council, Russian Association of Indigenous Peoples of the North, Siberia and Far East, and the Saami Council (see table 1).

All communities recognised as 'indigenous' populations in the Arctic⁴ are represented under the umbrella of these organisations, but these communities are not homogeneous and not all of them are represented in the Arctic Council. Each of them have their own history, culture, language and traditions; for instance, there are over 100 identified groups in Russian region: the Nenets, Yup'ik, Chukchi, Oroks, Even, Evenkis, etc. and only 41 groups are legally recognised as "indigenous" while RAIPON represents 42 indigenous groups⁵. Following figure shows the total area under the coverage of each organisation.

Table 1. Indigenous representatives of the Arctic region.

³ <http://www.ipy.org/>

⁴ For instance, according to the Russian legislation, the status of "indigenous" is applied only to populations below 50000 inhabitants (Zadorin et al., 2017).

⁵ <https://www.culturalsurvival.org/news/who-are-indigenous-peoples-russia>

| Arctic community | Region | Population | Representative group | Website |
|-------------------------------------|--|---|---|---|
| Aleut (Unangan) | originally inhabited the Aleutian Islands in Alaska and Kamchatka region in Russia | 2,200 Aleuts live in the Alaska territory, on the Aleutian Islands, the Pribilof Islands, and the Alaska Peninsula west of Stepovak Bay | The Aleut International Association (AIA) | https://www.aleut-international.org/ |
| Athabaskan | Arctic and sub-Arctic regions of Alaska, U.S.A., and the Yukon Territory and Northwest Territories of Canada | 42,000 Resident population of Alaska, U.S.A. (12,000) the Yukon Territory (10,000) the Northwest Territories and provincial norths (20,000) in Canada | The Arctic Athabaskan Council | http://www.arcticathabaskancouncil.com/aac/ |
| Gwich'in | Northwest Territories, Yukon and Alaska. | 9,000 | The Gwich'in Council International | https://gwichincouncil.com |
| Inuit | Arctic regions of Alaska, Canada, Greenland, and Chukotka (Russia). | 160,000 | The Inuit Circumpolar Council | http://www.inuitcircumpolar.com/ |
| Saami, Sámi or Sami. | northern Sweden, Norway, Finland and the Kola Peninsula of Russia | approx. 80,000 | The Saami Council | http://www.saamicouncil.net/en/ |
| Indigenous Peoples of Russia | northern and Far Eastern regions of Russia and Siberia | 270,000 people | Russian Association of Indigenous Peoples of the North, Siberia and Far East (RAIPON) | http://raipon.info/en/ |

From a top-down viewpoint, six Working Groups have been established within the Arctic Council with the aim of carrying out assessment and monitoring processes with an increasing consideration to engagement practices with these indigenous organisations:

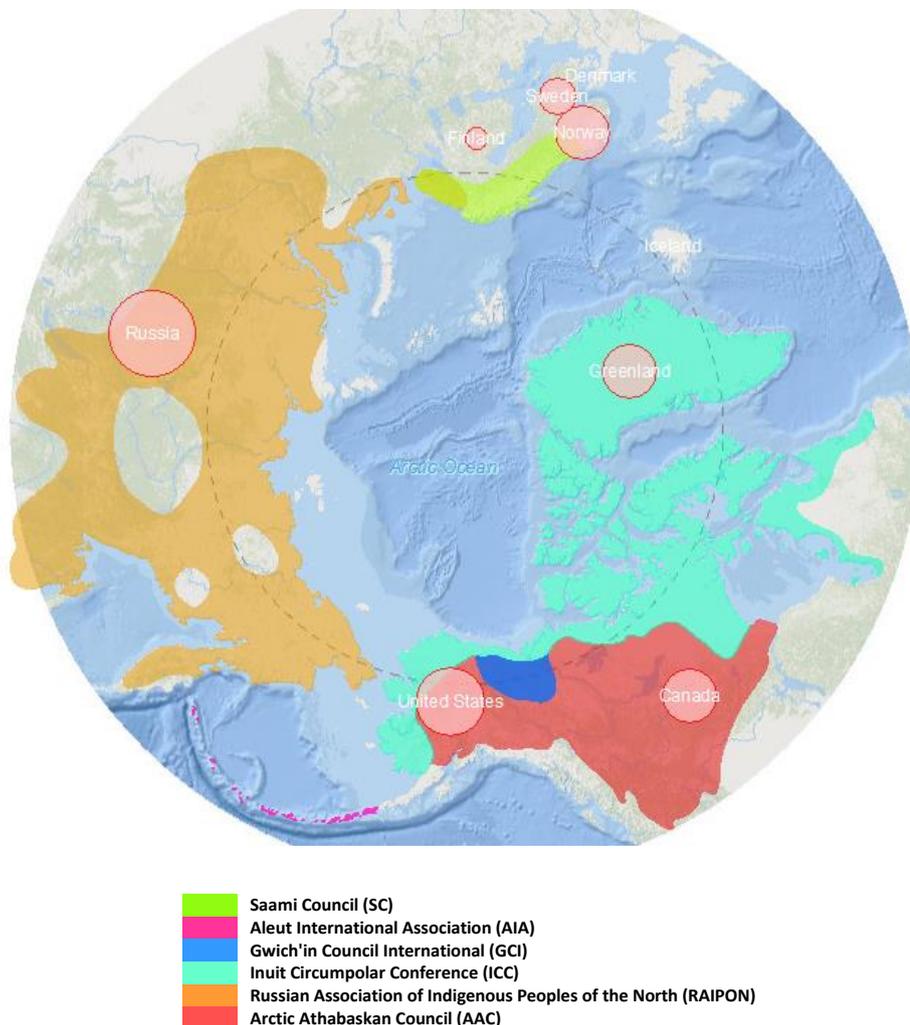
- ACAP (Arctic contaminants Action Program)
- AMAP (Arctic Monitoring and Assessment Programme)
- CAFF (Conservation of Arctic Flora and Fauna)
- EPPR (Emergency Prevention, Preparedness, and Response)
- PAME (Protection of the Arctic Marine Environment)
- SDWG (Sustainable Development Working Group)

Other important international initiatives and organisations involving indigenous people are:

- The Northern Dimension (ND)-a policy framework involving European Union states, plus Iceland, Norway, and Russia-assists Arctic/sub-Arctic areas.
- The International Arctic Science Committee (IASC).
- The University of the Arctic (UArctic).
- The International Work Group for Indigenous Affairs (IWGIA) brings together representatives of the various organisations striving to protect human rights of the indigenous people living in the Arctic. The IWGIA encourages efforts to strengthen democratic participation by native people in the decision-making bodies of Arctic states.
- WWF encourages the use of this traditional ecological knowledge to inform management policies in the Arctic. We have supported several projects that collect this form of knowledge, helping to provide a more rounded knowledge base.

- ArcticNorth works in partnership with communities and indigenous people to document and integrate traditional knowledge in climate change vulnerability assessment and planning. This organisation works together with community and industry partners to integrate multiple sources of information including traditional and local knowledge, and western scientific knowledge to develop inclusive and comprehensive understandings of climate change impacts and adaptations. <http://www.arctic-north.com/service/community-engagement/>
- The Arctic Centre of the University of Lapland. Arctic Centre is a national and international hub of information and centre of excellence that conducts multidisciplinary research in changes in the Arctic region. It is located in the Arktikum House, Rovaniemi, Finland (<http://www.arcticcentre.org/EN/communications/Barents/Kirkenes>).

Figure 2. Total area covered by the different indigenous organisations (Source: ArcGIS software own elaboration, 2018)



3 The Arctic political context

During the last decades, the Arctic region has acquired an increasing geo-political relevance in regard to its natural resources and new commercial opportunities, but also a significant matter of concern due to its both environmental fragility and influence on the global climate change. Activities, such as commercial shipping, fishing, oil and gas extraction, mining, industrial development and tourism are challenging both the ecological system and traditional lifestyles and livelihoods. Under this state of affairs, the environmental impact could be undesirable if these resources are not managed in a sustainable manner.

For these and other causes, the Arctic has attracted the attention of worldwide scientific bodies and environmental organisations in order to safeguard the environment and establish adequate strategies on the area. Interested countries in Arctic issues are organised around intergovernmental governance structures with the aim of developing consensual strategies and policies, which allow an ordered exploitation regarding environmental and socio-cultural particularities of the region. For instance, local native populations have found the manner to be represented at policy-making processes, within international forums, concerning their own development and future – see above. These communities have inhabited the region for centuries and hold a relevant understanding of the complex processes of the Arctic ecosystem, therefore, their voices have been increasingly recognised at all levels.

But the governance context in the Arctic is a complex issue since several actors, countries, intergovernmental bodies, enterprises, and local and international NGOs are involved in decision making (see figure 3 below).

Within this context, the highest-level intergovernmental forum is the Arctic Council, formally established in 1996 by the Ottawa Declaration⁶. The Arctic Council is the only circumpolar forum for political discussions on Arctic issues, involving all the Arctic states, and with the active participation of *Arctic Indigenous Peoples*. The Arctic Council is responsible for promoting cooperation, coordination and interaction among the Arctic States on common matters, in particular sustainable development and environmental protection in the Arctic.

The current Members of the Arctic Council are Canada, Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, the Russian Federation, Sweden, and the United States of America.

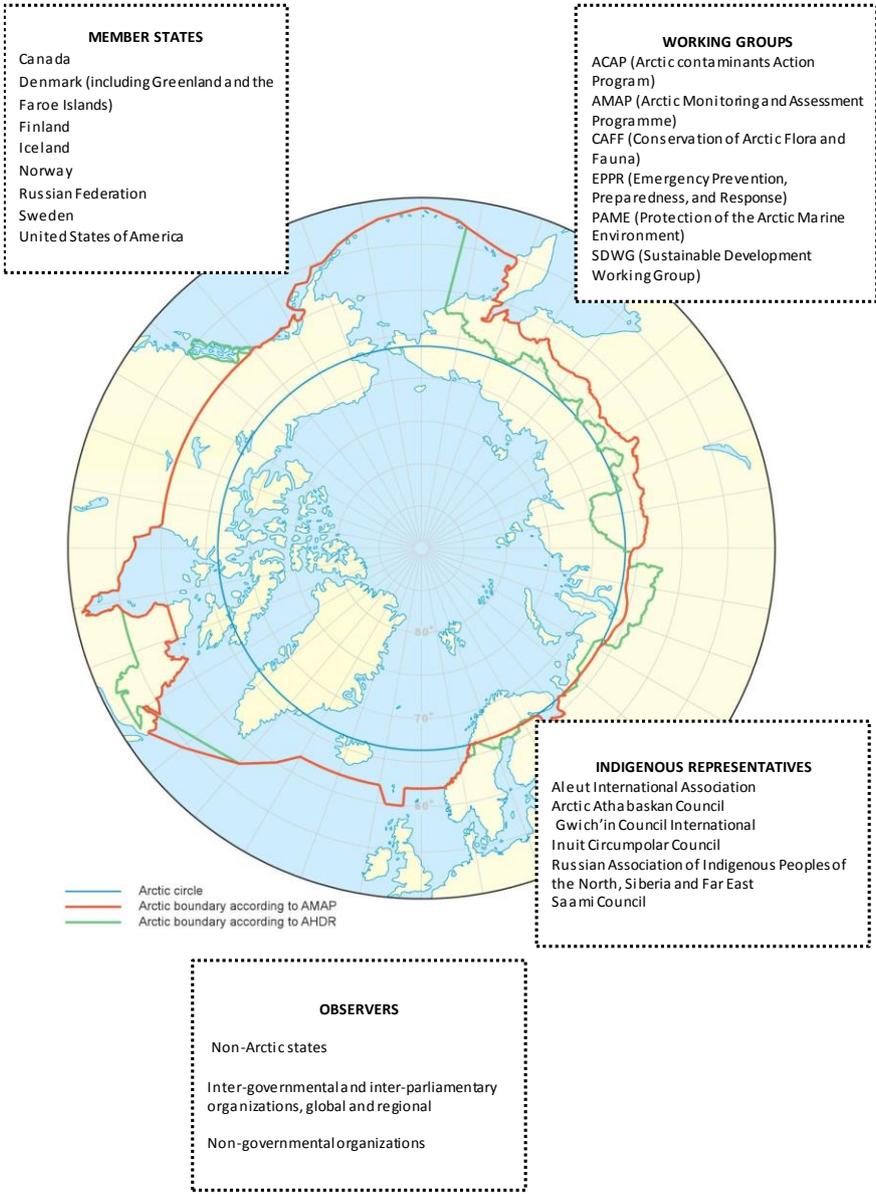
Permanent Participants represent the Arctic Indigenous Peoples. They include the Arctic Athabaskan Council, the Aleut International Association, the Gwich'in Council International, the Inuit Circumpolar Council, the Russian Association of Indigenous Peoples of the North and the Saami Council. The Saami and the Inuit are the only nationally recognised indigenous populations living partly on the territory of EU Member States. Greenland maintains a close relationship with the EU on the basis of its status as one of the EU's Overseas Countries and Territories associated with the EU.

Non-Arctic states, intergovernmental and inter-parliamentary organisations and non-governmental organisations may apply for observer status. Observer status in the Arctic Council, as established in the Ottawa Declaration, is open to: (a) non-Arctic states; (b) inter-governmental and inter-parliamentary organisations, global and regional; and (c) non-governmental organisations, which the Council determines can contribute to its work.

Currently, observers in the Arctic Council are: thirteen non-Arctic countries (EU Member States of France, Germany, the Netherlands, Poland, Spain and Italy), thirteen Intergovernmental and Inter-Parliamentary Organisations and thirteen Non-governmental Organisations. Observers have right to assist to Council's meetings but do not have any decision-making authority.

⁶ <https://oaarchive.arctic-council.org/handle/11374/85>

Figure 3. Governance constellation in the Arctic region. Source: self-elaboration, based on the map compiled by Winfried K. Dallmann for Arctic Council maps archive: <http://www.arctic-council.org/index.php/en/learn-more/maps>)



The role of the European Union is also relevant for several reasons. For instance, the EU is a high seafood consumer and the Arctic fisheries are significantly dependent on this market; other resources such as hydrocarbons and raw materials are imported from the EU, therefore, European policies and legislation have important implications for Arctic resources management since these activities have significant impacts on the vulnerable Arctic environment, and on the regional economy and society, including traditional livelihoods of native people⁷.

For these reasons, during the last decades, the EU has opened the path to be involved in Arctic issues with the main motivation of supporting research activities to address the challenges of environmental and climate changes in the Arctic; acting with responsibility to contribute to ensuring economic development in the Arctic is based on sustainable use

⁷ https://europa.eu/european-union/topics/maritime-affairs-fisheries_en

of resources and environmental expertise; and intensify its constructive engagement and dialogue with Arctic States, indigenous peoples and other partners.

Several examples in form of policy initiatives at regional levels demonstrate the usefulness of integrating traditional knowledge in decision-making processes. The pioneer has been the Government of the Northwest Territories (Canada) who implemented the Traditional Knowledge Policy in 1997 with the aim of integrating traditional knowledge in decisions and programs addressed to the residents. Within this policy plan, the Interdepartmental Traditional Knowledge Working Group was created with the purpose of providing a forum for the exchange of relevant information among government departments. This information has been related to factors, such as ground conditions, snowfall, snowmelt, flooding, wind direction and underground streams, and has been useful, for instance, to minimise the potentially negative impacts of highway and bridge construction.

Other Traditional Knowledge Policy initiative has been carried out by the First Nation of Na-Cho Nyak Dun Government (Yukon, Canada). This policy framework has been developed with the objective to protect, preserve, and manage the use of traditional knowledge, encouraging the Government to consider traditional knowledge in the design, implementation, and delivery of its programs and services.

4 Traditional livelihoods

This section discusses traditional livelihoods and the ways indigenous people shape their existence in Arctic local environments. It considers the extent to which livelihoods are resilient, transformed, and what may sustain them through climatic changes. The livelihood lens is a grounded and multidimensional perspective recognising the flexibility and constraints with which people construct their lives and adapt livelihoods in dynamic ways (Olsson, Opondo and Tschakert 2014, p.798). This approach pays attention to the wider institutional, cultural and policy contexts and also the drivers that direct livelihoods and quality (*ibid*). How livelihood is performed in practice, to what extent it is bound to cultural and social meanings and how these could be addressed by policy should be better framed in collaboration with the people concerned. Having recognised this, the following paragraphs shall offer insights into common accounts behind traditional livelihoods, and examine how the notion has been situated in broader discourses. Through examples, we illustrate how traditional livelihood may be defined and further explored in the Arctic context.

Livelihood refers to the means of securing the necessities of life⁸. In its origin, livelihood (c.1300) taking its roots from *livelode* (from *lifad* 'course of life', from *lif* 'life' + *lad* 'way, course') refers to the means of supporting one's existence.⁹ Livelihood can be associated with activities of earning, gaining, making and seeking to secure basic necessities¹⁰. It further refers to the capabilities, assets (including both material and social resources), and activities required for a means of living (Kitchin and Thrift, 2009). A review of appearances of 'livelihood' in discussions in the media, research and international organisations results in the following examples: 'sustainable livelihoods and ecosystems'¹¹, 'sustainable livelihoods for the world's poorest'¹², 'livelihood protection and climate insurance' (Smith, 2014). Geographically, such discourses mainly address remote communities, coastal areas and forests. Regarding the Arctic, livelihood studies are interested in, for example, measuring 'effects of climate change on Arctic livelihoods and living conditions'¹³, 'effects of livelihood transformation on older persons' (Begum, 2016) and 'legal protection of traditional livelihoods' (Koivurova et al., 2015). Therein, livelihood is often placed under the umbrella and in connection to key themes 'human health', 'well-being' and 'sustainability'. A widely used definition of livelihood, adopted by organisations advocating for a livelihood perspective such as the United Nations Development Programme (UNDP), the UN's global development network, and the Intergovernmental Panel on Climate Change (Olsson et al., 2014) a major international body for the assessment of climate change, is that proposed by Chambers & Conway (1991):

"a livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the long and short term." (Op. cit., pp.6)

In their definition, Chambers and Conway highlight several elements: livelihood ought to cope with 'stress and shocks' and be able to 'maintain or enhance' the 'capabilities and assets' into the future for the next generation. Economist Amartya Sen defines this capacity as the ability to perform basic functions, to what a person is capable of doing and being (Sen referenced in Chambers and Conway 1991, pp.4). Furthermore, Sen's

⁸ Oxford Dictionaries. 'Livelihood'. <https://en.oxforddictionaries.com/definition/livelihood>

⁹ Thesaurus. 'Livelihood'. <http://www.thesaurus.com/browse/livelihood?s=t>

¹⁰ Wikipedia. 'Livelihood'. <https://en.wikipedia.org/wiki/Livelihood>

¹¹ World Food Programme (WFP). <http://www1.wfp.org/sustainable-livelihoods-and-ecosystems>

¹² World Wildlife Fund/ World Wide Fund for Nature (WWF) http://wwf.panda.org/what_we_do/how_we_work/people_and_conservation/our_work/livelihoods___economies/

¹³ University of the Arctic (UARctic). <https://www.uarctic.org/news/2018/1/call-for-applications-effects-of-climate-change-on-arctic-livelihoods-and-living-conditions/>

subset of livelihood capabilities includes the ability to cope with stress and shocks and being able to find and make use of livelihood opportunities, which is a dynamic and proactive process.

The Sustainable Livelihood (SL) framework, underpinning many development initiatives, emphasises the value of sustainability. This framework can be interpreted to aim for a livelihood which can recover from shocks, such as environmental ones, at a certain rate or a sufficient level to succeed in continuity and with minimal disruption (Krantz, 2001). The SL framework approaches the measure of poverty beyond low-income and includes vulnerability and social exclusion thereby recognising the various factors and processes which constrain or enhance people's ability to make a living in an economically, ecologically, and socially sustainable manner (*ibid*). Krantz references the early experiences of the British Department for International Development (DFID) wherein the SL framework drew on the following core principles (Ashley and Carney 1999 referenced in Krantz, pp.18):

1. People-centred: sustainable poverty elimination will be achieved only if external support focuses on what matters to people's lives, understands the differences between people and works with them in a way that is congruent with their current livelihood strategies, social environments and ability to adapt;
2. Responsive and participatory: poor¹⁴ people themselves must be key actors in identifying and addressing livelihood priorities, and 'outsiders' need to adopt processes that ensure they listen and respond;
3. Multi-level: the scale of the challenge of poverty elimination is enormous, and can only be achieved by working at multiple levels, ensuring that micro-level activity informs the development of policy and an effective enabling environment and that macro-level structures and processes support people to build upon their own strengths;
4. Conducted in partnership: with both the public and the private sector (including civil society/ non-governmental organisations);
5. Sustainable: there are four key dimensions to sustainability - economic, institutional, social and environmental sustainability;
6. Dynamic: external support must recognise the dynamic nature of livelihood strategies, respond flexibly to changes in people's situation, and develop longer-term commitments of support.

These guiding indicators may be considered combined with new approaches to sustainable development that emphasise changing ecological and climatic conditions.

From a practical perspective, Arctic livelihood strategies – i.e., the range and combination of activities and choices that people make in order to achieve their livelihood goals (Kitchin and Thrift, 2009) - were once predominantly and still are to some extent migratory, mobile and nomadic (short and long distances) in accordance with seasonal needs to support activities such as hunting, reindeer herding, fishing or foraging (Ferris, 2013, pp.13). Moving is important to several livelihood activities. Yet some, which rely on mobility, may become increasingly difficult to achieve due to, for instance, the changing sea and ice levels, as in the case of the Thule District in northern Greenland in the town *Qaanaaq* inhabited by some 600 people. People's mobility is increasingly constricted by the melting ice and the landscape is shrinking which in turn is impacting participation on several scales such as "their economic and political manoeuvring", as argued by Hastrup

¹⁴ We understand 'poor' as more than the lack of income and resources to ensure a sustainable livelihood. Its manifestations include hunger and malnutrition, limited access to education and other basic services, social discrimination and exclusion as well as the lack of participation in decision-making (see the Sustainable Development Goals (Goal 1) as put forth by the United Nations).

(2009).

Evidently in the populations, which have survived in particularly demanding human habitats, indigenous people have succeeded to thrive despite demanding climatic conditions and at times geographic isolation¹⁵. The continuous recovery and survival throughout is often understood and expressed through the notion of resilience. According to the Arctic Resilience Report (2016) resilience is "the capacity of people to learn, share and make use of their knowledge of social and ecological interactions and feedbacks, to deliberately and actively engage in shaping adaptive or transformative social-ecological change" (Op. cit., pp.8). The component of engagement may refer to response to disturbances, to strengthen a desired set of functions or to pursue a more desirable set of arrangements (*ibid*).

Fast forward, the report identified factors helping successful communities to be resilient:

1. Capacity for self-organisation – to make decisions and implement responses to change
2. Diversity of responses to change
3. Capacity to learn from and integrate diverse types of knowledge
4. Capacity to navigate uncertainty and surprises

The report highlights in particular the importance of the capacity for self-organisation noting that "a resilient community has the ability to come together to effectively identify and respond to challenges, and can resolve conflicts and disagreements."(Arctic Resilience Report 2016, pp. xiii).

Moving further into case studies, the Stockholm Resilience Centre proposes three categories to measure how people and systems have managed to respond to change: (1) exhibit resilience (social-ecological system maintained its identity, function and structure), (2) experienced a loss of resilience and (3) transformations (people modified the system's identity, function and structure). To exemplify these case studies, one case is that of 'exhibit resilience' among the Skolt Saami traditional fishing communities who rely on productive salmon population in the *Näätämö* River, bordering Finland and Norway. Salmon is an important food and forms part of traditions and cultural livelihoods. Presently, climate change impacts, development and other environmental factors are threatening the *Näätämö* River's salmon population which tests the resilience of livelihood activities, and practically, demands for the ability to restore the watershed (in Stockholm Resilience Centre). In a case of 'transformations' in northern Finland, transformation has been driven by the demands of materials and geopolitics given the significant reserves of diverse raw materials including gold, nickel, chrome, iron, zinc and copper. While the extractive resource industry can contribute to prosperity, the ecological impacts of the extraction of these materials for the inhabitants are high, specifically in the form of water pollution, loss of biodiversity, and impacting workers' health conditions.

These industrial activities and geopolitical interests might have also enormous impacts on local economic activities and livelihoods. To further locate livelihoods for the indigenous people in different regions of the Arctic and recognising subsistence linkages to larger systems, it is useful to provide a brief overview of the economic system; this may refer to the way in which humankind have arranged for material provisioning beginning with the subsistence economy (Boettke and Heilbroner, 2018) ¹⁶. Presently, livelihoods and modes of subsistence are as varied as demographic and habitat arrangements of people

¹⁵ The Arctic Council Indigenous People's Secretariat represents itself with few slogans on the website: one of them being 'resilience' in which they voice the ability to thrive over time. <https://www.arcticpeoples.com/#ride>

¹⁶ Economic systems refer to the way in which humankind has arranged for its material provisioning beginning with the subsistence economy which in its essence can be deemed equivalent to the indigenous traditional economies. In Boettke, P.J. and Heilbroner, R.L. (2018). <https://www.britannica.com/topic/economic-system>

who live in both modern settlements and remote communities. Some regions are populated entirely by indigenous people engaged in traditional activities and rural lifestyles while urban settlers, mostly from outside the Arctic, are involved in industrial activities, such as resource extraction and construction (Larsen and Fondahl 2014, pp. 102). The Arctic is at once serving resources to an international market by product and resource distribution and likewise supporting local activities for residents through income, jobs and services. The traditional sector forms part of the local economy in which life is sustained mainly through fishing, hunting, herding, and gathering (*ibid*, pp.154). Further local traditional activities as named by Naskali et al. (2016) include reindeer/caribou herding, boat building, and farming, making handcrafts, knitting socks, and making traditional dresses¹⁷. It may be said that traditional livelihoods are sustained through applied knowledge, which is gained by intergenerational transfer and through interaction with the environment. It is lived by "moving about in it, exploring it, attending to it, ever alert to the signs by which it is revealed. Learning to see, then, is a matter not of acquiring schemata for mentally *constructing* the environment but of acquiring the skills for direct perceptual *engagement* with its constituents, human and non-human, animate and inanimate." (Ingold, 2000, pp. 55, emphasis in original). Hence, taking these different perspectives, livelihood can be understood in view of traditional and subsistence economies and the market-based economics, as a way of sustaining life through specific cycles of traditional activities (Jahan 2015, pp. 32). The interconnectedness between these sectors is worth exploring separately to address geopolitical and economic functions, resource sustainability and future North-South relations.

The following pictures represent the mapping of livelihood activities in the European Arctic region of Lapland, in order to illustrate how the different subsistence activities are performed at different locations depending on the local environmental conditions.

Case Mapping: Livelihood Activities in Lapland, Finland

¹⁷ Studying these activities, the authors note the gendered dimension of activities and find that most are performed by males while women contribute mostly in the form of traditional handicraft practices.

Figure 4 locates Lapland in Finland.

Figure 5 locates livelihood activities in the European Arctic focusing on activities performed by the Saami people who call their homelands Sápmi¹⁸ defined as a cultural region that stretches over the four countries of Fennoscandia: Norway, Sweden, Finland and a small portion of Russia. Figure 5 roughly indicates the regions in which the listed livelihood activities are performed¹⁹.

Within Finland, the Saami homeland is legally defined and covers the municipalities of Enontekiö, Inari and Utsjoki as well as the Lappi reindeer-herding district in the municipality of Sodankylä (Samediggi)²⁰. Livelihood activities include fishing which is specifically important in Enontekiö, Utsjoki and Inari municipalities. Other livelihood activities have historically consisted of agriculture, forestry, reindeer herding, and fishing. With changes in the economy, the resource-based livelihoods include forestry, reindeer herding, mining and tourism. Reindeer husbandry uses all the land area as the reindeer herders have the right to free range on lands while tourism uses small areas, but has scenic demands on much larger areas (Korhonen 2015).

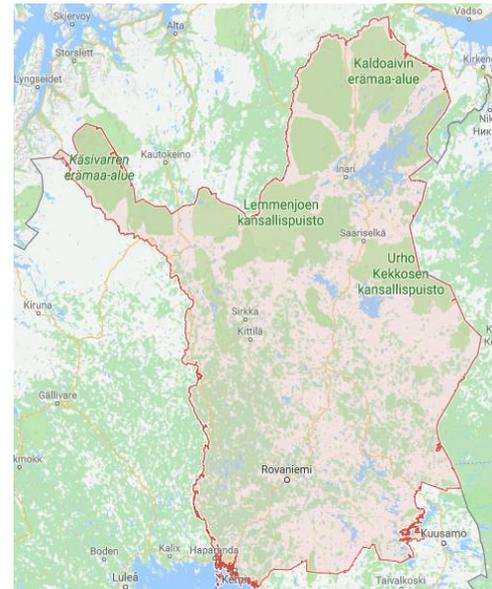


Figure 4: Marked Area, Lapland, Finland (Google Maps)

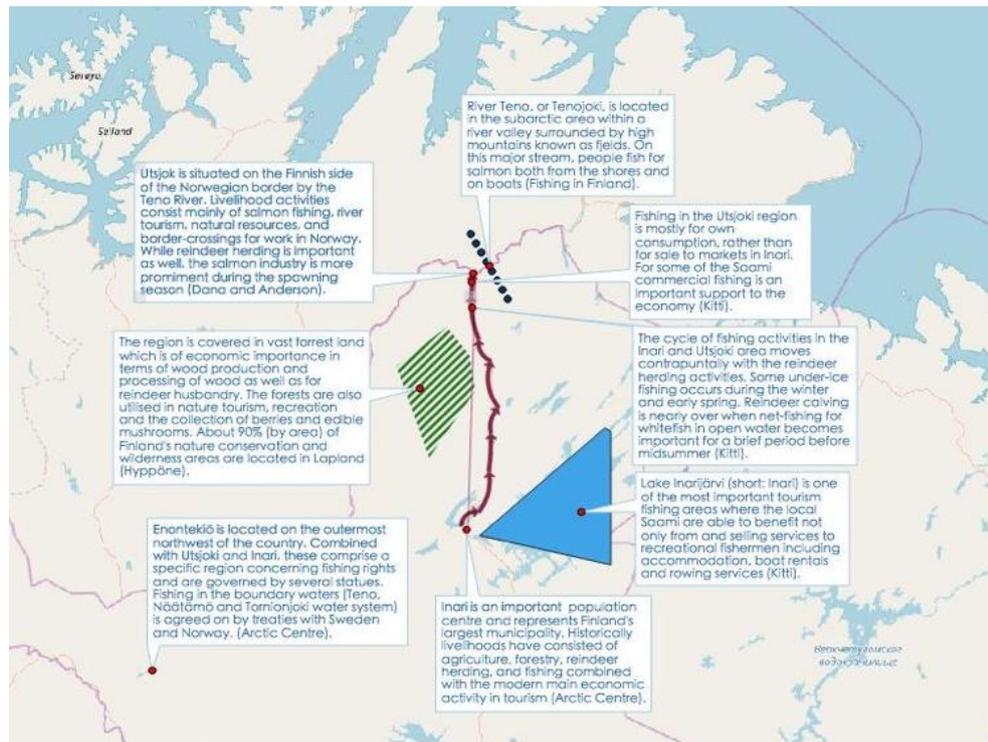


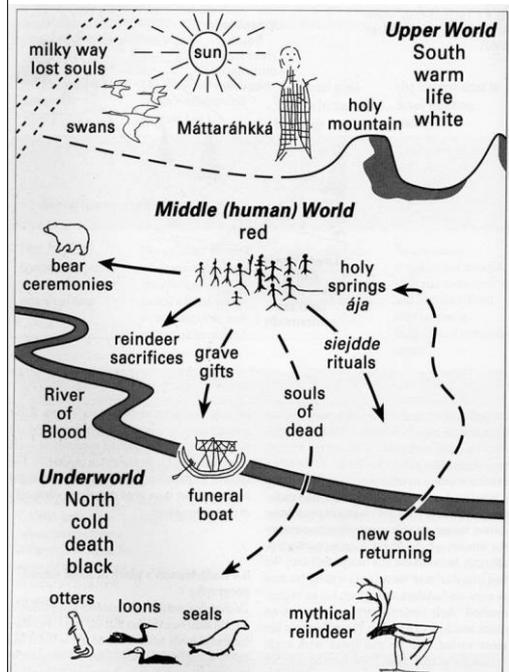
Figure 5. Lapland, Finland, Livelihood Activities

¹⁸ The area has been known as Lapland by outsiders and is named as such in academic and non-academic references.

¹⁹ N.B. Given the qualitative approach, the mapping does not aim to quantify activities and populations being informed by previous studies and online sources.

²⁰ Samediggi. <https://www.samediggi.fi/sami-info/?lang=en>

Figure 6, Saami World View and Mythology



The values that guide traditional livelihoods, the knowledge on which it is based and how it is interpreted and communicated through language is also important. Each indigenous language has distinct vocabulary capturing worldviews, orally transmitted over generations. Lessons that can be learned include that the relation to environment, to community, kinship and social association is vital to the well-being and livelihood of indigenous people, such as for Greenlanders (Nuttall, 2009). Without the constancy of the local relations, adaptation and resilience would become more difficult (*ibid*). Family and community ties are, for instance, crucial to Inuit culture and are expressed by the term *Inuuqatigiittiarniq* which refers to respecting others, building positive relationships, and caring for others. This is believed to build strength in the community and in each member (Karetak 2013). Another word giving insight to Inuit culture is *Piliriqatigiinni*, which refers to working together in a collaborative way for the common good (Healey and Tagak, 2014).

Figure 6 represents livelihoods' guiding ancient worldviews among the Saami²¹: According to the Saami worldview, humans and nature are one. The well-being of humans and nature alike was directly dependent upon the balance between the two. This was guided by the belief that natural resources should be used only to serve as much as it is needed, as people understood their dependency on these resources (Sutherland, September 25, 2016).

The notion of a connection and inter-dependencies between humans and nature has largely been preserved in today's Saami philosophy²². With regards to livelihood resilience, in their study 'Rethinking Resilience from Indigenous Perspectives', Kirmayer et al. (2011) propose that in learning from indigenous people, different models of thinking about resilience are needed in relation to their cultures, histories, social and geographic settings. The authors argue that indigenous concepts provide dynamic, systemic, ecological ways to approach resilience and that these concepts ought to be considered in building livelihoods and resilience. The Inuit, e.g., have historically lived in a self-sufficient manner without state intervention or government assistance. In this case the relation to land and animals to sustain human life and wellbeing, physically, socially and spiritually was a source of success. During the last 150 years their lands have been claimed by non-Northerners and ideas of social organisation and structure introduced and enforced. The people have been resilient guided by *niriunniq* (in Inuktitut), which can be understood as 'hope'. The Inuit, being animists at heart, recognise human limitations and believe that the world is shaped by forces beyond their control as further echoed in expressions such as *isumammunik* translating to 'its own will'. Furthermore, they do not position themselves at the centre of the world but as an entity in a world of powerful forces. In response to pressures of a changing social environment, Inuit conduct their own research activities and raise awareness in their communities about global warming. One of the struggles that remain today for is that "adapting to a daunting social environment created by the incongruent and often conflicting policies and institutions introduced by southern administration [...] Inuit have responded to this challenge by

²¹ Ancient Pages. Saami People Facts and History. <http://www.ancientpages.com/2016/09/25/sami-people-facts-and-history-about-the-only-indigenous-people-of-most-northern-europe/>.

²² The Saami World View and Mythology. <http://www.nationalparks.fi/thesamiworldviewandmythology>

initiating their own research activities and legal challenges, as well as by taking their predicament to global political organisations to raise awareness of the profound consequences of global warming to their communities and to urge a timely and effective response." (Kirmayer et al., 2011).

In this section, we have approached the people in the Arctic as agents of change in their own lives, as people with continuously evolving traditional knowledge, and as performers of these activities in respective contexts. As has been shown, traditional livelihoods are based on indigenous local knowledge imbued with life philosophies, cultural and social meanings, which are important capitals also for the transitions and continuity of livelihood activities. Many lessons can be learned from indigenous ways of life which can be of essential value as we reflect on modes of living and sustainability elsewhere and recognise the intrinsic and constructed interconnectedness of the local and global.

5 Traditional Knowledge

*"If there is one place in the world where climate change is plainly visible, it is the Arctic region. The Arctic is warming twice as fast as the rest of the world. (...) Together we can be a driving force towards sustainable economic development, which safeguards the very fragile Arctic environment, moves towards a more circular economy and respects the rights of indigenous peoples. Some of them are citizens of our Union: their culture is our culture, it is part of who we are. **Safeguarding their centuries-old traditions and their livelihoods** is a core commitment for the European Union. Our **dialogue with their representatives** has been important in the making of our new policy, and it will be an essential part of our future engagement in the Arctic."*²³

In this blogpost written by Federica Mogherini and Karmenu Vella we can see a common narrative about European activities in the Arctic regions. It is a story about a place that is overly exposed to the consequences and effects of climate change, it is a region under threat. To save this particularly fragile environment economic development is needed, sustainable and circular to be sure and also respecting the rights of indigenous people. Part of this region are indigenous people, their culture, traditions and livelihoods. Safeguarding these traditions and livelihoods becomes a core commitment in the economic development of this region. This, however, is supposed to be done through a dialogue.

Hence we can see that engagement of the Arctic indigenous people and local communities in activities of protection and safeguarding is a central discursive element in current policy narratives about the Arctic regions. They shall be a part of environmental governance practices and additionally, the so-called 'traditional' (or sometimes also called 'indigenous') knowledge shall be integrated as an important element in their resilience capacity.

Thus, in discussions like the one exemplified in the quote above about the engagement and participation of indigenous people in decision-making processes about policies that affect the Arctic regions very often the discourse circles around notions about a particular kind of knowledge, which is held by these people and includes amongst others traditional knowledge about the climate handed down over generations. This way of talking about certain *knowledges* is built upon a certain idea about what knowledge is, i.e. mostly a set of more or less verifiable facts about an external pre-given nature largely independent of human intervention on an individual level (up until the invention of the 'Anthropocene' that is). This is a particularly Western and modern way to think about knowledge.

In this section we want to draw upon a broad range of literature from anthropology, geography, science studies and management studies in order to take a step back to think not only about what kinds of knowledge Arctic people can contribute to the 'sustainable exploitation' of their homes, but what idea of knowledge this is based on. In that sense this section will provide briefly an overview of different ways to think about 'indigenous knowledge' and about potentials and challenges with these conceptualisations.

Starting with a brief digression into discussions on the relation of knowledge and world-making through notions like 'situated knowledge' or 'epistemological-ontological-ethical frameworks' we will move to Arun Agrawal's reflections on the distinction between indigenous and scientific knowledge and complement his work with a review of work from different disciplines dealing with the notion of indigenous knowledge. We will end this discussion with reflections on the kinds of knowledge necessary for dealing with climate change in the Arctic context.

²³ https://ec.europa.eu/commission/commissioners/2014-2019/vella/blog/why-arctic-matters-europe-eu-policy-sustainable-development-and-cooperative-security-federica_en, accessed 17.1.18.

5.1. Knowledge and Knowing

Often in accounts of so-called traditional knowledge we can see a range of implicit distinction between this kind of knowing or knowledge and what is understood as scientific knowledge. These different kinds of knowledge are usually distinguished in regard to their scope or range of validity. While traditional or indigenous knowledge is supposed to be tied to a certain locality or group of people, scientific knowledge is understood to transcend its particular practice of production and have a more general validity. Yet, extensive historical studies of scientific practice indicates, also scientific knowledge rests on a particular set of assumptions about under what circumstances proposition can be transformed into accepted knowledge, thus a particular way of knowing²⁴. In that sense science has been described akin to an 'indigenous knowledge system' (Turnbull & Watson-Verran, 1995).

In contrast to this view philosophers of science – important contributions here come from feminist epistemologies – have argued that all knowledge is necessarily situated and needs to be understood in terms of the situation of its production (Haraway, 1988) and as a particular way of 'becoming with' one another and the environment (Barad, 2003, 2007). Knowing the world cannot be separated from acting in the world, the two practices are inextricably entwined (Hacking, 1983; Rheinberger, 1997; Simon, 2015). Also, if we assume that knowing and intervening are one and the same, knowing the world also means taking into accounts the consequences and implications knowledge and knowledge practices have in the world: this brings us to issues of responsibility.

Scholars that have developed some of the arguments about the nature of knowledge and knowledge production is that distinctions between scientific and traditional/indigenous knowledge need to be grounded in a broader understanding about our conception of knowledge and how it relates to our continuous re-making of reality, what Verran calls 'ontic/epistemic imaginaries' (Verran, 1998, p. 242). Questions related to different ways of knowing thus are not only about epistemic questions (what counts as legitimate knowledge and what can be known), but also to about these questions being inextricably tied up to ontology, engagement and responsibility questions. This can be summed up in one of the central premises of the so-called 'idiom of co-production', which describes the premise that *"the ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it."* (Jasanoff, 2004, p. 2).

Put shortly: thinking about traditional or indigenous knowledge in contrast to scientific knowledge is not only about what we know (content, textbook knowledge), but importantly also about how we know (ways of knowing). With these implicit assumptions and distinctions in mind we now want to turn towards the ongoing debate about the role of traditional or indigenous knowledge in decision-making. For doing so we will discuss a set of seminal papers by authors that have been influential in the discussion of indigenous knowledge.

5.2. Conceptualising 'traditional' knowledge

In his seminal paper on indigenous knowledge Arun Agrawal (1995) explores an increasing interest in so-called traditional knowledge in development contexts and directs attention to the misleading dichotomy of scientific and indigenous knowledge²⁵. He

²⁴ Historians of science Steven Shapin and Simon Schaffer (Shapin & Schaffer, 1985) describe the British Gentlemen scientists and their 'public' experiments as foundational for our modern understanding for how science and objectivity work. In this tradition of knowing facts are always social, as experiments need to be witnessed by trustworthy actors, either in person as in 17th century Britain, or through virtual witnessing as e.g. in our contemporary peer review system. Through this practice of witnessing (and a series of additional translations) a particular knowledge claim might be stabilized for a time as an accepted fact (Latour, 1987; Latour & Woolgar, 1986 [1979]).

²⁵ We will maintain this designation in section 5, because the academic literature seems to somehow assume that 'indigenous and traditional knowledge are equivalent, whereas the

argues that this distinction rests on a set of assumptions, which upon closer inspection cannot be sustained. In order to understand the European Arctic policy and its take on the participation of Arctic people it seems worthwhile to revisit this text and the main arguments developed in it.

First, Agrawal states, there is the assumption of a substantive difference between scientific and indigenous knowledge in regard to their subject matter. An example for this is the idea that indigenous knowledge mainly deals with the daily livelihoods of people, while western science deals with abstract ideas, concepts and representations of the world and, based on that, produces general explanations. Second, it is assumed that scientific and indigenous knowledge can be distinguished in terms of methodology and epistemology meaning that there are different ideas about the methods through which to inquire reality and how they relate to said reality. In that view "science is open, systematic, objective, and analytical, and advances by building rigorously on previous achievements" (Agrawal, 1995, pp. 17), while indigenous knowledge amounts to little more than common sense. These two assumptions have been attacked from two sides arguing that on the one hand this is a simplification of the sophistication of indigenous ways of knowing (Ferguson, Williamson, & Messier, 1998; Verran, 1998) while on the other hand science is far from being this systematic, disinterested and rigorous enterprise from this narrative (Daston, 1995; Daston & Galison, 1992; Turnbull & Watson-Verran, 1995).

Finally, it is often argued that there is a contextual difference in the sense that traditional knowledge is more deeply rooted in its context.²⁶

Criticising these ideas about differences, Agrawal describes a fundamental dilemma that proponents of an increased use of indigenous knowledge are facing: in promoting indigenous knowledge e.g. for development projects they rehearse and stabilise these dichotomies when arguing that this knowledge resonates with local needs helps adaption and increases resilience due its local contextualisation. He argues that this dichotomisation is counterproductive since it homogenises the two sides of the dichotomy and thus hides differences within each side and potential similarities between different ways of knowing on both sides of this artificial divide.

Thus, what we can learn from Agrawal's discussion of the (mostly) academic debate on differences between western scientific and indigenous knowledge is to stay attentive to premature categorisation and to the creation of dichotomies that tend to overlook heterogeneities within these ways of knowing. In that sense he proposes to "talk about multiple domains and types of *knowledges*, with different logics and epistemologies." Furthermore, he stresses that a preservation of indigenous ways of knowing is only possible if the indigenous people themselves do not disappear. For example, crop genetic resources cannot successfully be protected without "the agro-ecosystem and the socio cultural organisation of the local people." This means that from this perspective the aims of simultaneous preservation and use of indigenous knowledge and pressures of modernisation or what is has been labelled 'sustainable management and exploitation' are likely to be at odds with each other.

authors consider that the equivalence can be problematic and not resonating with the variety of contexts in which traditional knowledge exists as way of knowing and body of knowledge.

²⁶ Sociologists and anthropologists work has shown in great detail that the practices of scientists are far from being detached from its context or culture. Much rather they show the huge amount of work that goes into purification of knowledge, i.e. into making singular observations into seemingly objective facts that can travel between laboratories and scientific departments (Fleck, 1979 [1935]; Hacking, 1983; Knorr Cetina, 1999; Kuhn, 1962; Latour, 1999; Latour & Woolgar, 1986 [1979]; Pickering, 1993).

Other scholars have addresses indigenous knowledge as a way of knowing. For example, in a study about international trading of GM crops and food Brian Wynne (2007) addresses indigenous knowledge as a way of knowing and compares it to scientific knowledge cultures and explores differences in their ability to assess risk and deal with unknowns. In this comparisons he is not interested in a general distinction between these ways of knowing, but carefully directs attention to limitations of a particular branch of scientific risk assessment and argues that scientific knowledge has a *performative* dimension in that, it not only informs policy decisions, but also frames the meanings of public issues in regard to what is a relevant question, what concerns can be safely ignored, what counts as risks and how to make risks governable. Furthermore, he stresses that the idea of 'sound science' systematically neglects certain kinds of uncertainty, contingency and ignorance. The related claim of predictive control frequently tends to externalise unpredicted consequences spatially, socially and temporally.

He argues that indigenous farmers' ways of knowing are more closely tied to actual farming practices and are thus more attuned to empirical experience, social-cultural commitments and oriented towards a long-term sustainability perspective, while 'modern' science applies a more universalistic concept of knowledge. Indigenous knowledge practices need to be understood "as situated, continually adaptive and learning in an experimental practical form, but within ethical and epistemic idiom which does not expect nor seek control (and thus deny and externalise uncontrolled effects) in the way that scientific culture does." (pp. 8). This way of knowing, Wynne argues, is better suited for dealing with unknowns and insecurities, i.e. skills that are not strongly developed in scientific epistemic cultures focused on control, reduction and externalisation of unknowns.

What follows from this analysis is that trying to understand an indigenous '*knowledge system*' must necessarily fall short, because this understanding imposes the idealised idea of science as a frame of reference. Drawing on anthropological literature he thus is not talking about a system as a particular set of knowledge (accumulated facts) and methods, but rather understands both science and indigenous knowledge as distinct ways of knowing embedded in cultural understandings of the meanings and place of knowing/knowledge within society. Furthermore, Wynne states:

"The key differences between scientific and indigenous may be more in their different, perhaps incompatible ethical, cultural and social substance, than in any more systematic logical aspects. To use a common philosophical parlance, it may be more about forms of life, than about abstract or reason-based, intellectual criteria." (Wynne, 2007).²⁷

Fikret Berkes (2009) resonates with Wynne's work and also talks about indigenous knowledge as a process rather than in terms of content or information. Indigenous knowledge for him is part of a broader traditional knowledge including both, information and the processes of obtaining and circulating that information. He exemplifies this understanding with the example of climate change:

"Indigenous elders cannot transmit and actual knowledge of climate change; what they can do is to teach what to look for and how to look for what is important. The example illustrates the distinction between traditional knowledge as content, information that can be passed on from one person to another, as opposed to traditional knowledge as process, a way of observing, discussing and making sense of new information – indigenous ways of knowing." (Berkes, 2009, pp. 153)

²⁷ For this argument he uses the example of the introduction of scientific potato breeding into indigenous Andean potato-breeding cultures. The multiple different breeds that were used by the farmers in a highly complex, adaptive and experimental system depending on different conditions were replaced by a standard 'optimal' seed/plant. The risk of introducing this kind of technology (the potato) into indigenous communities is that their collective ways of knowing and traditional skills are diminished and they become dependent on the technology and are not able to adapt to cases in which this seemingly optimised potato fails to produce results.

Indigenous knowledge for Berkes is about learning how to know and how to make sense of information and observation and thus “involves constant learning-by-doing, experimenting and knowledge-building” (ibid., pp. 154). Both kinds of what he describes as traditional knowledge are deeply situated and social. They are tied to particular epistemologies and world views, which poses challenges in collaborations or synthesis with knowledge based on other epistemologies (Berkes, 2009, pp. 154).

While acknowledging such difficulties he is nonetheless promoting knowledge co-production between science and indigenous groups. He understands these different kinds of knowing as complementary: while traditional ways of knowing tends to produce a situated and holistic picture of a given environment that can add to the more reductionist quantitative ‘scientific’ knowledge. In that sense indigenous ways of knowing can be understood as a way to deal with uncertainty and complexity.

Consequentially he calls for thinking about the relation of science and traditional knowledge as a dialogue and partnership and for models of co-production of knowledge. The benefit of this kind of coproduction lies in the potential to produce “locally relevant knowledge” (ibid., pp. 153). These kinds of knowledge build on pre-established relations of trust (and are thus not reduced to being a mere vehicle for creating trust) and ideas of accountability. Hence the criteria he sees for successful engagement are mainly personal traits of researchers and their indigenous partners including willingness and openness to engage. Furthermore, he mentions humility and recognition that knowledge is necessarily incomplete and partial and situated within a particular culture and socio-material context. He acknowledges that these are two distinct epistemologies that are based in “different worldviews” (pp. 154) but sees no fundamental problems of combining those. When he talks about a cultural context this applies mainly for *indigenous* knowledge; scientific knowledge thus is implicitly presented as context free and able to travel easily.

Berkes mentions several areas where this might be or has already been proven to be useful like resource management, environmental contamination (Wynne, 1992) and monitoring, biodiversity conservation, or adaption to climate change.

Summing up, what this brief and partial peek into the debate about different ‘knowledge systems’ or ‘ways of knowing’ shows us is that distinctions between scientific and traditional/indigenous knowledge are not easily to uphold when put under scrutiny and that our culturally shared ideas about both tend to be too simplistic or as Turnbull and Watson-Verran put it:

“There is no great divide between the past and the present between scientific and traditional knowledge or between science and technology [...] fundamentally because all knowledge systems are local and are the product of collective practice based on the earlier work of others.”
(Turnbull & Watson-Verran, 1995, p. 119)

It is equally wrong to ascribe to science a universalistic objective view from nowhere as it is to understand traditional or indigenous ways of knowing (and its usefulness) exclusively in terms as situated and based in experience. In this sense Wynne reminds us “*not to romanticise the indigenous as the supposedly innocent counterpart to science’s ethically-challenged, ‘purpose-disoriented’ instrumentalism.*” (Wynne, 2007).

Instead of trying to collect, systematise and categorise different ‘knowledge systems’ and thereby imposing a western understanding of science it seems to be more sensible to ask how particular ideas epistemic cultures are entwined with certain politics, ethics, world-views, meanings, identities and social relationships and explore how they not only produce representations of the Arctic, but also imply ideas about political representations in the sense of beliefs about who is supposed to represent the Arctic on the basis of which kind of knowledge.

Now what do these explorations of different ways of knowing leave us with in regard to the question of how to deal with contemporary and future challenges in the Arctic regions?

5.3. What “kinds” of knowledge/ways of knowing are needed?

The impacts of changes in the Arctic climate are causing serious and irreversible damages to native people in the Arctic region, reducing their adaptation and resilience capacity regardless the numerous scientific assessments that exist. The insufficiency of the scientific approach becomes evident when it has to cope with an increasing complexity characterised by uncertainty, nonlinear dynamics, and a plurality of conflicting perspectives (Funtowicz and Ravetz, 1990; Berkes and Berkes, 2009).

In consequence, the emergency to overcome the established tunnel vision and develop wider and knowledge-based frameworks arises. As Turnhout (2012) states, *'What counts as legitimate knowledge, and how it is generated, influences its practical effectiveness'*, thus, a process of ethical, rational and pragmatic legitimation of traditional knowledge at all policy and scientific levels would allow to achieve more effective outcomes while *refocusing the goals and redesigning the strategies* (Hulme, 2010).

In the last decades, there is a progressive and increasing recognition of the importance of traditional knowledge in international policy (Berkes et al., 2006; Abele, 2007; Turnhout et al., 2012), and international law has recognised the essential nature of indigenous consultation and participation and policy strategies supporting traditional knowledge, but in order to evolve to a more genuine engagement framework it is appropriate to identify the knowledge gaps in the theoretical frame, and the knowledge-holders in the practical ground.

According to Mike Hulme (2012), science-policy interaction has been deeply influenced by a linear model, in which *'knowledge is progressive, ignorance is finite and discovery leads to ever more complete understanding'*, and points out the IPCC as an illustrative example of this view of knowledge in the climate change domain. In terms of building new knowledge and evolving towards a knowledge-based framework, Jasanoff (2010) insists on the necessity that *'scientists have to be able to take each other's findings at face value'* which would contribute to progress of the ethical legitimation of other types of knowledge.

Traditional and local ecological knowledge is generally seen as subjective, arbitrary, and based on qualitative observations of phenomena and change, while scientific knowledge is viewed as objective and rigorous, with precise measuring with specific apparatus and empirical testing of events and trends confirming credibility and legitimacy (Mistry and Berardi, 2016). The democratic sphere and the role of the actors at all levels play a key role in the pragmatic recognition of different *knowledges*. In climate change assessment and monitoring processes, the controversy arises when reports and outcomes are directed to elite actors, from natural scientists to national governments, ignoring many other important stakeholders and actors, including indigenous people, businesses, farmers, community partnerships and fishers (Turnhout, 2012) who might have an equal value and rights to be actively involved in policy-making processes since they constitute significant knowledge-holders.

5.4 Traditional knowledge in international Arctic policy

There is a progressive and increasing acknowledgement of the importance of Traditional Knowledge in international policy since the last decades. At the international level, the Agenda 21 adopted in 1992 by the participants of the World Summit in Rio de Janeiro recognised the importance of Traditional Knowledge of indigenous populations²⁸. More recently, the need to engage native communities into decision-making processes and the recognition of Traditional Knowledge was established in the Anchorage Declaration within

²⁸ In particular, the basis for action of the program area: Strengthening the scientific basis for sustainable management reads as follows: “Sustainable development requires taking longer-term perspectives, integrating local and regional effects of global change into the development process, and using the best scientific and traditional knowledge available. (...)”

the United Nations Framework Convention for Climate Change. Specifically, all indigenous representatives have highlighted the relevance of Traditional Knowledge in developing strategies to address Climate Change and safeguarding the effective participation in formulating, implementing, and monitoring activities related to impacts of Climate Change, among others.

International law has widely recognised the essential nature of indigenous consultation and participation and policy strategies supporting Traditional Knowledge. The engagement of local people in governance processes is essential to ensure that they are not marginalised at the local level. The importance of recognising Traditional Knowledge as a relevant source to support adaptation strategies has been increasingly reflected in programs and projects by the main international governance bodies working on Arctic and Climate Change policies (see Table A.1 in Annex).

The UNESCO Conference on “Climate Change and Arctic Sustainable Development: Scientific, Social, Cultural, and Educational Challenges” (2009) recommended promoting Traditional Knowledge of indigenous people of the Arctic in several ways:

- Study and preservation of cultural traditions of the indigenous people of the Arctic;
- Recognition of the fact that indigenous communities in the Arctic are modern societies and use modern technologies;
- Study of the experience of the Arctic communities, as these communities are capable to develop adaptation strategies to environmental changes.

The Arctic Council is the institution that has made more efforts to integrate indigenous people in governance issues establishing channels for meetings, workshops sessions and discussion forums.

Engagement with Arctic communities: *That the Arctic states decide to determine if effective communication mechanisms exist to ensure engagement of their Arctic coastal communities and, where there are none, to develop their own mechanisms to engage and coordinate with the shipping industry, relevant economic activities and Arctic communities (in particular during the planning phase of a new marine activity) to increase benefits and help reduce the impacts from shipping.* The Arctic Marine Shipping Assessment (2009, pp. 6).

The Sustainable Development Working Group has endorsed the use and integration of traditional and local knowledge into their projects and activities, publishing several recommendations in numerous documents and reports. Allusions to the importance of knowledge of Arctic *residents*²⁹ have been made also within the Arctic Marine Shipping Assessment (AMSA)³⁰, a study focused on Arctic marine safety and environmental protection promoted by the Council's Protection of the Arctic Marine Environment (PAME) working group. This report is a policy document of the Arctic Council in which several recommendations were established to provide a guide for future action by the Arctic Council, Arctic states and many others. In accordance to the findings of the project, “constructive and early engagement of local residents in planned Arctic marine development projects can help to reduce negative impacts and to increase positive benefits” (pp. 5).

Regarding the European International cooperation strategy, the EU is currently taking part in international forums relevant to the Arctic, such as the Arctic Council, the Barents

²⁹ It is worth noticing that the discourse is about residents and not about ‘indigenous’ or ‘natives’.

³⁰ <https://pame.is/index.php/projects/arctic-marine-shipping/amsa>

Euro-Arctic Council (BEAC)³¹ and the Northern Dimension³², in order to increase consultation with Arctic indigenous people and local communities to guarantee their rights and views in EU policy-making processes.

Due to the integration of the Arctic people representatives into policy spheres, the role of traditional knowledge for adaptation and resilience of local communities when facing climate impacts is being increasingly recognised by all relevant organisations and institutions governing the Arctic. But more efforts are needed in order to integrate effectively this knowledge system into a wide knowledge-based policy framework.

Regarding EU policy, the Joint Communication to the European Parliament and the Council (2012)³³ puts emphasis on the importance of dialogue with the Arctic States and the involvement of indigenous people's representatives in decision making. Several projects have been launched with the aim to support indigenous people and local populations through funding programmes during the 2007-2013 co-financing period amount to €1.14 billion, or €1.98 billion including EU Member States co-financing (see table A.2 in Annex). The European Instrument for Democracy and Human Rights (EIDHR) also provides financial support to civil society organisations working on indigenous issues.

5.5 Indigenous, local and traditional in EU Arctic policy

Building on this review of different ways of conceptualising and thinking about 'traditional' knowledge, this section looks at the most relevant publications by European Union institutions on Arctic policy and asks how different kinds of knowledge and different ways of knowing are addressed/represented, exploring how conceptualisations might have developed and changed over time. To this end, the following documents are considered:

- EC Communication: The European Union and the Arctic region (2008)
- Council of the European Union: Council Conclusions on Arctic issues (2009)
- High Representative and EC Joint Communication to the European Parliament and the Council: Developing a European Union Policy towards the Arctic Region: Progress since 2008 and next steps (2012)
- High Representative and EC Joint Communication to the European Parliament and the Council: Joint staff working document: Inventory of activities. Accompanying the document: Developing a European Union Policy towards the Arctic Region: Progress since 2008 and next steps (2012)
- Council of the European Union: Council Conclusions on Developing a European Union Policy towards the Arctic Region (2014)
- DG JRC: The JRC and the Arctic (2015)
- High Representative and EC Joint Communication to the European Parliament and the Council: An integrated European Union policy for the Arctic (2016)

The *EC Communication: The European Union and the Arctic region (2008)* mainly talks about 'indigenous people' in terms of their 'vulnerability' and how they can be 'protected' and 'supported' in facing "pressures of climate change and globalisation". Protection here is further detailed as "full participation and free, informed consent".

³¹ The Barents Euro-Arctic Council (BEAC) is the forum for intergovernmental cooperation on issues concerning the Barents region.

³² The Northern Dimension (ND) policy aims at supporting stability, well-being and sustainable development in the region by means of practical cooperation. Is a joint policy partnered by the European Union (EU), the Russian Federation, Norway and Iceland. The EU member states also take part in the cooperation in their national capacities. Belarus, which is part of the Baltic Sea catchment area, participates in practical cooperation. The USA and Canada hold observer status in the ND.

³³ Online: https://ec.europa.eu/maritimeaffairs/publications/developing-european-union-policy-towards-arctic-region-progress-2008-and-next-steps_en

One of the main rights that need to be protected concerns "the right to maintain their traditional livelihood" and "their lifestyle". This includes "management of indigenous subsistence whaling" and "hunting of seals". Seal hunting is also an issue for which dialogues are proposed, but the document does not explain to what end. The main aim seems to be to find ways to ban seal products from markets in a way that does not affect the 'lifestyle' of "indigenous and local communities".

At the same time, the EU wants to "ensure exploitation of Arctic fisheries resources" while "respecting the rights of local coastal communities".

Ideas about the protection of the environment and "benefits to local coastal communities" also apply to tourism plans. Here local communities shall be "involved" in the development. Again, how and with what consequences, is not explained.

The *Council Conclusions on Arctic issues* (2009) aims to direct attention to the "sensitivities of ecosystems and their biodiversity as well as the needs and rights of Arctic residents, including the indigenous peoples". This description resonates with criticism voiced in the literature on indigenous knowledge in that it shows a tendency to frame indigenous people as part of nature as passive elements that need to be "respected" and protected from certain "impacts". These impacts are potential consequences of "natural resource management", which therefore needs to be in "close dialogue" with "local communities". This kind of resource management needs to "support" "traditional means of livelihood" of indigenous people. Keeping intact the "sustained livelihood of indigenous peoples" is thus equated with "protecting the environment" and "ecosystems" in the context of "climate change", "natural resource exploitation" and "transport of hazardous chemicals". Furthermore, the document mentions the aim of using resources and transport routes, but in a way that still allows protection of the Arctic environment, which is mainly described in terms of the "livelihood of indigenous peoples".

The particular means of how such a 'close dialogue' is best carried out are not yet developed. In that regard the document highlights that "further consideration would be needed on how indigenous peoples could be included in the deliberations on the ND Arctic Window".

In the High Representative and EC's Joint Communication to the European Parliament and the Council: *Developing a European Union Policy towards the Arctic Region: Progress since 2008 and next steps* (2012) and the related staff working documents, the basic framing stays the same: "Climate change" and "economic development" are described as the main pressures to "traditional livelihoods of indigenous peoples". The goal is to ensure "sustainable development" and "safeguarding the environment". Later in the document a more extensive list of the EU's interests and contributions is presented, which includes "environmental protection while developing the Arctic's economic potential in a sustainable manner". Here issues like "climate change, environmental degradation, the sustainable management and exploitation of energy, raw materials and fishing resources" are brought together with "tourism and new routes for maritime transport". Especially in regard to these issues and EU interests "the importance of dialogues (...) is emphasised".

Indigenous people enter the stage in the form of "partners" that need to be "represented" in various entities such as The Arctic Council in order to "intensify constructive engagement and dialogue". Consequentially indigenous people are also mainly framed as "relevant stakeholders".

In this way the "needs" of these communities shall be taken into "account". The "needs and wishes of the local populations" also shall be considered in regard to renewable energy policy and also in regards to tourism there is need "to discuss the challenges".

Interestingly, when it comes to fisheries in the same broad section of the staff working document, "respecting the rights of local coastal communities" is the sole issue mentioned. It seems that there is careful consideration of which topics are in need of dialogue, discussion or merely 'respect' in regards to current legal frameworks ('rights').

These reports also use the term 'traditional knowledge', which is mentioned together with "information from operational monitoring and observation, remote sensing, research as well as community-based monitoring and traditional knowledge". This quote indicates an understanding of traditional knowledge as one source of information amongst others that can help in "harnessing information". The term 'traditional knowledge' is also used at a later point in this document referring to a workshop held by the EEA in June 2011: "the use of lay, local and traditional knowledge in monitoring the Arctic environment and assessing trends and changes affecting the Arctic population". The combination of the terms 'lay, local and traditional' indicates that these are put together and distinguished from scientific knowledge. Epistemological, ontological and cultural differences in these ways of knowing as described in the literature.

In the accompanying staff working document the need to "identify possible areas of using traditional knowledge in future EEA environmental reports and products" is stressed. On such area that is proposed is "assessing the state of the environment and implementing decisions". It is noteworthy to mention that there was an EEA study on the use of "traditional knowledge in the Arctic". Directly after this part of the document, however, participation is again described in terms of "consultation".

The staff working document frames the "needs of local populations" as a sort of counterweight to desires to use "the Arctic's natural resources both on land, at sea, and at or below the sea-bed" as this needs to be done in a "sustainable manner", which "does not compromise the Arctic environment and benefits local communities".

Local communities are again almost exclusively described as an extension/part of the Arctic environment. Both entities need to be protected and supported as they are facing or are "affected" by several pressures that stem from "safe and sustainable management and use of resources". These actors remain unacceptably passive in the discourse of the policy papers. Even when there is talk about engagement and dialogue it's usually the EU organisations that initiate and need to think about how to involve indigenous people. When talking about engagement it is mostly about informing and consulting and about the necessity that they are "given appropriate platforms":

"The representatives of Arctic indigenous peoples are informed and consulted on the EU policies that affect them, and are given appropriate platforms to present their particular concerns to EU institutions and audiences."

Also here Arctic people remain passive. The only things that they decide about seem to be who their "representatives" are and the "particular concerns" they want to "present". The text seems to indicate that they shall remain passive recipients of "platforms" that 'are given' to them. Also, it is not clear who makes the choice of "EU policies that affect them" (and given that climate change is described as a main pressure on the Arctic environment this could be any policy contributing to climate change).

The term indigenous is also used as "indigenous issues", which seem to include disparate topics like "sealing" as well as the goal to "improve mental health, prevent addiction and promote child development and community health among indigenous peoples". This framing resonates with Arnstein's (1969) critique of participation as therapy and changing people's attitudes and behaviour.

The staff working document also describes indigenous people as a 'thematic area':

" (...) transatlantic discussion of five Arctic-related thematic areas: indigenous peoples, environmental governance, fisheries, offshore hydrocarbon activities, and shipping."

Framed as such they become an object of expert deliberations in designated "[e]xpert working groups".

The *Council Conclusions on Developing a European Union Policy towards the Arctic Region (2014)* strengthen the position that research needs to be 'supported' and knowledge needs to be 'channelled' in order to address challenges in the Arctic; they stress the importance of 'responsibility' in the economic development. Responsibility here seems to be understood mainly as a sustainable use of resources and reliance on environmental expertise. However, there is no explanation on what kind of expertise is envisioned here. Then there is an additional point that calls for "intensifying the EU's constructive engagement with Arctic States, indigenous peoples and other partners to find common solutions to challenges that require an international response". Examples for these challenges are "climate change, air pollutants including black carbon, biodiversity and fisheries". Again dealing with these challenges is framed in terms of "protection of the Arctic environment".

The document supports "increased dialogue" which involves informing and consulting indigenous people about policies that "may affect them".

The JRC report *The JRC and the Arctic (2015)* frames indigenous people as a "population" that is threatened by "environmental change due to effects of climate change", which make it "easier to exploit the natural wealth of the Arctic (mineral, fisheries, land)". Again "Arctic ecosystems and the indigenous population" are put together as entities that are "under threat". This threat is described later as "migration trends towards the north, with forests displacing permafrost, elk displacing reindeer, and indigenous people being threatened by the arrival of new people who will come to exploit the forest."

The discourse of threats is followed by the discursive construction of a need for 'protection'. Protection comes together with the idea to "enhance the environment and the economies, culture and health of indigenous peoples and Arctic communities, as well as to improve the environmental, economic and social conditions of Arctic communities as a whole". Sustainable development in the Arctic comes together with environmental protection – here it is especially interesting how environmental protection seems to be semantically distinguished from sustainable development. One could also assume that the latter would include the first.

The report talks about three key areas for the further development of EU Arctic policy:

- research and knowledge production for addressing environmental and climate change;
- "acting responsibly" in the economic development and the sustainable use of resources, drawing on "environmental expertise" (it is not clarified whose expertise that might be);
- and improving "constructive engagement and dialogue with Arctic states, indigenous peoples and other partners".

In 2016, the European Commission launched the **Joint Communication to the European Parliament and the Council - an integrated European Union policy for the Arctic**, in which is established its international compromise with Arctic protection.

Adaptation strategies are needed to help Arctic inhabitants respond to the serious challenges they face because of climate change. The EU's Arctic policy will be an important element in implementing the global agreement reached at the 21st Conference of the Parties under the United Nations Framework Convention on Climate Change in December 2015, which sets out a global action plan to limit global warming to well below 2 °C.

Joint Communication to the European Parliament and the Council-An integrated European Union policy for the Arctic.

This programme develops an integrated EU Arctic policy focused in three priority areas: 1) Climate change and safeguarding the Arctic environment; 2) Sustainable development in and around the Arctic; and 3) International cooperation on Arctic issues, which ensure the need to strengthen the dialogue with Arctic indigenous people and local communities to promote and respect their views and rights in the ongoing development of EU policies affecting the Arctic. To achieve these goals, it is not only essential to integrate Arctic people's ways of living, but also their ways of knowing.

This policy initiative focuses on sustainable development in the Arctic that takes "into account both the traditional livelihoods of those living in the region and the impact of economic development on the Arctic's fragile environment." Here a special characterisation of the Arctic environment comes into play: a particular 'fragility'. This is reminiscent of the use of the term 'vulnerability' in other documents. Whereas fragility addresses the environment, vulnerability is more focused on the indigenous people's livelihoods are under threat. The document also talks about "local circumstances and special nature of the Arctic regions."

The document describes attempts to explore possibilities to develop "Arctic standards" within H2020 that shall "speed up the translation of research outcomes into cold-climate technologies and services with commercial potential" and "social and environmental protection". The term 'social protection' is interesting here. The inclusion of 'traditional knowledge' into research science and technology is expected to ensure sustainable ways of development. This is a form of engaging traditional knowledge that is similar to what Turnhout and colleagues (2010) describe for Dutch natural areas, where the main objective is settled before the engagement starts³⁴: there it was the designation of a particular area as a national park that was non-negotiable; here the focus is economic development. Traditional knowledge seems to be sought for bringing the 'sustainable' into the 'development'.

'Engagement' with Arctic indigenous people and local communities needs to be continued according to this statement the objective being "to ensure that their views and rights are respected and promoted".

Summing up, although 'indigenous peoples' are indeed present in the policy documents we analysed, there is little detailed conceptualisation in regard to their concrete involvement and the consequentiality of various forms of engagement. In that sense the rather dire diagnosis of Pérez and Yaneva (2016), made in a recent article on the progress of the EU Arctic policies in regard to 'indigenous participation' seems to be quite pertinent:

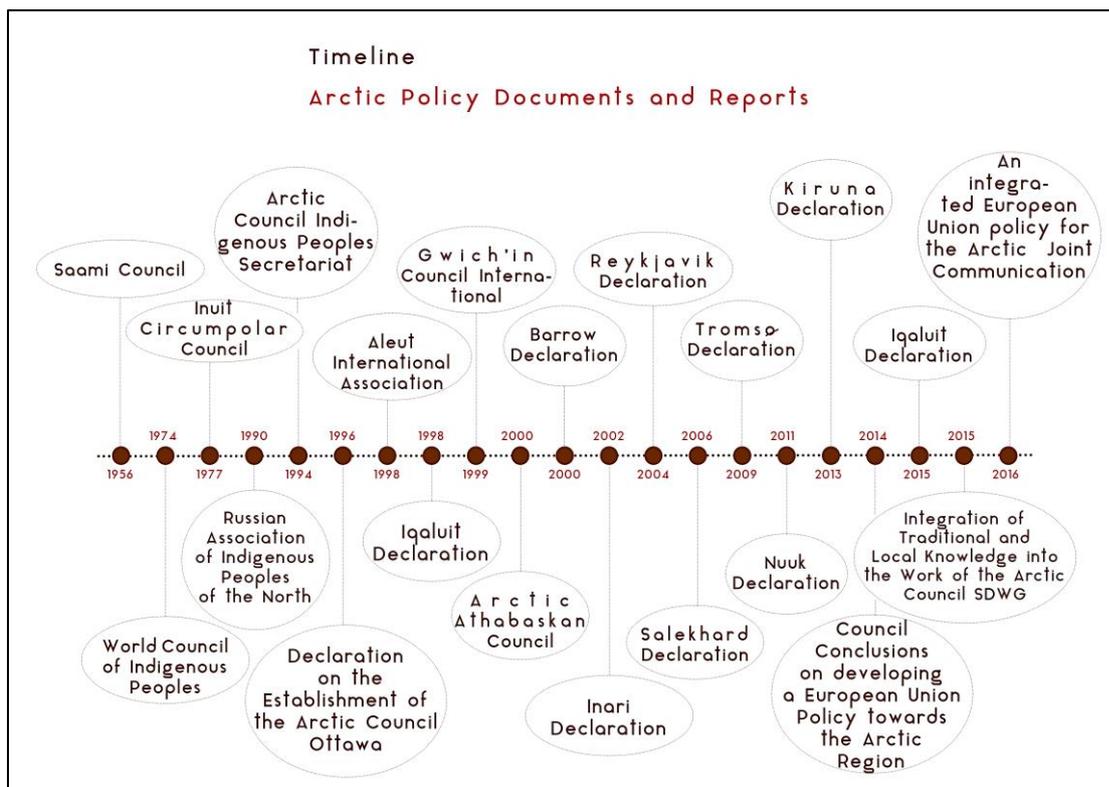
***"What is curious with regard to indigenous groups is that, although three of its member states - Finland, Sweden and Denmark/Greenland - have such populations, the Union still has not defined a common policy towards them and limits itself to work for their integration and tries to reflect their interests in its activities. In addition, references to any kind of indigenous participation are hardly ever made, even in the newest policy document and they mainly refer to political dialogue and consultation, not even providing them with the possibility to participate in the research activities."* (Pérez & Yaneva, 2016)**

³⁴ The planning and environmental impact assessment literature is full of examples of this type, where framings of discussions are decided before any dialogues take place.

6 Communities engagement in the governance of the Arctic

Albeit in very different ways and with nuanced formats and objectives, one can say that there have been many initiatives and efforts in order to strengthen the voice and involve Arctic people in policy making processes, research activities, non-governmental organisations (NGOs) and companies running businesses in the Arctic. Engagement initiatives have been led by indigenous groups since the year 1956, when the Saami Council was established, in the form of policy initiatives, political declarations, research or development projects, environmental assessments, observing networks, recommendations, etc. (see figure 7).

Figure 7. Historical overview of the most relevant political milestones regarding Arctic communities. (Source: elaboration of the authors).



Community-based research and any engagement initiatives imply taking into account divergences, different ideas, opinions, conflicts and other tensions, getting away from the idea that the Arctic people is an homogeneous population in a equally homogeneous territory with equal needs and expectations. In relation to climate change induced impacts in livelihoods, it is expected that engagement of the communities could prevent for example, potential maladaptation practices and their consequences, legitimisation of external interventions and control, and further marginalisation of communities (Ford et al., 2016).

For instance, Graybill (2013) notes that for rural populations of subarctic Kamchatka (Russia) global climate change is not recognised, but viewed largely as local environmental degradation by natural causes; Gofman et al. (2011) anticipated an increasing of marine industrial activities in the Arctic and consequently possible conflicts between coastal communities and marine-based industries. So, engagement could also be expected to verify the narratives behind environmental change in the Arctic and verify whether other anthropological sources of environmental degradation are not being reduced to climate change. Furthermore, engaging the communities could provide a *de facto* picture of livelihoods of significance for subsistence and local economies from the Arctic people's own account.

International institutions such as the Arctic Council (2016) establish that engagement actions may apply to research activities, government decision making, economic activities, or any other interaction that will bring people into an Indigenous community. But engagement is not a simple and unidirectional action, it requires a broad comprehension and respect of the local reality, an equal value recognition, a wide immersion in local and traditional knowledge systems into the whole life cycle of the activities, and obviously, effective communication mechanisms, for instance, to overcome language differences. More concretely, the MEMA Project (Arctic Council Secretariat, 2016) classifies the following common good practices of engagement with indigenous people:

- a) Timeliness: engagement is early in the process and prior to any decisions
- b) Adequate preparation: all parties prepare in advance
- c) Identification of who will participate in engagement and the design of authority to those individuals
- d) Identification of the activities that require engagement and of the degree of engagement that is necessary
- e) Comprehensive, culturally appropriate information sharing
- f) Ongoing communication focused on relationship-building
- g) A good faith intent to reach consensus and mitigate impacts
- h) Consent in some cases may be required by indigenous people before activities can proceed
- i) Accountability: measures to ensure accountability are built into the engagement process
- j) Shared economic and other benefits
- k) Shared decision-making and management authority
- l) Honouring the autonomy and human rights of indigenous people

Nevertheless, despite the efforts already done, the engagement actions have not reached all the groups in the region at the same level. Each organisation shows through their website the projects and activities in which they have been involved in the last decade. According to this information, not all of them have been involved in engagement or collaborative projects related to climate and environmental issues at the same level (see table A.4 in Annex) being the Aleut and the Gwich'in the most active.

A review on engagement practices carried out within the MEMA Project³⁵ revealed that Arctic Council documents most often deal with recommendations and guidance on the subjects of collaboration and traditional knowledge followed by participation, resources (for capacity and logistics), consultation, and information sharing (Arctic Council Secretariat, 2017).

As explained earlier, engagement processes are crucial since traditional knowledge of Arctic communities might play a key role in developing adaptation strategies and building resilience facing environmental and climate changes.

Engagement can also take the form of innovation ranging from technologies to governance as the Arctic Yearbook 2017 titled "Change and Innovation" highlights. Questions worth asking are: in what forms do indigenous people envision innovation? Do

³⁵ Meaningful Engagement of Indigenous Peoples and Local Communities in Marine Activities (MEMA)

<https://pame.is/index.php/projects/resource-exploration-and-development/mema>

they come in the form of technology? What already exists outside the Arctic and can it be useful elsewhere? Can the modern and the traditional be complementary? Can technology inform and local initiatives respond, and be adequately supported to do so? For instance, in 2013-2014 a new program started in the Inuit-controlled region of Nunatsiavut in the north of Labrador which sought to combine traditional ice knowledge with the latest technology in satellite tracking and ice sensing equipment. This initiative was supported by an Inuk business man and hunter embracing the possibilities of technology for continued movement across ice (Rapp Learn, 2015). Other initiatives are lead by indigenous people themselves such as Saami entrepreneurs. A small group of crafters, artists and creatives interested in regenerating indigenous culture, formed a social business 'Gállak Crafts'³⁶. According to the CEO and founder, "Gállak strives to propel the movement of conscious consumerism. The objects that we carry with us day to day shape not only our own lives but also our collective culture and livelihood."(Mulik, 2018)³⁷).

On the other hand, some have actively resisted new tools, such as mobile fishing gear among the Saami coastal population in Finnmark, Norway (Perdersen, 2011). Their traditional livelihood is sustained by fishing for various kind of fish such as Atlantic cod, haddock, and Atlantic salmon, and different marine mammals among various other activities on land. However, fish quotas have been made tradable and thereby been transferred to outsiders with enough capital to buy them which has gradually displaced livelihood. In this case, one of the main resistances was towards mobile fishing and modern fishing fleets which would overfish and thereby impact the quantity and quality of fish for local fishers (*ibid.*). Indigenous people, and all those actors who are driven by various motives, are challenged to find a common, integrated, ethical and fulfilling balance combining modernity and tradition (Larsen and Fondahl, 2014, pp. 482).

An idea could be to develop and design a **Knowledge-Based Framework** in which each knowledge system would contribute to generate wider strategies and policy proposals for the collective.

To achieve this goal, the main institutions and research bodies might facilitate and support the creation of closer channels to develop knowledge-systems-based policy and research making processes and develop knowledge and information sharing platforms and sources. This means bringing closer scientists, researchers and traditional people in order to develop enhanced informed policies. In this sense, several initiatives have been created, for instance, the International Platform on Disaster Displacement³⁸ is a global initiative launched on 2016 with the aim of follow-up on the work started by the Nansen Initiative consultative process, and to implement the recommendations of the Nansen Initiative Protection Agenda³⁹; Many Strong Voices Programme⁴⁰ is another example more focused on the Arctic. This international sharing platform was launched in 2005 with the objective of *promote the well-being, security, and sustainability of coastal communities in the Arctic and Small Island Developing States (SIDS) by bringing these regions together to take action on climate change mitigation and adaptation, and to tell their stories to the world.*

These kinds of platform open the path to develop informed and concrete actions that might lead to more concrete results for mitigation and adaptation, for instance:

- Carry out more in depth assessments and map regions and native settlements at risk of displacement.
- Identify the environmental hazards at small scales and the potentiality of traditional knowledge of these communities to increase resilience, minimize those

³⁶ Gállak refers to the area through which the reindeers migrate

³⁷ <https://miscmagazine.com/indigenous-innovation/>

³⁸ <http://disasterdisplacement.org/the-platform>

³⁹ <https://www.nanseninitiative.org/>

⁴⁰ <http://www.manystrongvoices.org/about.aspx?id=5068>

risks and avoid future displacements, in close collaboration with the affected communities.

- Carry out case studies in which native people can expose the changes they are observing and express possible strategies for adaptation to those changes from their point of view and experience.
- Develop networks and communication channels in which native people share and inform about environmental changes.
- Propose policy options.

These steps might be focused on the promotion and creation of **Local Observer Networks** in order to provide the information that technological tools are not capable to reach. Technological Observing Systems such as satellites provide relevant information and data, but have a functional gap: they cannot provide detailed information at local scale, as the National Research Council (2006) points out:

Observations and models are not as effective as they could be in representing northern regions. There are two reasons. First, the models do not have sufficient observational data to adequately reproduce the state of the Arctic Ocean, sea ice, and atmosphere. Second, the models do not adequately incorporate critical system-level feedbacks or reflect the chaotic physics of arctic climate. These deficiencies highlight the need for (i) observational data for model calibration and validation, and (ii) model improvement by inclusion of new processes, feedback mechanisms, and assimilation of observational data by reanalysis. In addition, models could be improved by incorporating underused sources of observations, such as the local and traditional knowledge of arctic residents (National Research Council, 2006. p.6).

Local people, by the use of traditional knowledge, might fulfil this deficiency of technological tools. It has been acknowledged in academic literature that traditional knowledge and science can complement each other. One of the characteristics of traditional knowledge is the possibility to carry out *factual observations* of different ecosystem's components, such as classifications, empirical observations, naming of places, descriptions of ecosystem components, understanding of interconnections, spatial and population patterns, ecosystems dynamics and changes (Houde, 2007).

This observational capacity is useful to fill the deficiency of data and information from the technological tools through the creation of Local Observer Networks. These kinds of networks have been launched in order to detect, document, and communicate unusual environmental changes (Okey and Brubaker, 2017) from in situ observations. Michael Brubaker, director of Community Environment and Safety and of the Centre for Climate and Health for the Alaska Native Tribal Health Consortium, and co-launcher of LEO Network, explains their usefulness:

"The network members apply local and traditional knowledge to document and share observations about unusual or unprecedented environmental events. Events that are also drivers for health impacts. We review and then transfer the observations to public maps. Sometimes we provide technical consults. Often the observations are forwarded to other organizations with topic expertise or appropriate resources. Through the network we have been able to increase awareness about vulnerabilities and impacts from climate change and to connect community members with technical experts"⁴¹.

The LEO Network⁴² uses web-accessible maps to display the observations made by the members about uncommon or exceptional environmental events, bringing together scientists, citizens, tribal elders, fishermen, hunters, etc. to co-monitor climate change.

⁴¹ In media: Michael Brubaker, Local Environmental Observer (LEO) Network (<http://citizenscience.org/2015/10/13/interview-with-michael-brubaker-local-environmental-observer-leo-network/>)

⁴² <https://www.leonetwork.org/en/docs/about/about>

These images or maps contain a variety of outputs, such as photos, event descriptions or links to information resources. The collected information is useful, for instance, to motivate the development of actions to reduce emissions and pollutants, and other. Thus, the LEO Network has been prolonged by the Arctic Contaminants Actions Program (ACAP) and its Expert Group, the Indigenous Peoples' Contaminants Action Program (IPCAP) in order to create a Circumpolar Local Environmental Observer Network (CLEO).⁴³ Other observatory systems include Sustaining Arctic Observing Networks (SAON) which was decided to be established by the Arctic Council in the Nuuk Declaration (2011)⁴⁴. Another initiative mapping traditional places is the Place Names Program (Inuit Heritage Trust - Canada)⁴⁵ producing detailed maps with traditional place names of and for communities. By mapping the names of traditional places, these indicate where people are located providing value for hunters, for example, and to better locate geographies.⁴⁶ In the book, 'Toward an Integrated Arctic Observing Network (2006)⁴⁷, the authors identify that the Arctic is a region with limited records of observations and yet these observations are necessary to describe Arctic conditions and to expand the abilities of people to anticipate, predict and respond to future changes. In summary, observatory systems such as these mentioned all contribute to mapping environmental changes and locating geographies, yet the measured variables need to be well integrated to provide quality assessment and pan-arctic cooperation further encouraged to build cohesion across the Arctic. Furthermore, being able to improve observatory practices and share these with indigenous people can strengthen their adaptive capacity, that is the ability to anticipate and transform structure, functioning, or organisation to better survive hazards (Ionesco, Mokhnacheva and Demenne, 2017).

As we have seen in this section there are many initiatives and efforts in order to strengthen the voices and involve Arctic people in policy making processes, and even to enhance their engagement opportunities with research institutions, non-governmental organisations (NGOs) and companies conducting activities in the Arctic. These initiatives have been carried out by both external bodies (institutional, industry, NGOs, etc.) and by indigenous groups in form of policy initiatives, research or development projects, environmental assessments, observing networks, recommendations, etc.

⁴³ <https://oaarchive.arctic-council.org/handle/11374/1715>

⁴⁴ Arctic Observing <https://www.arcticobserving.org/>

⁴⁵ <http://ihti.ca/eng/place-names/pn-index.html>

⁴⁶ <http://ihti.ca/eng/place-names/images/Map-WhereWeLiveTravel-1636px.jpg>

⁴⁷ <https://www.nap.edu/read/11607/chapter/3#7>

7 Final remarks and way ahead

Where are we with walking the talk of Arctic communities engagement in the governance of the Arctic?

The report provides insights to the wider definitions of traditional knowledge by the 'knowledge holders' and addresses its relevance in assessing and monitoring environmental changes at local levels in the Arctic. Yet although these communities are represented at the level of some international institutions and other organisations, traditional knowledge is still underused and needs to be streamed into policy making practices.

As we have seen in sections 5 and 6, a number of institutions and policy documents have provisions to collaborate with Arctic people to govern their matters of concern. The Arctic Council is certainly one of the organisations that has put a great deal of effort on developing mechanisms to engage the Arctic communities in governing the changes. Yet we also see that a lot of the policy discourse of other relevant governing bodies is rich in ambiguities and more seriously with poor understandings of what empowering engagement of the Arctic communities in governing their lives and their lands could mean.

The policy documents that we examined here, instrumental to walk this talk have some prompts that could impair the whole effort of engaging the Arctic communities in dialogue about the governance of the Arctic lands and people. For example, pre-defining what the dialogues should be about, confining Arctic people to 'representatives', describing engagement as 'consultations' leave room to discard the Arctic communities' actual matters of concern, and of care, and more importantly leave space for their matters of concern to be outright disregarded - as there is evidence everywhere in the world that consultations are not binding processes of policy making.

Where we need to go to walk the talk...

The most recent document analysed in the report, "*The Arctic environment — European perspectives on a changing Arctic* (EEA, 2017, pp.68), published by the EEA, stresses the importance for decision-makers "to have access to the best available information" and so "further efforts are required to sustain and develop data collection, information and knowledge flows, including near real-time data, and to make regularly updated Arctic indicators available". As thoroughly discussed in this report, the 'best available information' might not be the one produced through scientific framings and methods. In fact, the document stresses the need to engage different sources of knowledge, when referring to current and past research actions, insisting that "all sources play their part in the puzzle and indigenous knowledge and citizen science are currently underused sources of information" (pp. 72). Our reading, is that whilst there is substantial recognition that when facts are uncertain, stakes are high, values in dispute and decisions urgent⁴⁸ (Funtowicz and Ravetz, 1990) one needs to mobilise all *knowledges* to address substantial and practical societal challenges, there seems to be also some tension to make concrete space for that to happen. In other words, more needs to be done to establish channels that work together with scientific and traditional knowledge in an equal foot to address some of the challenges faced by Arctic people.

⁴⁸ A definitional framing of post-normal science. See https://en.wikipedia.org/wiki/Post-normal_science.

This in practice means that, any interventions by design need to engage Arctic citizens and rely on their experiential and practical knowledge cumulated over centuries. All ways of knowing can only benefit the monitoring and the study of the impacts of climate change and other pressures, and it is not far-fetched to think that co-created strategies could respond better to the challenges faced by Arctic people and the Arctic ecosystems⁴⁹. This will only be possible if there is a mutual recognition of different knowledge systems. As we have seen earlier, knowledge validity has more to do with politics rather than to the 'substantial differences' in which contrasting views of traditional and scientific knowledge have been argued about.

Arctic people have declared that they are experiencing and observing an increasing variability and unpredictability of the weather and seasonal climatic patterns, as well as changes in the sea ice and the health of wildlife (Krupnik and Jolly, 2002). These kinds of observation are based on communities' traditional knowledge and could be documented through adequate collaboration channels between native people, scientists and policy-makers.

Hence, in order to respond to the recent promises of the Arctic policy documents with regards to 'integration' and use of traditional knowledge to address the challenges faced by the Arctic communities some concrete action is recommended:

- To continue to secure the places where those dialogues already exist, partnerships examples with academia exist; it is important that representatives, policy-makers and researchers develop more collaborative actions on the ground, that is, at the locations where traditional knowledge shows its significance and can be used together with other kinds of knowledge. This means the development of a knowledge-based framework instead of the classic science-based one.
- To develop closer communication channels: in order to develop more purposeful policies regarding traditional knowledge in the region, it would be desirable to reduce the gap between policy-makers and traditional knowledge holders. To this end, the creation of closer communication channels through a dialogue with each relevant actor would allow the identification of obstacles hindering the development of a more openness policy and research.
- To investigate with the communities and make visible the impacts of climate change and other anthropological pressures in the Arctic region. This could help researchers with developing scientific research agendas, which address the relevant challenges and matters of concern. For instance, the assessments of climate impacts and environmental changes are widely based on technological observations and models providing very valuable images and identification of environmental change but these technologies have limitations since they cannot provide information in small scales like the traditional observer can do. Therefore, merging these two ways of assessment and monitoring would create a more accurate *image of reality*, allowing the development of effective adaptation and mitigation policies at all levels. In this sense, the local observer networks might serve as applicable examples of the collaborative and prolific use of different kinds of knowledge.
- These kinds of networks can work collaboratively with research organisations and provide evidences and indications of environmental changes which would be very useful to policy makers and further research in the region, thus, promoting and supporting them is desirable by the Arctic Council, the Arctic states, and the European Union.

⁴⁹ For example, co-management practices of environmental management are demanded by law in the Canadian Arctic – see e.g. Armitage et al., 2011; Houde, 2007.

- To adopt a posture of humility on the face of uncertainties including skipping the solemn acts, acting instead on mobilising the knowledge that is available, in other words, ensuring mobilisation of knowledge-holders.
- Encourage and explore engagement methodologies that are empowering so that all relevant knowledge is mobilised where it is needed to plan and act on the face of climate change. Future Arctic communities' engagement ought to consider co-production of practical adaptation strategies given that the communities are not merely contributors but engaged forecasters who may better anticipate impact of climate changes and communicate observations, if appropriate communication channels exist. The communities directly dependent on their lands and resources and have the right (at times legal rights) to lead livelihood changes. Hence, they are fully stakeholders.

Deepening this study

As we highlighted earlier, this report is a scene setter. In order to respond to the objectives of the ARCTIC-Coop project, the study needs to be deepened with empirical work. This means working closer with actors in the Arctic governance processes. The following are issues that we deem important to address in the near future:

1. Exploring how the Arctic communities interpret and locate their engagement at present and how they imagine it in the future may be relevant for discussion since "achieving resilience in the Arctic will depend on empowering the people of the North to self-organise, to define challenges in their own terms, and to find their own solutions, knowing that they have the flexibility and the support to implement them."⁵⁰ Options to build resilience capacity could be generated and tested through collaborative activities in order to identify whether new, carefully selected methods are worth of trial and investment, having studied the practical usefulness in everyday life, and to explore resilient livelihoods rather than to impose ways of life.
2. Working with traditional knowledge as a design strategy to develop adaptation plans within the Arctic policy context, is still limited. In Manrique et al. (2018), we have showed that there seems to be inadequate attention to the likely climate-induced displacements and migration of Arctic native communities; this is quite a pressing issue to which the lack of appropriately channelling of communities' knowledge into assessments, reports, scientific activities, is of limited help and use.
3. Climate change scientific research is developed from a western perspective, thus, the explanations and measures are focused on the application of western scientific procedures. Creating the spaces for local people to govern their territories as equally relevant partakers including in generating proposals and their assessments brings in knowledge, which is experiential and situated, is co-produced and has a historic perspective based on the intergenerational knowledge heritage, for instance, in telling past environmental events unrecorded by other means.

Summary

This report sets the scene for exploring further how the JRC could help with mobilising all relevant knowledge to tame climate change (and other environmental change) impacts in the Arctic that affect, not only the Arctic populations, but also many other populations of the planet. In that sense, the report maps communities, livelihoods, institutions and actors in the Arctic. Based on the reviewed academic literature the report offered a thorough discussion about traditional knowledge meanings, and investigates political and policy representations of traditional knowledge in different International and EU documents. Finally, it looked at instances of engagement of the Arctic people in the governance of the Arctic, identifying both institutional and substantial lacunas in mobilising experiential knowledge into governance processes characterised by high

⁵⁰ Stockholm Environment Institute. Snapshot of the Arctic Resilience Report. <https://stockholmenvironmentinstitute.exposure.co/into-the-blue>

complexity and uncertainty. In this final section, we attempt to instil into our recommendations the idea that, as in every other policy process all possible knowledges need to be mobilised if we are serious about addressing societal issues faced by the people of the Arctic.

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List of acronyms

| | |
|--------------|--|
| AC | Arctic Council |
| AAC | Arctic Athabaskan Council |
| ACAP | Arctic contaminants Action Program |
| ACIA | Arctic Climate Impact Assessment |
| AIA | Aleut International Association |
| AMAP | Arctic Monitoring and Assessment Programme |
| AMSA | Arctic Marine Shipping Assessment |
| BEAC | Barents Euro-Arctic Council |
| CAFF | Conservation of Arctic Flora and Fauna |
| CLEO | Circumpolar Local Environmental Observer Network |
| DFID | British Department for International Development |
| EC | European Commission |
| EEA | European Environmental Agency |
| ENPI | European Neighbourhood and Partnership Instrument |
| EIDHR | European Instrument for Democracy and Human Rights |
| EPPR | Emergency Prevention, Preparedness, and Response |
| ERDF | European Regional Development Fund |
| EU | European Union |
| GM | Genetically Modified |
| GCI | Gwich'in Council International |
| IASC | International Arctic Science Committee |
| ICC | Inuit Circumpolar Conference |
| IPCAP | Indigenous Peoples' Contaminants Action Program |
| IPCC | Intergovernmental Panel on Climate Change |
| IWGIA | International Work Group for Indigenous Affairs |
| JRC | Joint Research Centre |
| LEO Network | Local Environmental Observer Network |
| MEMA Project | Meaningful Engagement of Indigenous Peoples and Local Communities in Marine Activities |
| ND | Northern Dimension |
| NGO | Non-Governmental Organisation |
| PAME | Protection of the Arctic Marine Environment |
| RAIPON | Russian Association of Indigenous Peoples of the North |
| SAON | Sustaining Arctic Observing Networks |
| SC | Saami Council |
| SDWG | Sustainable Development Working Group |
| SIDS | Small Island Developing States |
| SL | Sustainable Livelihood |
| UArctic | University of the Arctic |
| UN | United Nations |
| UNDP | United Nations Development Programme |
| UNESCO | United Nations Educational, Scientific and Cultural organization |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WFP | World Food Programme |
| WWF | World Wildlife Fund/ World Wide Fund for Nature |

Annex

Annex 1. Arctic policy documents and actors

Table A.1. Overview of international actors and initiatives working on indigenous people and traditional knowledge.

| International Institution / organisation | References to Traditional Knowledge |
|--|---|
| United Nations Framework Convention on Climate Change (UNFCCC) - Report of the Indigenous Peoples' Global Summit on Climate Change | To enable Indigenous peoples from all regions of the globe to exchange their knowledge and experience in adapting to the impacts of climate change, and to develop key messages and recommendations: http://www.un.org/ga/president/63/letters/globalsummitoncc.pdf |
| Arctic Council | Six organisations representing Arctic indigenous peoples have status as Permanent Participants: The Aleut International Association, the Arctic Athabaskan Council, the Gwich'In Council International, the Inuit Circumpolar Council, RAIPON (the Russian Association of Indigenous Peoples of the North), and the Saami Council: http://www.arctic-council.org/index.php/en/ Protection of the Arctic Marine Environment (PAME) Working Group: https://pame.is/index.php/projects/resource-exploration-and-development/mema Arctic Council archive on Indigenous engagement: https://oaarchive.arctic-council.org/browse?value=Indigenous+People&type=subject |
| The Arctic Circle | Science and Traditional Knowledge forums. http://www.arcticcircle.org/assemblies/2016/program-news/news/indigenous-arctic-global-dialogue |
| UNESCO | Multimedia modules with interdisciplinary complex of indigenous knowledge related to mitigation and adaptation to environmental changes: https://iite.unesco.org/courses/climate_change/en/index.html |
| Inter-institutional cooperation | Arctic Monitoring and Assessment Programme (AMAP) in collaboration with the Arctic Council's Conservation of Arctic Flora and Fauna (CAFF) working group, and the International Arctic Science Committee (IASC). ACIA - Arctic Climate Impact Assessment: http://www.amap.no/arctic-climate-impact-assessment-acia |
| IPCC - Working Group II (Impacts, Adaptation, and | Assessment Reports, Special reports, methodology reports, technical papers and supporting material of the state of knowledge on Climate Change. https://www.ipcc.ch/report/ar5/wg2/ |

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| Vulnerability) | |
| European Union | <p>EUNETMAR, a study on Arctic lay and traditional knowledge: https://webgate.ec.europa.eu/maritimeforum/en/node/3569</p> <p>The Northern Periphery and Arctic 2014-2020 Programme establish actions to protect, promote and develop cultural and natural heritage: http://www.interreg-npa.eu/</p> <p>The Strategic Assessment of Development of the Arctic: Assessment Conducted for the European Union, recommends to give a voice to Arctic communities in policy developments that may affect them (chapter 9): http://www.arcticinfo.eu/en/</p> |

Table A.2. Joint Communication to the European Parliament and the Council. Developing a European Union Policy towards the Arctic Region: progress since 2008 and next steps.

| EU funding programme (2007-2013) | Characteristics |
|---|---|
| European Regional Development Fund (ERDF) | Set aside €4.3 million in the cross-border Saami sub-programme to support the Sami population in developing its cultural life and industry in a sustainable manner. |
| Interreg IVA North | The programme of which Saami is a part, with EU funding of €34 million (total €57 million) has the objective of strengthening the attractiveness and competitiveness of the northernmost regions of Finland, Sweden and Norway. |
| Botnia-Atlantica programme | In covering northern regions of Finland, Sweden and Norway (EU funding of €34.4 million out of a total of €60.9 million) and the Sweden-Norway Interreg IVA programme (EU funding of €37 million out of a total of €68 million). |
| The Northern Periphery Programme | Involving Ireland, Finland, Sweden and the United Kingdom as well as the Faroe Islands, Greenland, Iceland and Norway (with possible participation of the Russian Federation and Canada), has a budget of €59 million, of which EU funding amounts to €35 million. The Programme aims to help remote communities in northern Europe develop their economic, social and environmental potential. |
| The transnational Baltic Sea Region Programme | (of which EU funding amounts to €217 million out of €278 million), finances the Bothnian 'Green Logistic Corridor' to connect northern Scandinavia and the Barents with end markets in the Baltic Sea region and central Europe. |
| North Sweden and Mid-North Sweden programmes | In the 2007-2013 period ERDF invests € 243 million in the North Sweden Program and € 177 million in the Mid-North Sweden programme to increase the competitiveness of the regions. Sami issues are integrated into the different priority areas. |
| The Northern Finland ERDF Programme | Is operating with an overall budget of €1.1 billion, of which €311.3 million comes from the EU budget. The programme's priorities include measures specifically designed for the Sami, supporting entrepreneurship and business based on the Sami culture. |
| The Kolarctic programme | Is one of 13 cross-border cooperation programmes currently co-funded under the European Neighbourhood and Partnership Instrument (ENPI) and ERDF. The 2007-2013 budget of the programme amounts to €70.48 million, of which €28.24 million is EU funding. Northern regions of Finland, Sweden, Norway and the Russian Federation participate in the programme. |
| The Karelia programme | In the sub-Arctic part of the Barents region, this cross-border cooperation programme is operating with an overall budget of €46.5 million, of which €23.2 comes from the EU budget and the |

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| | remaining part consists of contributions from Member States and the Russian Federation. |
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Table A.3. Engagement projects related to climate change issues carried out by each organisation.

| Indigenous group | Project activity or | Year | Collaborators | Objectives or area |
|------------------|--|------------------------|---|---|
| ALEUT | Improvement of Indigenous Peoples' Participation in Governance of their Communities through Native NGOs | 2003 - 2004 | Trust for Mutual Understanding (TMU) | Governance |
| | Strengthening Alaska Indigenous Participation in the Arctic Council | June 2008 - May 2011 | OAK FOUNDATION; U.S. Department of State Office of Ocean and Polar Affairs | Governance |
| | Aleut/Unangax Ethnobotany: An Annotated Bibliography | 2006 | Conservation of Arctic Flora and Fauna (CAFF); Alaska Native Science Research Partnership for Health through the Institute for Circumpolar Health Studies | Local resources (plant biodiversity) and traditional knowledge |
| | CBON-SA - Community Based Observer Networks - Situational Awareness | April 2015 - June 2016 | University of Idaho | Improve situational awareness and crisis response capabilities related to maritime challenges posed by the dynamic Arctic environment. |
| | Ecosystem-Based Management Workshop | Dec-14 | Gordon and Betty Moore Foundation | Ecosystem based management (EA/EBM) and integrated ecosystem approach (IEA) |
| | Bering Sea Sub-Network: International Community-Based Observation Alliance for Arctic Observing Network (BSSN) http://www.bssn.net/ | June 2007 - May 2009 | National Science Foundation | Adaptation to Environmental and Socio-Economic Changes. Communicate indigenous observations on the environment and subsistence harvest. |

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| Arctic Indigenous Mapping | Marine Use | June 2015 – December 2017 | Korea Maritime Institute (KMI) | Marine resources use |
| CONAS Community Observation Network for Adaptation and Security https://www.facebook.com/CONASAK | – | March 2014 – December 2015 | University of Idaho | Environmental observations |
| Community Based Black Carbon and Public Health Assessment | | November 2014 – November 2015 & Ongoing | Swedish Environmental Protection Agency | Assess local sources of black carbon emissions from a representative sampling of Arctic Alaskan and Russian villages; provide a broad characterisation of associated risks to public health; explore short and long-term mitigation options; assess and strengthen local capacities to identify, mitigate and prevent black carbon pollution; draft a framework tool for community-based assessments of black carbon emissions and health risks; and educate local communities about black carbon emissions and risks. |
| Language Communications Project (Anchorage, Atka, and Nikolskoye) | | Ongoing | National Science Foundation | Cultural transmission |
| Arctic Remote Energy Networks Academy (ARENA) | | Ongoing | Arctic Council's Sustainable Development Working Group. The United States, Canada, Finland, Iceland and the Gwich'in Council International | Energy |

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|----------|--|-----------------------|---|---|
| | Development of an Arctic Indigenous Marine Use Survey Process | 2011-2015 | Aleut International Association and Saami Council | Identifying areas of significance for subsistence and local economies is crucial for preventing possible future conflicts between coastal communities and marine-based industries |
| GWICH'IN | The Arctic Energy Summit (AES) | September 18-20, 2017 | multi-disciplinary event | Energy |
| | Arctic Renewable Energy Atlas (AREA) | 5/11/2017 | Sustainable Development Working Group of the Arctic Council Co-led by the United States and Canada | Energy |
| | Diverging from Diesel | Ongoing | InterGroup Consultants, with support from Lumos Energy | Energy |
| | Arctic Environmental Impact Assessments - Good Practice Recommendations for Environmental Impact Assessment and Public Participation in the Arctic | Ongoing | Finnish Chairmanship | Assess beforehand the impacts of large-scale economic projects on the environment and the people potentially affected by the projects |
| | Arctic Remote Energy Networks Academy (ARENA) | Ongoing | Arctic Council's Sustainable Development Working Group. The United States, Canada, Finland, Iceland and the Aleut International Association | Knowledge exchange program emphasizing the development, operation, and management of remote energy networks (microgrids) incorporating renewable resources |
| | Arctic Sustainable Energy Toolkit | Ongoing | Circumpolar Affairs Division at Indigenous and Northern Affairs Canada | Energy |

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|-------------------|--|-----------|--|---|
| INUIT | Nuluaq Project and Inuit Food Security Canada | Ongoing | Inuit Food Security Working Group | Food security |
| | Coordination and Administration of the Northern Contaminants Program | Ongoing | Northern Contaminants Program Management Committee; Northern Contaminants Program Secretariat; Four Northern Aboriginal Partner Organisations; Regional Contaminants Committees; Arctic Institute of North America, coordinators of ASTIS Database | Researching and monitoring of long-range contaminants in the Canadian Arctic |
| SAAMI | Development of an Arctic Indigenous Marine Use Survey Process | 2011-2015 | Aleut International Association and Saami Council | Identifying areas of significance for subsistence and local economies is crucial for preventing possible future conflicts between coastal communities and marine-based industries |
| ATHABASKAN | Arctic Peoples, Culture, Resilience and Caribou | 2008 | Gwich'in Council International, Dene Nation, Inuit Tapiriit Kanatami, and the Inuit Circumpolar Council. Chris Furgal of Trent University and Brenda Parlee of the University of Alberta | human-ecological relationship involving caribou and how to promote community resilience and adaptability in the face of climate change |
| RAIPON | The information about the RAIPON association is only available in Russian. This constitutes a serious obstacle for sharing information with the international community. | | | |

Table A.4 Arctic Policy documents and reports

| |
|---|
| Declaration on the Establishment of the Arctic Council Ottawa 1996 |
| Joint Communiqué of the Governments of the Arctic Countries on the Establishment of the Arctic Council 1996 |
| The Iqaluit Declaration 1998 |
| The Barrow Declaration 2000 |
| The Inari Declaration 2002 |
| The Reykjavik Declaration 2004 |
| The Salekhard Declaration 2006 |
| The Tromsø Declaration 2009 |
| The Nuuk Declaration 2011 |
| The Kiruna Declaration 2013 |
| The Iqaluit Declaration 2015 |
| Integration of Traditional and Local Knowledge into the Work of the Arctic Council SDWG 2015 |
| Arctic Offshore Oil and Gas Guidelines 2009 PAME |
| Arctic Oil and Gas Summary Report AMAP 2007 |
| Arctic Marine Shipping Assessment PAME 2009 |
| Arctic Ocean Review II PAME 2013 |
| Arctic Biodiversity Assessment CAFF 2013 |
| Arctic Biodiversity Assessment Implementation Plan CAFF 2014 |
| Community Based Monitoring Handbook: Lessons from the Arctic, CAFF CBMP Report No. 21 August 2010 |
| Arctic Marine Strategic Plan 2015-2025 PAME 2014 |
| Arctic Marine Strategic Plan 2004-2014 PAME 2004 |
| Arctic Social Indicators Report II SDWG 2013 |
| Recommended Practices for Arctic Oil Spill Prevention EPPR 2013 |
| Arctic Guide EPPR 2008 |
| Adaptation Actions for a Changing Arctic Part A SDWG 2013 |
| Adaptation Actions for a Changing Arctic Part B 2013 |
| Arctic Climate Impact Assessment Policy Recommendations Report AMAP 2004 |
| European Union: |
| – EU Arctic Policy webpage, EEAS, 2017 |
| – Own initiative report and Arctic resolution, European Parliament, 2017 |
| – EEA: The Arctic environment: European perspectives and a changing Arctic |

(2017)

- *Climate change, impacts and vulnerability in Europe 2016*, EEA, 2017
- An integrated European Union policy for the Arctic, Joint Communication, 2016
- EU Arctic policy – in regional context, European Parliament, 2016
- *Adequacy of data available for the Arctic Sea basin*, First report, European Commission, 2016
- *The European Environment – state and outlook report, Global megatrends*, EEA, 2015
- 'The European environment – state and outlook report', Arctic Briefing, EEA, 2015
- European Climate Adaptation Platform, EEA, 2015
- *EU's 7th Environment Action Programme to 2020. Living well, within the limits of our planet*, EU, 2014
- *Strategic Assessment of Development of the Arctic, an Assessment conducted for the European Union*, Arctic Centre, 2014
- Council Conclusions on developing a European Union Policy towards the Arctic Region, EU, 2014
- The EU Framework Programme for Research and Innovation, Horizon 2020, EU, 2014
- Resolution on the EU strategy for the Arctic, European Parliament, 2014
- Council Conclusions on developing a European Union Policy towards the Arctic Region, 2014
- *Arctic Lay and Traditional Knowledge*, European Commission, 2014
- Communication on developing an EU Policy towards the Arctic Region: progress since 2008 and next steps, European Commission and EEAS, 2012
- Joint Staff Working Document on Space and the Arctic, EU, 2012.
- "*Climate Refugees*", *Legal and policy responses to environmentally induced migration*. Policy Department C - Citizens' Rights and Constitutional Affairs. European Parliament, 2011
- *EU Arctic Footprint and Policy Assessment*, Ecological Institute/European Commission, 2010
- Committee on Foreign Affairs: Report on a sustainable EU policy for the High North (2010)
- Commission Communication on the EU and the Arctic region, European Commission, 2008
- High Representative Report on Climate Change and International Security, EU, 2008
- *Arctic Environment: European perspectives. Why should Europe care?*, EEA et al., 2004
- Committee on Agriculture and Rural Development: Report on a New Strategy for Agriculture in Arctic Regions (1999)
- *The State of the European Arctic Environment*, EEA, 1997

Arctic Centre

- *Arctic information and communication – Gap Analysis Report*, Arctic Centre, 2014

- *Assessments in Policy-Making: Case Studies from the Arctic Council*, Arctic Centre, 2014
- *European Arctic Initiatives Compendium*, Arctic Centre, 2014
- *EU Arctic Information Centre, Network Feasibility Analysis*, Arctic Centre, 2014

Arctic Council

- Agreement on Enhancing International Arctic Scientific Cooperation, Arctic Council, 2017
- Snow, Water, Ice and Permafrost in the Arctic (SWIPA). Arctic Monitoring and Assessment Programme. (AMAP), 2017.
- *Adaptation Actions for a Changing Arctic (AACA) – Barents Area overview*, AMAP, 2017
- Council Conclusions on the Arctic, 2016
- *The Arctic Resilience Report (final report)*, Stockholm Environment Institute, 2016
- Circumpolar Biodiversity Monitoring Programme, CAFF, 2015
- *Human Health in the Arctic*, AMAP, 2015
- *Adaptation Actions for a Changing Arctic (AACA), Draft report*, Arctic Council, 2015
- *Framework for a Pan-Arctic Network of Marine Protected Areas (MPAs)*, PAME, 2015
- *Arctic Marine Strategic Plan for 2015-2025*, PAME, 2015
- *Life Linked to Ice: A guide to sea-ice-associated biodiversity*, CAFF, 2015
- *Socio-Economic Drivers of Change in the Arctic. AMAP Technical Report. Arctic Monitoring and Assessment Programme (AMAP)*, 2014
- Circumpolar Biodiversity Monitoring Program, CAFF, 2015
- Actions on Arctic Biodiversity for 2013-2021: Implementing the recommendations of the Arctic Biodiversity Assessment, CAFF, 2015
- Strategy of the Sustaining Arctic Observing Networks, SAON, 2014
- Ottawa Declaration. Declaration on the establishment of the Arctic Council. Ottawa, Canada, September, 19, 1996.

Regional level

- First Nation of Na-Cho Nyak Dun Traditional Knowledge Policy. February 4, 2008.
- Traditional Knowledge Policy implementation Framework. The Government of the Northwest Territories (GNWT), Department of Environment and Natural Resources (ENR). Annual reports 1994-2015.
- Stockholm Environmental Institute: Arctic Resilience Interim Report (2013)
- Stockholm Environmental Institute: Arctic Resilience Report (2016)

Indigenous Peoples Working Group

1. Source: Document Archive of the Barents Euro-Arctic Council

| | | | |
|--|------|----------------------|------------------|
| Action Plan 2017-2018 - Indigenous Peoples Working Group | 2017 | Action programme | |
| WGIP activity report 2015-2017 | 2017 | Working group report | |
| BIPC 2015 resolution Final | 2015 | Declaration | |
| Working Group of Indigenous Peoples Annual Report 2015 | 2015 | Annual report | |
| BIPC celkamus 2015 sami | 2015 | Declaration | |
| Working Group of Indigenous Peoples Annual report 2014 | 2014 | Annual report | |
| WGIP Annual Report 2013, English | 2013 | Annual report | |
| WGIP Action Plan 2013-2016 | 2012 | Action programme | |
| Barents Indigenous Peoples 2nd Congress - Program | 2012 | Agenda | |
| Barents Indigenous Peoples 2nd Congress - Resolution ENG | 2012 | Declaration | |
| WGIP Activity Plan 2011 | 2011 | | Other |
| Draft activity plan 2010 | 2010 | | Action programme |
| Participants on Barents Indigenous Peoples Congress, Kirkenes Feb 2010 | 2010 | | Other |
| Participants on Seminar Co-existence in the Arctic, Kirkenes Feb 2010 | 2010 | | Other |
| Final Resolution from Barents Indigenous Peoples Congress, Kirkenes Feb 2010 | 2010 | | Declaration |
| WGIP Action plan 2009-2012, English | 2009 | | Action programme |
| WGIP annual report 2008 | 2008 | | Annual report |
| Programme of WGIP meeting in Naryan-Mar, April 2008 | 2008 | | Action programme |

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|---|------|------------------|
| WGIP annual report 2007 (Eng) | 2007 | Action programme |
| Working Group on Indigenous Peoples Action plan of Indigenous peoples 2005-2008 (English version) | 2005 | Action programme |
| Working Group on Indigenous Peoples Indigenous Peoples' Year 2005, English version | 2005 | Action programme |

Table A.5 **Stakeholders and actors in the Arctic.**

| Name | Description | Other information |
|--|---|---|
| <p>The Arctic Council</p> | <p>The work of the Arctic Council is to promote cooperation, coordination and inter-action among the Arctic States, with the involvement of the Arctic indigenous peoples and communities of the Arctic region, on common Arctic issues, in particular issues of sustainable development and environmental protection. This work is carried out by the Council's subsidiary bodies under the guidance and direction of the Senior Arctic Officials.</p> | <p>PERMANENT PARTICIPANTS OF THE ARCTIC COUNCIL:</p> <p>Aleut International Association (AIA)</p> <p>Arctic Athabaskan Council (AAC)</p> <p>Gwich'in Council International (GCI)</p> <p>Inuit Circumpolar Council (ICC)</p> <p>Russian Association of Indigenous Peoples of the North (RAIPON)</p> <p>Saami Council (SC)</p> <p>www.arcticportal.org</p> <p>The Arctic Council consists of the eight Arctic States: Canada Denmark (including Greenland and the Faroe Islands) Finland Iceland Norway Russia Sweden United States.</p> |
| <p>Arctic Council Observer Manual for Subsidiary Bodies</p> | <p>The Observer Manual for Subsidiary Bodies⁵¹ exists to guide the Council's subsidiary bodies in matters of meeting logistics and the role played by Observers. The Observer Manual for Subsidiary Bodies is a useful resource for those interested in the role of Observers in the work of the Arctic Council. The Observer Manual was updated at the Anchorage October 2015 SAO meeting, and at the Portland SAO meeting in October 2016. The file was updated in this archive 14 November, 2016.</p> | |
| <p>The Indigenous Peoples'</p> | <p>The Indigenous Peoples' Secretariat (IPS)⁵² serves as a</p> | |

⁵¹ <http://hdl.handle.net/11374/939>

⁵² <https://www.arcticpeoples.com/about#bio>

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|---------------------------------|--|--|
| Secretariat | support secretariat for all the Permanent Participants. Indigenous Peoples' Secretariat assists with creating opportunities for the Permanent Participants to present their causes, and helps provide them with necessary information and materials. | |
| Arctic Stakeholder Forum | A temporary platform for EU institutions, Member States, regional and local authorities to discuss how to better streamline EU funding opportunities relevant for the Arctic region and how to enhance collaboration and coordination between different EU funding programmes. | |
| Arctic Consensus | <p>Arctic Consensus focuses on working across fields of business, education, research, culture, and infrastructure with three main focus areas.</p> <ul style="list-style-type: none"> • A closer coordination of the many existing activities and initiatives within existing networks, hereby improving integration and synergies. • A strengthened strategic focus on partnership working towards attracting significant external financing of new common initiatives and projects. • Establishing a new and visible platform for Arctic teamwork which can be applied during the implementation of "The Kingdom of Denmark and EU's Strategy for the Arctic 2011-2020." | |
| Arctic Education Network | The network was established to promote a closer cooperation between educational institutions in North Denmark and Greenland, thereby increasing mobility between the regions and ensuring a smooth educational path for |  |

| | | |
|---|---|--|
| | students. | |
| Arctic Business Network | Arctic Business Network is a transatlantic network aimed at developing cooperation between companies, organisations, institutions and authorities in both Greenland and North Jutland. |  |
| Ilisimatusarfik – University of Greenland | The research and education at Ilisimatusarfik focus on subjects with relation to Greenland and the Arctic |  |
| DTU – Technical University of Denmark | For almost two centuries DTU, Technical University of Denmark, has been dedicated to fulfilling the vision of H.C. Ørsted |  |
| Arctic Institute of Community-Based Research | The vision for AICBR includes the meaningful engagement of Northerners in health research focused on Northern health priorities, with results contributing to lasting health improvements. |  |
| ArcticNet | ArcticNet is a Network of Centres of Excellence of Canada that brings together scientists and managers in the natural, human health and social sciences with their partners from Inuit organisations, northern communities, federal and provincial agencies and the private sector. |  |
| Arctic Research Centre (ARC) | The Arctic is borderless, and so is ARC. |  |
| ARTEK | Arctic Technology Centre (ARTEK) was established in 2000 and educates engineers and carries out |  |

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| | research and innovation projects in Arctic technology. | |
| ASIAQ | Asiaq, Greenland Survey, operates all over Greenland, undertaking a wide variety of activities concerning the physical, non-living environment. |  |
| Canadian High Arctic Research Station (CHARS) | The Canadian High Arctic Research Station (CHARS) will provide a world-class hub for science and technology in Canada's North that complements and anchors the network of smaller regional facilities across the North. | |
| The University of the Arctic | The University of the Arctic is an international cooperative network based in the circumpolar region, consisting of universities, colleges and other organisations with an interest in promoting education and research in the North. | |
| Aarhus University | Aarhus University was established in 1928 as a small private initiative. It has since grown to become a leading public research university with international reach covering the entire research spectrum. |  |
| Maritime Development Center of Europe | Maritime Development Center of Europe (MDCE) is the national Danish maritime cluster- and network organisation |  |
| Greenland's Employers' Association (GA) – Sulisitsisut | Since 1966 Greenland Employers' Association (GA) has undertaken Greenland industry interests on national and international issues. On behalf of approximately 500 companies with a total of approximately 6.000 employees spread over the country's various businesses. |  |

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| <p>Geocenter Denmark</p> | <p>The Geocenter is a national center of geoscientific research, education, consulting, innovation and publishing at a high international level.</p> |  |
| <p>Greenland Institute of Natural Resources</p> | <p>The main goals of the Nature Institute are to: something missing here?</p> |  |
| <p>ICC Grønland</p> | <p>The Inuit Circumpolar Council was founded in 1977 and represents the Inuit, the Arctic people living on top of the planet, living across the North American continent and the eastern tip of the Russian Arctic regions; from Greenland in the East, through the Canadian Arctic, Alaska to Chukotka in the West.</p> |  |
| <p>Kujalleq Municipality</p> | <p>At 32.000 km² Kujalleq Municipality is the smallest municipality in Greenland by area.</p> |  |
| <p>Kommuneqarfi Sermersooq</p> | <p>Sermersooq Municipality, also referred to as the East-West municipality, is the second largest municipality in the world in terms of area which is 635.600 km².</p> |  |
| <p>Qaasuitsup Kommunia</p> | <p>Qaasuitsup Municipality is located in north-western Greenland. The municipality stretches from slightly north of the polar circle in the south to approx. 81 degrees north.</p> |  |
| <p>Qeqqata Kommunia</p> | <p>Qeqqeta Municipality is located on the west coast of Greenland and holds approx. 10,000 people. The inhabitants are spread between 2 towns and 6 settlements.</p> |  |
| <p>Sermersooq Business Council</p> | <p>Sermersooq Business Council is a business development unit situated in Nuuk, the capital of Greenland.</p> |  |

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| <p>The North Denmark Chamber of Commerce and Industry</p> | <p>The North Denmark Chamber of Commerce and Industry is the region's largest business organisation representing approx. 500 Danish companies/persons within trade, industry, services and liberal professions. All companies actively contribute to the Aalborg region being an attractive region for business.</p> |  |
| <p>NORA – Nordic Atlantic Cooperation</p> | <p>NORA (Nordic Atlantic Cooperation) is an intergovernmental organisation under the Nordic Council of Ministers.</p> |  |

STAKEHOLDERS AND ACTORS IN THE ARCTIC

- Arctic states: Canada, Russia, U.S., Iceland, Norway, Sweden and Finland.
- Intergovernmental organisations
- Subnational governments
- Non-Arctic states (eg China, Japan, S. Korea, Singapore and others)
- Corporations (State-owned, national, and multinational)
- Environmental organisations
- Indigenous organisations

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