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Social and economic impact of climate change on winter tourism: the role of artificial snowmaking

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The role of tourism sector is seen as extremely relevant to tackle the issue of climate change with special reference to its behavioral ability to respond to global challenges over time (UNWTO, 2007). In this framework, winter tourism plays a substantial role.

The Alps are among the main tourist attractors for people interested in winter sports worldwide and require a special attention. Appropriate tourism policies in the Alps can generate a global echo and sound as practices to replicate in other areas of the world. Favorable climatic conditions at destinations are key attractions for tourists. Mountain tourism ýor winter sports highly depend on specific climate and weather conditions. ý

Outdoors winter tourism activities require accurate climate and ýweather information since in absence of these conditions it is highly difficult to run the season and to plan the activities. On the other hand inadequate climatic conditions can seriously harm tourism operations and communities depending on them. A range of technological and behavioral adaptation measures have already been put into practice in the tourist sector.

Tourism cannot be seen in isolation. Changes in the pattern of demand can lead to wider impacts on many areas of ýeconomic and social policy (e.g. in employment and labour demand ýand in regional policy issues such as housing, transport and social infrastructure). ýKnock-on effects could then influence other sectors, such as agriculture supplying tourism ýdemand, handicraft industries, local small business networks and so on (UNWTO, 2007)ý.

Climate change can also be considered under a different point of view. For example it can induce the re-structuring ýof both, tourism demand and supply patterns. Even though winter season in the Alps and other mountain regions is expected to suffer from climate change, summer seasons ýcould lengthen, and generate increased demand, although this could bring further ýnegative environmental consequences.

ýA reduced length in winter tourist season is likely to produce adverse effect in the social and economic spheres (e.g. reduction in income for local businesses, stagnation in regional development, reduction of tourist flows, relocation of local workers, migrations, etc.).

Winter sports still represent the main attractors for tourists visiting the Alps. This is why adaptation strategies to climate change are needed to manage winter tourism in these locations, where an off-hand change doesn't seem to be an appropriate solution. Recently the issue has been pondered at the international level (OECD, 2007; UNWTO, 2007; Alpine Convention, 2007) and some possible adaptation strategies have been suggested. Among them, artificial snowmaking is the dominant adaptation strategy (OECD, 2007).

Main advantages in using artificial snowmaking facilities include wide diffusion of snow cannons on the market, general knowledge about snowmaking facilities running costs, effectiveness of the method. Artificial snowmaking facilities need appropriate temperatures to work that is not possible to manage, large ski tracks require a high number of cannons (which are sometimes quite expensive) consuming high quotas of energy, other contend the pricing of water used for artificial snowmaking is another key issue. The internalization of these costs is still an open issue and should be searched. In this context, responsible energy consumption becomes a key need, too.

This response strategy can be seen mainly as a short-run adaptation, since it doesn't produce strong behavioral changes in people's attitude towards winter tourism. In a sustainable development perspective, artificial snowmaking can help to mitigate the economic impact of climate change and can allow businesses and people involved in winter sports management to profitably run winter seasons, even if temperature is growing. In this terms it can be read as a double strategy:

- an activity supporting local economic development in the short-run (and over longer periods in case of limited climate change), and
- a strategy for managing a deeper change in traditional winter tourism management and people's expectations

A need emerges to seek for an economic assessment of the costs generated by arti-

ficial snowmaking in alpine ski resorts and their coverage strategies. Organizational change, financial strategies, diversification in winter tourism revenues represent other adaptation measures which need a longer period of time to be implemented and can be anticipated by use of artificial snowmaking.