

**WEATHER AND CLIMATE AS LIMITING FACTORS IN WINTER TOURISM IN
POLAR AREAS: CHANGING CLIMATE AND NATURE-BASED TOURISM IN
NORTHERN FINLAND**

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ABSTRACT Climate and weather conditions play an important role in nature-based tourism and especially in snow-based winter activities. Earlier studies on climate change and winter tourism have mainly focused on ski-related activities and their capability to adapt, while the futures of other types of snow-activities, such as cross-country skiing, snowmobiling, reindeer- and dog-sledding, have received little analysis. Nevertheless, these activities form an important part of nature-based winter tourism in Finland, often combined with skiing or other snow-activities as part of a comprehensive tourist experience.

The study aims to survey the attitudes and preparedness for climate change of nature-based tourism entrepreneurs in Finland. As climate change is predicted to cause more intense and harmful effects to winter tourism, the study also assesses which climatic conditions and weather events affect or limit the viability of snow-based tourism activities, including the differences between skiing and other snow-based activities. Based on thematic interviews and a questionnaire of nature-based tourism entrepreneurs, the results indicate that entrepreneurs providing tourism activities seem to be well prepared for normal climatic variability. This may enhance their preparedness for climate change, even though hardly any adaptation strategies have been developed for it. Thresholds to realise activities depend on the type of activity, but climate and weather induced cancellations are ordinary events in all winter tourism. The most common reasons for cancellations are either warm or extremely cold temperatures, but rain also affects business operations.

KEYWORDS: *Nature-based tourism, snow-based tourism, climate change, Finland, tourism entrepreneurs*

INTRODUCTION

The potential effects of climate change on tourism have received minimal attention in Finland. The first reports dealing with climate change from a tourism perspective were published in 2005 (Martilla et al., 2005, Sievänen et al., 2005) and noted that climate change was considered

mainly as a positive phenomenon for summer tourism due to lengthening and warming of the season. For winter tourism climate change was viewed as both a positive and a negative matter. In southern and western Finland warming winters were regarded as endangering snow-related tourism activities while northern parts of the country may, in the short run, gain competitive advantage at the expense of southern Finland and central Europe. The influence of climate change on both summer and winter tourism depends on the adaptive capacity of the tourism sector. This especially applies to the future of nature-based tourism, which has internationally been defined as one of the most vulnerable and climate-sensitive tourism activities (Scott et al., 2007). The fact that nature-based tourism is of great importance for Finland, whose image as a tourist destination is closely connected with nature - especially in northern Finland (Finnish Lapland) where the employment effect of nature-related tourism is higher than any other regional industry (Saarinen, 2003) - raises the importance of adaptation to even higher level. Approximately one-third of the total tourism revenue in Finland comes from nature-based tourism and related activities, which means that radical changes in climate and weather conditions may have significant impact.

This paper assesses the future of Finnish nature-based tourism by examining the adaptive capacity of the industry and the intensity of climate and weather conditions as limiting factors for winter tourism. It is based on a study that sought knowledge of the adaptation strategies of Finnish tourism industry (Saarinen and Tervo, 2005) and on a study on the vulnerability of snow tourism to changes in climatic conditions. Winter tourism activities were chosen as a target for more detailed analysis since the predicted effects of climate change are considered more harmful and intense than on summer tourism.

METHODS

The study material consists of semi-structured interviews and a questionnaire survey targeting nature-based tourism entrepreneurs. Tourism operators offering either snow- or water-related activities from northern and eastern Finland (n=19) were chosen as representatives for summer and winter tourism for the interviews, the aim of which was to analyse entrepreneurs' perceptions and awareness concerning climate change and adaptation. For financial and temporal reasons, most representatives for summer (water) tourism were selected from the Savonlinna area and for winter (snow) tourism from the Rovaniemi area. The sample was completed with snowball sampling. Thematic interviews were completed in spring 2005. The issues covered were entrepreneurs' knowledge about climate change and its potential impacts and their attitudes towards adaptation strategies. The results and feedback of the interview

study led to the development of the questionnaire that was executed in the second part of the study.

The mail questionnaire was sent to nature-based winter tourism entrepreneurs to gather data from different winter tourism activities and their climatic sensitivity. The questionnaire form with cover letter was mailed to 540 nature-based tourism entrepreneurs in June 2007 and the non-respondents were contacted twice after the first mailing. The questions dealt with such issues as length of the season, the preconditions (snow, ice, temperature) for starting the winter season and weather conditions preventing the production of activities during the season. Both qualitative and quantitative methods were used to analyse the data. The analyses were based on descriptive and statistical approaches, and also comparative perspective was used to define the differences between winter and summer tourism, different regions and different winter activities.

RESULTS

Most entrepreneurs were aware of climate change and had an understanding that reflected contemporary scientific understanding about it. They were able to list many climate change induced impacts such as winters getting shorter and milder, summers getting longer, environmental changes (flora and fauna), northern areas attracting more tourists and extreme weather events becoming more frequent. Most of them did not believe, however, that climate change would affect their operations. Attitudes towards climate change and its impacts varied according to location and main season (Tab. 1). In general, nature-based tourism was defined as non-vulnerable and tourism entrepreneurs were not worried about their future, except for the Christmas and New Year seasons, which are the most important seasons for many animation service enterprises. Only two of the interviewed entrepreneurs stated to have adaptation plans in order to cope with the changing climate.

However, the entrepreneurs also note that in order to be able to operate in varying conditions and to keep their customers satisfied they need to have some contingency plans regarding natural climate variability (e. g. differences in season lengths) and sudden changes or extraordinary weather conditions. Almost two-thirds of those interviewed had recently observed climatic phenomena that had affected their business (Tab. 1) and most of them had also prepared for these events. In order to prevent climatic events causing cancellations the tourism operators had, among others, invested in snowmaking facilities, developed substitutional activities and changed their marketing strategies.

Table 1: The impact of climate change on tourism and perceived effects of climate variability according to winter and summer tourism entrepreneurs in Northern and Eastern Finland (N=19)

| | <i>Impact on region's tourism industry</i> | | | <i>Has climate variability affected one's own business</i> | |
|-----------------------------------|--|-----------------|------------------|--|-----------|
| | <i>Positive</i> | <i>Negative</i> | <i>No impact</i> | <i>Yes</i> | <i>No</i> |
| Northern Finland (winter tourism) | 1 | 5 | 3 | 8 | 1 |
| Eastern Finland (summer tourism) | 4 | 1 | 5 | 4 | 6 |
| Total | 5 | 6 | 8 | 12 | 7 |

Almost two-thirds of the entrepreneurs that responded to the questionnaire (n= 182) stated that climatic conditions had caused cancellations during the last three winter seasons. Analysis on climatic conditions affecting winter activities revealed that temperature was the most common cause for cancellations during the winter season: during the last three seasons, 47 % of the respondents had cancelled their activities because of cold temperatures and 46 % because of exceptional high temperatures. The resiliency towards temperatures varied between activities. Reindeer and dog sledding were the most cold-resistant activities while ice fishing and dog sledding were the activities most resistant to high temperatures. Rain had disturbed 35 % of the respondents while strong wind and snow storms caused only minor cancellations. Exceptions from these were skiing and snow buildings and similar activities where rain caused more cancellations than high temperature. Skiing and ice fishing were more prone to cancellations than other activities (Tab. 2).

The thresholds to start the winter season differed by the amount of snow needed and by ice thickness (Tab. 2). Optimal temperatures varied considerably, from +10 to -20 centigrade, but there were no statistical differences between different activity groups. More than half of the enterprises were using some methods to ease the start of the season or to prolong the season in case of unfavourable conditions (e.g. snow deficiency). Snowmaking was mainly used in skiing, while other enterprises used, at a smaller scale, simpler methods such as shoveling/transferring snow to critical areas, relocating activities (within operating areas) or offering substitute activities (e.g. ATV-safaris for snowmobile-safaris). However, except for skiing, these methods were not used regularly.

Table 2: Occurred cancellations in different activities due to climatic conditions; the amount of snow (mean and mode) and ice thickness (mode) needed to start the season; the frequencies of provision methods in enterprises and the use of these methods to start or end season at preferred date

| <i>Activity</i> | <i>Cancellations during last 3 seasons, median</i> | <i>Natural snow(cm), mean (mode)</i> | <i>Ice thickness (cm), mode</i> | <i>Existence of prov. methods in enterprises (%)</i> | <i>Use of prov. methods, median for 3 seasons</i> |
|---|--|--------------------------------------|---------------------------------|--|---|
| Skiing (n=24) | >10 | 14 (0) | 0 | 100 | >5 |
| Cross-country skiing /snow-shoeing (n=32) | 4–6 | 23 (11–20) | 0 | 33,3 | 0 |
| Snowmobiling (n=32) | 7–10 | 29 (21–30) | 15–24 | 51,7 | 0 |
| Dog sledding (n=24) | 4–6 | 21 (11–20) | 15–24 | 73,9 | 0 |
| Reindeer-sledding (n=17) | 1–3 | 17 (11–20) | 0 | 68,8 | 0–2 |
| Ice fishing (n=12) | >10 | 14 (0) | 15–24 | 27,3 | 0 |
| Wintergolf/ ice breaker/ skating/ winter rally(n=5) | 4–6 | 12 (0) | 25–34 | 80,0 | >5 |
| Snow buildings etc. (n=18) | 7–10 | 11 (6–10) | 15–24 | 64,7 | 0 |

DISCUSSION

The entrepreneurs' impressions of the effects of climate change on nature-based tourism in Finland are similar to the anticipated effects elsewhere (König, 1998, Scott et al., 2002). The skepticism towards these impacts affecting their own enterprise may be linked with the climate variability that has influenced most entrepreneurs' operations throughout their existence. Operating in varying conditions has increased confidence in getting through changes in climate and since the methods used to prevent variability causing troubles are almost identical with methods used to adapt to climate change (König, 1998, Scott et al., 2002), this confidence may be justified. In most enterprises and at least within all activity groups there are some methods in reserve in case there is need to improve the conditions to be operational. Also these methods are similar to adaptation methods familiar from studies on skiing (Bürki, 2002). Cross-country skiing and ice fishing seem to be the most "natural" tourism products in this sense, only about one third of the enterprises claimed to have some methods in reserve. Skiing enterprises are the

other extreme with every respondent having access to at least one method (most often snowmaking facilities).

In the questionnaire, the respondents assessed the instances when provision methods had been used in order to start the season or to prolong the season in spring. The use has mainly aimed at reaching the thresholds for snow, since other factors (temperature, ice cover on rivers/lakes/sea) are harder to manipulate. Respondents stated to have drawn on them during the season as well, but, especially for smaller enterprises, it was found too hard to estimate the frequency of use for the whole season. This indicates that entrepreneurs in Finland are familiar with a range of provision and adaptation methods, even though accessibility to these methods and their suitability for different enterprises varies. Climatic conditions have, nevertheless, led to cancellations in winter tourism, and more often in skiing and ice fishing than in other activities. This may be surprising for skiing, which mainly operates on constructed slopes and unnatural snow. Climate change will possibly increase the number of climate-related cancellations, even though the main cause for cancellations has been frost (-20/-40 centigrade depending on activity), which event should happen less frequently in warming climate (Jylhä et al., 2004). Warming will add to the number of occurrence of high temperatures and also rain, if precipitation coincides with days of temperature above 0 centigrade. High temperatures do not necessarily threaten operations unless the warm period continues several days. Rain, on the contrary, causes a severe threat, since even small amount of precipitation increases snow melting and easily leads to cancellations or bad tourist experiences.

Even though the study reveals rather small differences in the vulnerability, research should not focus only on skiing as it has been the trend. For example, little is known about the interrelationships between different products, how some activities “feed” visitors to other activities and what their combined value for different tourist groups is. In this sense, it may be too early to predict the future of nature-based tourism in Finland. It is also noteworthy that only one operational aspect was taken into account in this vulnerability study. In this way the results are indicative. Given that climate conditions, forms of tourism and tourist groups in the southern and northern regions of Finland differ considerably, a more thorough analysis that takes account of both regional and operational perspectives will probably give more detailed results concerning both vulnerability and adaptation to climate change.

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