Drivers of change in the Nordic Arctic: Compiled keywords from nine exploratory scenario exercises 2015-2020

Annika E. Nilsson[1]

Keywords and phrases from nine scenario exercises in answer to the question: What future changes may influence this region economically, environmentally, and socially within the perspective of one to two generations? The number of participants varied across the exercises from two to almost 40. The results from Bodø 2015, Pajala, Inari and Kirovsk have been presented in (Nilsson et al. 2017b, 2017a). See also workshops reports for Pajala (Nilsson et al. 2015), Bodø 2015 and Kirovsk (van Oort et al. 2015), Kiruna (Nilsson 2020), Bodø 2015 (Reinar,n.d), and Ilulissat (Report from a scenario exercise in Ilulissat, Greenland, April 2018, see separate data file). The compilation was carried out for the book chapter Scenarios and surprises. When change is the only given. In S. Sörlin (Ed) Resource Extraction and Arctic Communities: The New Extractivist Paradigm, Cambridge University Press (Nilsson & Sarkki 2022). The categorization of the keywords and phrases presented here was carried out separately from the scenario exercise and is based on elements of the Shared socio-economic pathways (SSPs) (O'Neill *et al.* 2017), with the additional element Climate (change and impacts).

A= Alta, B1= Bodø 2015, B2= Bodø 2020, I= Inari, Il= Ilulissat, K=Kirovsk, Ki= Kiruna, N= Narsaq P=Pajala.

Demographics	
Demography	B1, P
Demographic structure	K
Cultural diversity	K
Morbidity	K
Population change/migration	I
Social: Demographic change and urbanization	Il
Increased urbanization	Il
The number of settlements declines significantly	Il
Worldwide migration	Il
Chinese influx of workforce, skilled + unskilled	Il
Aging but healthier population	Ki
Population decline, esp. Inland	Ki
Demographic change (climate refugees; aging population)	Ki
Outmigation, aging population	Ki
Inmigration	Ki
Flight from climate change, inmigration	Ki
Outmigration from the region	Ki
Urbanization	Ki
Closing of settlements	N

More social acceptance after generation shift relevant for healing etc.	B2
Much more varied demography: How will society adapt?	B2
Internationalization, increased cultural diversity as a consequence	B2
Immigration affects economic growth - positive - negative – opportunity? Risk=opportunity	B2
Equitable treatment helps us build a more inclusive society	B2
More diversity in the population as a result of immigration for different reasons	B2
Social: increased diversity	B2
Traditional knowledge as subject at the university.	B2
Human development	
Knowledge/competence	B1, P
Health	B1
Reflection (perception, culture)	K
Ideology/values	P
Values/worldviews	I
Traditional knowledge	I
Education	I
Communication	P
Education level	Il

[1] Corresponding address: annika.nilsson@vetani.se

Angallanneq. (Infrastructure) Education and work.	II
Promote education	II
Local education - Tourism – Fishing	II
Soc .: A.R.	II
New opportunities: For whom? Those who are involved, language	II
Asian tourism, investments require skills	II
Brain drain - lack of higher education in the region	II
Feeling of hopelessness	A
Sterotypes created by southerners	A
Less solutions	A
Young people's aspirations and creativity	A
Media problematizing change	A
Media adjusting to youth interests	A
Xenophobia	A
Narration of spaces, internally and externally	Ki
Political views of northern Sweden	Ki
Education	N
Value changes	B2
Nord University has closed down due to lack of applicants. Nordland problem no longer relevant for research	B2
Economy and lifestyle	
Energy/Petroleum	B1
Global economy	B1
Business structure	B1
Consumption	B1
Food security	B1
Mineral resources market	K
Energy markets	P
Raw materials markets	P
Economic development	P
Entrepreneurship	P
Local job market	P
Industrial economic development	I
Tourism	I
Business dev. in reindeer herding	I
Meat market prices	I
Relations to corporate actors	I
Naleqqussainen + nuttarterinuq (Adaptation / Renewal)	II
Naugrisanni naligusar - tuarneq (Local adaptation)	II
Faith in the future	II
Tourism's impact on economy culture & environment	II

Increased tourism and mobility	II
Tourism	II
Increased tourism; Driver: Airport	II
Mass tourism	II
Increased tourism	II
More who make a living from tourists	II
Tourism increases	II
Mass tourism	II
Economic change: tourism	II
Sustainable resource utilization	II
Green energy	II
Greater focus on sustainability	II
New business areas	II
New primary industry: Industrial solutions in a circular economy	II
Global financial crisis	II
Tourism	A
Adaptive educational system	A
Work spaces/employment	A
Making it attractive to come home	A
Economic cycles	Ki
Working conditions	Ki
Job opportunities	Ki
Tourism becomes a basic industry and competes with mining	Ki
Increased tourism in the region, better economy, environmental impacts	Ki
Workplaces	N
The fishery	N
Different export goods, more mines	N
Value changes	
Increased recognition for additional climate and environmental requirements, rules for citizens and civil society	B2
More hectic days=longer workdays (work life balance in the social dimension)	B2
Climate change-->new environmental awareness - Norwegians use Norway as vacation destination, less outdoor life	B2
Changing consumption patterns+reduction as a consequence of climate change and urbanization	B2
A center for blue and green business	B2
Growth replaced by development	B2
Increased awareness about sustainability→financing directed to projects with low climate footprints	B2
Economic crisis/recession boosts climate work	B2
Economically: sufficient labor force	B2

A center for green business	B2
Growth has been replaced by development	B2
Economically: awareness of sustainability -> finance is directed towards projects etc. with low climate footprint	B2
Economic crisis/recession boosts climate work	B2
More hectic days=longer workdays (work life balance in the social dimension)	B2
Policies and institutions	
International security	B1, P
New conflicts	B1
Security	B1
Local politics	B1
National politics	B1, I
Foreign policy	K
Power relations national-local	P
Laws and regulations	P
International cooperation	I
Indigenous rights	I
Influence on decisions	I
Political courage, geopolitics, political cooperation, foresight	II
CO2 quotas with all consequences included	II
Quick detachment (of Greenland from Denmark)	II
The Danish realm: Common realm or not	II
Improper central management/administration	II
Nuuk regional-local relationship (centralization-decentralization)	II
Decisions or lack of decisions about necessary local infrastructure	II
Increased sectorization versus increased cross-sectoral cooperation	II
Global ownership of values (vs local ownership)	II
Globalization ctr. Local growth	II
Global conflict that will impact locally	A
Relationship with the south	A
Relationship with neighboring countries	A
County merging	A
Resource management	A
Conflicts over natural resources	Ki
Global requirement for sustainable resources	Ki
Patriarchy busted	Ki
Further recognition of minorities	Ki
Cultivation border abolished	Ki

New laws with stricter rule for mineral extraction	Ki
Handmaid's tale becomes reality	Ki
Broken promises about local and regional politics	Ki
New generation in power (Greta)	Ki
New laws and rules about work	Ki
The military	N
Changes in governance	B2
New and shared living situations create new types of inhabitants and citizens	B2
Co-creation become the new normal	B2
Young people get more power to influence development	B2
Fewer municipalities	B2
Increased recognition for additional climate and environmental requirements, rules for citizens and civil society	B2
Technology	
Transport	B1
Technological development	K
Technology development	P
Transport/infrastructure	P
Technology/infrastructure	I
Harbor	II
Airport	II
Internet (high-speed broadband)	II
Technology and access to knowledge	II
Technology	II
Small satellite GN / innovation laboratories	II
New technologies lead to fewer people employed in mining	Ki
Digitalization and virtualization	Ki
Automation	Ki
New technologies enable sustainable mining and steel production	Ki
Communication infrastructure (cars, trains, aviation)	Ki
Housing	N
Digitalization affects social relations among people	B2
Increased digitalization - changed working life, and manners of meeting	B2
A shift from fossil to green energy	B2
Oil workers" create necessary technological installations for new energy	B2
Environmental. Transport/infrastructure	B2
Environment and natural resources	
Natural resources	B1
Environmental conditions	K

Mineral resources reserves	K
Ecosystem services	P
Ecosystems	P
Environmental damage	I
Renewable resources	A
Nearing the end of the mineral reserve	Ki
Increased interest in wind and hydropower	Ki
Closing of local mines	Ki
"Untouched" nature, silence	Ki
Warmer climate/fewer cold water raw materials	N
More fish species and animals	N
Society / environment: regenerative agriculture is implemented on a large and small scale, agriculture as part of the solution	B2
Food shortages due to climate change	B2
Food shortages - global food shortages affect food security - increased local food supply necessary	B2
Loss of biodiversity have consequences for ecosystem services, e.g. insects (pollination), water, food production	B2
Reindeer herding has died out	B2
Lack of land for development and ny building. Demands for effective use of land.	B2
Climate (change and impacts)	
Climate change + impacts	B1, P
Climate	I
Climate change	K
Unusual weather and ice	II
Faster than expected loss of sea ice	II

Stress on nature	II
Environment: Effects of rising ocean temperatures	II
Ecosystem shift	II
Fishing (Driver: Climate)	II
Climate (Fishing)	II
Ice free periods; number of months with sea ice	II
Changed ocean currents impacts on marine production	II
climate change	II
Climate change. Impact of the distribution of living resources	II
Environment: Iluliar suit allannguuuuteqernen: Change in ice conditions	II
Shipping tourism (accidents, environment) Icebergs!	II
Climate change	A
Winter becomes a scarse resrouce	Ki
Climate change	Ki
Shorter winters, less snow	Ki
Increased ocean acidification	B2
Climate change. More extreme weather, high sea level, etc.	B2
Environment/economy/society. Fisheries fail due to warmer sea. The ”skrei” (cod) is no longer present at Lofoten	B2
Increased vulnerability of physical infrastructure with extreme weather and increased technological vulnerability in the districts	B2
Climate change affect business structure	B2

References

Nilsson, A. E. (2020). *Gruvor och hållbar utveckling i norra Sverige - går det att förena? Rapport från en workshop i Kiruna 6 november 2019* (No. RITA-ABE-RPT-207), Stockholm, Sweden: Avdelningen för historiska studier av teknik, vetenskap och miljö, KTH. Retrieved from https://www.rexsac.org/publications/gruvor-och-hallbar-utveckling-norra-sverige/

Nilsson, A. E., Bay-Larsen, I., Carlsen, H., Jylhä, K., van der Watt, L.-M., & van Oort, B. (2017a). Future narratives. In AMAP, ed., *Adaptation Actions for a Changing Arctic – Perspectives from the Barents Area*, Oslo, Norway: Arctic Monitoring and Assessment Programme (AMAP).

Nilsson, A. E., Bay-Larsen, I., Carlsen, H., … van der Watt, L.-M. (2017b). Towards extended shared socioeconomic pathways: A combined participatory bottom-up and top-down methodology with results from the Barents region. *Global Environmental Change*, **45**, 124–132.

Nilsson, A. E., Carlsen, H., & van der Watt, L.-M. (2015). *Uncertain Futures: The Changing Global Context of the European Arctic. Report from a Scenario Workshop in Pajala,*

Sweden 9-10 March 2015 (No. 2015–12), Stockholm: Stockholm Environment Institute. Retrieved from http://www.sei-international.org/publications?pid=2833

Nilsson, A. E., & Sarkki, S. (2022). Scenarios and surprises: When change is the only given. In S. Sörlin, ed., *Resource Extraction and Arctic Communities: The New Extractivist Paradigm*, Cambridge University Press, p. ***-***.

O'Neill, B. C., Kriegler, E., Ebi, K. L., … Solecki, W. (2017). The roads ahead: Narratives for shared socioeconomic pathways describing world futures in the 21st century. *Global Environmental Change*, **42**, 169–180.

van Oort, B., Bjørkan, M., & Klyuchnikova, E. M. (2015). *Future Narratives for Two Locations in the Barents Region* (No. CICERO Report 2015:06), Oslo, Norway: CICERO Center for International Climate and Environmental Research - Oslo. Retrieved from http://hdl.handle.net/11250/2367371

Reinar, M., Vangelsten, B-V, Lundberg, A-K.A., Temesgen, A.K., Nilsson, A. (manuscript). Oppsummering fram workshop i Bodø 29 october 2020 [Report from workshop in Bodø, Norway 29 October 2020]. Bodø: Nordland Research Instituite.