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## Climate Change, Resilience and Transition to a Carbon-Neutral Economy

### By the end of this chapter, the reader will be able to:

- Describe the role the Intergovernmental Panel on Climate Change plays in discussing climate change
- Discuss whether tourism is a victim, winner or loser in climate change
- Analyse tourism's contribution to climate change
- Discuss and analyse the concept of resilience as it relates to tourism
- Identify various models for tourism and climate change and/or resilience

### Introduction

The tourism industry is in the unique and unenviable position of being simultaneously a major contributor of greenhouse gases (GHG) and a significant victim of changing climate. Historically, research on the relationship between tourism and climate lagged significantly behind that of other studies on climate change (Pang, McKercher and Prideaux, 2012) and to some extent remains on the periphery of mainstream tourism research when measured by the volume of published research, the number of active tourism researchers and the number of climate change subjects taught in tertiary level tourism programs. Much of the research has focused on social science aspects of climate change, without necessarily delving into deeper hard science based models. This chapter reviews a range of models

and frameworks that are used in climate studies in a tourism context, followed by models and frameworks that relate to resilience as a response to climate change. It concludes with a review of three theories and associated models of the future transition to a carbon neutral economy.

## Climate change

Research in the sciences has produced an almost overwhelming amount of data that has been used to build models that show how the drivers of climate change will affect global temperatures, precipitation, wind and sea level rise. These models can be used to investigate change at a system level, with the most widely used being those that appear in the Intergovernmental Panel on Climate Change (IPCC) reports. These models will become increasingly important in coming decades as the tourist industry begins to grapple with the impact of climate change at enterprise, destination and global levels.

### ■ IPCC modelling

The IPCC process presents a different perspective on how models are able to be used to investigate tourism related issues. The key to the IPCC process is the review and synthesis of a large range of publications (both peer reviewed and from reputable grey literature sources) and the development of a range of climate models based on scenarios of future increases in atmospheric concentrations of CO<sub>2</sub>. The IPCC was established in 1988 as a joint initiative of the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP) with the objective of providing policy makers with regular scientific assessments of the implications of climate change. Reports include identification of risks and suggestions for adaptation and mitigation options. As of 2020, the IPCC had 195-member countries. The First Assessment Report (FAR) was published in 1990 (IPCC, 1990) and updated in 1992. FAR and subsequent assessment reports quickly became authoritative sources for model-based predictions used by a large number of researchers in the sciences and social sciences, governments and the private sector. Apart from regular assessment reports, the IPCC also produces special reports on issues that are of concern to member countries and methodology reports that outline guidelines for developing greenhouse gas inventories. Examples of recent special reports that may be of interest to tourism researchers include: a Special Report on Emissions Scenarios (SRES) (Nakićenović et al., 2000); a report on Global Warming at 1.5C (SR15) (IPCC, 2018); a Special Report on Climate Change and Land (SRCCL) (IPCC, 2019a); and a Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC) (IPCC, 2019b). The sixth Assessment report is due to be published in 2022.

The methodology used in compiling IPCC reports is based on the synthesis of peer reviewed publications as well as appropriately documented industry publications by a panel of acknowledged academic experts (IPCC, nd). It should be noted that the IPCC process is one based on review, not the commissioning of new research. Once a draft report is completed, it undergoes a two-stage review process. In the first review, the draft is circulated to acknowledged experts for comment. The number of reviewers may be several hundred (IPCC, nd). After revision, the second draft is given to governments, authors and expert reviewers for further comments. The final draft must be approved by the IPCC Panel. The involvement of governments in determining the final version of Assessment Reports has been questioned by a number of scholars. Trenberth (2001: 11) for example, noted that while the rationale for this process is based on the view that “scientists determine what can be said, but the governments determine how it can best be said”, there is scope for governments to blunt report findings. In general, the negotiations that occur over wording ensures accuracy, balance, clarity of message, and relevance to the scientific community and policy makers. While the inclusion of governments in the review process has been criticised as having the potential to distort findings, there has been a high level of acceptance of the reports by both the academic and government communities.

The FAR (IPCC, 1990) provided researchers with the first comprehensive assessment of the likely impact of climate change. Highlights of the report included:

- Confirmation that greenhouse gases (GHGs) were enhancing the greenhouse effect causing the Earth’s surface to warm;
- Under a business as normal approach the global mean temperature will rise about 0.3°C per decade with an uncertainty range of 0.2° to 0.5°C per decade;
- The rate of change contained in IPCC predictions was uncertain due to the magnitude, timing and regional patterns of climate change and incomplete understanding of a range of drivers including the melt rate of polar ice caps, sources and sinks of GHGs, absorption level of the oceans and impacts of cloud cover;
- Publication of climate scenarios based on modelling that make extensive use of data to predict future outcomes.

The most recent Assessment Report (AR5) (IPCC, 2014) stated that without world-wide adoption of mitigating policies, the global mean temperature will rise to between 3.7°C to 4.8°C above pre-industrial levels by 2100. AR5 was written by 831 authors and has become an important reference point for climate change related research in many disciplines including tourism. AR5 was a key document in negotiations to reduce carbon emissions at the 2015 Paris UN Climate Change Conference.