

## Project information

### Keywords

Climate change, infectious disease, pathogen, reindeer

### Project title

Health and infectious diseases in semi-domesticated reindeer in a changing climate

### Year

2017

### Project leader

Morten Tryland

Geographical localization of the research project in decimal degrees (max 5 per project, ex. 70,662°N and 23,707°E)

• Seidafjellet, Tana (N70.10, E28.19), • Hattfjelldal/Sjåmoen (coordinates depending on site of gathering), Røros: 62°34'N 11°22'Ø

### Participants

**UiT – Arctic University of Norway, AMB:** Morten Tryland (project leader)

Javier Sanchez Romano (PhD student) and Emily Magnuson (University of Alaska, Fairbanks, Master student)

**Norwegian Veterinary Institute:** Tromsø: Torill Mørk (Researcher) and Ingebjørg H. Nymo (Researcher).

Norwegian Institute for Nature Research, Tromsø (NINA): Hans Tømmervik (Sen. Res.)

Northern Research Institute (Norut), Tromsø: Jan Åge Riseth (Researcher)

East Iceland Nature Research Centre (Egilsstaðir, Iceland): Kristin Áugústsdóttir

(Researcher), Rán Þórarinsdóttir (Researcher), Skarphéðinn G. Þórisson (Researcher)

### **Selected reindeer herders and pasture regions (NO):**

Stig Rune Smuk, Tana (Rákkonjårga), Torstein Appfjell, Hattfjelldal (Jillen-Njaarke) and Inge Danielsen (Riast/Hylling).

### Flagship

Terrestrial

### Funding Source

The main funding body is FRAM. The Swedish project, CLINF (see below), has allocated money to support field work and sampling of semi-domesticated reindeer in Norway and wild reindeer in Iceland. In addition, all the institutions involved have contributed with considerable resources regarding field and lab facilities, equipment and working hours, which is not directly visible in the budget.

## Summary of Results

The project has conducted field work in two ways:

Fieldwork and interviews conducted in Gabna sameby (Sweden-Norway), Rebbenesøy reinbeitedistrikt, Mauken/Tromsdalen reinbeitedistrikt and Kanstadfjorden og Vestre Hinnøy reinbeitedistrikt.

Further, we have conducted field work in Tana, Hattfjelldal and Røros (sampling of semi-domesticated reindeer) and Iceland (wild reindeer).

A literature study has been conducted concerning climate, ethnographical literature and reindeer herders' narratives about reindeer diseases from 1700 and up to 1960. Laboratory investigations are ongoing and will continue on the 2017-samples also in 2018. The project has generated a promising record on publications and other dissemination during 2017.

## Master and PhD-students involved in the project

PhD student Javier Sanchez Romano is attached to this project. He is working specifically on infectious keratoconjunctivitis (IKC), a transmissible eye infection among semi-domesticated reindeer. He is now (June - Dec. 2017) working at UC Davis, California, with John Angelos, to characterize bacterial isolates from diseased reindeer. He has also participated in the field work (Norway and Iceland).

Emily Magnuson (University of Fairbanks, Alaska) is involved in a smaller part of Javier's PhD project, evaluating antiviral treatment against IKC. She has also been participating in the field work for the FRAM project.

## Published Results/Planned Publications

One scientific article has been published with relevance to the project:

Karlsen, S.R., Tømmervik, H., Johansen, B. Riseth, J.Å. 2017. Future forest distribution on Finnmarksvidda, North Norway. *Climate Research* (CR), 73: 125–133, 2017 <https://doi.org/10.3354/cr01459>

One report has been published, in cooperation with the County Council of Troms:

Riseth, Jan Åge og Tømmervik, Hans (2017) Klimautfordringer og arealforvaltning for reindrifta i Norge. Kunnskapsstatus og forslag til tiltak – eksempler fra Troms. Rapport 6/2017. Norut. ISBN 78-82-7492-352-2

Two book chapters with relevance to the project has been prepared and submitted: Tryland M, and Kutz S. (Eds.): "Reindeer and Caribou - Health and Disease", Taylor and Francis. CRC Press. ISBN 978-1-48225-069-5 (to be printed 2018):

Riseth, J. Å., Tømmervik, H., and Forbes, B. 2018. Sustainable and resilient reindeer herding.

Tryland, M., Ravolainen, V., and Pedersen, Å. Ø. 2018. Climate change - potential impacts on pasture resources, health and diseases of reindeer and caribou.

Two manuscripts are under preparation, one on Saami TEK about climate and reindeer diseases, and one on the findings of ticks in reindeer and their possible impact as vectors for reindeer pathogens.

## Communicated Results

Tømmervik, H., Riseth, J.Å. and Karlsen, S.R. 2017. Landscape transitions from tundra/mountain heaths to forests the last century in northern Norway and the impact on reindeer husbandry: The likelihood for spreading climate sensitive infections (CSIs) in the future. Nordic Conference on Reindeer Husbandry Research; Kiruna, Sweden, 29-31 May, 2017.

Tryland, M. 2017. Reindeer health in perspective - from the "reindeer pest" to chronic wasting disease. Key note lecture, Nordic Conference on Reindeer Husbandry Research; Kiruna, Sweden, 29-31 May, 2017.

Riseth, J. Å., Tømmervik, H. (2017) *May Traditional Reindeer Herding Knowledge help in counteracting climate sensitive infections (CSIs)?* Oral presentation at the 4th International Indigenous Social Work Conference, in Alta 11-14 June 2017.

Abstract:

One abstract accepted as an oral presentation: Arctic Frontiers , Tromsø 23-25.1.2018.

## Interdisciplinary Cooperation

This project has several interdisciplinary links. This research project is about infectious diseases in reindeer in Norway and Iceland, and how they might be linked to climate change. In addition to screening for diseases and disease pathogens (viruses, bacteria and parasites; VI and UiT), we also investigate traditional knowledge and how this is transmitted between reindeer herders (NINA, Norut). Further, the work in Iceland has been conducted in cooperation with the biologists and ecologists at East Iceland Nature Research Centre. The link to CLINF in Sweden also has interdisciplinary aspects, since the samples generated from this project is made available to CLINF, including how reindeer diseases may impact northern societies. Through the field work (Norway) we also have direct contact with the involved reindeer herders

Budget in accordance to results

Budget (x 1000  
NOK) 2017

Meetings 20

Fieldwork Norway	85
Fieldwork Iceland	60
Conference	-
Parasitology	30
Bacteriology	25
Virology	65
Publications	-
Other dissemination	-
UiT work hours	100
NINA work hours	70
Norut work hours	70
NINA Travels	30
Norut Travels	30
<b>Sum:</b>	<b>585</b>
Overhead (11 %)	64
<b>Total project costs:</b>	<b>649</b>
CLINF UiT	70
CLINF NINA	70
CLINF Norut	70
CLINF Total	210
<b>Application FRAM</b>	<b>440</b>

Comments to the budget and expenses:

We have not had separate project meetings as planned, since we have met associated to other meetings. Thus, the money allocated for meetings have been used to cover interviews with reindeer herders (traditional knowledge). The field work has been carried out as planned, but to some extent exceeding the budget posts for the FRAM project. However, it has been made possible through the link to CLINF. As applied for (2017) appr. 50 000 NOK has been used for bacteriology and parasitology investigations (VI), whereas expenses for virology investigations have been lower than budgeted in 2017, since the investigations are ongoing and not finished. Money allocated for salary has been used as budgeted (UiT).

Including the invoices and services already conducted, 13 000,- NOK is left on the budget for 2017. This sum will be used until the end of this year, supplying diagnostic tests and consumables for the virology studies.

Could results from the project be subject for any commercial utilization

No

Conclusions

The results from the laboratory investigations are not ready and will go on into 2018. It is thus too early to display tables and summaries and also to draw even preliminary conclusions on the main goals fro the project. However, the cooperation within the project is functional and fruitful, showing promising dissemination so far.