

Project information

Project title

Local Land-Use Change in a Changing Climate: Farming Practices, Nature-Based Tourism, and Outdoor Recreation (LUCC)

Year

2011/2012

Project leader

Astrid Ogilvie, CICERO

Participants

- Astrid Ogilvie, , project leader, CICERO
- Grete Hovelsrud, CICERO
- Helene Amundsen, CICERO
- Bob van Oort, CICERO

Flagship

Terrestrial, Theme: Capacity for adaptations in indigenous people and local societies

Summary of Results

The primary goal of the interdisciplinary LUCC project has been to understand the interaction of societies with climate and the environment, and the feedbacks involved. In addition to input from a wide variety of disciplines drawn from both the natural and the social sciences the project is also employing ethnographic research methods in local communities in order to acquire contemporary data related to questions of sustainability, adaptability and vulnerability. Further research objectives have been to understand present and potential future linkages between Arctic/Northern Norway climate processes and social adaptations. In particular, the vulnerability and adaptive capacity of the combined consequences of climatic, ecosystem, and societal changes for local communities in Northern Norway have been considered. Three communities were chosen for special study: Lyngen, Bardu and Kvæfjord. The major focus of the project has been on the terrestrial sphere, with an emphasis on landuse activities such as: animal husbandry; agriculture; nature-based tourism; and outdoor recreational activities. Specific deliverables of the project include detailed data on the communities studied with regard to their varying emphases on the economic practices central to the project. Information is also being gathered on the importance of these practices in the recent past, as well as perspectives on the likely development of such practices in the future in the light of potential climate change as well as other changes. This information will lay the foundation for planning for adaptation to potential vulnerabilities in the future.

In line with other recent studies (e.g. ACIA, 2005), the project notes the evidence for recent rapid societal and climatic changes. Arctic climate is warming rapidly and much larger changes are projected. This Arctic warming and its consequences have implications that are global as well as local. An important part of the study has involved gathering climate data. Figure 1 shows annual-mean temperature variations over the North Atlantic Arctic compared with global-mean variations. Although far from synchronous there are noticeable similarities. Particularly striking is the twentieth-century global warming. Although this is commonly thought to be primarily the result of natural forcing (solar in particular), it has been shown that this explanation is inadequate (Foukal et al., 2004). An alternative explanation is that much of the global-scale warming in the early twentieth-century resulted in changes in the formation rate of North Atlantic Deep Water (NADW, Wigley and Raper, 1987), which, in turn is reflected strongly in the North Atlantic temperature series shown in the Figure. Although the North Atlantic Arctic region is clearly more variable than the global record in terms of temperature, both show another strong warming trend over 1995 to 2005. While internally generated variability and fluctuations (such as those related to NADW changes) are important, the longer time-scale changes are primarily due to anthropogenic forcing. (IPCC, 2007, p.10). Highlights include the confirmation of the importance of the burgeoning tourist industry for northern Norway, and the urgent need for adaptation in land-use practices in the light of potential future changes in climate.

References

- ACIA, Arctic Climate Impact Assessment. 2005. Impacts of a Warming Arctic: Arctic Climate Impact Assessment. Cambridge University Press, New York.
- Brohan P., Kennedy J., Harris I., Tett, S.F.B. and Jones, P.D. 2006. Uncertainty estimates in regional and global observed temperature changes: a new dataset from 1850. *J.Geophys Res.* 111, D12106, doi:10.1029/2005JD006548.
- Foukal, P., North, G. and Wigley, T.M.L. 2004: A stellar view on solar variations and climate. *Science* 306, 68–69.
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Regions. Springer, Netherlands – Dordrecht.

IPCC, 2007. *Climate Change 2007. Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climatic Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 976pp.

Wigley, T.M.L. and Raper, S.C.B. 1987. Thermal expansion of sea water associated with global warming. *Nature* 330, 127–131.

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References

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Published Results/Planned Publications

"Local Land-Use in a Changing Climate: The Case of Northern Norway". In preparation for international journal.

"Local Land-Use in a Changing Climate: The Case of Northern Norway". Conference presentation planned for 42nd Annual Arctic Workshop, Winter Park, Colorado, USA 7-9 March 2012.

Communicated Results

A workshop will be held in February 2012.

Interdisciplinary Cooperation

The project has benefited greatly from inter-disciplinary cooperation, indeed, it would not have been possible without such an approach. Disciplines involved include climatology, socio-economic studies, and anthropology. It has thus effectively combined disciplines from the natural and social sciences.

Budget in accordance to results

The project would not have been possible without funding from the Fram Centre.
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Could results from the project be subject for any commercial utilization

No

If Yes

The project as such could not be used for any commercial utilization. However, 39 continued research building on the topic of "land-use change in a changing climate" should be of general use to farmers and stakeholders in northern Norway.

Conclusions

Further information of benefit to stakeholders, policy managers and local land managers will be obtained in a project building on this one that broadens and deepens the findings of the current project.

The project has employed a novel approach to systematically document key linkages between physical and human systems. It cannot be said that this is an entirely new method as such methods have been used, for example, by the CAVIAR project (Hovelsrud and Smit, 2010). This was based on the concept that a combination of topdown and, especially, bottom-up approaches for assessing the vulnerability of climate-sensitive sectors is vital. However, this project has affirmed that such an approach is by far the best for this type of project. Further information of benefit to stakeholders, policy managers and local land managers will be obtained in a project building on this one that broadens and deepens the findings of the current project.

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