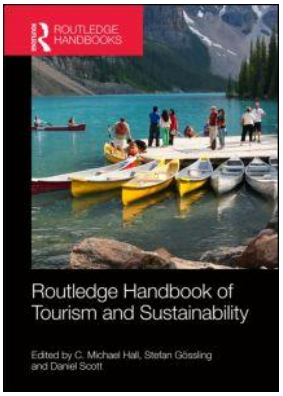

The Routledge Handbook of Tourism and Sustainability

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The global effects and impacts of tourism

Publication details
https://www.routledgehandbooks.com/doi/10.4324/9780203072332.ch3
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Published online on: 16 Feb 2015

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The global effects and impacts of tourism

An overview

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Human Development Index A composite index that combines indicators of health (i.e., life expectancy at birth), educational attainment (i.e., mean years of schooling, expected years of schooling), and living standards (i.e., gross national income per capita) in order to measure human well-being.

Introduction

The global impacts of tourism are garnering increased societal attention. Climate change, coastal urbanization, biodiversity loss, fossil fuel consumption, disease transmission, and cultural commoditization, are among the more contentious tourism issues permeating the media. However, until relatively recently, the positive economic impacts of tourism were the primary focus, with far less emphasis on the environmental and social consequences. Throughout the 1960s, tourism was generally viewed optimistically because of its contribution to economic development (e.g. employment, investment, income, balance of payments, tax revenues) (Mathieson & Wall 1982). Concern regarding the negative impacts of tourism only emerged as a significant issue in the 1970s and 1980s (De Kadt 1979; Hall & Page 2006). It was during this time that broader public concern over the impact of natural resource management began to grow, with the passage of the first environmental impact legislation (i.e. *United States National Environmental Policy Act* enacted in 1969) and the creation of national environmental protection agencies (e.g. the United States Environmental Protection Agency (EPA) established in 1970) (Hall & Lew 2009).

In the seminal work of Mathieson and Wall (1982), a review of the tourism impact literature available at that time highlighted the substantial environmental and social risks and costs that tourism posed. This recognition prompted a reorientation of tourism research towards a more balanced perspective, with studies critically examining both the positive and negative implications of tourism. In their updated book, Wall and Mathieson (2006: 5) note that 'as

tourism has grown in volume and diversity, the consequences of tourism have become increasingly complex and contradictory'. This is also attributable to the influential insights provided by the 1987 Brundtland Report, which formally introduced the concept of sustainable development to a wider audience (WCED 1987). By taking sustainability into account, impact studies are approached with consideration for the interrelationship between economic, social and environmental impact types, rather than focusing on environmental impacts – the original focus of the Brundtland Report – in isolation. There is now a wealth of literature on sustainable tourism development, with sustainable tourism a major focus of impact research (Wall & Mathieson 2006; Hall & Lew 2009; see also Chapter 1).

Unlike tourism-related impact assessments, which focus on a particular project, event or facility, impact studies are concerned with the broader aspects of change, including the factors that lead to change. Importantly, impact studies aim to provide an account of the bigger picture with respect to tourism and its relationship to economic, environmental and sociocultural change over time (Hall & Lew 2009). An inherent challenge with impact studies is trying to disentangle changes that are attributable to pre-existing processes versus changes induced by tourism. Consequently, the scope and accuracy of research results become constrained (Wall & Mathieson 2006). Few impact studies attempt a comprehensive examination, but rather focus on a particular activity or destination. Impact results subsequently become isolated from the broader tourism phenomena of which they are a part, limiting the narrative at the larger global level (Hall & Lew 2009).

This chapter looks at the macro-scale, global environmental footprint of tourism and the global impact of tourism on development, using conventional economic indicators (e.g. GDP, employment), as well as broader indicators of human well-being and societal development (e.g. Human Development Index). This is done through an examination of what is widely regarded as the three dimensions of sustainable tourism: economic, environmental and sociocultural. While tourism impacts are rarely, if ever, just an issue of one of these dimensions, most impact studies focus primarily on one of these three types of impacts (Hall & Lew 2009). Therefore the organization of this chapter echoes the dominant approach in the current literature.

Economic

International tourism has grown rapidly over the past 60 years. It has become one of the largest global economic sectors and a significant contributor to many national and local economies (Coles & Hall 2008). However, one of the difficulties in assessing the economic impacts of tourism is that it is not a standard industrial classification and is therefore subject to different interpretations with respect to contributing sectors in different international and national jurisdictions (Hall & Coles 2008; Hall & Lew 2009).

The growth of international tourist arrivals has been virtually continuous; from 25 million in 1950, to 278 million in 1980, 528 million in 1995, and exceeding the 1 billion mark for the first time ever in 2012 with 1,035 million international tourists (UNWTO 2013). Just over half of all international tourist arrivals (52% or 536 million arrivals in 2012) travel for holidays, recreation and types of leisure, followed by 27% to visit friends and relatives (VFR), religious regions/pilgrimages or health/treatment, and 14% of trips are for business and professional purposes (the remaining 7% not specified) (UNWTO 2013). Although international tourism is usually the primary policy focus because of its business and trade dimensions (Coles & Hall 2008), the vast majority of tourism is domestic in nature and is estimated to have accounted for 6 billion arrivals in 2012 (UNWTO 2013).

International tourism receipts achieved a new record in 2012 of US$1,075 billion worldwide (UNWTO 2013). According to the UNWTO (2013), in 2012, tourism generated an estimated 9% of world's Gross Domestic Product (GDP) (direct, indirect and induced), and contributed to one in 11 jobs globally. Tourism also accounted for 6% of the world's exports (US$1.3 trillion) (UNWTO 2013) or 30% of the world's export of commercial services (UNWTO 2012). However, UNCTAD and WTO statistics provide a slightly different picture of its contribution to the global economy. According to UNCTAD, WTO and IMF statistics (see Table 3.1), in 2012, the export of travel services accounted for 25.1% of total global trade in commercial services and 4.91% of total trade in goods and services. This figure is reasonably similar to that of 1980. However, it represents a decline from 1995 when travel exports accounted for 32.79% of global trade in commercial services and 6.32% of total trade in goods and services. Such figures also raise questions about the often made statement about tourism being the 'world's fastest growing industry' as well as the relative values of tourism as a development mechanism. Nevertheless, this does not deny the economic importance of tourism. Tourism is one of five top export earners in over 150 countries, while in 60 countries it is the number one export sector (UNCTAD 2010; UNWTO & UNEP 2011). It is also the main source of foreign exchange for one-third of developing countries and one-half of less developed countries (LDCs) (UNWTO & UNEP 2011) (see Tables 3.2 and 3.3).

Table 3.1 Travel service exports as proportion of total trade in goods and services and total trade in commercial services 1980–2012

Year	*Travel service exports as % of total trade in goods & services*	*Travel service exports as % of total trade in commercial services*
1980	4.36%	26.16%
1985	5.03%	28.21%
1990	6.16%	31.66%
1995	6.32%	32.79%
2000	5.99%	31.30%
2005	5.41%	27.26%
2010	4.99%	24.43%
2012	4.91%	25.10%

Sources:
Contributions are derived from UNCTAD, WTO and ITC secretariats' calculations of international exports and imports, based on: IMF, Balance of Payments Statistics; Eurostat, online database; UN/DESA/Statistics Division, Service Trade Statistical Database; OECD, OECD.Stat; other international and national sources. See http://unctad.org/en/pages/Statistics.aspx or WTO statistical database: http://stat.wto.org/Home/WSDBHome.aspx?Language=E

Notes:
Exports and imports of goods and services are credits and debits of goods and services as reported in the current account of the balance of payments.

Goods include general merchandise, goods used for processing other goods, and non-monetary gold. In order for a transaction to be recorded under 'goods', a change of ownership from/to a resident of a local country to/from a non-resident in a foreign country has to take place.

Services are defined as the economic output of intangible commodities that may be produced, transferred and consumed at the same time. However, services cover a heterogeneous range of intangible products and activities that are difficult to capture within a single definition and are sometimes hard to separate from goods. Services are outputs produced to order, and they typically include changes in the condition of the consumers realized through the activities of the producers at the demand of customers. Ownership rights over services cannot be established. By the time production of a service is completed, it must have been provided to a consumer. International trade covers transactions between residents and non-residents of an economy.

Travel: Includes goods and services acquired from an economy by non-resident travellers during visits shorter than one year.

For detailed explanations, refer to IMF (1993, 2002, 2009).

Table 3.2 Travel as an export activity 2000–2011

	Billions of dollars				*As % of total services*			
Country grouping	*2000*	*2005*	*2010*	*2011*	*2000*	*2005*	*2010*	*2011*
World	479.4	694.6	950.5	1,067.4	31.5	27.1	24.8	25.2
Least developed countries	2.5	4.8	9.8	11.3	35.9	41.3	44.1	44.0
Developing economies	130.3	213.6	362.4	411.4	37.1	33.9	31.9	32.5
Developing economies excluding China	114.1	184.3	316.6	362.9	35.6	33.2	32.8	33.5
Developing economies: Africa	14.5	28.8	42.2	40.5	43.7	48.2	46.6	44.1
Developing economies: America	31.6	42.9	55.8	58.8	51.2	48.7	41.9	39.6
Developing economies: Asia	83.9	140.5	262.9	310.4	32.9	29.4	28.9	30.4
Developing economies: Oceania	0.3	1.4	1.5	1.7	33.4	45.9	45.6	46.1
Transition economies	8.4	20.5	29.5	35.8	34.8	35.6	28.6	29.6
Developed economies	340.7	460.5	558.5	620.2	29.7	24.5	21.5	21.7
Developed economies: America	111.5	119.9	151.9	166.8	33.9	27.7	24.3	24.6
Developed economies: Asia	8.6	9.5	18.0	15.9	10.0	7.8	10.9	9.2
Developed economies: Europe	209.0	309.0	354.9	400.6	29.6	24.1	20.3	20.6
Developed economies: Oceania	11.6	22.1	34.7	36.9	47.6	55.6	61.1	59.7

Source: Adapted from UNCTAD (2012)

Table 3.3 The importance of tourism for developing economies

Region	*Visitor spending as a % of GDP (2009 or most recent available)*			
	> 50%	*25–50%*	*10–24%*	*5–9%*
Eastern Africa	–	Seychelles	Mauritius, Zimbabwe	United Republic of Tanzania, Madagascar, Comoros, Eritrea, Kenya
Middle Africa	–	–	Sao Tome and Principe	–
Western Africa	–	Cape Verde	Gambia	Ghana
Northern Africa	–	–	Morocco	Tunisia, Egypt
Southern Africa	–	–	–	Namibia, Botswana
Eastern Asia	China, Macao SAR	–	Bahrain	Mongolia; China, Hong Kong SAR
Western Asia	–	–	Lebanon, Jordan	Syrian Arab Republic
Southern Asia	–	Maldives	–	–
Southeast Asia	–	–	Cambodia	Thailand, Singapore
Central America	–	–	Belize	Costa Rica, Panama, El Salvador, Honduras
South America	–	–	–	Suriname
Caribbean	Anguilla	Aruba, Turks and Caicos Islands, Saint Lucia, Antigua and Barbuda, Bahamas, Barbados	Saint Kitts and Nevis, Saint Vincent and the Grenadines, Grenada, Dominica, Cayman Islands, Jamaica, Montserrat, Dominican Republic	–
Oceania	Palau, Cook Islands	Vanuatu	Samoa, Fiji, French Polynesia	Micronesia (Federated States of), Tonga, New Caledonia

Source: Derived from UNCTAD (2008) and UNWTO (2011)

Classifying countries based on their level of development (i.e. developed, developing, LDCs, emerging economies) is not grounded in theory or based on a universally accepted benchmark (Nielsen 2011). In the absence of a general classification system, membership in the Organisation for Economic Co-operation and Development (OECD) is sometimes used as the main criterion for developed country status. For the UN, the country classification system is based on the Human Development Index (HDI), which is a composite index of three indices that measure a country's achievement in longevity (i.e. life expectancy at birth), education (actual and expected years of schooling) and income (Gross National Income per capita). Developed countries are those in the top quartile of the HDI distribution, with the bottom three quartiles considered developing countries (Nielsen 2011). The UN also classifies some countries as LDCs, which are defined as 'low-income countries suffering from structural impediments to sustainable development' (UN DESA 2013). This classification is based on GNI per capita, Human Assets Index (percentage of population undernourished, mortality rate for children aged five years or under, gross secondary school enrolment ratio, adult literacy rate), and the Economic Vulnerability Index (an exposure index and shock index that consists of seven indicators: 1) population size, 2) remoteness, 3) merchandise export concentration, 4) share of agriculture, forestry and fisheries in gross domestic product, 5) homelessness owing to natural disasters, 6) instability of agricultural production, and 7) instability of exports of goods and services). The threshold for inclusion as an LDC is determined by the index number corresponding to the third quartile in the distribution of results for the reference group of all developing countries (i.e. if the reference group consists of 60 countries, there will be 45 countries below the threshold and meet inclusion criterion). Emerging economies are countries considered to be in a transitional phase, with social and/or economic activity in the process of rapid growth and industrialization (Nielsen 2011).

While the majority of international tourism currently occurs in developed countries, the UNWTO has reported that between 1995 and 2007, international tourism in emerging and developing markets grew at twice the rate of industrialized countries (UNWTO 2007). International tourism in developing countries also expanded by 6% as a whole between 1996 and 2006, by 9% for LDCs and by 8% for other low and lower-middle income economies (UNWTO 2008). Growth between 2000 and 2009 was also most marked in emerging economies (58.8%), with their overall global market share growing from 38.1% in 2000 to 46.9% in 2009 (UNEP 2011). UNWTO (2012) expects international arrivals to almost double from 940 million in 2010 to 1.8 billion by 2030 (an average increase of 3.3% per year). Most of this international tourism growth is forecast to come from the emerging economies and the Asia-Pacific region; by 2030 it is estimated that 57% of international arrivals will be in what are currently classified as emerging economies (UNWTO 2011, 2012) (see Chapter 1, Table 1.3).

The significant role of tourism in many developing economies is highlighted in Tables 3.2 and 3.3. Table 3.2 indicates that although travel as an export activity has continued to grow between 2000 and 2011, its relative proportion of total global export of services has declined during this period, particularly as the result of the growth of ICT. In developing economies, the relative proportion of total export services has declined since 2000 levels (-4.6%), with regional declines noted in the developing economies of Asia (-2.5%), and particularly in America (-11.6%). Declines from 2000 levels are also evident in transition economies (-5.2%), as well as in developed economies (-8%), including substantial decreases in America (-9.3%) and Europe (-9%). One exception is in the developed economies of Oceania, whereby tourism's relative importance in service exports has increased substantially since 2000 (+12.1%). Such regional differences are also reflected in Table 3.3, which outlines the importance of tourism to different developing economies. Tourism is especially important to island states in the

Caribbean, Eastern Africa, and Oceania. For example, in the Caribbean, visitor spending contributes between 10–50% of the GDP for 14 countries in the region, and more than 50% of GDP in Anguilla. It should also be noted that the vast majority of global tourism is domestic rather than international in nature and may not be fully captured in these statistics (UNWTO-UNEP-WMO 2008). The overall economic importance of tourism in contributing to particular economies may therefore be much greater.

Given the ongoing growth of international tourism in developing countries, it is perhaps not surprising that tourism is increasingly supported by many development agencies and organizations, such as the UNWTO and the UNEP, as an important component in national employment generation and poverty reduction strategies. International tourism is also recognized as an important sector by policy makers in developing economies within the context of the perceived need to sustain international competitiveness (Crouch & Ritchie 2012; Hall 2013). Although the relative long-term value of an open economy to many countries is increasingly being questioned, especially post the economic and financial crises of 2008–12 (Scheyvens 2007). Nevertheless, many policy makers have come to regard tourism as an avenue to achieve competitive economic specialization (Komlev & Encontre 2004) and improve foreign exchange flows (Kasahara 2004). It is along these lines that the UNWTO, World Travel and Tourism Council (WTTC), and international development organizations strongly promote international tourism as a means to achieve both poverty reduction and advancement on the UN Millennium Development Goals (Gössling 2009) This position has been similarly advocated by other international bodies such as the World Economic Forum (WEF) (2009a, 2009b), as well as the international development cooperation sector, including, for example, the Asian Development Bank, British Department for International Development, Canadian International Development Agency, German Gesellschaft für Technische Zusammenarbeit, Inter-American Development Bank, Swedish Agency for International Development Cooperation, and United States Agency for International Development (Hawkins & Mann 2007; Saarinen *et al.* 2009). As stated by the UNWTO (2005: 3), 'tourism development, if properly developed and supported, can indeed be a "quick-win" in overcoming the economic and social conditions that prevail in LDCs and in accelerating their integration into the world economy'. More recently, as part of its green economy strategy, the UNEP (2011: 424) has been advocating the potential poverty reduction benefits of tourism, indicating that 'when tourism-related income grows with a substantial reorientation in favour of the poor, poverty can be reduced'. Significantly, tourism can also have an important enabling function and support international transport and business connections, which can then be utilized to export other products and services.

The UNWTO (2006: 1) outlines several reasons why tourism makes an 'especially suitable economic development sector for LDCs':

- Tourism is consumed at the point of production; the tourist has to go to the destination and spend his/her money there, opening an opportunity for local businesses of all sorts, and allowing local communities to benefit through the informal economy, by selling goods and services directly to visitors;
- Most LDCs have a comparative advantage in tourism over developed countries;
- Tourism is a more diverse industry than many others. It has the potential to support other economic activities, both through providing flexible, part-time jobs that can complement other livelihood options, and through creating income throughout a complex supply chain of goods and services;

- Tourism is labour intensive, which is particularly important in tackling poverty. It also provides a wide range of different employment opportunities especially for women and young people – from the highly skilled to the unskilled – and it usually requires relatively little training;
- It creates opportunities for many small and micro entrepreneurs, either in the formal or informal economy; it is an industry in which start-up costs and barriers to entry are generally low or can easily be lowered;
- Tourism provides not only material benefits for the poor but also cultural pride. It creates greater awareness of the natural environment and its economic value, a sense of ownership and reduced vulnerability through diversification of income sources;
- The infrastructure required by tourism, such as transport and communications, water supply and sanitation, public security, and health services, can also benefit poor communities.

However, international tourism as a development strategy to achieve welfare equity and poverty reduction has long been substantially criticized (e.g. De Kadt 1979; Chok *et al.* 2007; Hall 2007; Telfer & Sharpley 2008; Hall & Lew 2009; Truong *et al.* 2014; see also Truong this volume). There may be limited opportunities for many developing countries and regions to benefit from international tourism, with the supposed comparative advantage of LDCs unevenly distributed (Blake *et al.* 2008). Moreover, the economic advantages accompanying with international tourism development may not be as pronounced as anticipated due to profit repatriation by foreign investors, the nature of local economic networks and structures, relatively low wages, underemployment because of seasonal demand, and the replacement of existing economic activity in some tourism resort areas (e.g. Chok *et al.* 2007). A detailed study by Wieranga (2008: 133) of the benefits of tourism as a means of poverty reduction, often termed pro-poor tourism (PPT), concluded, 'all in all, PPT is more of a livelihood supplement than a poverty solution, and poverty elimination through ethnic tourism is the exception rather than the rule'. This is supported by Blake's (2008) study of Kenya, Tanzania and Uganda, which found that compared to other export sectors, hotels and restaurants, and in particular the transport industry, provide below-average shares of income to poor households. As such, 'these results paint a fairly poor picture of the ability of tourism to alleviate poverty' (Blake 2008: 511), a result of tourism's tendency to be disproportionally beneficial to the already wealthy (Schilcher 2007; Blake *et al.* 2008). This may consequently reinforce existing inequalities (Scheyvens & Momsen 2008). As shown in the case of Thailand, 'the expansion of foreign tourism demand creates general equilibrium effects that undermine profitability in tradable sectors (such as agriculture) from which the poor derive a substantial fraction of their income' (Wattanakuljarus & Coxhead 2008: 929).

In addition to contrary evidence for tourism being a decisive mechanism of poverty reduction and alleviation, tourism also negatively contributes to resource consumption (Gössling 2002; Hall 2010c) and global environmental change (Gössling & Hall 2006b; Scott *et al.* 2012). For example, Hall (2010c) observed that the estimated economic losses with respect to climate change in the developing world are already greater than the level of international tourism expenditure in the 49 least-developed countries. This led him to conclude that 'Tourism may contribute to poverty alleviation but the benefits of tourism need to be weighed up against all its costs, including the effects of climate change' (Hall 2010c: 135).

Despite sustainable tourism being at the forefront of policy statements within supranational institutions, national governments, industry associations and tourism operators, the more that is published on sustainable tourism, the less sustainable it appears to be (Hall 2011a; see also Chapter 1). The sustainability of tourism as a development mechanism is increasingly questioned

for two primary reasons. First, while tourism has been promoted by some in the development community since the late 1960s, the mid- to long-term relative contribution of tourism projects to development strategies remains poorly evaluated (Hawkins & Mann 2007). Rather than critically assessing the consequences of tourism-related development strategies, international development agencies and other international bodies have placed greater emphasis on advocating tourism and initiating projects (Gössling, Haglund *et al.* 2009; Zapata *et al.* 2011). Second, and in which the first reason is potentially embedded, the paradigmatic and institutional context of tourism and sustainable development often makes it difficult for some policy actors to recognize 'other' policy alternatives and priorities (Hall 2011a).

Environmental

Tourism is a human activity that is both dependent on natural resources and contributes to the their depletion. This interrelationship can be direct or indirect, and while all tourism activities may inevitably be local, they add up to phenomena of global significance (Gössling 2002; Gössling & Hall 2006a). Tourism plays an important role in the consumption of energy and the generation of greenhouse gas (GHG) emissions, exerting pressure on global water sources, impacting land use and change, as well as contributing to biodiversity loss and unsustainable food consumption. In 2007, it has been estimated that tourism's global environmental impacts resulted in energy consumption of 18,586 PJ and emissions of 1461 Mt CO_2 for transport, accommodation and activities, as well as contributing to 0.6–0.7% in land cover change, and an estimated 3.5–5.5% of global species loss (Hall 2011a). Global freshwater consumption by the tourism sector is estimated to account for less than 1% of fresh water, but overall, the water use for infrastructure construction, fuel, and food production is considerably larger (Gössling *et al.* 2012). In terms of food consumption, tourists eat an estimated 75 billion meals per annum, which is a relatively small share of global food use, yet significant in terms of the higher-order foodstuffs used (Gössling *et al.* 2011; Gössling & Hall 2013). Tourism's role in global resource consumption is detailed below, while underscoring the notion that the sector is likely to increasingly compete for scarce resources.

Energy use and emissions

The tourism sector depends on fossil fuels and other sources of energy, thereby contributing to the global emissions of various GHGs, particularly carbon dioxide (CO_2), as well as methane (CH_4), nitrous oxides (NOx), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6). Tourism-related energy use and emissions include all domestic and international leisure and business travel, and have thus far been calculated for three major subsectors: transport to and from the destination; accommodation; and activities at destinations. An estimate by two independent analyses found that for these three subsectors, tourism contributed approximately 5% to global anthropogenic emissions of CO_2 in 2005, corresponding to 1,304 Mt CO_2 (see Table 3.4) (UNWTO-UNEP-WMO 2008; WEF 2009a). In terms of energy use, this equates to 435 Mt of fuel, or about 17,500 PJ of energy, at an assumed conservative average of 3 kg CO_2 per 1 kg of fuel (Defra 2013).

As outlined in Table 3.4, most CO_2 emissions from tourism are associated with transportation. Aviation emits the largest share at 515 Mt CO_2 or 40% of tourism's overall carbon footprint. While aviation's share of global emissions of CO_2 (i.e. 26,400 Mt CO_2) may seem small, most of these emissions are generated by the 'hyper-mobile' (Gössling, Ceron *et al.* 2009), the less than 2–3% of the world's population that participate in international aviation on an annual basis

Table 3.4 Distribution of emissions from tourism by sub-sector

	2005		*2035**	
Sub–sectors	*CO_2(Mt)*	*%*	*CO_2(Mt)*	*%*
Air transport	515	40%	1,631	53%
Car transport	420	32%	456	15%
Other transport	45	3%	37	1%
Accommodation	274	21%	739	24%
Activities	48	4%	195	6%
Total	1,307	100%	3,059	100%
Total world (IPCC 2007)	26,400			
Tourism contribution		5%		

*Assumes business as usual (BAU)

Source: UNWTO-UNEP-WMO (2008)

(Peeters *et al.* 2007). Car transportation emits 420 Mt CO_2, accounting for 32% of the sector's carbon footprint, followed by accommodation (274 Mt CO_2 or 21%), and activities at the destination (48 Mt CO_2 or 4%) (UNWTO-UNEP-WMO 2008). Cruise ships are included in 'other transport' with an estimated 19.17 Mt CO_2, accounting for 1.5% of global tourism emissions (De Bruijn *et al.* 2010). Importantly, these calculations represent energy throughput and do not include the impact of short-lived GHGs (Scott *et al.* 2010). A more accurate assessment of tourism's contribution to global warming can be made on the basis of radiative forcing (RF) (i.e. the contribution to warming of long- and short-lived GHGs in a given past year). With RF considered, Scott *et al.* (2010) estimated that tourism contributed 5.2–12.5% of all anthropogenic forcing in 2005, with a best estimate of approximately 8%. A more comprehensive analysis would also need to include food and beverages, infrastructure construction and maintenance, as well as tourist retail and services. This assessment should be based on a lifecycle perspective, taking into account the energy embodied in the goods and services consumed in tourism (Gössling 2013).

While tourism's emissions are already considerable, this contribution is expected to grow significantly in both absolute terms and proportionately, as other economic sectors achieve emission reduction targets (legislated or voluntary). As previously noted, tourism is projected to grow at an average of 3.3% per year until 2030 (UNWTO 2012), resulting in large energy use and emissions trajectories (Gössling 2013). Several tourism trends are expected to increase emissions, including the growth in the number of people travelling for employment, business, leisure, education and health services; continuing declines in the real cost of travel; increases in per capita disposable incomes leading to a growing number of trips made per capita; and growth in the average length of trips made, a function of the greater speed of the transport modes used (Scott *et al.* 2012). Based on a business-as-usual (BAU) growth scenario to 2035, which considers changes in travel frequency, length of stay, travel distance and technological efficiency gains, CO_2 emissions from tourism are projected to grow approximately 135% by 2035 compared with 2005 levels, totalling 3.059 Gt CO_2 (UNWTO-UNEP-WMO 2008). These estimates are very similar to the WEF (2009a) projection for tourism emissions growth of 3.164 Gt CO_2 by 2035 (Table 3.5). Most of this growth will be associated with air transportation, with emissions anticipated to increase in the order of 290–670% by 2050 (IEA 2009; Gössling *et al.* 2013). These projections also align with projections from aviation organizations and aircraft producers that the global fleet of aircraft will double between 2011 and 2031 (Boeing 2011; Airbus 2012).

Table 3.5 Tourism sector emissions and mitigation targets

	Emission estimates and BAU projections (CO_2)		*Mitigation targets*	
Year	*UNWTO-UNEP (2008)*	*WEF (2009a)*	*WTTC (2009) **	*5% allocation of overall GHG emissions to tourism ***
2005	1.304 Gt	1.476 Gt	–	
2020	2.181 Gt	2.319 Gt	0.978 Gt	1.254 Gt
2035	3.059 Gt	3.164 Gt	0.652 Gt	0.940 Gt

*** Pathway that limits global average temperature increase to below 2°C; assuming CO_2 continues to representing approximately 57% (IPCC 2007) of the median estimate of 44 Gt CO_2-e total GHG emissions in 2020 and 2035 (Rogeli 2011) and the tourism sector continues to represent approximately 5% of global CO_2 emissions (UNWTO-UNEP-WMO 2008; WEF 2009a) over the same time frame (Gössling *et al.* 2013).

It is important to note that none of these future emissions projections for the tourism sector account for either the rebound effects (i.e. the behavioural or other systemic responses to the introduction of new technologies that stimulate resource consumption) (Jenkins *et al.* 2011; Santarius 2012) or the gains in energy efficiencies over the period to 2035, which may be significantly lower than expected (Hall *et al.* 2013). Hence, these projections are in stark contrast to mitigation targets, as for instance presented by WTTC (2009) (see Table 3.5). With other major emitting sectors (e.g. manufacturing, energy supply, housing) looking to stabilize or reduce emissions over the next 30 years in many regions of the world, if travel and tourism remain on a BAU pathway, the sector will become an increasingly important source of global GHG emissions (Gössling *et al.* 2010; Hall 2011a). In a recent review by Gössling (2013), these findings for global tourism have been confirmed on a national scale, with emissions from tourism in 22 countries, including several OECD nations, assessed on the basis of Kyoto Protocol guidelines for national GHG inventories (i.e. a calculation excluding international bunker fuels from shipping/aviation). The study found that tourism contributes the equivalent of 4% (Suriname) to 150% (Turks and Caicos) of national emissions, with Small Island Developing States (SIDS) often having economies that are much more energy intense than suggested by Kyoto-based assessments, with tourism dwarfing energy use in all other sectors.

Importantly, other national assessments have underscored the low carbon-efficiency of tourism as an economic sector. In the Netherlands, the carbon-efficiency of the Dutch economy is approximately 0.3 kg CO_2 per Euro, which is more than three times lower than the tourism average at 1 kg CO_2 per Euro (de Bruijn *et al.* 2010). In Switzerland, tourism is the fourth most emission-intense sector (of 22 sectors; Perch-Nielsen *et al.* 2010) and the fifth most emission-intense sector in Australia (of 17 sectors; Dwyer *et al.* 2010). In Sweden, tourism accounted for 11% of national emissions in 2001, which is expected to increase 5% by 2020 (Gössling & Hall 2008). The UK Department of Transport (2007) project that the 9% contribution of aviation to total UK emissions in 2005 (taking radiative forcing into account) will grow to approximately 15% in 2020 and to 29% in 2050. Similarly, the Australian government's energy white paper estimates that air transport will more than quadruple by 2050 (Department of Resources, Energy and Tourism 2012).

The use of energy and subsequent emissions within the tourism sector leads to various conclusions. First, tourism is more energy intense than other economic sectors, and hence more vulnerable to changes in the cost of energy and fossil fuels. Second, this vulnerability is likely to intensify given both tourism's growth and the mounting competition over increasingly

scarce fossil fuel resources. Third, if efforts to reduce absolute global emissions of GHG are to be achieved, the cost of CO_2 emissions due to market-based measures (taxes, duties) will become increasingly relevant for tourism. Together, both fuel cost developments and climate policy may affect the global tourism system in a way that would imply changing travel patterns.

Fresh water

Tourism is heavily reliant on the availability of fresh water. Tourists consume fresh water directly, including consumption for hygienic purposes (e.g., for showers and toilets), as well as when engaging in a wide range of activities (e.g., spas, saunas, wellness areas, swimming pools). Tourists also consume fresh water in the form of irrigated hotel gardens and golf courses, as well as supporting infrastructure development (e.g. accommodation), and indirectly in food and fuel (Pigram 1995; Gössling 2001; Hoekstra & Hung 2002; Worldwatch Institute 2004; Chapagain & Hoekstra 2008; Gössling *et al.* 2012). Though people also consume water while at home, there is strong evidence that tourism increases overall water consumption (Gössling *et al.* 2012). On average, water use by tourism stays below 5% of domestic water use, but there are several countries where tourism is a major factor in both water consumption and security (e.g. Caribbean, China, southeast Asia, Mediterranean) (see Table 3.6). Such high levels of consumption, in addition to pollution, population growth, and climate change, have placed increased pressure on freshwater sources (WWAP 2012). Given the global growth in tourism, as well as declining water resources in some regions, changes in the availability or quality of water resources can have negative impacts on tourism, requiring careful attention to account for water usage patterns within the sector.

For accommodation, water consumption ranges from 84 to 2,000 L per tourist per day, or up to 3,423 L per bedroom per day have been reported (Gössling *et al.* 2012). Higher standard accommodation tends to consume more litres of water per tourist, due to the amenities provided. For example, high consumption of water is linked to hotels that provide spas and have multiple large swimming pools (Bohdanowicz & Martinac 2007), as well as hotels with on-site sport and health centres. The quality of textiles within a hotel also increases water consumption as it increases the weight of laundry items (e.g. very large towels at spa facilities). On a global average, it has been suggested that an international tourist consumes 300 L per day in direct water use (Gössling *et al.* 2012).

Table 3.6 Important tourism regions facing water security threat

Region	*Tourism importance (% GDP)*	*Water security threat*	*Tourism > 5% of domestic water use*
Caribbean	High	High	Barbados
Mediterranean	High	Low-High	8 countries
Southeast Asia	Medium-High	High	Thailand, Indonesia
New Zealand & SW Australia	High	Low	no
East Africa	High	High	unknown
West Coast USA	High	Low	no
Coastal zone Brazil	Medium	Low-High	no
Indian subcontinent	Low	High	India
China	Low	High	no

Source: Derived from Vörösmarty *et al.* (2000) and Gössling *et al.* (2012)

Various tourist activities add to freshwater use. An often cited example is golf (Rodriguez Diaz *et al.* 2007). While the consumption of water at golf courses varies considerably based on soil, climate and size, a standard golf course may have an annual consumption of 80,000 m^3 to 100,000 m^3 in the North of France and 150,000 m^3 to 200,000 m^3 in Southern France (Baillon & Ceron 1991; Ceron & Kovacs 1993). Much higher values are reported in dry and warm climates, such that an 18-hole golf course in a Mediterranean sand dune system uses 0.5 to 1 million m^3 of fresh water per year (van der Meulen & Salman 1996). Snowmaking for ski resorts is also highly water intensive. Based on a literature review by Rixen *et al.* (2011), the water consumption for the production of 1 m^3 of snow ranges between 200 and 500 L of water (or between 600,000 and 1,500,000 L for 1 ha with 30cm of artificial snow). A case study by Badré *et al.* (2009) concluded that to produce man-made snow, water consumption in a ski resort in France was 19 million m^3 in 2007, of which approximately 70% was run-off. Large conventions or events and attractions infrastructure can also add to freshwater demand (e.g. Meyer & Chaffee 1997; Zaizen *et al.* 2000; Sebake & Gibberd 2008). In a study of the Millennium Dome in London, each of the six million visitors in 2000 used approximately 22 L of water; 55% was consumed by the flushing of toilets and urinals, 32% for cleaning and canteen use, and 13% for hand washing (Hills *et al.* 2002).

While there are limited studies that examine water use within the lifecycle of tourism infrastructure, research suggests a high level of water consumption. Roselló-Batie *et al.* (2010) found that building construction is responsible for 17% of global water consumption. A life-cycle analysis of three hotels in the Balearic Islands accounted for approximately 5% of the total mass of the construction materials. Moreover, after water, concrete is the most consumed material in the world (Low 2005), with Van Oss and Padovani (2003) estimating that global water consumption for cement hydration is approximately 1 billion m^3 of water annually. Tourism's contribution to this is likely to be significant, given that the major end uses of concrete are residential buildings (31%), highways and roads (26%) and industrial and commercial buildings (18%), with increasing second home ownership being a significant driver of the growing demand for building materials (Low 2005).

Water use is also interlinked with energy as it is required for the production of water (e.g. pumping, transport, treatment, desalination) and energy (e.g. thermoelectric cooling, hydropower, minerals extraction and mining, fuel production, emission controls). Fuel production is particularly water-intensive, with 18 L of water required to produce 1 L of gasoline (Worldwatch Institute 2004). Given that air travel entails an average energy consumption of 4.1 L of fuel per passenger for every 100 km (UNWTO-UNEP-WMO 2008), the average international air-based tourist trip over 7,600 km (return distance) would consequently lead to the consumption of 5,600 L (Gössling *et al.* 2012). This is equivalent to the direct water use associated with a stay in a higher-standard resort hotel over a 14-day period (at 400 L per tourist per day).

Biofuels are increasingly advocated for having the greatest potential as a sustainable fuel for air transport, but this will also increase water use. For instance, UNESCO (2009: 11) reports that 44 km^3 or 2% of all irrigation water is already allocated to biofuel production. Should all current national biofuel policies and plans be realized, an additional 180 km^3 of irrigation water will be needed. Other fuel alternatives, including bioethanol from sugarcane, corn, sugar beet, wheat and sorghum, tripled water use between 2000 and 2007, with the production of biodiesel from oil- and tree-seeds (e.g. rapeseed, sunflower, soybean, palm oil, coconut, jatropha) leading to an 11-fold increase in water use during the same time period. The production of 1 L of liquid biofuels currently takes a global average of 2,500 L of water. The European Union, the United States and Brazil consume most of these biofuels, including 23% of maize production

in the US (ethanol production) or 47% of vegetable oil produced in the EU (biodiesel) – and necessitating higher imports of vegetable oil to meet domestic consumption needs. Yet, biodiesel accounts for only 3% of fuel use in the EU thus far (UNESCO 2009).

Food consumption also requires a considerable amount of water. Pending local climate, crop or livestock varieties and agricultural practices, it can take between 400 to 2,000 L of water to produce 1 kg of wheat or 1,000 to 20,000 L of water to produce 1 kg of meat (UNESCO 2009; Gössling & Hall 2013). Based on these figures, it is estimated that daily water requirements to support human diets range from 2,000 to 5,000 L of water per person per day, with an estimate of 1 L of water for 1 kcal of food. Within a tourism context, tourists may be responsible for greater share of higher-order, protein-rich foods, while also requiring additional energy for transport by air over large distances. Both of these contribute to a larger water footprint (Gössling *et al.* 2010). As such, a 14-day holiday may involve water use for food exceeding 70 m^3 of water.

As shown in Table 3.7 indirect water use is likely to be more relevant than direct uses, with fuel use and food consumption constituting particularly high levels of water use. Overall water consumption also varies considerably on an individual basis, depending on hotel standard, distance to the destination, as well as the type and amount of food consumed (Table 3.7). These results would indicate that water management in tourism should look beyond direct water use, and examine more closely 'sustainable' solutions currently seen as promising to solve energy-related problems, such as the greater use of biofuels in global transport, but which will increase global water use.

With the continued growth in tourism and the trend towards higher-standard accommodation and more water-intense activities, pressure on water is bound to increase in many destinations, particularly in regions with a high level of water security threat (e.g. the Caribbean, China, southeast Asia, the Mediterranean) (Table 3.6) (Vörösmarty *et al.* 2000). Tourism may lead to possible competition with other users, which can be further exacerbated by a decrease in freshwater availability. Consequently, the development of tourism may become less viable, or perhaps even unfeasible, for many areas of the world as a result of rising costs associated with fresh water or declining water quality. Impacts will ultimately depend on several factors, including the relative scarcity of fresh water in existing and potential tourism destinations, competition with other economic sectors such as agriculture or biofuels, and the structure of the tourist industry (e.g. small guesthouses vs. large resort hotels), and concomitant low or high daily water use per guest. Regional conflicts over water use have already been reported (Mutiga *et al.* 2010; Deyà Tortella & Tirado 2011), and are projected to increase in the future due to increasing demand and a declining supply (Gössling *et al.* 2012; International Tourism

Table 3.7 Water use categories and estimated use per tourist per day

Water use category – direct	*Litres per tourist per day*
Accommodation	84–2,000
Activities	10–30
Water use category – indirect	*Litres per tourist per day*
Fossil fuels	750 (per 1,000 km)
Biofuels	2,500 (per L)
Food	2,000–500,000
Total per tourist per day	2,000–7,500

Source: Derived from Gössling *et al.* (2012)

Partnership 2013). Pollution, population growth and climate change are creating further pressure on freshwater resources (WWAP 2012), to the extent that water issues are no longer discussed solely on a local or national basis, but also on a global scale (Hoekstra & Mekonnen 2012). To adapt to future water situations and mitigate its use, the tourism industry needs to engage in strategic and integrated water management. This includes measuring water consumption, taking measures to reduce and recycle water, invest in new water-conserving technologies, and educate tourists and staff, amongst others. Most of these measures may also lead to positive economic gains, but as with other environmental resource-related measures, strong policies are needed to ensure their proper and successful implementation (Gössling *et al.* 2012).

Land use and change

The use and conversion of the Earth's lands 'represents the most substantial human alteration of the Earth system' as it has a profound impact on global ecosystems and 'interacts strongly with most other components of global environmental change' (Vitousek *et al.* 1997: 494). Not only has some 50% of the Earth's surface been transformed; nearly all land is in some way affected by human-induced processes (Turner *et al.* 2007). Tourism is no exception, with the use and conversion of land central for this sector. In 1999, it was estimated that leisure-related land use amounted to approximately 515,000 km^2, representing 0.34% of the Earth's terrestrial surface or 0.5% of its biologically productive area (Gössling 2002). Since 2000, approximately 27,000 km^2 or 4% of the total global sale of land has been for tourism purposes (Anseeuw *et al.* 2012). While the construction of accommodation establishments may be the primary direct use of land for tourism, a multitude of other direct uses are also present. Examples include airports, roads, railways, paths, trails, pedestrian walks, shopping areas, parking, campsites, vacation homes, golf courses, marinas, ski areas and indirect land use for food production, burying grounds for solid wastes, lands to treat waste waters, and industrial areas required for the production of infrastructure (e.g. computers, TVs, beds). Hence, the land surfaces affected by tourism are considerably larger than the directly built area alone.

UNWTO identifies over 80 categories of accommodation, which includes hotels, hostels, motels, pensions, bed and breakfast, self-catering accommodation, and holiday villages. These are responsible for most of the direct land alteration linked to tourism. Depending on the accommodation category, land use per bed can vary between 30 m^2 to 100 m^2 at ground level. For example, reported average land use per bed in hotels and youth hostels are 30 m^2, followed by 50 m^2 for rented and self-catering accommodation, as well as for camping and caravan sites (per site), and 100 m^2 for holiday villas (Grenon & Batisse 1989, cited in GFANC 1997). In a survey by Lüthje and Lindstädt (1994), the average size of holiday villages was 41 ha. However, since the mid-1990s, there has been a strong trend towards larger holiday villages, and land use per bed has been found to increase (Strasdas 1992).

Given the comparably cheap lands available in tropical regions, land use for tourism may be particularly extensive in these regions, leading to the construction of relatively large hotels. In the Kiwengwa area of Unguja Island (Tanzania), a survey of the land use for five resort hotels indicated that an average of 284 m^2 of land was used per bed (Dahlin & Stridh 1996, Gössling 2001). Land use also increases with the standard of the hotel. For example, the five-star Lemuria Resort in the Seychelles, spans an area of 110 ha (including the golf course), which amounts to over 4,580 m^2 per bed (Gössling *et al.* 2002). Conversely, up-market hotels in cities are comparably smaller in area as a result of the high value of prime urban sites. They are often functional blocks with relatively limited areas available for gardens, forecourts and swimming pools (cf. Jim 2000).

Global land use for tourism is substantial. Worldwide accommodation is estimated to use approximately 1,450 km^2 of land, with an additional 500,000 km^2 used for traffic infrastructure that supports tourism (e.g. airports, roads, railways) (Gössling 2002). Tourism activities also require high land acquisition, with golf courses estimated to cover 13,500 km^2 of global land surfaces alone (Gössling *et al.* 2002). However, these figures are likely to be extremely conservative given the growth in accommodation, traffic infrastructure and golf courses since Gössling's (2002) study (Hall 2011a). For example, Wiles (2013) suggested that golfing establishments take up around 2,700 km^2 in England alone, a figure that constitutes approximately 2% of England's total land area. As noted, assessments on land use and change for tourism remain somewhat limited. An important consideration with respect to indirect tourism land use is the growth and development of biofuels. With the increase in advocacy for biofuels as a sustainable fuel alternative, an increase in land use would be needed to allow crops to be grown for its production (e.g. sugarcane, corn, soybean). The indirect impact of the ecological footprint of tourism land use can also be quite high, particularly in coastal areas due to pressures on biodiversity (Hall 2006, 2010a). On a positive note, the surface area covered by protected recreational areas has increased over time as a result of tourism, especially ecotourism, likely an important economic factor behind this development (Frost & Hall 2009; Buckley 2010). For example, the UN List of Protected Areas has increased from 2.4 million km^2 in 1962, to 18.8 million km^2 in 2003, and protected areas that have recreation as the primary management function (i.e. National Parks and Protected Land-/Seascapes), represent approximately 29% of total protected areas (Chape *et al.* 2003). Yet, these protected areas are often of low biological diversity and their conversion will not have interfered with the acquisition of (frequently high-biodiversity) coastal areas for tourism development (Hall 2010a). To date, conflicts regarding land use for tourism appear regionally restricted, although it may be possible that conflicts are widespread, but not reported upon due to the complexity of land use conflicts and their often small-scale nature.

Biodiversity

Tourism is often dependent on opportunities to observe, see or collect flora and fauna, and to visit specific landscapes, landscape elements, habitats or ecosystems. The rate of species extinction and biodiversity loss during the Anthropocene of 100 to 1,000 times more than natural (Mace *et al.* 2005; Rockström *et al.* 2009) should therefore be of significant concern for the tourism industry, especially given the significance of charismatic fauna and flora (Hall *et al.* 2011). Over the past four decades, biodiversity has experienced a continual decline, as evidenced by various indicators, including the Living Planet Index (mean population trends of vertebrates) and the Red List Index (extinction risk of mammals, birds, amphibians, and corals). Pressure indicators, such as the ecological footprint, have also increased (Butchart *et al.* 2010). While the impact of tourism on biodiversity may be difficult to both specify and quantify (Hall 2010a, b, c; 2011b), direct impacts can result from land use (habitat) change, introduction of diseases, the exchange of species, or locally relevant impacts related to disturbances, collection or purchases of species by tourists (Gössling 2002; Hall 2010a, d).

Although tourism may enhance awareness for preserving and protecting species and ecosystems, the sector may not be a net contributor to biodiversity conservation (Hall 2010a, d), rather, it can be responsible for altering the landscapes and ecosystems of entire regions (Gössling 1999; Buckley 2010). Landscape change is reported as the most important driver of biodiversity loss (Mace *et al.* 2005). The direct use of land for tourism (e.g. construction of accommodation) can lead to the introduction of plant species that are alien to the local ecosystem. Infrastructure to support tourist

mobility (i.e. airports, roads, bridges) can also fragment or destroy habitats (Gössling 2002). Such land use changes are also interlinked with tourism urbanization, with disturbance or loss of biodiversity in coastal and alpine areas, as well as wetland and dune conversion, of specific concern (see Table 3.8) (Serra *et al.* 2008; UNWTO 2010).

Human mobility also significantly contributes to biotic exchange on a large and global scale, while simultaneously contributing to the dispersion of diseases and the extinction of wild species. For instance, cruise ships can transport organisms over long distances. In the North American Great Lakes, one-third of the 130 non-native species were introduced by ships (Wilson 1997). Since the seventeenth century, invasive alien species have contributed to nearly 40% of all animal extinctions for which the cause is known, while as of 2000, it was estimated that approximately 480,000 species had been accidentally or deliberately introduced by humans into locations that lie beyond the natural limits of their geographic range (Hall & Baird 2013). However, the overall scale and importance of tourism-related biotic exchange remains relatively unknown, with assessments on the size of this exchange difficult to evaluate (Gössling 2002; Hall & Baird 2013).

Tourism also contributes to the extinction of species through disturbance, collection, and purchase (Hunter & Green 1995; Orams 1998). Trade in souvenirs of biological origin, including shells, corals, shark teeth and other parts of marine species, are popular in many coastal areas of tropical countries and have been identified as a driving force in ecosystem degradation (e.g. Poulsen 1995). A survey of tourists in Zanzibar (Tanzania) found, for instance, that 46% collected or purchased shells (equivalent of 13 tonnes per year), to be exported back home as a souvenir (Gössling *et al.* 2004).

Indirect impacts on biodiversity are also relevant. Plants and animals suffer from increased levels of emissions of various pollutants through leisure-related transport as, for example, described for the National Park Bayerischer Wald in Germany (Brüggemann 1997). Tourism is also a significant contributor to GHG emissions, with climate change playing a dominant role in the extinction of species this century (Mace *et al.* 2005). Hall (2010a) conservatively estimates that tourism is responsible for 3.5–5.5% of species loss based on the relationship between energy use and biodiversity, with this figure to increase in the future should climate change scenarios be considered.

Table 3.8 Important tourism regions facing biodiversity threat

Region	*Tourism importance (% GDP)*	*Regional biodiversity hotspot*
Caribbean	High	Caribbean
Mediterranean	High	Mediterranean Basin
Southeast Asia	Medium–High	Sundaland, Wallacea, Philippines & Indo-Burma
New Zealand & SW Australia	High	New Zealand and South West Australia
East Africa	High	Eastern Arc Mountains and Coastal Forests of Tanzania and Kenya
West Coast USA	High	California Floristic Province
Coastal zone Brazil	Medium	Atlantic Forest Region
Indian subcontinent	Low	Western Ghats and Sri Lanka
China	Low	Mountains of South-Central China

Sources: Derived from Christ *et al.* (2003); UNCTAD (2008); Vörösmarty *et al.* (2000)

Food consumption

Due to the central role of food in hospitality and travel, food consumption has both direct and indirect links to tourism impacts (Gössling *et al.* 2011; Hall & Gössling 2013). In 2005, there were close to 25 billion tourist days (UNWTO-UNEP-WMO 2008); at an average of three meals per tourist per day, approximately 75 billion meals per year, or 200 million meals per day, were consumed by tourists. Foodservice providers prepare the majority of these meals, which has considerable relevance for sustainability. As an example, a board initiative by the Scandic hotel chain to purchase only organic and fairly traded coffee affected 20 million cups of coffee annually served to hotel guests (Gössling *et al.* 2011). Hotels consequently have considerable power over food production. Through local (regional) or organic food-purchasing policies, tourism can directly influence sustainable food production. However, when food purchases are made entirely with a focus on the lowest per-unit costs, pressure on food producers increases, leading to the globalization of food production, which Vos (2000) argues, is the primary obstacle to sustainable food production.

Food production has a wide range of sustainability implications. This includes land conversion and the associated loss of biodiversity and ecosystems (Lawton & May 1995; Pimm *et al.* 1995; Vitousek *et al.* 1997); changes in global biogeochemical processes, such as nitrogen and phosporus cycles (Vitousek *et al.* 1997); water consumption (Chapagain & Hoekstra 2007, 2008; Hoekstra & Chapagain 2007); the use of substances potentially harmful to human health, such as pesticides, herbicides and fungicides (Koutros *et al.* 2008); and the foodservice sector's contribution to global GHG emissions relating to agriculture, food processing, transport, the preparation of meals, and waste (Gössling & Hall 2013). Tourism is also a factor in the consumption of 'problematic' foods, such as giant shrimps leading to the deforestation of mangrove ecosystems (Gössling *et al.* 2012). As such, food is an important category, though other than energy or water use, its impacts are more distributed and relevant for a greater number of impact categories.

Depending on the nature of backward linkages and supply chains the relationships of food production and tourism can have both positive and negative contributions for sustainability (Telfer & Wall 1996; Hall & Gössling 2013). In some developing country destinations there may be considerable scope in replacing imports of food by ship and air with locally grown foodstuffs (Gössling 2013). However, such initiatives may require the development of new food policies, particularly in those countries where tourism is currently impacting other export sectors (e.g. Tanzania, Uganda and Kenya) (Blake 2008). Even more broadly, food policies can have significant importance for the overall structure and development of global food production. Nevertheless, sustainable food provisions can have considerable appeal to tourists. Food is the one area where regional or organic purchases constitute added value to guests, with indications that interest in sustainable, high-quality and 'locally distinctive' foods is increasing among tourists (Cohen & Avieli 2004; du Rand & Heath 2006; Hall & Gössling 2013).

Sociocultural

According to Wolf (1977: 3), sociocultural impacts can be summarized as 'people impacts'; it is the impacts experienced by host communities as a result of the direct and indirect relationships with tourists. More specifically, it refers to the manner in which tourism effects changes in collective and individual systems, behaviour patterns, community structures, lifestyle, and the quality of life (Hall & Lew 2009). A rapidly growing body of literature has emerged that examines the sociocultural impact of tourism. In contrast with the economic impact of tourism,

the sociocultural impact is often portrayed as negative in the literature. Studies are increasingly questioning whether or not tourism development brings benefits to the host communities. Jafari (2001) concludes that the output of sociocultural research within tourism illuminates one of two platforms; advocacy or controversy. The advocacy platform includes positive impacts such as the spread of international peace and understanding, the preservation of heritage and culture, a reduction in religious, racial and language barriers, and enhanced appreciation for one's own culture. The controversy platform highlights negative impacts, including trends of xenophobia, prostitution, increased crime, breakdowns in family structure, and the commercialization of arts, crafts and cultural traditions. A further dimension that is also significant when considering the benefits of tourism are the (often) low wages paid to some workers in the tourism and hospitality sector; in some cases these may be below that of a living wage (Hightower 2002).

Wall and Mathieson (2006) describe the sociocultural impacts literature for tourism as largely negative and summarize such research findings to fall within five general impacts: (1) overcrowding of infrastructures, accommodation, services and facilities as tourists increasingly share with locals; (2) explosive situations by way of demonstration effect due to the display of prosperity by tourists amidst less-wealthy/impoverished host destination; (3) spread of undesirable activities (e.g. prostitution, gambling, crime); (4) non-locals are employed for managerial and professional occupations, which hold greater responsibility and pay higher wages, compared to the occupations open to local community members; (5) gradual erosion of indigenous language and culture as host communities increasingly adopt the language of tourists. The authors note that while sociocultural changes in many areas are coincident with tourism growth, it is unclear whether these negative impacts can all be attributable to tourism. Much of this research tends to adopt a narrow focus (e.g. a case study in a specific country) or concentrates on a limited number of sociocultural effects (Hall & Lew 2009). This is partly attributable to what Marsh (1975: 19) and Dana (1999: 60) describe as the 'incremental intangible costs', which are the inherently difficult social and cultural effects that are hard to measure and may be overlooked until major, irreversible changes in society occur (Wall & Mathieson 2006). Sociocultural impacts are highly dependent on local conditions, as well as the types of tourist development being analyzsed. Generally, the more rapid and larger tourism developments tend to generate more impact than the slower, more organic and smaller-scale developments (Hall & Lew 2009). Nevertheless, the sociocultural impact of tourism is difficult to unpack from the broader processes of global economic, political and social change.

Measurable factors and associated social indicators that contribute to the social well-being and quality of life for host communities include economic security, employment, health, personal safety, housing conditions, physical environment, and recreational opportunities (Hall & Lew 2009). Many of these factors have been evaluated using the Human Development Index (HDI). As noted above, the HDI combines indicators of health (i.e. life expectancy at birth), educational attainment (i.e. mean years of schooling, expected years of schooling) and living standards (i.e. gross national income per capita) into a composite index to measure human well-being. As shown in Figure 3.1 the HDI improves for Small Island Developing States (SIDS) as the contribution of travel and tourism to national GDP increases. An increased HDI for LDCs is also shown in Figure 3.2, as the contribution of travel and tourism to national GDP increases. Figures 3.3 and 3.4 also indicate that HDI improves for both SIDS and LDCs as the total contribution of travel and tourism to employment increases. These figures suggest that on a national and global scale, tourism can have a positive sociocultural impact that can improve the well-being of hosts. Importantly, these figures capture only international tourism with the possibility of even greater improvements in human development should domestic tourism be considered.

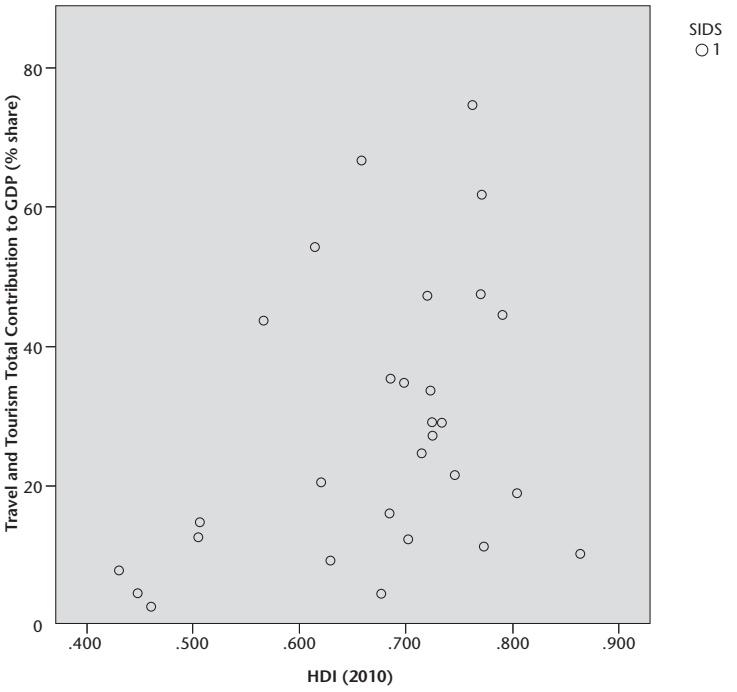

Figure 3.1 Relationship between tourism's contribution to GDP and the HDI for SIDS

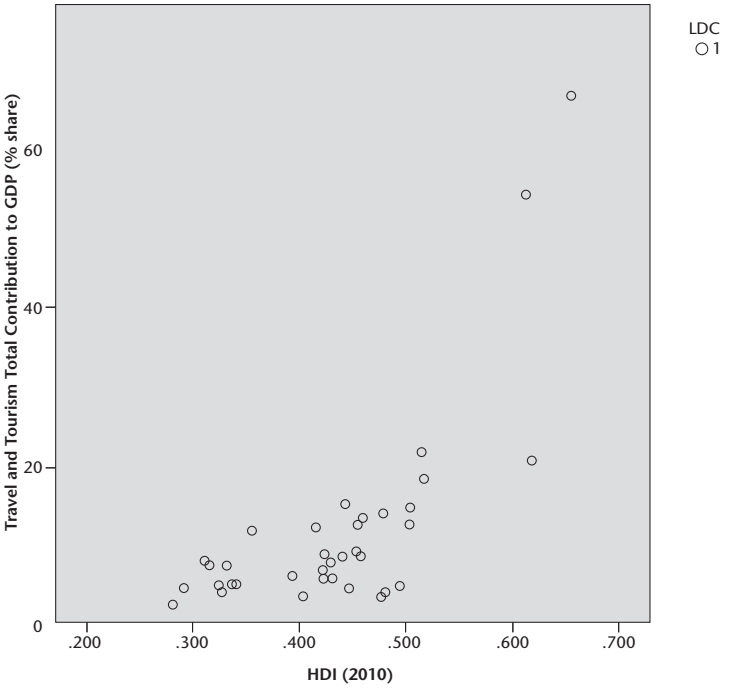

Figure 3.2 Relationship between tourism's contribution to GDP and the HDI for LDCs

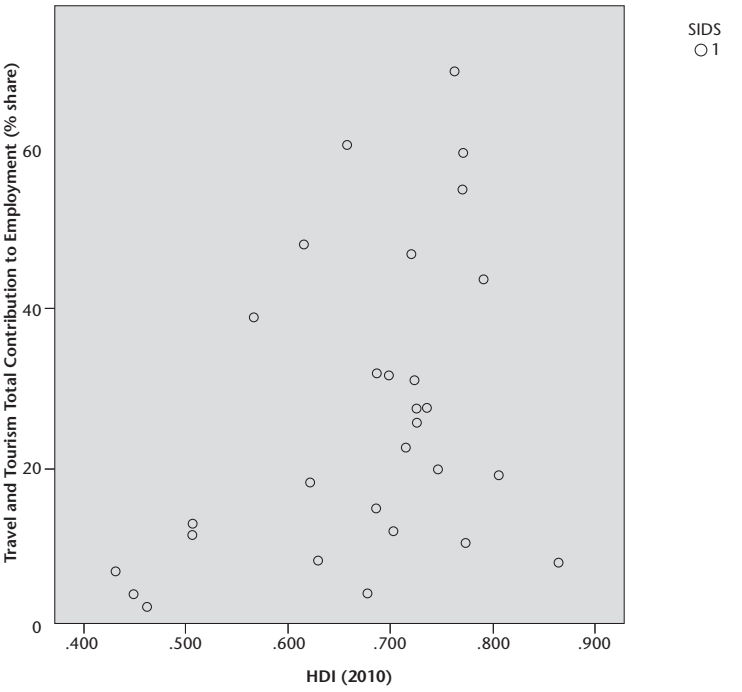

Figure 3.3 Relationship between tourism's contribution to employment and the HDI for SIDS

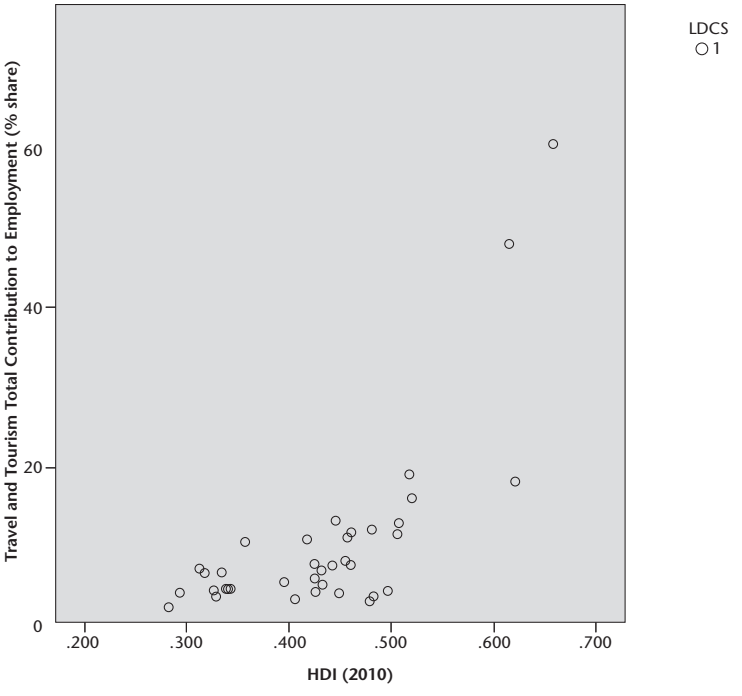

Figure 3.4 Relationship between tourism's contribution to employment and the HDI for LDCs

Conclusion

Tourism is a significant factor in resource use, global environmental and social change. While social and cultural changes are more difficult to assess and change, resource use intensities might serve as a new metric to compare the relative impact of various forms of tourism. Results as presented in this chapter have shown that there are many interlinkages between tourism's sub-sectors, such as food production's relevance for freshwater consumption. These need to be considered to adequately understand tourism's impacts and interaction with resource scarcity. It is also important to note that different forms of tourism affect resource use differently. Table 3.9 provides values for tourism's resource intensities for energy and emissions, fresh water, land use and food consumption, indicating that there exist vast differences, depending on the tourist and tourism product consumed. Values can serve as global benchmarks and potentially help develop such products that lead to low-intensity consumption, and consequently a de-materialization of the global tourism system. However, as discussed, there are many reasons why tourism is currently becoming more energy, freshwater, land and food intense on a per trip/arrival/guest night basis, and changes in the tourism system would be required in order to reverse this trend.

Table 3.9 Resource use intensities in global tourism

Aspect	*Range of estimates*	*Global average*	*Reference*
Energy			
per guest night	1.4–3,717 MJ	n.a.	Gössling 2010
per activity/tourist	7–1,300 MJ per activity	n.a.	Becken 2001
Emissions			
per trip (domestic and international)	0.2–9.00 t CO_2	0.25 t CO_2	UNWTO-UNEP-WMO 2008; Eijgelaar et al. 2010
per international arrival (air transport)	0.37–1.83 t CO_2	n.a.	Gössling et al. 2013
per night (accommodation)	0.1–260 kg CO_2	16 kg CO_2/night	Gössling 2002, 2010
Fresh water			
direct (accommodation)	87–2,000 L/day/tourist	300 L/day/tourist	Gössling et al. 2011
indirect (fuels, food)	2,000–5,000 L/day/tourist	n.a.	Gössling et al. 2011
Land use			
direct, per bed	30–34,580 m^2/bed	40 m^2/bed	Gössling 2002

Source: OECD 2013

Yet, there is very limited evidence that restricting resource use would have a fundamental impact on the global tourism system (see also UNEP 2011). Tourism is flexible and adjustable, as many case studies have shown (e.g. Gössling 2010; Scott *et al.* 2012). A new perspective of 'scarcity' could help to increase efficiencies and reduce wastage, which will usually translate directly into resource and economic savings, while maintaining the capacity to engage in tourist trips. Tourism has, for decades, been built on the availability of cheap natural resources such as water and energy, and resource limitations have only very recently been considered by a small

share of decision makers in tourism. To develop an understanding of preservation for tourism's own sustainable future is thus likely to have negligible negative, and in most cases, even positive effects. Better education on these benefits is needed throughout tourism value chains. Where greater resource use efficiencies are combined with tourism's positive economic potential, there are many options for the sector to contribute to global economic development.

To achieve greater resource efficiencies, green investment structures, and cross-sectoral synergies, UNEP (2011) suggests in its green economy approach that 'sustainability drivers' be considered. These include, for energy, increased costs and carbon surcharges; government incentives; eco-labels; as well as regulations/legislation on energy efficiency. For water, price structures reflecting water scarcity and responsible water management. For biodiversity, regulation regarding sensitive ecosystems, as well as national policies attracting revenue through tourism for protecting critical biological habitat. Implementing these sustainability drivers will, however, be a major political challenge.

Key Reading

www.waterfootprint.org – Website of the Water Footprint Network's global water database.

http://footprintnetwork.org – Website of the global footprint network. Provides for assessments of global, national and individual consumption in terms of ecological footprints.

www.millenniumassessment.org/en/index.html – Website provides free access to the Millennium Ecosystem Assessment (MEA). The MEA assessed the consequences of ecosystem change for human well-being. From 2001 to 2005, the MEA involved the work of more than a thousand experts worldwide. Their findings provide a state-of-the-art scientific appraisal and benchmark of the condition of the world's ecosystems and the services they provide.

Intergovernmental Panel on Climate Change (IPCC): https://www.ipcc.ch/index.htm – The leading scientific body on climate change that provides state-of-the-art syntheses of our understanding of climate change and associated adaptation, mitigation and vulnerability.

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