

Report on sectoral climate change effects

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Executive summary

This report (Deliverable 2.3 Report on sectoral climate change effects) presents a two-part analysis of climate change impacts on Arctic livelihoods in the northern Fennoscandia. The first part is based on a comprehensive literature review of 208 scientific articles, highlighting the observed and projected effects of climate change on key nature-based sectors such as reindeer husbandry, tourism, forestry, and freshwater fisheries. The most prominent impacts include rising temperatures, increased precipitation, and changing snow and ice conditions, all of which directly affect livelihoods that rely on stable environmental conditions.

The second part draws on local observations collected through a Public Participation Geographic Information System (PPGIS) survey conducted in the municipalities of Enontekiö and Utsjoki, Finnish Lapland. The survey gathered 161 responses and 217 map-based observations from reindeer herders, tourism operators, local residents, and visitors. Local knowledge has also been collected by organizing workshops in the regions and by conducting a case study in two reindeer herding cooperatives in Utsjoki. PPGIS results have also been discussed and evaluated in local workshops after the data collection, and the Sámi Climate Adaptation study has been examined to create a comprehensive picture.

Notable key environmental changes include the melting of palsa mires (peat mounds with a permanently frozen peat and mineral soil core), altered snow and ice conditions, shifting tree lines, hotter and drier summers, and changing wind patterns. Alongside the impacts of climate change, the report also highlighted the significant impact of land use pressures, particularly from tourism infrastructure, mineral exploration and soil extraction, on reindeer husbandry. The PPGIS results also identified areas that offer natural protection from the impacts of climate change, such as cooler microhabitats for Arctic species that can no longer retreat further north. A case study of grazing conditions in the Kaldoaivi and Paistunturi reindeer husbandry cooperatives in winter 2025 illustrates the increasing challenges faced by herders due to unpredictable weather and pasture conditions.

The discussion highlights that while Arctic Fennoscandian communities have demonstrated resilience, the rapid pace of climate change may exceed their capacity to adapt. Adaptation will require multi-level political action, the integration of scientific and local knowledge, and attention to competing land uses. In particular, reindeer husbandry is not only affected by climate but also by increasing pressures from tourism and industrial development, raising concerns about the cumulative impacts on pastureland. Similarly, changes in forest management and pest dynamics, as well as under-researched challenges in freshwater fisheries, underscore the complexity of climate change impacts. Overall, the findings emphasize that environmental changes are already clearly visible and affecting livelihoods in the region. Particularly reindeer husbandry is already sensing the impacts of climate change and other environmental changes while the tourism industry has only recently started to react to the changes. The combination of scientific and community-driven knowledge—in data collection such as PPGIS—proves essential for identifying adaptation needs and informing sustainable, place-based strategies for the Arctic's future.