



Learnings from the changing Arctic: economy, society, and sustainability

Jerbelle Elomina *, Ivana Živojinović *, Roy Robertsen , Seija Tuulentie & Pasi Rautio

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ABSTRACT

The European Arctic is experiencing rapid industrial expansion, driven by global demographic shifts and the transition to carbon-neutral economies. Traditional livelihoods such as reindeer husbandry, fishing, and hunting increasingly compete with industries like fish farming, mining, forestry, and tourism. This editorial examines the socio-economic and environmental implications of these developments, highlighting conflicts over land use, indigenous rights, and sustainability. This editorial recognises the benefits that the industries bring to the local communities while emphasising the need for genuine participation of local stakeholders and diversified economic strategies. It advocates for post-growth frameworks that balance economic, social, cultural, and ecological well-being while cautioning against unchecked industrial expansion.

KEYWORDS

Arctic development;
Indigenous rights; Social
License to Operate; Land use
conflicts; Sustainability

1. Introduction

Arctic research is continuously expanding as policymakers and industry leaders increasingly focus on the region in response to pressing issues such as climate change, the race for Arctic resources, and the vulnerability of Arctic ecosystems and communities, including Indigenous peoples (Aksnes et al., 2016, 2024; Stępień, et al., 2014). These trends are also present in the European Arctic, which is undergoing profound transformation, where traditional practices like reindeer husbandry, fishing, and hunting increasingly compete with expanding industries like fish farming, forestry, mining, and tourism (Glomsrød et al., 2021; Živojinović et al., 2024). These changes are primarily driven by global demographic shifts, coupled with the ongoing transition toward carbon-neutral societies. This shift has created an unprecedented demand for minerals and resources essential for the renewable energy infrastructure (Kirchner, 2020; Suopajarvi et al., 2022). However, this industrial expansion presents a complex paradox: while it offers economic opportunities, it simultaneously threatens the delicate balance of Arctic ecosystems and the cultural heritage of local and indigenous communities whose traditional livelihoods are intrinsically linked to these landscapes (Glomsrød et al., 2021; Manrique et al., 2018; Nygaard et al., 2024; Živojinović et al., 2024).

While current Arctic challenges deeply affect local communities, it is striking that research in the region remains dominated by the natural sciences—particularly Earth and Environmental Sciences—whereas the social sciences and humanities, which are essential for understanding societal impacts and changes, remain among the least represented fields (Aksnes et al., 2024; International Arctic Science Committee [IASC], 2024). Hence, this special issue aims to contribute to the social sciences and humanities scholarship by examining the socio-economic and environmental implications of industrial development in the European Arctic region. This paper also foregrounds local knowledge with particular attention to local and indigenous communities and their perspectives.

Through our work in the ArcticHubs project¹ and the studies in this special issue, we uncovered the intricate challenges of achieving sustainable and equitable development in the European Arctic. These challenges arise from the convergence of competing interests, diverse perspectives on development, and rapid environmental changes (AMAP, 2021; Bjerke et al., 2022; Elomina et al., 2024; Flick et al., 2022; Nilsson & Larsen, 2020). Addressing these challenges demands a nuanced, context-specific approach that places community involvement at its core, upholds Indigenous rights, and carefully balances economic

*Two equal first authorship

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development with environmental and socio-cultural sustainability. This requires the meaningful inclusion of local communities and Indigenous peoples in decision-making processes. Inclusion involves the active participation of local stakeholders in the design, implementation, and revision of development projects and policies that affect their lives and livelihoods, ensuring their voices are not only heard but acted upon (Johnsen, 2016; Martinez-Avila & Olander, 2024; Nygaard, 2016). Evidence shows that top-down, prescriptive policies and 'win-win' solutions often fail, as compromises are disproportionately borne by marginalised groups (Johansson et al., 2022; Larsen & Rasmus, 2023). Therefore, inclusive and genuine participatory processes are essential for the Arctic to move toward a shared and sustainable future.

We also advocate for moving beyond development models focused solely on economic growth, shifting instead toward approaches that prioritise sustainability, equity, and the well-being of all Arctic communities. This calls for integrating 'post-growth' frameworks, like de-growth and doughnut economics, which emphasise social and ecological health over relentless economic expansion (EEA, 2021; Raworth, 2012). Unchecked economic growth, especially when driven by foreign interests, may not be sustainable for the environment and Arctic communities, especially indigenous communities. A critical reassessment of current economic growth models and 'business as usual' strategies is necessary to achieve long-term stability and sustainability in the Arctic. Similarly, we advocate for diversification of economic activities that would help local communities avoid overreliance on single extractive industries, shielding them from the vulnerabilities of boom-and-bust cycles (Haikola & Anshelm, 2020; Larsen and Fondahl, 2014; Lindahl et al., 2023). Moreover, we align with our fellow researchers, Lindahl et al. (2018), Beling et al. (2018) and Hickel (2021) in advocating for a departure from consumption-driven lifestyles and cautioning against the misuse of concepts like sustainability and green transition as justifications for continued industrial expansion.

In the succeeding chapters, we elaborate on our viewpoint by first identifying the current challenges affecting the region, with particular focus on environmental, socio-cultural, and economic dimensions, all within the context of broader global drivers. Secondly, we discuss how local communities and indigenous populations perceive the impacts of ongoing economic development in the Arctic, especially in terms of socio-economic aspects. Lastly, we explore the solutions offered by indigenous and local communities for fostering sustainable economic development that strikes a balance between ecological preservation and socio-economic well-being

2. Challenges and global drivers in the European Arctic

Industry intensification in the European Arctic is largely driven by global population growth, rising living standards, and technological innovation. These factors increase the demand for food and energy production, construction materials, resource use, and technological advancements. Additionally, more people with the financial means are now able to travel long distances to explore diverse regions like the Arctic (Arnarsson et al., 2014; Stępień et al., 2016; Suopajärvi et al., 2022). Beyond these overarching global trends, specific industries have unique factors fuelling their growth: the fish farming and aquaculture industry is expanding to meet rising fish and fish products demands globally (Arnarsson & Justus, 2016); forestry is under increased pressure to meet timber demands as economies transition from fossil fuels to bio-based alternatives (Latola et al., 2016; Widmark et al., 2020); mining is scaling up to supply the minerals essential for the shift to carbon-neutral societies (Tolvanen et al., 2019; van Dam et al., 2016); and tourism is growing as greater accessibility and increased travel capacity allow more tourists and cruise ships to visit the Arctic (Glomsrød et al., 2021; Latola et al., 2016). These industrial expansions, however, impact local and indigenous communities, cultures, and traditional livelihoods as well as the environment (Flick et al., 2022; Suopajärvi et al., 2022; Zivojinovic et al., 2022).

2.1. Socio-cultural challenges

The expansion of industries often conflicts with traditional land use. Case in point, the conversion of lands traditionally used for reindeer herding to mining areas reduces pasture land, interrupts reindeer herding routes, and changes reindeer behaviour (Holand et al. 2022; Latola et al., 2016). Expansion of forestry activities is considered to be the most impending threat to reindeer husbandry, as forest activities (e.g. extensive logging, rigorous replanting, fertilisation, soil scarification, and

fire suppression) decrease the availability of ground and arboreal lichens, which are crucial reindeer food, especially in winter (Kivinen et al., 2010; Sandström et al., 2016). However, it is important to note that reindeer grazing itself can also impact pasture quality. In many areas, traditional grazing rotations have been disrupted by the current management structure of reindeer husbandry, forcing reindeer to graze in the same areas year-round. This continuous grazing leads to the trampling and degradation of lichen cover, further contributing to pasture deterioration (Akujärvi et al., 2014).

Rapid expansion of fish farming also brings social sustainability challenges, as increasing foreign ownership and investments often undermine local community initiatives, as seen in Iceland (Nygaard et al., 2024; Robertsen et al., 2024). In Norway, the aquaculture industry is predominantly Norwegian-owned, encompassing a mix of international, regional, and local companies. The primary discussions in Norway focus on issues of coexistence, particularly in relation to traditional fisheries, environmental sustainability, and the industry's growth. When it comes to tourism, small-to-medium-sized enterprises, and most notably cruise tourism, clash with traditional land use; for example, nature-based tourism in Nuuk resulted in banning traditional whale hunting due to tourist demands (Zivojinovic et al., 2022). Tourism also raises house rents for residents and increases noise pollution around tourist areas (Tommervik et al., 2025). However, it should be noted that local communities also benefit from tourism rather than being disrupted by overcrowding (Tuulentie et al., 2024). Cruise tourism, for its part, has minimal communication and coordination with local communities, which exacerbates problems of acceptance and trust of the local people with the tourism industry (Ólafsdóttir et al., 2024).

Another challenge facing the Arctic today is the continuous outmigration and the ageing demographics. Young people are seeking education and employment opportunities in cities and urban areas, which is a significant challenge for remote Arctic communities. More women are getting an education away from their towns, thereby decreasing birth rates. This trend results in population decline, reduces the tax base, and strains essential services (Kirchner, 2020; Stępień et al., 2016; Yeasmin et al., 2020; Zivojinovic et al., 2024).

2.2. Economic challenges

Industries such as mining, fish farming, forestry, and tourism play a critical role in job creation and economic growth in the Arctic. These industries provide employment in remote, sparsely populated areas, stabilising local populations and reducing outmigration. Additionally, they contribute tax revenues that support public services and infrastructure improvements, often leading to the creation of new businesses and services, which further boost local economies (Glomsrød et al., 2017, 2021; Stępień et al., 2016). For instance, mining in Kittilä, Finland, has spurred infrastructure development and attracted new residents, while fish farming expansion in Iceland's Westfjords has fostered population growth and economic vitality (Elomina et al., 2024). Infrastructure investment is a key benefit accompanying industrial growth, as these sectors drive improvements in transportation networks, communication systems, and community facilities. Such investments enhance accessibility, facilitate trade, and improve the quality of life for residents (Brutschin & Schubert, 2016; Latola et al., 2016; Zivojinovic et al., 2022). In Gällivare, Sweden, mining has led to road upgrades and recreation and apartment establishment that aid both the industry and the municipality. Similarly, aquaculture expansion in the Faroe Islands has improved port facilities and road networks, benefiting local communities and businesses alike (Elomina et al., 2024).

Despite these benefits, dependency on a single industry is often risky, as industries are highly dependent on fluctuating commodity prices that are dictated by the global market. This dependence makes them vulnerable (Accastello et al., 2019; Frederiksen & Kadenic, 2020; Haikola & Anshelm, 2020). As seen in Norway and Sweden, local communities often face economic despair due to the loss of a key industry when mining companies go bankrupt (Frederiksen & Kadenic, 2020; Garbis et al., 2024). Another significant concern is the uneven distribution of benefits. Although many Arctic industries remain largely state-owned, benefit-sharing mechanisms are inadequate, with much of the revenue flowing to company headquarters outside the municipalities where industry activities are located. These challenges risk being exacerbated by the growing presence of foreign ownership (Nygaard et al., 2024). These limits local economic gains and contribute to social inequality (Wilson, 2019; Zivojinovic et al., 2022). Furthermore, a considerable portion of the workforce in Arctic mining consists of fly-in-fly-out workers, which further restricts long-term economic benefits and

hampers skill development within local communities (Garbis et al., 2024; Storey, 2010; Zivojinovic et al., 2024).

Similarly, tourism and certain types of fishing are highly seasonal, leading to job instability and income insecurity. This seasonality exacerbates outmigration, making it difficult for Arctic communities to maintain a stable economic base (Stępień et al., 2016). However, in some cases, tourism has contributed positively by attracting new residents to municipalities like Inari and Kittilä in Finnish Lapland. A persistent challenge, though, is that seasonal workers often do not pay taxes to the municipalities where they work temporarily, limiting the financial benefits for local governments (Bogadóttir et al., 2022). Tourism is also highly susceptible to economic shocks and unforeseen events; for example, the COVID-19 pandemic severely disrupted the industry, drastically reducing international tourists and halting cruise tourism (Nygaard et al., 2024; Ólafsdóttir et al., 2024).

2.3. Environmental challenges

Environmental impacts in the European Arctic are severe and multifaceted. Although not the central focus of this special issue, it is important to briefly acknowledge the region's challenges: the Arctic is warming nearly four times faster than the global average, driving widespread glacial melt and permafrost thaw. This rapid warming directly affects all economic activities in the region, with particularly severe consequences for local and indigenous communities (AMAP, 2021; IASC, 2024).

In forestry, climate change brings higher risks of extreme weather that triggers new pests and diseases. Short and warm winters also result in a lack of frozen ground needed for harvesting, which affects production. In mining, there is an intensification of activities as demand for minerals essential to green energy transitions grows. In fish farming, ocean acidification and rising sea temperatures affect fish farming practices and attract more interest in Arctic regions for salmon farming—leading to conflicts with Sámi fishers and traditional hunting practices in areas like Nuuk. Nature-based and winter tourism are also impacted, as shorter snow seasons and unpredictable weather make Arctic attractions more difficult to rely on. Rising sea temperatures have made the region more accessible to cruise ships, spurring 'last-chance tourism,' where visitors rush to see the Arctic before further climate impacts alter its landscapes (Bjerke et al., 2022; Flick et al., 2022; Lesser & Suopajärvi, 2022; Stępień et al., 2016). Climate change also hits indigenous livelihoods particularly hard, disrupting traditional practices like reindeer herding due to changing weather patterns and declining lichen availability, which threatens this centuries-old way of life (Bjerke et al., 2022; Holand et al., 2022; Lesser & Suopajärvi, 2022; Sarkki et al., 2025).

Industrial activities pose additional environmental challenges. Fish farming results in nutrient release, escapes, sea lice, and diseases. The expansion of fish farming operations into offshore locations may lead to conflicts with other industries, such as offshore fisheries, oil and gas production, and wind power (Arnarsson & Justus, 2016; Nygaard et al., 2024). Forestry practices, especially in Sweden, face criticism due to the conflict with Sámi reindeer herding communities, primarily because of landscape fragmentation and reduced availability of lichen. Additionally, forestry operations disrupt wild animal habitats and traditional Sámi hunting practice (Sandström et al., 2016; Sjölander-Lindqvist & Sandström, 2019). Mine expansion often overlaps with traditional Sámi lands, disrupting reindeer migration routes and fragmenting grazing areas. The infrastructure associated with mining, such as roads and railroads, contributes to habitat fragmentation and increases the risk of reindeer roadkill. Furthermore, mining dust can affect lichen growth, further impacting reindeer foraging. Unsustainable mining practices also pollute the environment, impacting water quality and overall ecosystem health (Dyca et al., 2024; Nygaard et al., 2022; van Dam et al., 2016). Tourism activities, e.g. snowmobiling and husky safaris, disturb reindeer routes and behaviour. Mass tourism results in littering, wear and tear on natural areas, pollution, and increasing ship traffic negatively impacts marine wildlife and vegetation and heritage environments (Bogadóttir et al., 2022; Chen et al., 2020). Biodiversity loss presents another critical challenge, particularly in sectors such as forestry, mining, and fish farming. These industries contribute to habitat fragmentation and loss, disrupting ecological balance and threatening species dependent on undisturbed environments (Flick et al., 2022).

3. Local stakeholders perceived impacts

We highlight the diverse and often conflicting perspectives regarding the current operations and impacts of economic activities in the Arctic, particularly at a very local level between communities, city councils, indigenous populations, and representatives of the economic sectors.

3.1. Tensions between economic growth, environmental sustainability and cultural conservation

Studies reveal a recurring tension between those who see economic growth as the primary goal of development and those who prioritise environmental sustainability and the protection of cultural heritage. This tension is evident in the contrasting perspectives on industries like mining, fish farming, tourism, and forestry. Local stakeholders in Kittilä (Finland), Gällivare (Sweden), Egersund (Norway), Nuuk (Greenland), and Suduroy (Faroe Islands) have contrasting perspectives on this matter. Some local stakeholders agree on prioritising nature alongside upholding indigenous rights, while some agree that industry growth should be prioritised as it is equal to local community development. However, it should be noted that there are also neutral perspectives that are critical of industry activities, as stakeholders acknowledge the positive and negative impacts of the industries. Westfjords (Iceland) is an exception, as local perspectives are focused on local infrastructure growth, since the tourism sector is not as developed compared to other study sites (Elomina et al., 2024, 2025).

3.2. Social license to operate: a crucial factor for acceptance

There is a sense of distrust among some local communities, particularly indigenous groups, towards external actors, including governments and large corporations, particularly concerning their commitment to environmental and cultural sustainability. This distrust stems from historical experiences of exploitation and a perception that decisions are often made without adequate involvement or consideration of local interests (Bowles & MacPhail, 2022; Heikkinen et al., 2016; Thisted, 2019). Local stakeholders also agree that there is a lack of transparent processes in the development of their communities, and participants doubt that people's voices are heard and considered in decision-making (Robertsen et al., 2024)

Building trust and ensuring transparency are crucial for fostering acceptance of development projects. Companies need to demonstrate a genuine commitment to involving communities in decision-making, addressing their concerns, and mitigating potential negative impacts. This requires going beyond superficial consultations and actively incorporating local knowledge and perspectives into decision-making processes (Edwards et al., 2016; Wyatt, 2016). Additionally, this also means that members of local communities and indigenous groups have equal opportunities and resources to participate in decision-making processes. Ólafsdóttir et al. (2024) emphasised that fostering awareness of each stakeholder group's motivation helps to build trust among all parties involved.

4. Local-based solutions

4.1. Towards a more sustainable and just future

Local stakeholders recognise the role of industries in economic development, but hold diverse values and beliefs about the direction of development (James et al., 2020; Moritz et al., 2017). Striking a balance is essential but challenging, underscoring the need for transparent, inclusive processes that engage all stakeholders. In Sweden, scholars call for a deliberative democracy, meta-consensus, and structured disagreement, which can provide a venue for local stakeholders to air their concerns and discuss possible solutions. However, agreements are not the aim of these discussions, but understanding each other's motivations in order to build trust (Elomina et al., 2024; Johansson et al., 2022; Martinez-Avila & Olander, 2024). In Inari, efforts have been made to engage local stakeholders in developing a toolkit with commonly agreed-upon principles for forest management, aimed at reducing risks associated with wood procurement. This approach, for example, seeks to mitigate negative impacts and, from a reindeer husbandry perspective, offers improvements over previous practices (Lidestav et al., 2022).

Additionally, respecting indigenous rights and incorporating their knowledge into current practices are essential. Incorporating methods like Public Participation GIS (PPGIS) into planning, zoning, and reindeer husbandry plans assures that the indigenous communities co-create the solutions to current challenges (Engen et al., 2018; Turunen et al., 2024). In Sweden, the use of RenGIS – a custom-developed tool for the co-production of knowledge—combines traditional knowledge among reindeer herding communities with updated data on other land uses such as mining and forestry. The tool incorporates up-to-date tracking of reindeer, their routes, and grazing areas, which are crucial data for developing reindeer husbandry plans. RenGIS facilitates analysis and visualisation of data by reindeer herders as a direct response to their present needs (Sandström et al., 2024). Additionally, the automated unmanned forestry machine, aimed to enable small-scale targeted operations, is a tool developed to facilitate socially responsible Lean Forestry. This is to decrease the negative impacts of forestry on, e.g. reindeer husbandry and other land use modes. Particular focus was given to leaving lichens untouched as much as possible during soil scarification and planting (Rautio et al., 2023). However, it should be noted that while technological advances are promising, they are not a cure-all. Technologies should be adopted with a strong ethical framework, ensuring respect for local communities' and indigenous groups' needs and data-sharing requirements, rather than just industrial stakeholders.

Empowering local communities to have greater control over development trajectories is crucial for ensuring that development aligns with their values and priorities (Arctic Council 2016; SWDG, 2019). Businesses and policymakers must heed these local voices to build mutual trust and sustainable partnerships. Involving local stakeholders in decision-making in the early stages of project conceptualisation is crucial for local stakeholders to have a sense of ownership (Martinez-Avila & Olander, 2024). In Kittilä, they created a collaboration group where representatives from the municipal council, locals, reindeer herders, and environmentalists gather 2–4 times per year to discuss topical issues, creating a proactive dialogue. In Inari, indigenous communities and locals are part of designing tourism experiences, thereby giving them control over which part of Sami or Finnish culture should be highlighted (Keskitalo et al., 2021; Zivojinovic et al., 2022).

5. Special issue

This editorial draws from the contributions to this special issue, *'Sustainability Challenges in the Arctic: Exploring Land Use Changes and their Impacts'* This special issue aims to contribute to a better understanding of the complex socio-economic challenges currently facing the Arctic.

Suopajärvi et al. (2024) emphasised the geopolitical tensions in the European Arctic about aquaculture, forestry, mining, and tourism in the context of the ongoing Russia-Ukraine war. The study underscores that local industries in the European Arctic are deeply interconnected with global markets and that geopolitical tensions create significant boundary conditions for their economic operations. The authors express hope for continued cooperation to ensure peace and sustainable development in the region. Nygaard et al. (2024) explored global drivers that affect key industries and their impacts. The authors proposed key solutions and strategies per sector, with technological innovation and meaningful engagement with local and Indigenous communities as common to all the industries. A cross-industry approach to learning and collaboration is also highlighted as necessary to navigate the complex and interconnected global drivers affecting the region.

While the previous papers analysed global dynamics, Živojinović et al. (2024) shift the focus to a local scale. Their paper examined the socioeconomic impacts of the key industries on local communities and explored land use conflicts arising from competing economic activities. The authors identified that many economic activities are focused on growth without adequately considering the environmental limits and the needs of local and indigenous communities. They stress the critical need for the participation of all actors in future developments to mitigate the negative impacts of industrial activities. The study also advocates for the development of alternative economic activities that are more aligned with the needs of these communities. Flick et al. (2025), on the other hand, addresses Arctic challenges and industry impacts by using the Driver-Pressure-State-Impact-Response (DPSIR) framework to systematically analyze extensive datasets on environmental impacts and change in the European Arctic. The study argues that the DPSIR framework provides a snapshot of environmental change, considering the multifaceted characteristics of the 17 case-

study locations, and serves as a communication tool that facilitates stakeholder engagement and mutual learning.

Delving deeper into specific cases, Turunen et al. (2024) investigated the case of reindeer herders' perspectives on land use challenges and conflicts in the Sámi homeland in Inari, Finland. A key message from the research is that the herders are not just concerned about any single land use, but rather the combined and cumulative impact of all these activities, which fragment and degrade valuable pasturelands. The findings indicated that any new land uses should be directed toward existing population centres and infrastructure. The authors strongly advised against developing new activities in important grazing areas and wilderness, which are essential for the sustainability of their traditional livelihood. Ólafsdóttir et al. (2024) explored social acceptance and trust in cruise tourism in Iceland and the Faroe Islands. The study reveals a significant disconnect between the non-regionally owned cruise companies and the local ports and communities. While cruise companies dominate itinerary planning, there is minimal communication and collaboration between destinations, which often compete for business. This power imbalance leads to varying levels of social acceptance, heavily influenced by whether local stakeholders benefit economically. The authors suggest that achieving a sustainable future for Arctic cruise tourism requires ongoing dialogue, mutual understanding, and collaboration between cruise companies, local communities, and passengers to co-create solutions that balance economic benefits with cultural and environmental protection. Tommervik et al. (2025) focused on high-Arctic cultural heritage environments being deteriorated by cruise tourism in Svalbard. The research highlights that human trampling, a direct result of cruise tourism, is a major cause of vegetation degradation, compounded by climate change, erosion and permafrost thaw. In response, the heritage management authorities have recognised the need for a monitoring program, which will track the effects of tourism and human trampling on cultural heritage monuments and their surrounding environments to inform future management decisions.

Looking to the future, Sarkki et al. (2025) examined land use futures related to reindeer herding in Finland, aiming to refine methodologies for exploring potential futures. The study highlights that land use and governance are the most critical issues for the future of reindeer herding. The 'wild logic' approach proved effective in generating novel scenarios, particularly those incorporating affirmative governance, which consistently appeared to be the most favourable option for reindeer herders across different futures. Their suggested wild logic method provides a structured way to imagine more diverse and equitable futures for Indigenous and local communities.

Together, these papers present a powerful narrative of the European Arctic at a critical tipping point, where accelerating global economic and geopolitical forces clash with fragile ecosystems and deeply rooted local and Indigenous realities. This special issue demonstrates how current development models drive escalating land-use conflicts, threatening cultural heritage and traditional livelihoods, and makes an evidence-based call for a fundamental shift toward more equitable, participatory governance that recognises Indigenous rights.

6. Outlook and future research

Based on the studies in this special issue and the current literature, several research needs have emerged. There is a need for more comparable data and qualitative studies, especially on local levels, to enable a thorough interpretation of industry impacts. Future research should prioritise gathering qualitative data, such as in-depth interviews, focus groups, and ethnographic studies, to provide a more nuanced understanding of the lived experiences of local communities and stakeholders affected by industrial activities, including their current stance on local development.

There is also a need for long-term monitoring and evaluation of industry impacts to track their evolving effects over time, particularly in light of current geopolitics, security issues, global drivers such as climate change, and changing market demands. Future research should establish longitudinal studies that monitor social, economic, environmental, and cultural indicators affected by industrial activities at local levels. This would allow researchers to identify impacts of cumulative effects, assess

the effectiveness of mitigation measures, and adapt locally fitted development strategies based on emerging trends and challenges.

Further research is needed to evaluate the effectiveness of existing policies, identify gaps and challenges, and explore innovative policy instruments and governance approaches for promoting sustainable and inclusive development. Lastly, studies are needed to understand why, despite claims from industries and local councils that engagement with stakeholders is established, these efforts may still fall short, as the ongoing call for true and inclusive dialogue from local stakeholders raises questions about the effectiveness of existing mechanisms.

Note

1. ArcticHubs aims to develop sustainable, solution-oriented responses for the reconciliation of competing livelihoods and land-use modes in Arctic hubs – hotspots of livelihoods in the area – and their surroundings, whilst respecting the needs and cultures of local populations. <https://projects.luke.fi/arctichubs/>

Author contributions

CRedit: **Jerbelle Elomina** *: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing; **Ivana Živojinović** *: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Writing – original draft, Writing – review & editing; **Roy Robertsen**: Formal analysis, Investigation, Writing – review & editing; **Seija Tuulentie**: Project administration, Supervision, Validation, Writing – review & editing; **Pasi Rautio**: Project administration, Resources, Supervision, Validation, Writing – review & editing.

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References

- Accastello, C., Bieniasz, A., Blaško, R., Lula, M., Pzenny, D., Sallustio, L., Šimunović, N., Vošvrđová, N., & Speelman, E.N. (2019). Conflicting demands on the Natural resources in Northern Sweden: A participatory scenario development study. *Journal of Environmental Assessment Policy and Management*, 21(3), 1950017. <https://doi.org/10.1142/S1464333219500170>
- Aksnes, D.W., Danell, R., Kullerud, L., & Nilsson, L.M. (2024). *Arctic Research Trends: External Funding 2016-2022*. With assistance of SCITE team, Keith Larson, Diane Hirshberg. Arctic Centre at Umeå University (pp. 1–28). <https://doi.org/10.5281/ZENODO.10521422>
- Aksnes, D.W., Osipov, I., Moskaleva, O., & Kullerud, L. (2016). *Arctic Research Publication Trends: A Pilot Study*. UArctic. Rovaniemi, Finland (pp. 1–62). <https://www.uarctic.org/activities/thematic-networks/research-analytics-and-bibliometrics/publications/>.
- Akujärvi, A., Hallikainen, V., Hyppönen, M., Mattila, E., Mikkola, K., & Rautio, P. (2014). Effects of reindeer grazing and forestry on ground lichens in Finnish Lapland. *Silva Fenn*, 48(3). <https://doi.org/10.14214/sf.1153>
- Arctic Council. (2016). Arctic resilience report. In M. Carson & G. Peterson. (Eds.), Stockholm environment Institute and Stockholm Resilience Centre, Stockholm. <http://www.arctic-council.org/arr>.
- Arctic monitoring and assessment programme. (2021). Arctic climate change update, 2021: Key trends and impacts. Summary for Policy-makers. Retrieved July 19, 2024, from <https://www.amap.no/documents/download/6759/inline>.
- Arnarsson, S., & Justus, D. (2016). Changing nature of Arctic Fisheries. In A. Stępień, T. Koivurova, & P. Kankaanpää (Eds.), *The changing Arctic and the European Union. A book based on the report "strategic assessment of the development of the Arctic assessment conducted for the European Union"* (Vol. 89, pp. 115–136). Brill Nijhoff (Nijhoff law specials).

- Annarsson, S., van Dam, Kim, S., Annette, S., Adam, S., & Mikko. (2014). The strategic assessment of development of the Arctic: An assessment conducted for the European Union. Report is a deliverable within the preparatory action “strategic environmental impact assessment of development of the Arctic. In A. Stępień, T. Koivurova, & P. Kankaanpää (Eds.), *Commissioned by the European Commission’s environment directorate General*. Arctic Centre. University of Lapland.
- Beling, A.E., Vanhulst, J., Demaria, F., Rabi, V., Carballo, A.E., & Pelenc, J. (2018). Discursive synergies for a ‘great transformation’ towards sustainability: Pragmatic contributions to a necessary dialogue between human development, degrowth, and Buen Vivir. *Ecological Economics*, 144, 304–313. <https://doi.org/10.1016/j.ecolecon.2017.08.025>
- Bjerke, J.W., Tømmervik, H., López-Blanco, E., Stribern, A., Davids, C., Nikula, A., Ólafsdóttir, R., Karlsen, S., Høgda, K., Sandström, P., Turunen, M., Rikkonen, T., Bogadóttir, R., Tuulentie, S., Arneberg, M., Siikavuopio, S., Myntti, E., Jonsson, N., Zinglersen, K., Miettinen, J. (2022). D2.4. Changes in the Arctic environment as result of climate change, D8 (pp. 1–176). Zenodo. <https://doi.org/10.5281/zenodo.17376812>
- Bogadóttir, R., Ólafsdóttir, R., Tuulentie, S., Lyng-Pedersen, K., Simonsen, A., & Sandström, P. (2022). Annex 4_D3.2_Tourism. In I. Zivojinovic, M. Elomina et al. (Eds.), *Report about context and effects of existing and new economic activities on local societies and cultures*. ArcticHubs, H2020 (pp. 305–426). <https://doi.org/10.5281/zenodo.14830971>.
- Bowles, P., & MacPhail, F. (2022). Social licence comes to Greenland’s mining sector: Will communities be empowered? *ARCTIC*, 74(4), 496–508. <https://doi.org/10.14430/arctic74038>
- Brutschin, E., & Schubert, S.R. (2016). Icy waters, hot tempers, and high stakes: Geopolitics and Geoeconomics of the Arctic. *Energy Research and Social Science*, 16, 147–159. <https://doi.org/10.1016/j.erss.2016.03.020>
- Chen, J.S., Wang, W., Jensen, O., Kim, H., & Liu, W.-Y. (2020). Perceived impacts of tourism in the Arctic. *Journal of Tourism and Cultural Change*, 1–15. <https://doi.org/10.1080/14766825.2020.1735403>
- Dyca, B., Carsjens, G.J., Endl, A., & Gugerell, K. (2024). Beyond the surface: An analysis of the institutional regime in the extractive industries in Sweden and Spain. *Ecological Economics*, 226, 108321. <https://doi.org/10.1016/j.ecolecon.2024.108321>
- Edwards, P., Lacey, J., Wyatt, S., & Williams, K.J.H. (2016). Social licence to operate and forestry – an introduction. *Forestry*, 89(5), 473–476. <https://doi.org/10.1093/forestry/cpw036>
- Elomina, J., Živojinović, I., Calanasan, K., &. (2024). D3.4. Synthesis report comparative analysis on socio-cultural effects. Deliverable 3.4. H2020 ArcticHubs project with assistance of Isidora Dabic, Stojan Ivanovic, Helga Pülzl, Antonia Lindau, Harald Vacik, Marco Giardino et al. BOKU University - University of Natural Resources and Life Sciences. Vienna, Austria.
- Elomina, J., Živojinović, I., Lidestav, G., Sandström, P., Sandström, S., & Pülzl, H. (2025, 1). Local stakeholder’s perspectives on development of economic activities: The gällivare case. Article no. *Extractive Industries and Society*, 23(1), 101664. <https://doi.org/10.1016/j.exis.2025.101664>
- Engen, S., Runge, C., Brown, G., Fauchald, P., Nilsen, L., & Hausner, V. (2018). Assessing local acceptance of protected area management using public participation GIS (PPGIS). *Journal for Nature Conservation*, 43, 27–34. <https://doi.org/10.1016/j.jnc.2017.12.002>
- European Environment Agency. (2021). Growth without economic growth. Drivers of change. Sustainability transitions. Retrieved March, 2022, from <https://www.eea.europa.eu/en/analysis/publications/growth-without-economic-growth>
- Flick, H., Terås, J., & Ellingsen, M.B. (2022). *Changes in the Arctic environment as result of hub activity, D 2.3. Grant 869580*. NORCE Norwegian Research Centre AS.
- Flick, H., Terås, J., Kartveit, B., & Nilsen, T. (2025). Applying the DPSIR framework to a Nordic Arctic context – opportunities and challenges. Special Issue: Sustainability Challenges in the Arctic: Exploring Land Use Changes and Their Impacts. In *Journal of Land Use Science*, 20(1), 197–220. <https://doi.org/10.1080/1747423X.2025.2557798>
- Frederiksen, A., & Kadenic, M.D. (2020). Mining the north: Local impacts. *Labour Economics*, 63, 101790. <https://doi.org/10.1016/j.labeco.2019.101790>
- Garbis, Z., Heleniak, T., Poelzer, G., Söderberg, C., & Orttung, R. (2024). “The ketchup effect”: Challenges in reconciling growth and justice in Northern Sweden’s green transition. *Energy Research and Social Science*, 112, 103537. <https://doi.org/10.1016/j.erss.2024.103537>
- Glomsrød, S., Aslaksen, I., Duhaime, G., Caron, A., Lévesque, S., & Lemelin, A. (2017). The economy of the north 2015. <https://www.ssb.no/en/natur-og-miljo/artikler-og-publikasjoner/the-economy-of-the-north-2015>
- Glomsrød, S., Duhaime, G., & Aslaksen, I. (Eds.) (2021). The economy of the north 2020. ECONOR. Oslo-Kongsvinger: Statistisk sentralbyrå (Statistical analyses/Statistics Norway, 167). https://www.ssb.no/en/natur-og-miljo/artikler-og-publikasjoner/_attachment/454081?_ts=1797e6e7a00
- Haikola, S., & Anshelm, J. (2020). Evolutionary governance in mining: Boom and bust in peripheral communities in Sweden. *Land Use Policy*, 93, 104056. <https://doi.org/10.1016/j.landusepol.2019.104056>
- Heikkinen, H.I., Lepy, E., Sarkki, S., & Komu, T. (2016). Challenges in acquiring a social licence to mine in the globalising Arctic. *The Polar Record*, 52(4), 399–411. <https://doi.org/10.1017/S0032247413000843>
- Hickel, J. (2021). What does degrowth mean? A few points of clarification. *Globalizations*, 18(7), 1105–1111. <https://doi.org/10.1080/14747731.2020.1812222>
- Holand, Ø., Horstkotte, T., Kumpula, J., & Moen, J. (2022). Reindeer pastoralism in Fennoscandia. In Horstkotte, T., Holand, Ø. Kumpula, J. (Eds.), *Reindeer husbandry and global environmental change* (pp. 7–47). Routledge (Earthscan studies in natural resource management).

- International Arctic Science Committee. (2024). IASC state of Arctic Science report 2024.
- James, L., Olsen, L.S., & Karlsdóttir, A. (2020). Sustainability and cruise tourism in the arctic: Stakeholder perspectives from Ísafjörður, Iceland and Qaqortoq, Greenland. *Journal of Sustainable Tourism*, 28(9), 1425–1441. <https://doi.org/10.1080/09669582.2020.1745213>
- Johansson, A., Lindahl, K.B., & Zachrisson, A. (2022). Exploring prospects of deliberation in intractable natural resource management conflicts. *Journal of Environmental Management*, 315, 115205. <https://doi.org/10.1016/j.jenvman.2022.115205>
- Johnsen, K.I. (2016). Land-use conflicts between reindeer husbandry and mineral extraction in Finnmark, Norway: Contested rationalities and the politics of belonging. *Polar Geography*, 39(1), 58–79. <https://doi.org/10.1080/1088937X.2016.1156181>
- Keskitalo, E., Carina, H., Schilar, H., Cassel, H., Susanna, P., & Albina. (2021). Deconstructing the indigenous in tourism. The production of indigeneity in tourism-oriented labelling and handicraft/souvenir development in Northern Europe. *Current Issues in Tourism*, 24(1), 16–32. <https://doi.org/10.1080/13683500.2019.1696285>
- Kirchner, S. (2020). Migration and sustainable development in the European Arctic. In N. Yeasmin, W. Hasanat, J. Brzozowski, & S. Kirchner (Eds.), *Immigration in the circumpolar north. Integration and resilience* (pp. 176–192). Routledge.
- Kivinen, S., Moen, J., Berg, A., & Eriksson, Å. (2010). Effects of modern forest management on winter grazing resources for reindeer in Sweden. *Ambio*, 39(4), 269–278. <https://doi.org/10.1007/s13280-010-0044-1>
- Larsen, J.N.; & Fondahl, G., (Eds.). (2014). Arctic human development report. Regional processes and global linkages. *Norden Denmark*. <https://doi.org/10.6027/TN2014-567>
- Larsen, K., & Rasmus, R. (2023). Protected areas and indigenous rights in Sápmi: An agonistic reading of conflict and collaboration in land use planning. *Journal of Environmental Policy & Planning*, 25(3), 342–354. <https://doi.org/10.1080/1523908X.2022.2137483>
- Latola, K., Sarkki, S., Stępień, A., & Jokinen, M. (2016). Activities affecting land use in the European Arctic. In A. Stępień, T. Koivurova, & P. Kankaanpää (Eds.), *The changing Arctic and the European Union. A book based on the report "strategic assessment of the development of the Arctic assessment conducted for the European Union"* (Vol. 89, pp. 186–212). Brill Nijhoff (Nijhoff law specials).
- Lesser, P., & Suopajarvi, L. (2022). D 1.4. Climate change impacts in different industries and Arctic hubs - project report. EU horizon 2020. Grant 869580. ArcticHubs.
- Lidestav, G., Sandström, S., & Sandström. (2022). Annex 1_D3.2_Overview of socio-economics in forestry hubs. In report about context and effects of existing and new economic activities on local societies and cultures.
- Lindahl, B., Karin, J., Andreas, Z., & Anna, V. (2018). Competing pathways to sustainability? Exploring conflicts over mine establishments in the Swedish mountain region. *Journal of Environmental Management*, 218, 402–415. <https://doi.org/10.1016/j.jenvman.2018.04.063>
- Lindahl, B., Karin, S., Leena, T., Mari, P., Gregory, E., & Toni. (2023). Factors affecting local attitudes to mineral exploration: What's within the company's control? *Resources Policy*, 84, 103715. <https://doi.org/10.1016/j.resourpol.2023.103715>
- Manrique, D.R., Völker, T., Zoghbi, J., & Pereira, Â.G. (2018). Arctic: Traditional knowledge. *Livelihoods and Community Engagement*. <https://doi.org/10.2760/61611>
- Martinez-Avila, C., & Olander, S. (2024). Stakeholder participation in the implementation of urban property development projects. *Construction Management & Economics*, 42(10), 926–941. <https://doi.org/10.1080/01446193.2024.2361789>
- Moritz, T., Ejdemo, T., Söderholm, P., & Wårell, L. (2017). The local employment impacts of mining: An econometric analysis of job multipliers in northern Sweden. *Mineral Economics*, 30(1), 53–65. <https://doi.org/10.1007/s13563-017-0103-1>
- Nilsson, A.E., & Larsen, J.N. (2020). Making regional sense of global sustainable development indicators for the Arctic. *Sustainability*, 12(3), 1027. <https://doi.org/10.3390/su12031027>
- Nygaard, V. (2016). Do indigenous interests have a say in planning of new mining projects? Experiences from Finnmark, Norway. *Extractive Industries and Society-an International Journal*, 3(1), 17–24. <https://doi.org/10.1016/j.exis.2015.11.009>
- Nygaard, V., Engen, S., Suopajarvi, L., Edvardsdóttir, A.G., Iversen, A., Bogadóttir, R., Tuulentie, S., Bjerke, J.W., Ólafsdóttir, R., Rautio, P., Elomina, J., & Miettinen, J. (2024). Industry-Specific Impacts of Global Drivers in the European Arctic. *Journal of Land Use Science*, 19(1), 150–169. <https://doi.org/10.1080/1747423X.2024.2358951>
- Nygaard, V., Strugstad, M.P., & Thjømøe, P. (2022). Annex 3_D3.2_Overview of socio-economics in mining hubs. In report about context and effects of existing and new economic activities on local societies and cultures. 2nd version.
- Ólafsdóttir, R., Bogadóttir, R., Karkut, J., Welling, J.T., Tuulentie, S., Edvardsdóttir, A.G., Pállsdóttir Vang, E., & Karlsdóttir, A. (2024). Arctic cruise tourism and social license to operate: exploring social acceptance and trust in cruise tourism. *Journal of Land Use Science*, 19(1), 170–185. <https://doi.org/10.1080/1747423X.2024.2362733>
- Rautio, P., Lideskog, H., Bergsten, U., & Karlberg, M. (2023). Perspectives: Lean forestry – a paradigm shift from economies of scale to precise and sustainable use of ecosystem services in forests. *Forest Ecology & Management*, 530, 120766. <https://doi.org/10.1016/j.foreco.2022.120766>

- Raworth, K. (2012). A safe and just space for humanity: Can we live within the doughnut? Oxfam discussion paper. Retrieved March, 2022, from <https://policy-practice.oxfam.org/resources/a-safe-and-just-space-for-humanity-can-we-live-within-the-doughnut-210490/>
- Robertsen, R., Eriksen, K., Iversen, A., Nygaard, V., Lidestav, G., & Miettinen, J. (2024). D.3.3 synthesis report on the application of CSR activities in order to gain SLO in different Arctic hubs. Norwegian Institute of Food, Fisheries and Aquaculture Research (NOFIMA).
- Sandström, P., Cory, N., Svensson, J., Hedenås, H., Jougda, L., & Borchert, N. (2016). On the decline of ground lichen forests in the Swedish boreal landscape: Implications for reindeer husbandry and sustainable forest management. *Ambio*, 45(4), 415–429. <https://doi.org/10.1007/s13280-015-0759-0>
- Sandström, P., Forss, K., Kahila, M., Elomina, J., Striberny, A., & Karlsen, A. (2024). 4.7 described and communicated practical solutions to land use issues for each hub (D22). Grant 869580. ArcticHubs.
- Sarkki, S., Rasmus, S., Habeck, J.O., Matthes, H., Pihlajamäki, M., & Eronen, J. (2025). Exploring the land-use futures related to reindeer herding in Finland by “wild logic” -scenarios. *Special Issue: Sustainability Challenges in the Arctic: Exploring Land Use Changes and Their Impacts*, 20(1), 151–175. <https://doi.org/10.1080/1747423X.2025.2504420>
- Sjölander-Lindqvist, A., & Sandström, C. (2019). Shaking hands: Balancing tensions in the Swedish forested landscape. *Conservation & Society*, 17(4), 319. https://doi.org/10.4103/cs.cs_18_112
- Stępień, A., Koivurova, T., & Kankaanpää, P. (Eds.). (2014). *Strategic assessment of development of the Arctic. Assessment conducted for the European Union*. Arctic Centre, University of Lapland: European Union.
- Stępień, A., Koivurova, T., & Kankaanpää, P. (Eds.). (2016). *The changing Arctic and the European Union. A book based on the report “strategic assessment of the development of the Arctic assessment conducted for the European Union”* (Vol. 89). Brill Nijhoff (Nijhoff law specials).
- Storey, K. (2010). Fly-in/fly-out: Implications for community sustainability. *Sustainability*, 2(5), 1161–1181. <https://doi.org/10.3390/su2051161>
- Suopajärvi, L., Nygaard, V., Guðrún Edvardsdóttir, A., Iversen, A., Kyllönen, & Lesser, P. (2022). *Global economic drivers in the development of different industrial hubs in the European Arctic. Arctichubs project deliverable. Horizon2020*. University of Lapland.
- Suopajärvi, L., Tikkanen, J., Edvardsdóttir, A.G., Engen, S., Inkilä, E., Iversen, A., Nygaard, V., & Ólafsdóttir, R. (2024). Geopolitical tensions framing different industries in the European Arctic: Aquaculture, forestry, mining, and tourism in question. *Journal of Land Use Science*, 19(1), 121–133. <https://doi.org/10.1080/1747423X.2024.2357576>
- SWDG. (2019). For Environmental Impact Assessment and Meaningful Engagement in the Arctic. Including good practice and recommendations. Sustainable Development Working Group; Arctic Council. <https://oaarchive.arctic-council.org/server/api/core/bitstreams/a5b2257f-6f8b-4251-a04c-50562c991fca/content>, 2024 August 5.
- Thisted, K. (2019). *Emotions, finances and independence. uranium as a happy object in the Greenlandic debate on secession from Denmark*. In *Polar Record* 56. <https://doi.org/10.1017/S0032247419000433>
- Tolvanen, A., Eilu, P., Juutinen, A., Kangas, K., Kivinen, M., Markovaara-Koivisto, M., Naskali, A., Salokannel, V., Tuulentie, S., & Similä, J. (2019). Mining in the Arctic environment – a review from ecological, socioeconomic and legal perspectives. *Journal of Environmental Management*, 233, 832–844. <https://doi.org/10.1016/j.jenvman.2018.11.124>
- Tommervik, H., Thuestad, A., Stein, J., Arneberg, K., Marit, B., & Jarle. (2025). High-Arctic cultural heritage environments are deteriorated by cruise tourism: A case study from Svalbard. *Special Issue: Sustainability Challenges in the Arctic: Exploring Land Use Changes and Their Impacts*. In *Journal of Land Use Science*, 20(1), 45–60. <https://doi.org/10.1080/1747423X.2025.2476948>
- Turunen, M.T., Rikkonen, T., Nikula, A., Tuulentie, S., & Rautio, P. (2024). Between the local and the global? - reindeer herders’ perspectives on land use challenges and conflicts in the Sámi homeland, Finland. *Journal of Land Use Science*, 19(1), 134–149. <https://doi.org/10.1080/1747423X.2024.2359606>
- Tuulentie, S., Rikkonen, P., Rikkonen, T., Inkilä, E., Lyngge-Pedersen, K., Lidestav, G., Sandström, P., Sandström, S., Iversen, Iversen, A., Robertsen, R., Bogadóttir, R., Vang, E., Ólafsdóttir, R., Edvardsdóttir, A. G., Bishop, M. V., Miettinen, J., & Rautio, P. (2024). *Future scenario reports* (pp. 1–203). LUKE, Finland. Zenodo. <https://doi.org/10.5281/zenodo.14959040>
- van Dam, Kim, S., Annette, G., Johan, S., Adam, K., & Timo. (2016). Mining in the European Arctic. In A. Stępień, T. Koivurova, & P. Kankaanpää (Eds.), *The changing Arctic and the European Union. A book based on the report “strategic assessment of the development of the Arctic assessment conducted for the European Union”* (Vol. 89). Brill Nijhoff (Nijhoff law specials).
- Widmark, C., Heräjärvi, H., Katila, P., Kurttila, M., Lier, M., Mutanen, A., & Øistad, K. (2020). The forest in Northern Europe’s emerging Bioeconomy. Reflections on the forest’s role in the bioeconomy. *With Assistance of the Barents Euro-Arctic Region, Swedish Forest Agency, EFI Bioeconomy Research Network*. <https://forbioeconomy.com/app/uploads/2021/01/The-Forest-in-Northern-Europe%E2%80%99s-Emerging-Bioeconomy.pdf>
- Wilson, E. (2019). What is benefit sharing? Respecting indigenous rights and addressing inequities in Arctic resource projects. *Resources*, 8(2), 74. <https://doi.org/10.3390/resources8020074>
- Wyatt, S. (2016). Aboriginal people and forestry companies in Canada: Possibilities and pitfalls of an informal ‘social licence’ in a contested environment: Table 1. *Forestry*, 89(5), 565–576. <https://doi.org/10.1093/forestry/cpw034>
- Yeasmin, N., Hasanat, W., Brzozowski, J., & Kirchner, S. (Eds.) (2020). *Immigration in the circumpolar north. Integration and resilience*. Routledge. <https://www.taylorfrancis.com/books/9780429344275> .

- Zivojinovic, I., Elomina, J., & Moioli, S. (2022). 3.2. Report about context and effects of existing and new economic activities on local societies and cultures. ArcticHubs, H2020. 2nd version. updated 2024. BOKU University - University of Natural Resources and Life Sciences.
- Živojinović, I., Elomina, J., Pülzl, H., Calanasan, K., Dabić, I., Ólafsdóttir, R., Siikavuopio, S., Iversen, A., Robertsen, R., Bjerke, J., Engen, S., Tommervik, H., Bogadóttir, R., Moioli, S., Tuulentie, S., Rautio, P., Lyngge-Pedersen, K., Lidestav, G., Edvardsdóttir, A.G., & Nygaard, V. (2024, 3). Exploring land use conflicts arising from economic activities and their impacts on local communities in the European Arctic. *Journal of Land Use Science*, 19(1), 186–210. <https://doi.org/10.1080/1747423X.2024.2382676>
- Zivojinovic, I., Elomina, J., Robertsen, R., & Rautio, P. (2024). *Policy brief. Socio-cultural impacts and social license for economic activities in the Arctic and alpine regions*. BOKU University - University of Natural Resources and Life Sciences.; NOFIMA; LUKE.

Jerbelle Elomina*

*Institute of Forest, Environmental and Natural Resource Policy, BOKU University, Vienna, Austria
Forest Policy Research Network of European Forest Institute (EFI), Vienna, Austria*

 jerbelle.elomina@boku.ac.at

 <http://orcid.org/0000-0003-4024-0503>

Ivana Živojinović*

*Institute of Forest, Environmental and Natural Resource Policy, BOKU University, Vienna, Austria
Forest Policy Research Network of European Forest Institute (EFI), Vienna, Austria
Center for Bioeconomy, BOKU University, Vienna, Austria*

 ivana.zivojinovic@boku.ac.at

 <http://orcid.org/0000-0001-9900-7066>

Roy Robertsen

The Norwegian Institute of Food, Fisheries and Aquaculture Research (NOFIMA), Tromsø, Norway

Seija Tuulentie and Pasi Rautio

Natural Resources Institute Finland LUKE, Finland