



## Review

## Research on environmental impacts of tourism in China: Progress and prospect

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## ARTICLE INFO

## Article history:

Received 19 June 2010

Received in revised form

29 June 2011

Accepted 15 July 2011

Available online 6 August 2011

## Keywords:

Tourism  
Environment  
Impact  
Progress  
Prospect  
China

## ABSTRACT

With the rapid development of tourism industry in China since 1980, the country has experienced an increasing use of its natural and cultural environment for tourism, resulting in tourism resources being adversely impacted in many tourism destinations. This paper described the research progress in tourism impacts on the environment in the context of China through a review of the growing literature in this field. Specifically, research on tourism impacts on the biophysical and socio-cultural environments, tourism carrying capacity, environmental quality assessment, and measures for the protection and management of tourism resources was reviewed. The review found that the majority of research was qualitative and descriptive in nature, and there was a lack of case studies and theoretical development. Future research should focus on the evaluation of environmental impacts, particularly those gradual cumulative impacts on the tourism environment; examination of the quantitative relationship between the impact and the level of tourism use for different activities; development of methods to estimate the carrying capacity; and understanding of positive impacts of tourism.

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## 1. Introduction

Tourism development is largely dependent upon the natural and social/cultural environments. Thus, it is essential to maintain or enhance the quality of the tourism environment for a destination. However, tourism development is often a double-edged sword, in that it not only creates positive impacts (i.e., creation of jobs and enhancement of image), but also causes negative ones on the biophysical environment (i.e., water pollution, air pollution, ecosystem degradation) and social/cultural environment (i.e., loss of the traditional culture), if not well planned, developed, and managed. Therefore, it deems necessary to monitor and examine tourism impacts on the environment. Indeed, the environmental impacts of tourism have been extensively investigated in some developed countries (i.e., Australia, the USA, the UK) (Pickering and Hill, 2007) and some developing countries (i.e., India and Nepal) and have also emerged recently as a hot research topic among Chinese researchers in tourism-related fields.

The emergence of research on the environmental impacts of tourism in China is reflective of the increasing concerns over the negative tourism impacts on the environment as a result of rapid

tourism development since 1978 when China began to adopt an open-door policy and make major economic reforms, resulting in impressive economic development in the following decades. In 2009, the number of China inbound tourists reached 126.5 million, 70.3 times more than that for the year of 1978, with the total foreign exchange earnings of US\$39.7 billion, which was 152.4 times as much as that for the year of 1978. In addition, China accommodated 1.9 billion domestic tourists in 2009, an increase of 4.6 times against the year of 1993, with domestic tourism revenue of US\$145.5 billion, an increase of 11.8 times over the year of 1993 (National Tourism Administration of China, 2009).

Concomitant with the rapid development of the tourism industry are increasing environmental problems, such as increasing noise, declining air quality, increasing water pollution, and increasing biodiversity loss (Jiang et al., 1996; Xie and Zheng, 2001; Lv, 2003; Wen et al., 2003; Li, 2004). For example, Wulingyuan Scenic Area, a World Natural Heritage Site in Zhangjiajie City of Hunan Province, was criticized in 1998 by the World Heritage Committee of UNESCO because of the increasing urbanization and degrading environmental quality arising from uncontrolled tourism development (Quan, 2003). These tourism-related environmental problems not only negatively affected the image of a tourist destination, but the sustainable development of the local tourism industry.

In recognition of the increasing importance of developing tourism as a means for economic promotion and growth in China,

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the increasing interests among China academics in conducting research on the environmental impacts of tourism, and the lack of the introduction of the work done by Chinese researchers to their international counterparts, this paper reviewed studies and findings on the environmental impacts of tourism in the context of mainland China (excluding Taiwan, Hong Kong, and Macaw). This review was conducted by mainly focusing on research published in China. However, research findings published by Chinese researchers and their international collaborators in international English journals were also reviewed. This paper is organized in such a way that a brief review on research progress in the environmental impacts of tourism in the country is presented first, followed by a review of tourism impacts on both biophysical and social/cultural environments, tourism environmental carrying capacity, tourism environmental quality assessment, and measures and actions that should be taken for the protection and management of tourism resources in the country. In addition, research methods used in the literature were reviewed and discussed. Finally, a brief comparison was made between China and other developed countries with regard to research on tourism impacts on the environment.

## 2. Research progress in the tourism environment in China

Studies of the tourism environment have received increasing attention in China, especially in recent years. Although research on the environmental impacts of tourism in the country has not emerged until the early 1980s (Xiang et al., 2007), a search of the Chinese core journals using “tourism environment” as the keyword from [www.cnki.net](http://www.cnki.net), China’s most prestigious and comprehensive academic search platform, and a search of the Scopus using the key words “tourism environment” and “China” indicate that the number of academic papers on the tourism environment involving China has increased considerably after 2000. As Table 1 shows, during the 20 year period between 1981 and 2000, a total of 155 papers have been published with an average of 7.8 papers per year. In contrast, 380 papers have been published during the nine year period from 2001 to 2009, with an average of 42.2 papers per year. These papers examined a wide range of issues associated with tourism development in China, including environmental impacts, environment carrying capacity, environmental quality evaluation, and protection measures.

Table 1 also shows the research trend on environmental impacts of tourism in the country. That is, more studies, particularly those related to tourism impacts on the biophysical environment and conservation and management measures, have been conducted in recent years. For example, 28 papers on tourism impacts on the biophysical environment have been published between 2001 and 2005 while 72 published in the following 4 years. Relatively, studies on the socio-cultural aspects of tourism impacts have received less attention.

Table 2 and Fig. 1 present empirical studies (excluding articles on definitions and general review) conducted across the country.

As shown, much of the research has been conducted in the East China Region (110 papers, accounting for 23.7% of a total of 465 empirical studies), followed by the Southwest Region (82 papers), which is closely followed by the Central China Region (80 papers) and Northwest Region (71 papers), with the Northeast Region being the least researched (45 papers). In terms of research topics, most studies focused on tourism impacts on the biophysical environments (128 papers or 27.5%) and carrying capacity (117 papers or 25.2%) with environmental quality evaluation (60 papers or 12.9%) and socio-cultural aspects of the tourism impacts (65 papers or 14.0%) being the least researched.

## 3. Definitions of the tourism environment

The concept of tourism environment has been defined differently by different people in China. The earliest definition was given by Chen (1981) who defined tourism environment as “a kind of environment in which people can engage in tourism activities, experience beauty, gain spiritual, physical enjoyment and knowledge and have fun. It involves natural, social, economic and political environments as well as scientific and technological conditions” (p.1). Since then, nearly 30 definitions have been provided based on it (e.g., Zhou, 1986; Liu, 1989; Chen and Lu, 1991; Sun and Chen, 1989; Chen, 1992; Cui, 1995; Xiao, 1995; Lin, 1998; Wang, 2001; Hu, 2008). The common point among various definitions is that the tourism environment is a group of elements or interactions centered on people, especially tourists. The group of elements was variously described as “terms”, “systems”, “locations”, “aspects”, “factors”, “circumstances” or “conditions”. The differences mainly lie in the contents and scopes of the tourism environment. For example, Zhou (1986) pointed out that tourism environment is “the physical and human environment, which consists of all the natural and human factors, including air, water, land, flora and fauna, built facilities, landscape, color, sound and other environmental factors” (p.29). This explanation of the tourism environment emphasizes the biophysical side of the environment, while according to Chen and Lu (1991, p.20), the tourism environment “should be the sum of all the external conditions on which tourism activities depend, including the social and political environment, ecological environment and tourism resources”. Obviously, this definition goes far beyond the biophysical environment in content and scope.

In summary, existing definitions of the tourism environment can be divided into two categories: narrow and broad. The narrow type emphasizes the natural ecological environment or the biophysical environment, while the broad type includes both biophysical and social-cultural environments. The broad type of definitions has been more frequently used in the articles reviewed, whereas some scholars considered the economic environment as a component of the tourism environment while some others viewed the tourism environment as a system. For example, Lin (1998, p.14) defined the tourism environment as “the compound system consisting of the natural ecological environment and social-cultural environment,

**Table 1**  
Number of papers on the tourism environment published by a 5-year interval.<sup>a</sup>

Years	Definition	Physical environmental impact	Socio-cultural impact	Carrying capacity	Environmental quality evaluation	Conservation and management measures	Total
1981–1985	–	2	1	1	–	–	4
1986–1990	4	5	1	2	5	4	21
1991–1995	5	12	3	7	4	10	41
1996–2000	7	23	9	17	10	23	89
2001–2005	4	28 (2)	23 (2)	23	13 (1)	25	116
2006–2009	5	72 (3)	35 (7)	76	34 (1)	42	264
Total	25	142 (5)	72 (9)	126	66 (2)	104	535

<sup>a</sup> Numbers in brackets refer to papers published in international English journals.

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