

**TOURISM DEVELOPMENT AND CLIMATE CHANGE:**  
**UNDERSTANDING, ANTICIPATING, ADAPTING,**  
**PARTICIPATING IN THE COMMON EFFORT**

There are few activities – besides agriculture, perhaps – that are as dependent on meteorology and climatology, that is to say, both the prevailing weather and long-term climate changes, as tourism.

Tourism and leisure are based on a range of activities that, in large part, take place outdoors. Generally speaking, tourism loves good weather – and tourists as well!

***What will the weather be like tomorrow?***

Weather conditions and their changes in the short term are important for tourism, as they also are for leisure activities practised close to home. The quality and reliability of forecasts have improved considerably over the course of the past years, and weather predictions are now also valid for a longer period of time ahead, which allows everybody, whether tourists or leisure industry professionals, to better plan their activities in advance. Meteorology is no longer a game of chance, a divinatory practice or one of the more esoteric branches of astrology, and the tourism sector is one of the primary beneficiaries of this development.

Nevertheless, the interrelation between tourism, leisure and travel on the one hand, and meteorology in the broad sense, on the other hand, is not limited to the short term. Both sectors have another area of concern in common: that of the evolution of climate over the long term.

It is true that, for the very long term, there is a lack of points of reference, and when they do exist, they are sometimes surprising. For example, the grape harvests were particularly early in the great French wine region of Burgundy in 2003, when the summer was marked by an exceptional heat wave, and the year that was closest to that one in history was...1523. But the direction of recent change is clear, and the phenomenon of acceleration of the last period is incontestable. It can only become more amplified.

***Warming, a central challenge for a major industry***

The Intergovernmental Panel on Climate Change (IPCC) has just confirmed, at its meetings held in January-February 2007 in Paris, and then in April in Brussels, and most recently in Bangkok in April-May, what awaits us with near certainty: a rise in temperature caused by human activity on the order of 1.8 to 4 degrees between now and the end of the century, taking the respective midpoints of the IPCC's most optimistic and most pessimistic scenarios. The ranges are still wide, but the change, unfortunately, is inevitable. Even if greenhouse-gas emissions were to suddenly cease – something that no-one can really expect to happen – the inertia of the system is such that warming will continue for several decades, given the volume of

what has already been released into the atmosphere. Climate is like one of those mastodons of the sea, container ships or supertankers: even if the engine stops, the vessel will continue to move forward along its course for a long time.

The tourism and leisure industry therefore finds itself absolutely obliged to cope with the prospect of a significant warming of the climate over the long term. This is no minor problem since it concerns a considerable sector of the world's economy and society: according to the World Tourism Organization (UNWTO), 842 million people travelled to a country other than their own during 2006 (the equivalent of the population of Africa); they spent over 500 billion dollars at their destinations, and that is without counting airline transport receipts or taking into account domestic travel within each country. Tourism has become one of the biggest categories of international trade, generating receipts that represent (including air transport) 40 per cent of trade in services. Thus, even if the warming trend could be brought under control and slowed down, it is very much a major challenge that, under all hypotheses, awaits not just the tourism industry, but also through it, the world economy as a whole.

### ***Complicated interactions***

The interactions between tourism development and climate change are of different nature; they resemble those “complication watches” that are so cherished by fortunate aficionados; they constitute a complex web of relationships, consisting as they do, like climate change itself, of phenomena that are part natural, and also partly the result of human behaviours. It is possible to identify four major types of such interaction. The most visible are the immediate – and sometimes severe – impacts of weather phenomena caused by warming: the destruction wrought by floods, storms, or fires, glacial lake overflows, the disappearance of beaches... Then there are the indirect or longer-term impacts resulting from a substantial and lasting alteration of the environment at tourism destinations that reduce their attractiveness (polluted waters, receding forests and decreased biodiversity, retreating glaciers and snow caps...). Some effects of this kind are indirect: for instance, rising temperatures in humid regions encourage the proliferation of insects and the spread of contagious diseases that may well affect visitors. A third type of impact has to do with lifestyle changes caused by climate change (reorientation of tourism flows both in winter<sup>1</sup> and summer). Lastly, the efforts of individuals and public policies aimed at attenuating the effects of warming also induce an entire series of consequences for tourism activity (adoption of new, more energy-efficient technologies, increased transport costs, product-diversification efforts aimed at prolonging the season and reducing vulnerability). These interactions of different nature will appear in the background of the following description, which, for the sake of clarity, is structured around a typology of major problems and types of destinations.

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Tourism is already – and it will be more so in the future – the victim of the imminent changes; but it is also partly the vector of such changes.

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<sup>1</sup> British tourists travelled more to the Rocky Mountains and less to the Alps during the 2006-2007 winter season, owing to the snow cover conditions at the two massifs.

## I. TOURISM, A VICTIM OF CLIMATE CHANGE

Tourism is, first and foremost, an undeniable victim.

True, the outlook in this regard is not all negative, and it is plausible, for example, that certain seaside destinations will be able to extend their season, given the fact that higher water and air temperatures will make beach tourism possible during periods when it has hitherto hardly been practised. The development of rural, or even seaside tourism could be benefited in the northern regions of Europe. The report submitted by Nicholas Stern to the British Government also mentions the possibility of spurring tourism in countries or regions such as Canada, Russia or Scandinavia. But the negative considerations outweigh such benefits – and by a wide margin. There are four major foci of particular concern<sup>2</sup>.

### *Small islands and coastal regions*

The first is that of small developing islands and coastal strips in the tropics. The tsunami that struck the Maldives, among other countries, on 26 December 2004, caused by a seismic movement, was not a direct consequence of climate warming. But certain islands of this archipelago had been submerged, several years earlier, by another large wave surge that damaged numerous tourism facilities, and this wave was simply an effect of tides and storms. Since the highest point of some of these islands is just a few metres above sea level, and given that the latter is bound to rise, their very existence is coming increasingly under threat, and many others along with them, such as those of Tonga, Tuvalu or the Marshall Islands. This is because the Maldives – like a majority of the 51 island countries or territories – live off tourism, thanks to which this nation has recently managed to get off the list of the 49 least developed countries. For reasons having to do mainly with warming, a large part of coral formations have already disappeared there (see below).

By definition, the expected rise in sea levels will not be limited to inter-tropical areas, although it is in these regions, for example all along the Bay of Bengal, where most of the “*hundreds of millions of people*” that according to the IPCC could be affected, live. If the warming should reach four degrees, it is one-fifth of the world's population that could be faced with flooding. We already know the gigantic cost, surpassing 4 billion euros, of the investments decided by the local authorities and the Italian Government to preserve the historic centre of Venice, one of the jewels of world tourism. Rising sea levels are also often accompanied by cliff and beach erosion to the detriment of tourism.

The bleaching of corals, along with their degradation, is another source of concern for these island and tropical beach destinations, since with the biodiversity that they generate, coral beds constitute a notable attraction for visitors who enjoy scuba diving. A very modest rise in seawater temperature, accompanied by the ongoing acidification of oceans and by diverse pollution phenomena, has been enough to trigger this phenomenon; this can only become more accentuated: two degrees higher and bleaching becomes generalized; three degrees, and substantial die-offs are possible. Many major tourism zones of the world are already affected,

<sup>2</sup> The *Special Report* published by *Newsweek* magazine on 16 April 2007 provides a considerable amount of data on these interactions.

and in particular, the reefs of the Caribbean, where half the coral, for example, has disappeared since 2005 in the US Virgin Islands National Park, and the 2,500 individual reefs spread over the 2,000 kilometres of the Great Barrier Reef that stretches along the coast of Australia, where they generate tourism activity with a business turnover of over 4 billion euros, which has now become vulnerable. In other regions, it is marshland and mangrove areas, also frequented by visitors, that are receding.

Various countries such as Australia, France, Egypt and the United States – for the Hawaiian Islands and the Merritt Island National Wildlife Refuge of Florida – have undertaken measures to protect coral ecosystems and coastal fishing areas. For its part, the World Tourism Organization is involved with the Global Environment Facility (GEF) and the United Nations Environment Programme (UNEP) in two pilot projects concerning the impacts of climate change for the Maldives and the Fiji Islands.

Even if the causal links still need to be perfectly confirmed, it is extremely likely that the correlation is direct between higher sea temperatures and the multiplication of tropical cyclones, such as those that caused serious damage in New Orleans in the United States, and the resort of Cancun in Mexico, in August and October 2005, respectively. A major tourism destination, the Caribbean Sea, which received (including Mexico, but not counting the United States) over 40 million international tourists in 2006, is particularly hard hit by these extraordinary phenomena whose intensity and frequency are increasing.

### ***Water and deserts***

The second focus of concern is the situation arising from the increased scarcity or irregularity in the supply of water, as well as the process of desertification manifesting itself in various parts of the world, in particular, in sub-Saharan Africa and Central Asia, and which is tending to spread to countries such as India and China in their western parts. Thus, for example, in the region of the Niger River bend, wherever the desert advances, biodiversity declines (see below). But human communities are also affected, especially in Africa, a continent that despite its size has but one-tenth of the world's hydrological resources. The United Nations declared 2006 as the International Year of Deserts and Desertification.

Over the long term, water consumption is increasing twice as fast as the population. It has increased six-fold in one century, while world population has tripled over the same period. Agriculture uses 70 per cent of the fresh water consumed on the planet. Scientists gathered together within the IPCC estimate that by the end of the century the number of people who will be affected by water shortage and the illnesses associated with it could rise to 3.2 or even 3.4 billion, as compared to 1.2 billion today.

In semi-desert areas, there is increasingly fierce competition for access to supply, which has become more arbitrary – competition between the needs of indigenous communities and those that arise from tourism development, the daily water consumption of a visitor being infinitely greater than that of a permanent resident. Should the needs of the former be satisfied first then, as one would be naturally inclined to think? Perhaps, but in certain cases, for example in Tunisia, it is tourism development that provides the local communities with the financial resources that precisely allow the creation of infrastructure, notably, access to potable water,

treatment of waste water and sanitation, while 2.7 billion people suffer from the lack of this service.

As regards the zones of the Sahel, where soil salination phenomena are becoming more accentuated, one of the motives of concern is that consumption peaks corresponding to the needs of permanent populations often coincide with those generated by tourist visits, although it is true that recycled water of a quality level lower than that required for human consumption can be utilized for the maintenance of golf courses or for watering the parks and gardens around hotels.

We can see just how complex this problem is, and we can observe this in a country like Spain, where considerable real estate developments (on the order of 300,000 new housing units in 2006) are being carried out on a large part of the coast, accompanied by the creation of golf courses aimed at making them profitable, and this is happening even as the limit of the capacity to supply potable water is being approached; in this context, the issue of the diversion of water from one river basin to another has become a subject of public debate. The IPCC's studies conclude that water availability in Southern Europe will decline by between 5 and 35 per cent by the end of the century. This will augment regional inequalities, incite conflicts, and in a correlative manner, increase the frequency of fires, and this at a time when the growth of leisure property development, which escapes all control, is taking up the scarce spaces that are still preserved on the Mediterranean coast (Morocco, Turkey, Cyprus, Croatia, Montenegro...).

As a consequence of accelerated economic growth, the surge in consumption is particularly spectacular in Asia, a continent where 60 per cent of the planet's population lives, but which possesses only a third of the world's water reserves. The processes of industrialization and urbanization, coupled with the general rise in living standards, generate considerably increased needs in addition to those of international tourists, whose number has doubled in ten years to reach 167 million in 2006, as well as of domestic visitors (1.4 billion just in China, including same-day trips).

Depending on the region of the world, heat-waves and droughts are multiplying, sometimes accompanied by violent brush and forest fires, to which reckless actions by tourists may also contribute; or, conversely, increased precipitation and floods are becoming more frequent as warming continues to advance. Events of this nature, notably gigantic fires, have recently affected major tourism zones such as the western United States, the Iberian Peninsula or Greece, but also poor regions such as Yemen or the Horn of Africa. In Australia, repeated fires reduce the area covered by eucalyptus trees, and consequently, the numbers of koalas, which tourists are so fond of. The "El Niño" phenomenon is added to this in certain years, aggravating the situation in the inter-tropical regions of the Pacific coast where it manifests itself. Already on several occasions in the recent past, sharp and sudden increases in the river flows have damaged the cultural heritage and tourism assets of cities in Germany and Central Europe.

### ***Forests and biodiversity***

The third area of concern has to do with the evolution of ecosystems, principally but not exclusively, in tropical zones.

Biodiversity, which attracts tourists, is in decline, with climate changes being one of the reasons behind the acceleration of this phenomenon, which is no longer limited to islands and bird populations (the late-lamented and charming dodo disappeared from Mauritius in the 18th century and the giant turtles of the Galapagos barely evaded the same fate, due to excessive hunting). The spectacular decrease in the number of lions (there remain just between 23,000 and 39,000 in Africa, where they have disappeared from 80 per cent of their former habitat), and the threatened survival of polar bears, constitute emblematic cases in this regard. Since the independence of Kenya in 1963, the population of elephants has gone from 170,000 to 30,000, and that of rhinoceroses from 20,000 to 500, making the latter almost impossible to see for tourists. The list of species in extreme danger of extinction has increased by 7 per cent between 2004 and 2006, and is approaching 3,000. This trend is exacerbated, notably in Africa, by the invasion of foreign species that disturb traditional balances. The IPCC estimates that between 20 to 30 per cent of animal and plant species are exposed to increased risk of extinction if the temperature rises an average of 1.5 to 2.5 degrees.

In Kenya, an important tourism zone such as that of Lake Nakuru, famous for its immense bird populations, is already suffering from the reduction of its water inflows, and this while in neighbouring Tanzania, it is projected that by 2020 the snows of Kilimanjaro, whose effect is so striking in the backdrop of films and photographs showing large animals, will have totally disappeared. In the same part of the world, the populations of mountain gorillas are being threatened and are suffering from the process of deforestation, as are those of orangutans in Indonesia, or even of tigers on the Indian subcontinent, where visitors can only hope to glimpse a rare paw-print at best.

In these tropical zones, the two problems of climate and the survival of wildlife collide. Climate change has been added to the twofold pressure of demographics and speculative fever, whether the latter takes the form of logging, expanding livestock pasture areas, or the cultivation of rubber trees, oil palms, soybeans, or even sugar cane, which in a country like Brazil, is no longer found only in the North-East, but is also now expanding towards the Central-West region of the territory; tropical forests are receding dramatically, and there are many species that are seeing their natural habitat shrink. As a result, the tourism attractiveness of these regions is growing weaker. According to the FAO, the world has lost in 15 years, 3 per cent of its forest cover. Thirteen million hectares – equivalent to the area of Greece – disappear each year, including six million hectares of primary forest. Whether in the Amazon basin, that of the Parana and the Paraguay rivers, or that of the Congo, or on the archipelagos of Indonesia and Papua New Guinea, tropical forests are playing a progressively smaller role as “carbon sinks”, essential for climate balance, a function that northern forests perform to a much lower extent or not at all. At the same time, slash-and burn practices are sources of carbon emissions as well as of particulates, and at certain times, an immense cloud of haze extends over part of South-East Asia. Important destinations such as Singapore and Malaysia, or even Bali and the Maldives, suffer their consequences at irregular intervals.

With the impending warming, the phenomenon of deforestation is expected to become more accentuated, and the IPCC predicts that the savannah will replace tropical forests in great proportions in Africa and South America.

It is true, however, that not all is bad news. In Europe, in North America, in certain regions of Asia, the forest is expanding, but this is not enough to turn the

global balance around. Eleven per cent of the world's forest cover is now protected, a third more than fifteen years ago. When a country like Gabon decides to block off 11 per cent of its territory in order to create a network of 13 nature parks, a great opportunity for developing ecotourism presents itself. This is because safeguarding or restoring biodiversity constitutes a formidable lever of tourism development. The panda research centre of Chengdu, in the Sichuan province of China, has thus become a successful attraction: the receipts generated by the 400,000 visits it attracts annually cover three-quarters of the budget of the establishment, so much so that a reintroduction of the animals to their natural environment is now being considered, with the aim of creating a new tourism product there. It is with the same kind of objective in mind, and also in order to allow village communities to derive greater benefits from their presence, that the UNWTO is encouraging in West Africa and equatorial Africa the establishment of cross-border cooperation in the field of tourism management of nature parks and protected areas.

### ***Snow and glaciers***

Our fourth focus of concern is the future of sports and sight-seeing activities in polar and mountain zones.

Glaciers and snow-covered areas are shrinking everywhere; a self-reinforcing process has begun as the snow blanket loses part of its capacity to reflect solar radiation back into space, and with the melting of ice shelves constituting the main factor contributing to the elevation of ocean levels.

The polar regions, where cruise ships have taken the place of explorers, are particularly suffering. Over the course of the last century, temperatures in the Arctic have risen twice as fast as the average, although the flora and the fauna are quickly adapting to this change. Canadian tourism suffered from exceptionally late snowfall during the winter of 2006-2007. In Lapland, the abnormal accumulation of snow and ice formed by the alternation between periods of cold and thaws is threatening reindeer, which can no longer reach their food. One unusual development is that very peculiar cruises to the Antarctic are now being organized to observe the calving of the ice shelf, a bit like how Nero looked on from atop his palace as the city of Rome burned. In these two cases, it is human malfeasance that caused the disaster. But unlike Nero, tourists in the Antarctic are taking photos or recording videos instead of singing to the accompaniment of a lyre, and in contrast to the Titanic, there is no orchestra accompanying them! For its part, the small town of Ilulissat, in the north of Greenland, where the spectacle of the ice sheet breaking up is drawing visitors, has become a fashionable destination that any self-respecting political figure is keen to visit to see and in order to be seen<sup>3</sup>.

The mountain glaciers that attract numerous visitors are receding in many parts of the world, especially in the Andes. The Himalayas are expected to become increasingly affected and the glaciers of Tibet could be gone by 2100; the Alps are already severely hit. What a pity it would be for Argentina's Patagonian region to lose such an exceptional tourist attraction as the glacier lake of Perito Moreno! How can one imagine a visit to the Chamonix valley during the summer without an excursion to the famous Mer de Glace, whose thickness has already been reduced by 120 metres since 1905, and in front of which the view of the Aiguille du Dru has changed

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<sup>3</sup> *The Economist*, May 2007.

due to rockfalls caused by the higher temperatures? A century from now, the Matterhorn will still tower over Zermatt, but how sad it would be not to be able to ski anymore on the glacier facing it! With a two-degree rise in temperature, the survival of glaciers would become uncertain in the Alps below 3000 metres.

Indeed, even more important is the plight that awaits skiing and other winter mountain sports activities. The exceptional mildness of the 2006-2007 winter season – the warmest since 1880, the date when temperatures began to be measured – has called further attention to the vulnerability of winter sports activities, in particular in the Pyrenees and in the French, Swiss and Austrian Alps. And the old refrain from the deep middle ages – Villon as popularized by Brassens – echoes relentlessly in our ears: *“Where are they, where, O Sovereign Virgin? Where are the snows of yesteryear?”*

The stakes are high. Winter sports, with their 606 resorts and 12,000 ski lifts, represent for the Alps a business turnover of 50 billion euros each year; and mountain tourism accounts for 4.5 per cent of the national product of a country such as Austria.

A community such as Morzine-Avoriaz, situated in the northern Alps on the French-Swiss border, is a victim, like others, of the rarefaction of snow cover. At an altitude of 1800 metres it used to receive an average, during the decade of the 1970s, of 13 to 14 metres of accumulated snowfall over the course of a winter. These past years, the average has been 6 to 7 metres – just half! But, above all, the worst is undoubtedly yet to come. A study carried out by the country’s meteorological institute (Météo France) indicates that at an altitude of 1500 metres, a 1.8 degree rise in temperature will cause the northern Alps to lose 40 days of snow cover out of the current five months they enjoy. This means that it will no longer be possible to ski during Christmas or Easter; now then, we know that in order to be profitable, a winter sports resort in the Alps needs to be open for at least 100 days. And the scenario being considered here is very much on the low end of the range of what climatologists predict for the end of the century. Unless the tourism product is rapidly and drastically modified, a shortened ski season and the congestion of reception and transport infrastructure during the remaining period will become the rule. Initially, only resorts whose ski areas are situated above 2000 metres will escape this fate, and in certain cases, only those facing north will remain skiable.

Partial solutions exist, through careful grooming of the ski runs, better maintenance, seeding them – which provides the equivalent of an additional 10 to 20 centimetres of snow base – and of course, the use of artificial snow or “cultured snow”. In a country such as France, 187 resorts are so equipped and artificial snow covers 4000 hectares. But snow cannons are merely a palliative measure that itself generates a negative impact on the environment in terms of both aesthetics and noise. They are costly, consume water that has become scarce, and can only operate if temperatures are low. The situation is considerably even more worrying for mid-mountain destinations situated in valleys that have seen tourism replace agriculture in half a century. As shown by studies conducted by the Organization for Economic Cooperation and Development (OECD), with a warming of moderate amplitude (2 degrees), 200 alpine ski resorts, that is, a third of the total, would be negatively affected; a 4-degree rise and two-thirds would be affected, with only those situated above 1800 metres remaining assured of adequate snow cover. A warming of 2 degrees would result in Germany losing 60 per cent of its potential for winter sports in the Bavarian Alps; 4 degrees and there will be none left.



### ***Self-reassessment in the face of warming***

It is therefore vital for tourism destinations, in mountain regions and elsewhere, to anticipate these coming changes and to draw their consequences, starting now. Partial responses exist. Alternatives can be proposed in many cases. A diversification of the tourism products offered, based on a broadened range of outdoor and indoor activities, generally constitutes the best possible response in order not to be overly dependent on the vicissitudes of climate. But this is a long-term project that must be anticipated and carefully prepared beforehand; it is not easy to see this through successfully, because it entails, all at the same time, modifying economic circuits, introducing new technologies, carrying out an intensive training effort, investing for the creation of new products, lengthening the season, and above all, changing the minds of public authorities, entrepreneurs, host communities and tourists.

In the space of two generations, the “*leisure civilization*” has, in many regions that are now tourism-oriented, replaced the old rural order, and, with this upheaval, prosperity has taken the place of precariousness. It is not so easy to make a second economic and cultural revolution happen in such a relatively short span of time when measured on the scale of the history of these communities; it is not a simple matter to get those who have just managed to reach a certain level of affluence to admit that they must be able to question and profoundly alter their way of life. In these conditions, and given that the movement of warming is not linear, each phase of remission revives hope and becomes a pretext for inaction, even if everyone is well aware deep inside that the former can only turn out to be illusory and that the latter is tantamount to burying one’s head in the sand while the problem inevitably grows larger.

## **II. TOURISM, A VECTOR OF CLIMATE CHANGE**

Tourism appears then, as we have just seen, first and foremost as a victim; but it is also a non-negligible vector of the changes that are taking place; it contributes, through its very existence, and – it must be recognized – through its own excesses, to the warming process.

### ***An inexorable and growing contribution to warming***

The transport sector as a whole is, according to some estimates, responsible for one-fifth of carbon dioxide emissions. Its share of emissions is growing, while that of other sectors, such as industry or accommodation, is shrinking. It is true that transport is not tourism, and that the bulk of emissions comes from local automobile traffic. Nevertheless, the general trend can also become more accentuated – so strong is the demand for transport, whether of passengers or merchandise. If the developing countries were to adopt the same consumption structures as the Western countries, the number of individual automobiles in the world would grow from 800 million to 1.6 billion. Within the transport sector, it is only the contribution of rail traffic that is on a declining trend.

The Stern report is more measured. For its part, it estimates at 14 per cent of the total, the contribution of the transport sector to the emission of carbon dioxide and other greenhouse gases, that is to say, a contribution on the same order as that of agriculture or industrial activities. And it is also quite evident that, out of this 14 per cent, the largest part comes from local land transport, and notably, from the use of cars in urban settings or over short distances.

Attention has been drawn recently to the responsibility of the air transport sector, and of the 931 million passengers it carried in 2006, to CO<sub>2</sub> emissions. Estimates put this at around 2 to 3 per cent of total emissions. But the trend is definitely upward; in Europe, for instance, estimates have increased by 87 per cent since 1990. It should be noted, with regard to the 842 million international trips already mentioned, that 40 per cent of visitors arrive at their destinations by air.

Aside from greenhouse gas emissions, air transport also generates other impacts on the skies, such as the formation of cirrus clouds, but it is not the only factor involved: the other forms of transport also play their role, as do, for example, the heating and, conversely, the air-conditioning, of accommodation establishments. Efforts must be made in the latter domain to introduce concepts, technologies and materials that are more energy-efficient, and to enhance insulation. To the extent that it is in its hands, the sector of hotels and other tourist accommodation establishments should become a model to follow in the use of renewable forms of energy. A hotel group such as Accor plans to equip 200 of its establishments worldwide with solar panels by 2010.

Initial estimates<sup>4</sup> attributing to tourism around 5.3 per cent of total emissions have been presented for the sector as a whole, not including business travel. These need to be confirmed and refined.

Nevertheless, one thing is sure: the contribution of transport used by travellers for leisure or tourism purposes to the phenomenon of warming is growing. Confirmed by the developments observed over the past several years, the UNWTO's forecasts indicate that the 800 million international arrivals in 2005, will increase to 1.1 billion in 2010 and to nearly 1.6 billion in 2020. This outlook corresponds to annual growth rates of slightly over 4 per cent; these will be on the order of 5 per cent for air transport. We should therefore expect a doubling of international travel flows within the span of 15 years. The profound sociological phenomenon tending towards the shortening of long vacations and the multiplication of short stays constitutes an important element that underlies this inevitable growth in the volume of trips, which is much stronger than that of overnights.

Quite evidently, the percentages in question remain too small to suggest the existence of any kind of direct correlation or dominant responsibility of tourism in the phenomenon of warming; rather, what should be looked at are the common factors having to do with the industrialization of countries and the increasing wealth of their populations; but it is not entirely by chance that the region of the world whose emissions are increasing the most, Asia-Pacific, is also that where tourism is progressing most rapidly. It is no coincidence that within the very short term, and perhaps even this year, China will take the place of the United States as both the

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<sup>4</sup> cf. S. Gossling – 2002 – Global environmental consequences of tourism. Global environmental changes.

number three destination in terms of international tourist arrivals and as the biggest contributor to gas emissions into the atmosphere.

### ***Bearing its share of the collective burden***

The tourism and travel industry therefore has its part to contribute to the international community's effort to stop climate warming.

It is regrettable in this regard that, outside of the Djerba Declaration of the UNWTO (see below), the problem has yet to be addressed from an overall perspective on the part of specialists. Indeed, in the Fourth Report (Working Group III) of the IPCC, aimed at providing recommendations to governments on the proper measures to mitigate the impact of climate change, tourism as such is not mentioned, whereas transport does appear in it alongside energy, the habitat, industry, agriculture, forests and waste. It is the UNWTO's conviction that the mitigation potential is especially high in the tourism industry, because efforts to lower its energy consumption are still in their infancy and have hitherto been undertaken without a global vision. Furthermore, the expected growth of this sector justifies that it be given particular attention.

Within certain limits, alternative solutions can be proposed to reduce the sector's contribution to the greenhouse effect, especially in the area of transport, which accounts for the bulk of emissions. For example, in France, the world's top tourist destination, in order to travel from Paris (as from Brussels or from London) to the ski resorts in the Alps or to the Côte d'Azur, there are three main types of transport that can be used: one can go by personal automobile, which releases substantial gas emissions into the atmosphere; by plane to Geneva, Lyon, Marseille or Nice, which generates even more, or by high-speed train (TGV), which connects these cities. Given that in this country 78 per cent of the electricity that powers this train comes from nuclear energy, gas emissions are therefore considerably reduced<sup>5</sup>. A recent study has shown that shifting 3 per cent of goods and passenger traffic from road to rail reduces the corresponding gas emissions by 10 per cent. But such alternatives do not always exist. There is no foreseeable substitute, in the short or medium term, for jet fuel for airplanes, while there are many possible innovations in the area of road transport. Air transport is one of the sectors that lend themselves least easily to the introduction of carbon sequestration technologies.

Is it therefore necessary to stop travelling in order not to pollute anymore?

Very recently, it was proposed in Germany to abstain from going on holidays abroad in order to limit emissions. The President of the Federal Environment Agency urged consumers to do so, on the eve of Berlin's big tourism fair in March 2007: *"Anyone who travels to South Asia by plane should be aware that he is producing over six tons of carbon dioxide"*. No doubt. But if you stay at home, in your apartment that you heat, if you work in your factory or your office, and if you use your car, you are polluting just the same – and maybe just as much – because no human activity is innocuous in this regard.

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<sup>5</sup> On the Paris-Strasbourg route, by TGV the CO<sub>2</sub> emission per passenger is an estimated 1.2 kg, by motor coach it is 19.5 kg, by diesel train 44.3 kg, by car 51.2 kg and by air 70.2 kg. The energy efficiency of the barge is also excellent (2.5 kg), but with a speed of 16 km an hour it is not a means of transport that appeals to travellers in a hurry.

In any case, pious wishes are of but limited interest. The inhabitants of the world will not stop travelling. The current is too strong to resist. It is therefore necessary to search for solutions elsewhere.

### ***Tourism, climate, sustainability and poverty***

And then, there is another even more important consideration. If many decide to forgo a long-distance trip that would have taken them to Cambodia in order to visit the temples of Angkor, or to Indonesia to visit Borobudur, the guide that would have accompanied them at the site, the driver who was to take them there or the cleaning lady who was to prepare their rooms, will undoubtedly lose their jobs, and it is the economy of a country that is more and more dependent on tourism activity that will be hurt. This guide, this driver, this cleaning lady, each supports a large family. Other jobs throughout the industry would also be threatened; poverty would gain ground.

As a global phenomenon, tourism is intimately linked to this other global phenomenon that is climate change. However, as noted by the IPCC's Working Group III, there often exists, but not always, a relationship of synergy between climate change reduction policy and other sustainable development policies. We thus know that tourism has the capacity to contribute to another global challenge that is at least as important: the fight against extreme poverty. Indeed, tourism has become an important instrument for the reduction of poverty at the planetary scale: in 2005 it contributed 205 billion dollars in foreign-currency income to developing countries and emerging countries. It has created many jobs, both direct and indirect.

It was to strengthen this contribution and in application of the recommendations of the 2002 Johannesburg Summit on Sustainable Development that the UNWTO launched in 2003 an initiative called ST-EP (*Sustainable Tourism for the Elimination of Poverty*). 47 ST-EP projects are currently under way in Africa, Asia and Latin America. Several major developed countries, such as the Republic of Korea, the Netherlands, Italy, and, to a certain extent, France, have joined the initiative, and a Foundation has been established in Seoul, in charge of overall coordination. Such an achievement should be preserved, highlighted, and not be put into question.

We must tackle two challenges at the same time: that of climate warming and that of poverty, in their respective relationships with tourism. Both are linked to the issue of sustainable development; they are, nonetheless, partly antinomic, and it is necessary to take this into account. It would be an error to engage ourselves in an overly simplistic effort, in which preoccupation about climate change would lead to losing sight of all other priorities and, in particular, the plight of the poorest populations. We already know that these populations, notably in Africa, where the capacity to adapt is weakest, will inevitably be the first victims of global warming: according to the IPCC, 120 million additional people will be exposed to hunger in the countries of the South; these populations would be doubly affected if we also deprive them of the economic contribution of tourism.

***Solutions, nevertheless...***

A certain number of interesting solutions are currently on the table to reduce the contribution of tourism and transport to warming. The World Tourism Organization is called upon to back them, and in particular, support should be given to the proposal by the European Commission to include air transport by 2011-2012 in the general mechanism for limiting and trading emission rights ("cap and trade"), which is based on Article 17 of the Kyoto Protocol. This does not resolve the problem in its entirety, but it could contribute to its mitigation. It is an option that is more flexible than that of taxation. Such a scheme would impact ticket prices only to a reasonable extent (on the order of 9 to 40 euros per flight, according to estimates and depending on the specific circumstances); it would urge airlines to exert pressure on aircraft manufacturers to supply them with more fuel-efficient planes, and on airports to improve their operations. Other solutions along the same lines, such as more efficient handling of air traffic and shorter wait times for aircraft on the ground, can be looked into. It is important that they be implemented in a global manner, and not just in one part of the world. It is desirable that the General Assembly of the International Civil Aviation Organization (ICAO), which will be held in September 2007, advance in this direction for all air transport in the world.

Other solutions can be envisaged to reduce the emissions that are inherent to the transport sector. Let us cite two of them: the use of biofuels and carbon-emission offsetting mechanisms.

### ***Biofuels: an opportunity not a panacea***

Biofuels are all the rage, whether produced from sugar cane, corn, beets, palm oil, soy oil, rapeseed oil, or, in the case of biodiesel, sunflower oil. Whereas they were wary or doubtful before, farming organizations are now pushing for their introduction. Large countries such as the United States or Brazil have begun to move along this path in spectacular fashion, and while the former exhorts the latter to follow its lead, the aim is apparently not the protection of the Amazon rainforest, but rather energy independence vis-à-vis Venezuela! Brazil's experience in this regard has been no less spectacular, and the rapid conversion of the country's automobiles to the use of less polluting fuels should be commended. The European Union, for its part, has decided that 10 per cent of the fuel in the tanks of Europeans' cars should come from vegetable oil stock by 2020. This is an ambitious project that implies that their production should be highly subsidized today.

To some, biofuels offer only advantages: reduction of greenhouse-gas emissions – which is a certainty –, less dependence of foreign suppliers or on a single source of energy, the possibility of not being too concerned about the uninterrupted growth of emissions related to the grow in transport flows, and thus to avoid having to take restrictive measures that would necessarily prove unpopular. The United Nations, through the IPCC and UNEP, supports this objective, even if the FAO fears that its implementation would cause increases in the price of food products for the poorest consumers, due to the competition for arable land that could ensue. The fact is that innovation is a double-edged sword, and in no way can these new fuels be considered the panacea. First of all, because the energy yield of biofuels is highly variable; only tropical agricultural production is truly efficient in this regard, and the yield of sugar cane, for example, is double that of corn. Consequently, these fuels originating from developing countries have to be transported to the industrialized countries where they are to be consumed, thus generating new emissions. But above all, the spaces dedicated to the cultivation of

crops for biofuel production are necessarily considerable and as mentioned earlier, they are expanding, especially in tropical regions to the detriment of primary forests, which constitute tourist attractions. The greenhouse effect could end up being amplified, when the aim was to reduce it.

Quite rightly, but perhaps a little late, as it was after having launched its policy to promote them that the European Union has just decided to study the environmental impact of these new crops. Such considerations should not be limited to just the industrialized countries, which are big consumers of energy in their transport systems; the ecological impact of these new fuels is global, and it is at the global level that they should be evaluated. In such an analysis, the consequences for tourism should be carefully considered. The introduction on an industrial scale of new fuels that are less polluting than fossil fuels in terms of carbon emissions, is good news for tourism, for the environment and for the climate; the resulting reduction of forested areas and the decline in biodiversity is bad news for all three.

### ***Buying self-redemption***

The last attempt at a response that should be studied has to do with mechanisms for the trading of carbon credits or "carbon offsets". Indeed, there are many initiatives of all kinds aimed at introducing more efficient energy-consumption schemes or calling for the adoption of renewable energy sources, and lacking the latter, for offsetting emissions that cannot be avoided. Tourism should take a part in this, whether in the areas of accommodation or transport, even though this is a more complicated matter for air transport, as already pointed out.

Emission offsets – by individual tourists, by travel agents, by tour operators by transport companies, by NGOs, or by any other economic agent – constitutes an interesting response, since it is impossible to significantly reduce emissions themselves. It can take diverse forms, such as investment in renewable-energy projects or waste processing, or even the launching of reforestation programmes. In each case, the aim is to move toward a certain neutrality, that is to say, to arrive at a zero-sum game between carbon emissions linked, for example, to a trip, and a cut-back or an investment in another area. The moral dimension – or a guilty conscience – is not absent from such initiatives: redemption through payment! Thus, you can travel on Air Canada and pay, if you feel a certain remorse, 12.80 dollars for the 800 kilograms of carbon dioxide that you will have released into the atmosphere between Vancouver and Montreal!

The World Tourism Organization should support the principle of such initiatives, but it would undoubtedly be desirable, during an initial period, to begin by monitoring such schemes and evaluating the most interesting results from among them. The UNWTO could include this activity in its programme of work for 2008-2009.

### ***Surviving the change; contributing less and less to it***

Several years ago, when this issue was not yet drawing the attention of the media as it does now, the UNWTO undertook to study the interaction between tourism and climate change. It took the initiative of organizing in 2003, in Djerba, Tunisia, the first Summit on this subject. A formal declaration was adopted, which still

remains largely valid today. In order to take into account the progress made in our knowledge and recent developments regarding the matter, the UNWTO will hold this year the second conference on this subject, with a technical segment during the first several days of October, at the symbolic venue of Davos, Switzerland, with the support of the World Economic Forum, followed by a ministerial summit on the occasion of the World Travel Market in London, in mid-November.

Based on the latest knowledge acquired, and notably the work done by the IPCC, our assessment is being refined, and unfortunately, our apprehension is growing stronger. Regardless of the efforts undertaken or what they might be, a warming phase is inevitable. If thanks to our efforts the change is contained within reasonable limits (+2 to 3 degrees), certain economic activities such as agriculture in temperate or northern regions could even benefit from effects that are mainly positive. It is only beyond such a threshold that the balance for them turns negative. For many areas of tourism activity (skiing and winter sports, scuba diving, cruises...) on the other hand, negative effects predominate even at this modest level of warming. The vulnerability of tourism thus appears greater than that of many other human activities.

What we are trying to do is not inspired by some kind of Proustian nostalgia. We are not "*à la recherche du temps perdu*" ("*temps*" in French meaning both "time" and "weather", and we are certainly not seeking to recover the latter!) Our approach to the issue is essentially economic in nature, as Nicholas Stern puts it: "*the benefits of strong and early action far outweigh the economic costs of not acting*". Our aim is to underline that failure to act would be particularly tragic for the tourism sector and would thus have heavy consequences for the world economy, considering tourism's substantial weight in it.

Together, and despite the difficulties, it behoves us to set a good example. It is up to us to propose avenues of research and instruments of action that will allow tourism to transform itself, and in so doing, survive climate change and progressively lessen its contribution to it. "*In the long run we're all dead*", quipped John Maynard Keynes: let us make sure that this will not be the case of the world tourism industry! We must be guided by four watchwords: understanding the interactions and what is at stake, anticipating changes, adapting to the new environment that is emerging, and reacting by participating in the common effort of the international community.