



The way mountain tourism is dealing with climate change

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Introduction

This case study will outline the way three different mountain tourism countries, Nepal, the alps and Arizona in the U.S, are dealing with climate change and which adaption strategies has the tourism sector taken so far.

Summary of results of the three studies

Since climate change has become a major threat now for many mountain tourism destinations, tourism organisations in Nepal have come up with several adaptation strategies at the local, state and national level in 2011 to prevent the intensity of natural hazards such as landslides, avalanches and flooding having dramatic threatening tourism destinations. These adaptation strategies were taken in the interest of stakeholders, government and resident communities as a collaborative effort with considerations for institutional development, diversification of opportunities, equity and sustainable economic growth. In Nepal, tourism stakeholders are looking at the different opportunities available in order to adapt to climate change the tourism demand and then identify and develop niche tourism products and destinations. Future adaptation strategies at the local level included for instance, establishing social institutions to approach the issue of climate change, diversifying the employment and income sources in the mountains in order to prevent the economic fall of a local tourism industry and collective security measures against the negative effects of climate change. At the national and regional level the adaption strategies included the diversification of tourism products and services, management disasters related to climate change by having solid training programs, establishing better monitoring and communication systems, encouraging local or community level adaptation and the private sector, having a sustainable economic growth, as well as linking tourism livelihood to climate influences. But additional research on location-specific treat of climate change must be carried out. (Sonjay, 2011). After going over the situation of Napal and the way Nepal is dealing with climatic change effect, let's take a closer look at the way climate adaptation strategies are managed in the Australian alps resorts.

In the Australian Alps, adaption strategies to climate have been developed as well by tourism organisations for ski resorts. They report they have been using snow-making for over ten years. A second action taken was creating new infrastructure to suit the shifting snow levels. The idea was according to interviews in this research "to shift village assets

around like the playgrounds and the beginners' ski area. Another more feasible strategy was considering all year-round resorts by marketing the summer activities ahead of time. Marketing the mountain as a year-round resort requires creating more summer activities. The creation of bike trail creation, and additional costs related to the creation of new hiking trails to enhance the Australian Alps' summer offer. However there are biophysical limits associated to snow making, these being the warmer temperatures and the volumes of water, and also the costs of infrastructure and water licence limits



Figure 1: Snow-making

for summer tourism. Moreover, ski tourism market in Australia is relatively expensive given the fact that other skiing activities can be done as well overseas. The rising temperatures of course are also a significant barrier. If there is no snow product being able to generate skiing during winter, this means the alpine resorts, such as the region of Victoria will eventually collapse. In their future projections, tourism organisations say snow-making in Australia will support the skiing tourism industry until 2050. Thus allowing the resorts to develop new seasonal products and not just winter products (Pickeringb, 2013)

In Arizona, USA, they are some ski resorts that have been suffering from snow unavailability. Arizona's ski resorts are influenced by a high degree of interannual variability of snowpack, skiable days and visitor numbers. However in some resorts the number of skiable days has decreased due the lack of snow more and more throughout the last years. Therefore, the adaption strategy for climate change on tourism resort was to invest in snowmaking. Nevertheless, the cost of snowmaking are, accoding the Frisvold and Colby the expenses ranging from 401 \$ to 3252\$ per 1000 m³, representing 15% to 25% of total resort operating costs. Moreover, snow making relies on a great amount of water, 9,222 gallons of water is needed to make 1 acre foot of snow. Snowmaking investments enable ski resorts to adapt to warmer winters in the short and medium term, but on the long-term is not the best adaptation strategy. Of course, in the case of Arizona, the two important limits to snow-

making, as mentioned previously, the costs associated and the second being the high volumes of water used to provide the snow. However Arizona resorts have found in order for their ski resorts to survive despite climate change, would be to more fully employ climate forecast, which have high levels of predictive skills, by using good forecasting systems, such as ENSO, a known forecast system used there. Using such forecast, resort operators in the southwest could plan ahead to increase advertising and hire additional employees to have enough capital for increased snowmaking in their resorts (Frisvold, 2011)

Synthesis and Recommendations

Among the three different mountain tourism regions discussed in this case study, the one that seemed to have the adaptation strategies, which could best learned from are the Australian alps. Nepal also is a good example, but in the paper there are not any relevant results showing the future projections of these adaptation strategies like it is the case for the Australian alps. Moreover, the strategies suggested for the mountain tourism in Nepal have not been implemented yet. Switzerland could also do snow making over the next 40 years, as long as they also market all year long activities by developing more products for summer tourism. Nepal does have some interesting suggestions in terms of security methods used in case of landslide, which Switzerland could also look into in the future.

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