Climate Change and Winter Tourism
OECD Report on Adaptation

Bruno Abegg, Department of Geography
Climate Change and Winter Tourism
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Natural Snow-Reliability of Alpine Ski Areas
- Overview
- Results

Adaptation Strategies
- Technological Adaptation
  - Slope Development, Going Higher, Snowmaking
- New Business Models
  - Diversification, All-Year Tourism, Withdrawal

Conclusions

Bruno Abegg

University of Zurich
Natural Snow-Reliability of Ski Areas
A Sensitivity Analysis

- **Concept**
  - 100 days rule / line of natural snow-reliability

- **Climate Change Impact**
  - Plus 150 m per 1°C warming

- Number of naturally snow-reliable ski areas today and in future: +1°C (2020s), +2°C (~2050), +4°C (~2100)

- Sample: 666 ski areas from A, CH, F, G and I

- A ski area is considered to be naturally snow-reliable if the upper half of its altitudinal range is located above the threshold value for the line of natural snow-reliability.
Naturally Snow-Reliable Ski Areas in %
Number of Naturally Snow-Reliable Ski Areas
Results

- The alpine ski industry is very sensitive to changes in natural snow conditions. In case of plus 2°C, only 61% of today’s ski areas would remain naturally snow-reliable.

- **Implications**
  - New pattern: low-elevation ski areas are likely to disappear; skiing will concentrate on most suitable locations (higher terrain); changes in the market share etc.
  - However, the most important regions are usually the least affected
  - Increasing pressure to adapt to changing climatic conditions
Technical Adaptation I

- **Landscaping and Slope Development**
  - Contouring/Smoothing of smaller areas
  - Landscaping/Bulldozing of wider areas

- **Goal**: Facilitate the use of grooming equipment for ski run preparation, reduce the snow depth required for skiing (also cost saving strategy for snowmaking)

- **Limitations**: Impact on vegetation/landscape, environmental regulations
**Going Higher and Facing North**

- Developing north facing slopes
- Moving operation to upper part of existing ski area
- Extending existing ski area to higher elevations
- Building new ski areas at higher elevations

**Goal:** Concentrate ski operation in climatically advantaged locations

**Limitations:** Topography, investment costs, environmental regulations, climate (avalanches, heavy winds)
Snowmaking

Area covered by snowmaking:
- Austria: 50%
- French Alps: 15.5%
- Bavaria: 11.5%
- Italy: 40%
- Swiss Alps: 18%

Goal: Extending the duration of the skiing season and increasing the range of climate variability and change the ski area can cope with

Limitations: Climate, investment and operational costs (mainly energy costs), water availability, regulations
New Business Models I

Winter Revenue Diversification

1. Snow-related offers
   - Cater for the growing market of non-skiers
   - Popular activities: hiking, tobogganing, snowshoeing
   - Problem: these offers also require snow

2. Non-snow related offers
   - Health tourism, congress tourism etc.
   - Problem of complementary offers

Key question: Is it possible to substitute the revenue generating power of traditional winter sports?
New Business Models II

- **All Year Tourism**
  - Seasonal diversification
  - Summer tourism (including shoulder seasons)
  - Weather and climate independent offers
  - Future summer climate
  - Challenge for cableway operators

- **Goal is a) to back up the tourism business in general, and b) to reduce the dependence on snow/winter**
 Withdrawal from Ski Tourism

- Forced or planned?
- Option or necessity?

Geschwender Horn: At the beginning of 1990s, the facilities (2 ski lifts and a transportable children’s lift) were dismantled, and the ski runs were re-naturalized. Today, the area is used for summer and winter tourism, namely hiking, mountain biking, snowshoeing and ski touring.
Conclusions

- It is the adaptive capacity (not climate) that will determine the future of alpine (winter) tourism.
- Climate adaptations cannot be isolated from other business decisions.
- Most climate change adaptations are likely to be incremental adjustments of existing strategies.
- For the time being, climate change adaptation can be described as reactive, highly individualistic and very context-specific.
“Winners” and “Losers”

“Winners”: Great Adaptive Capacity

- Top holiday and day-trip destinations
- Large and snow-reliable ski areas (favorable local climate, access to high-elevation terrain and extensive snowmaking) with high-quality offerings, well diversified, internationally competitive/ easily accessible, and economically successful

“Losers”: Restricted Adaptive Capacity

- Remote holiday and low-elevation day-trip destinations
- Small or medium-size ski areas (in remote regions) with outdated facilities, limited offers and financial problems. Restricted snow-reliability will reinforce already existing problems. Such ski areas often have a “lifecycle-problem”.