

Managing climate change impacts on tourism: Mitigating and adaptive strategies with special reference to the Western Cape Province of South Africa

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Abstract

Climate is considered to be a tourist resource, and it is widely acknowledged that the nature and distribution of tourist activities are affected by climatic elements. Changing world climatic regimes are therefore likely to have long term impacts on tourism activities, resources and distribution patterns. South African tourism will not escape the impacts of climate change. This is unfortunately also true of the Western Cape, South Africa's premier tourist destination. This article explores the impacts of climate change on tourism in this sub-region and investigates the actions that can be taken to mitigate and adapt to the impacts of climate change. A model for the development of adaptive strategies is proposed.

Keywords: Climate change, tourism impacts, mitigation and adaptation strategies, adaptation model, Western Cape.

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Introduction

Environmental conditions on earth are changing rapidly. The degree to which those changes are human-induced could be debated, but the fact that changes are taking place is indisputable (Zietsman, 2011). During the COP 17 Conference on climate change held in Durban, South Africa in December 2011, delegates expressed their concerns about predictions that CO₂ emissions will rise to 55 gigatons during the next nine years, resulting in an increase of world temperatures of 3.5°C. in stead of the targeted 44 gigatons and a more acceptable 2°C rise in temperature (Tempelhof, 2011). This could have catastrophic consequences, on world economies, including international tourism. Delegates at COP 17 consequently called on governments to sign binding agreements leading to the reduction of CO₂ emissions. Unfortunately, a number of governments are not fully supportive of CO₂ restrictive measures (Liebenberg, 2011). Some governments, however, were quick to respond. The European Union recently announced a carbon tax of R139 per ton on CO₂ emitted by airlines, effective

from 1st January 2012 (Styan, 2011). This will push up the cost of airline tickets, with negative consequences for international tourism. The EU announcement did not come unexpectedly as tourism related activities are known to contribute to CO₂ levels. Studies by Gosling *et al.*, (2002), focusing on the environmental impact of travel to the Seychelles, revealed that 97% of the energy footprint was the result of travel, especially air travel. Carbon taxes on air travel could well result not only in a reduction in long haul travel, but also a spatial redistribution of activities. Studies by Hamilton *et al.* (2005) suggest that intercontinental tourism may well keep on growing, but mass tourism is likely to continue to prefer destinations closer to home. Uncertainties about future travel costs, nevertheless, make projections of international tourist numbers very uncertain. What is certain is that the nature and type of tourists, and the growth rate in world tourism, are likely to change. Hamilton *et al.* (2005) are also of the opinion that climate change could mean that the currently dominant group of international tourists – especially sun and beach lovers from Western Europe - would stay closer to home, implying a possible reduction of international travellers and distances travelled. This would impact negatively on the South African tourism industry, which relies heavily on northern hemisphere tourists for its sustainability. European countries not only constitute major markets for South Africa, but the country's sunny climate and pristine beaches are major attractions for European tourists. South Africa; and the Western Cape in particular, could simply lose its competitive advantage and leading tourism destination status, in terms of the particular niche market (sun, sea and beach tourism).

It should be noted here that two different types of strategies are presently employed on the international and local levels to manage the effects of climate change, namely mitigating and adaptation strategies. Although the paper will focus primarily on the Western Cape situation, it is important to provide a short discussion of mitigation strategies in order to contextualize proposals regarding adaptation strategies.

Mitigation strategies

Mitigation strategies focus on the reduction of greenhouse gases (GHC). Mitigation efforts are intended to benefit the global community. It is primarily aimed at reducing the impact of man-made contributions to GHC emissions. The responsibility lies primarily with national governments.

South Africa depends on fossil fuels to produce energy for itself and other countries of the SADC region. While these fossil fuel sources are abundant and cheap by world standards, they are classed as dirty in terms of the pollutants and the quantities there-of that power stations pump into the atmosphere. South Africa's carbon dioxide pollutions are far higher than those of Europe and the

USA, when measured on a per capita basis. South Africa's 'emissions are 7.4 metric tonnes of CO₂ per annum, compared to a world average of 4 tonnes'. South Africa is a signatory to a number of climate change agreements, including the Vienna Convention for the Protection of the Ozone Layer. The Government adopted the White Paper on Renewable Energy in 2003, the National Climate Change Response Strategy in 2004, and hosted the National Climate Change Conference in 2005, all seeking to eliminate (or at least seriously reduce) greenhouse gas emissions and address climate change issues (Masters, 2009).

In July 2008 the Long Term Mitigation Scenarios (LTMS) were introduced. These highlighted a move to regulate state action, and to economic actions through taxes (including a carbon tax and a tax on air travel) and incentives for companies seeking energy efficiency. This was followed by the National Climate Change Summit in March 2009, to demonstrate the importance Government attached to domestic and international climate change negotiations. A Green Paper was published in 2010, aiming at a 'final National Climate Change Response Policy' which should recognise the seriousness of the climate change problem, and the development of finite policies towards South Africa's obligation to combat adverse climate change (Masters, 2009).

Despite steps taken to reduce GHG, tourism-related emissions are projected to continue to grow rapidly under 'business as usual' practices, in contrast to the substantial emission reduction targets the international community agreed were required in the latest round of the UNFCCC negotiations (Vienna Climatic Change Talks of 2007), where it was recognised that global emissions of GHG needs to be reduced to well below half of the 2000 levels by mid 21st century. Mitigation is thus of particular importance to tourism. However, mitigation policies need to consider a number of dimensions, such as the need to stabilise the global climate, and the right of people to rest, recovery and leisure. As the emission reductions required from tourism are substantial, mitigation should ideally consider various strategic options, such as voluntary, economic, or regulatory instruments. These can be targeted at different stakeholder groups, including tourists, tour operators, the accommodation sector, airlines, manufacturers of cars and aircraft, and all levels of government.

Four major mitigation strategies for addressing the emissions of GHG can be distinguished:

- Reducing energy use.
- Improving energy efficiency. New technology in aviation, for example, could lead to reductions in emissions per kilometre of travel of 32% between 2005 and 2035 (Peeters & Middel, 2006), while new technology in car transport has the potential of reducing 7% of all tourist emissions of carbon dioxide (UNWTO, 2007).

- Increasing the use of renewable energy in tourism.
- Sequestering carbon through sinks.

Regardless of the successes in reducing GHG emissions by the international community, there will undoubtedly be costs associated with climate change adaptations. These costs cannot be borne solely by those affected, that is, the tourist and the local population benefiting from tourism. The capacity of the tourism sector to adapt to climate change is thought to be relatively high due to its dynamic nature, and therefore there will be important opportunities for tourism to reduce the vulnerability of communities to climatic change (UNWTO, 2007).

Climate Change Impacts In The Western Cape

There appears to be increasing agreement that large parts of South Africa may become drier (Hulme et al., 2001) and warmer. This would be detrimental for tourism and farming, fishing, and the economy in general. Midgley et al. (2001) predicted that by 2050 the most probable climatic change scenario for South Africa would be an increase in January temperatures along the coast of between 0.5 and 1.0° C and in the central interior between 2.5 and 4.5° C. This would be accompanied by a decrease in summer rainfall of between 5% in the northern part of the country, and 25% in the South Western Cape. There could also be a substantial decrease in the winter rainfall areas of the Western Cape, which would have a profound effect on the wine and fruit industries, and consequently on tourism. The Cape Floral Kingdom will also come under threat. According to Hulme (1996), as much as one fifth of the Tsitsikamma forest in the mountains surrounding Knysna could disappear by 2050 as a result of aridification.

The West Coast National Park in the Western Cape of South Africa with its succulent Karoo-type vegetation will also be affected. This Park, and the adjacent Langebaan Lagoon, is a particularly popular tourist destination area. The Park is known for its landscaped carpet of spring flowers, and in summer for the large flocks of paelarctic migrants that congregate in the lagoon. The severe detrimental loss of winter rainfall, predicted by Midgley et al. (2001), could seriously impact the zone's tourist potential. Aridification may also lead to a substantial loss of the Fynbos ecozone, and also of the world's smallest floral biome according to Preston-Whyte & Watson, 2005). Since the Fynbos area is also the wine producing area, the latter could be affected in a serious manner, with resulting negative consequences for tourism.

While higher land temperatures may have a negative effect on certain farming activities, particularly wine farming and therefore of course on wine tourism, sea temperatures are also changing with further definite impacts on tourism. The Agulhas current has warmed by 1.5°C since 1980 due to the increased intensity in trade winds and a pole-ward shift of the westerly wind in the South Indian

Ocean, leading to an overall increase in wind stress curl at relevant latitudes (Roualt et al., 2011). Increasing sea temperature may have a range of implications for coastal fish species. The most obvious effects will be shifts in the distribution and abundance of individual species (James et al., 2011), and as a result also on angling tourism. The impacts of global warming and sea-level rises has already brought changes in the distributional range of fish and other marine species (Griffiths & Mead, 2011) along the South African coast, and has now reached the point where it affects the conservation status of South African fish and seabirds (Crawford & Ryan, 2011), including altering the abundance of their prey. Climate change is also responsible for a major southerly and easterly shift in the distribution of the West Coast rock lobster to the area east of Hangklip on the South African south-east coast (Cockroft, 2011). The current view is that even if global warming could be stopped now, the lag in thermal expansion of the oceans will continue till the year 2300 (Mather, 2011). Climate change impacts may take a wide variety of forms, but it is evident that the coastal areas will bear the brunt of such changes. The following impacts are important for tourism:

- As far as sea level rises and the frequency and intensity of storms are concerned, it is important to note that the Intergovernmental Panel on Climate Change pronounced that anthropogenic warming and sea level rises would continue for centuries even if GHG concentrations were to be stabilized (Theron, 2011). Consequently there is no way of avoiding it in the longer term.
- The probability of sudden sea level rises due to catastrophic failure of large sea waves is still considered unlikely this century, but continental ice-melts in Greenland and Antarctica may soon force a re-evaluation. In the longer term, these large-scale smelting of huge ice masses is inevitable (Theron, 2011). Brundrit et al. (2011) actually predict that a global mean sea level rise of 7 metres, following a disintegration of a large ice field at the South Pole, is considered a real possibility within this century. Such a rise in sea level will lead to permanent flooding of the land along the South African coast, especially the south-west and south-east regions, with considerable destruction of tourism infrastructure. Reclaimed land and estuaries are the most vulnerable. In such an instance the area around Cape Town that will be affected is about 95 square kilometres. In such a case the sea level rise will lead to a new coastline. According to Brundrit et al., (2011) the value of property, the tourism sector, and public infrastructure at risk, would be close to R55bn at 2008 prices.
- The Cape Town sea level has risen roughly in line with the measured global increase of 2cm each decade (Brundrit et al., 2011). This in itself may sound insignificant, but it cannot be viewed in isolation of associated changes, such as big storms. At present the worst case scenario

for Cape Town is a big storm occurring at the same time as a spring high tide.

- The expected increase in storm activity and severity is likely to be the most visible impact in the near future. For example, higher sea levels will require smaller storm events to overtop existing storm protection measures (Theron, 2011). As far as Cape winter storms are concerned, the waves at surf break are often 10 metres in height. At the coast these waves can erode the sand dunes, damage coastal defences and flood low lying areas. It is almost certain that over the next 25 years the sea could flood 25 square kilometres of the City's low-lying areas during such a storm, and threaten R5.2 bn worth of public infrastructure, private real estate and tourism plant (Brundrit et al., 2011).
- Average wind velocity is expected to increase in all seasons in South Africa. This is certainly not good news for tourism. Strong winds, for example, prevent the Table Mountain cable car from operating, while visitors to Robben Island have often to cancel visits, due to strong winds. The majority of beach goers also try to avoid strong winds and flock to sheltered beaches. Kite surfers, on the other hand, enjoy strong winds. If, due to climatic change, winds become only 10% stronger, then wave height increases by 26%. And coastal sediment transport rates potentially increase between 40% and 100% (Theron, 2011). This would have a profound impact on the surfing community, and lead to severe beach erosion and storm damage to tourism plant.

The most vulnerable coastal areas in the Western Cape are northern False Bay, Table Bay, the Saldanha Bay area, and the area between Mossel Bay and Natures Valley, on the south-eastern coast of South Africa. This simply means that low lying areas at tourist resorts, such as Paternoster, Langebaan, Bloubergstrand, the Strand, Gordons Bay and many other similar coastal towns, would be severely threatened. The Cape Waterfront, South Africa's most visited tourist attraction, would also be vulnerable to coastal storms in particular. Unfortunately these predictions do not lie in the too distant future.

From the foregoing discussions it is clear that the most likely impacts on tourism in the Western Cape will be as a result of higher temperatures, increasing droughts, rising sea levels and an increase in the frequency and severity of storms.

Adaptation strategies

Adaptation strategies are employed to reduce the vulnerability of tourist destinations. Adaptation is regarded as complementary to mitigation efforts (IPCC, 2007). It is also seen as a mechanism to manage risks, adjust economic activity to reduce vulnerability, and to improve business certainty (Jopp et al.,

2010). Scott *et al.* (2006) suggest that three types of adaptation, namely behavioural-, technical- and business, may be relevant for tourism. Adaptation strategies are developed primarily to benefit local communities through targeted responses to local climate change issues, and are best implemented at the provincial/local authority level (Scott *et al.*, 2008). Because of the dynamic nature of climate change flexibility remains a key to successful adaptation (Fussel, 2009).

Western Cape beaches are major tourist attractions. But it appears as if developed areas and existing infrastructure in coastal areas have very little adaptive capacity. Where this deemed is acceptable and space permits, the best policy according to Theron (2011) in the long term is probably not to combat coastal erosion and to allow the natural progression of coastal processes. Theron (2011) is also of the opinion that our ability to halt coastal impacts on a large scale is virtually non-existent. According to him each vulnerable stretch of coastline should be studied in terms of aspects such as wave energy, sand budgets, future sea levels and potential storm erosion setback lines, with a view to develop decision-support tools for coastal management and planning. Our best adaptive capacity, according to Theron (2011) appears to lie in planning and research related initiatives and adaptation for disaster management. The fact is that the tourism industry and infrastructure are likely to suffer badly, and everything possible and affordable should be done to reduce the affects of climate change.

Various frameworks have been developed for tourism adaptation (Scott *et al.*, 2006; Becken *et al.*, 2007; Simpson *et al.*, 2008; Jopp *et al.*, 2010). The Simpson model is undoubtedly the most comprehensive. It considers a sequence of seven steps in the adaptation process, starting with engaging stakeholders, definition of the problem, assessment of adaptive strategy, identification of adaptive options, evaluation of options, implementation there-of, and monitoring and evaluation of the sequence, all presented in a cycle with a proper feedback system. The fact that tourists themselves are not considered among the list of suggested stakeholders has been criticised by other researchers (Jopp *et al.*, 2010). It is nevertheless debateable whether tourists, or for that matter any stakeholder group, can make any meaningful contribution during phase one of such a process, simply because a considerable amount of scientific evidence regarding the nature and extent of climatic impacts is required before stakeholders could be employed to consider adaptive strategies.

Jopp *et al.* (2010) proposed a climate change adaptation process commencing with an assessment of the vulnerability and resilience of tourist destinations, before proceeding to strategic objectives to decrease vulnerability and increase resilience and readiness, the latter referring to the ability of tourist destinations to take advantage of opportunities climate change may present. Although this

approach is useful as a starting point, it does not present a comprehensive strategy for planning purposes.

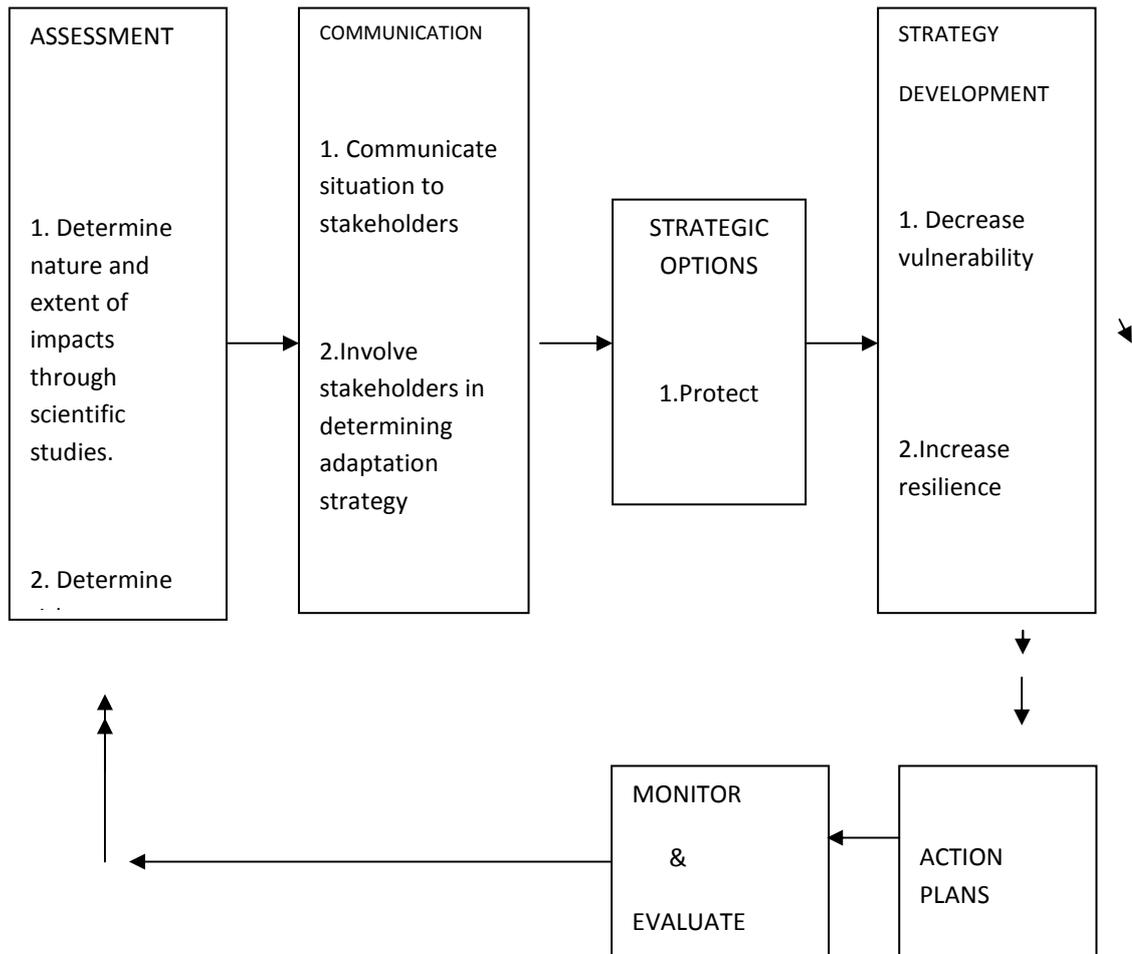
Brundrit *et al.* (2011) suggest the following adaptive strategy for the local government of Cape Town to reduce the impact of sea level rises:

- The first resort, the no-regrets resort, is to stop land reclamation from the sea, stop further wetland and dune degradation, maintain storm water infrastructure, integrate sea level rises into spatial planning, incorporate actions with disaster management, and decentralise strategic economic infrastructure and services.
- The second resort focused on additional institutional measures, which include the following: The enforcement of a coastal buffer zone, managed retreats where necessary, social and geographical vulnerability mapping, risk communication, and application of relevant legislation.
- The third resort focused on additional biological measures, including dune rehabilitation, proactive estuary and wetland rehabilitation, kelp-bed protection and ensuring washed-up kelp on beaches remained on exposed beaches.
- The fourth resort focused on additional physical measures, including beach and dune replenishment, seawalls, barrages and barriers, raising infrastructure, offshore reefs, revetments and rock armour.

The proposed model is clearly a package deal containing details of adaptive interventions. The first resort clearly places the initial responsibility on the City's planning department. By implication, other stakeholders are only brought in during the second resort. To what extent stakeholders are involved in the development of the strategy is not clear, but it appears as if they are merely informed about the proposed actions and that they are not considered as participants in the development process. It is also clear that the local government is simultaneously implementing elements listed in all the different resorts. To remedy the apparent deficiencies, the following model is therefore proposed (Figure 1):

Destination Adaptation Strategy

Step 1 of the model deals with the assessment of risks, general vulnerability and adaptive capacity of destinations. Such assessments require a comprehensive body of scientific knowledge informed by researchers from a multitude of disciplines, such as climatologists, oceanographers, botanists, etc. An assessment of the exact nature of the threats can only commence once scientific evidence is presented. Requests for the collection of scientific data may well be initiated by local /regional authorities, and/or research institutions. It is unlikely that tourists could be involved at this stage



Step 2 involves stakeholder participation. This is of crucial importance to the successful development and implementation of any adaptive strategy. Because of the potential impacts on the tourist industry, the active involvement of this stakeholder group is essential.

Step 3 lists the generic options proposed by Mather *et al.* (2005) which may be applicable to any destination, namely the choice to focus on protection of coastal resorts, accommodation of the threats, or to retreat. The choice here is critical in determining the design of the detailed adaptation strategy.

Step 4 deals with the adaptation strategy, which, depending on the strategic option of choice, may aim to decrease vulnerability, increase resilience and increase readiness to cope with change, as suggested by Jopp *et al.* (2010).

Step 5 deals with the development of action plans aimed at implementation of any selected strategy. During this stage, actions such as raising land levels, dune resettlement, the building of sea defences, the adaptation of building requirements, moving back building lines, etc, may be considered.

Step 6 concerns the monitoring of progress and an evaluation of the successes of the plans. Feedback is then provided leading to a reassessment of risks and vulnerability of a destination.

Models, unfortunately, deal with theory which may well differ considerably from practice. In this case the key problems experienced by local authorities of coastal resort towns are as follows:

- Scientific data is often incomplete or not readily available for the whole coastline.
- Small local authorities are often not aware of climate impact threats in their area.
- Most of the smaller local authorities do not have the capacity, or the enquiring minds, to instigate research to facilitate the required studies, nor do they have the funds. The City of Cape Town is probably the only urban node in the area that is taking action in this regard.
- Funding adaptive strategies represents a major problem since such actions are often very expensive.

The model needs to be tested for validity and it is hoped that local authorities will provide feedback in this regard.

Summary

Climate change cannot be ignored any longer. Neither can we ignore the potential impacts on tourism. It is also important to realize that these changes and impacts are long term. Although there appears to be very little that we can do to stop climate change, it seems to be important to monitor the situation carefully and direct our planning efforts to minimise the impacts on tourism. Planning would have to be comprehensive with involvement of both government and tourism bodies working hand in hand. Activities would have to include the development of legal and policy frameworks developed in response to scientific reports, and of course supported by budgets at all levels of governments. Yet the sustainability of existing tourist practices and distributional patterns appears to be at risk, especially in the medium and longer term.

It is hoped that the model proposed here would assist town planners in their efforts to manage the pending climate change impacts.

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