Reindeer Husbandry in a Globalizing North – Resilience, Adaptations and Pathways for Actions (ReiGN)

The Fennoscandia reindeer husbandry area covers the subarctic and boreal region. This area is characterised by a wide span of various herding systems and animal densities – which is determined by contrasting climate/weather conditions, geography, topography and vegetation zones, and shaped by historical and cultural factors, as well as by other land-use practices. Climate change and its effects on reindeer husbandry therefore vary both locally and regionally. Additionally, institutional arrangements, policies and governance practices differ between the countries in the area and play decisive roles for adaptations in reindeer husbandry. Pastoralism is still practiced in Sweden and Norway, although it is slowly being curtailed due to landscape fragmentation and socioeconomic reasons. The herds in Finland are generally stationary.

Future climate change is expected to have major impacts on both ecosystems and human societies, and these changes are expected to happen sooner and to be more pronounced in the northern hemisphere. The implications of climate change for pastoralists are poorly understood and difficult to predict due to the complex relationship between people, livestock and the environment. It is therefore important to assess how climate change may affect northern socioeconomic systems such as reindeer husbandry. To enhance our understanding of the impacts of climate change, it is therefore important to investigate the impacts of environmental change on both the animals and the people making their living from them. Additionally, there has been a growing recognition that it might not be climate change *per se* that represents the largest threat for long-term pastoral viability, but rather that sociopolitical changes, such as fragmentation and flawed management policies, exacerbate the negative effects of climate change and thus increase pastoral vulnerability. There has been a growing awareness that successful management of socioecological systems requires integrating social as well as ecological considerations. This necessitates combining a variety of approaches, taking into account the growing understanding of the biological processes involved in how climate change may impact livestock production, i.e. biological (e.g. calf production per live female) and economic production (e.g. meat production and profitability. Environmental hazards, such as drought, floods and icing, significantly affect livestock survival and reproduction, and hence pastoral systems worldwide. Reindeer herders in Fennoscandia are no exception – they have adopted a risk-sensitive herding strategy to limit the impact of extreme climatic events on their livelihood.

Subproject 5: Reindeer husbandry as bioeconomy
Led by Olli Tahvonen, University of Helsinki, Department of Forest Sciences

Our aim is to develop an interdisciplinary economic-ecological model that aids our understanding of reindeer husbandry as a source of income and as an important livelihood in northern Fennoscandia. Our approach allows an assessment of how to achieve economically viable reindeer densities, which is coupled with pasture dynamics (i.e. arboreal lichen pastures and supplementary feeding), optimal slaughtering strategies, economic outcome and public policy.

This subproject will use an existing model (Tahvonen et al. 2014, Pekkarinen et al. 2014), which is the most detailed economic specification for the reindeer husbandry system to date, as a starting point. The novelty of our model is a detailed age and sex structure of reindeer population. Even though the model was originally designed to describe conditions in the central Finnish Lapland, it will be expanded to encompass the reindeer husbandry diversity within the three Fennoscandian countries. Within the climate change perspective, we aim to refine and develop our approach by adding stochastic winter and spring conditions to the existing model where the importance of stochastic winter and spring conditions for calf mortality and hence productivity is evident. We aim to parameterise and operationalise the model on a regional scale, enabling us to, for example, assess the interaction between land-use policy and climate. This again will enable us to assess the optimal recovery from overgrazed pastures and the profitability and impact of supplementary feeding on the economic output.

Our objectives are to develop and refine an economic-ecological model and to assess how stochastic winter and spring conditions together with climate and various institutional setups influence the bioeconomy of the Fennoscandian reindeer husbandry at different scales by:

- developing the existing model to recognise the contrasts in environmental, economic and social conditions found in Fennoscandia
- specifying a reindeer-pasture dynamic in the model that includes stochastic variation in winter/spring foraging conditions.

Project Leader: Øystein Holand, Norwegian University of Life Sciences (UMB)