

Eco-tourism industry development——An alternative to sustainable use of landscape resources^{*}

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Abstract——Traditional tourism is a source of not only income and recreation but also environmental pollution and landscape resource destruction. How to leave the same or even better landscape resources to future generations is the key to sustainable development of tourism industry. Eco-tourism industry could be an approach to sustainable use of landscape resources.

The connotation of eco-tourism industry and its differences from the traditional tourism in resource use were given in this paper. The ecological planning for Kangyuan recreation area is taken as an example to demonstrate how to make an eco-tourism industry development plan from a system's point of view.

In terms of the characteristics of the landscape resources, advantageous geographic location and principles for eco-tourism industry development, a suitable structure of the eco-tourism industry was presented. Based on ecological suitability analysis of the landscape resource use-analysis of capacity and constraint of landscape resources, spatial distribution of the industry sectors was given. In the development process, both opportunities and risks exist, cost-benefit analysis is thus made, and cost-effective strategies and policies are provided for the eco-tourism industry development.

Keywords: eco-tourism; resource use; sustainability.

1 Increasing tourism calls for sustainable development

According to the World Tourism Organization, world tourism grew by almost 3 times from 1970 to 1990, as shown in Fig. 1. It is expected to grow by half again before the end of the century. In 1990, an estimated 425 million tourists, nearly 8 percent of the world's population, traveled internationally. World tourism is expected to shoot up during the 1990s. The World Tourism Organization predicts a 4 percent annual growth rate in international tourist arrivals and a 9 percent annual growth rate in international tourist receipts.

There are several reasons for the dramatic increase in world tourism. The main ones are increased personal disposable incomes and leisure time, improvements in transportation systems, and greater desire to have a real experience in the other world due to improved commu-

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nications.

The tourism industry serves over 450 million people traveling internationally, and ten times as many traveling domestically. It covers such diverse activities as transport, accommodation, entertainment and catering among many others. It ranks alongside such sectors as construction and petrochemicals as a major world industry. For many countries, tourism is both a generator of hard currency and an important contributor to gross national product (GNP).

Given the scale of the tourism industry, its environmental impacts which were underestimated in the past are receiving much attention. The potential environmental impacts of tourism activities are numerous and varied. They can cause fundamental changes to landscape, pressure on wildlife, and liquid and solid waste management problems. For local people, tourism also means disturbance to ways of life and social structures, and increased costs to build and maintain facilities, such as sewage treatment plants or roads, to cater for peak number of tourists. Tourism-generated pollution is now a threat in many developing countries which lack the technological, managerial or financial capacity to handle tourist resource consumption and waste generation far greater than that of their own populations. Because of this, some former tourist destinations have fallen into disuse because of local environmental degradation. But a sound environment is itself the basic resource upon which the tourism industry depends to thrive.

A thorny question comes to us: how can the goals of tourism development and environmental protection be reconciled? In other words, how to make the tourism industry development sustainable?

2 Eco-tourism as a means to achieve sustainable use of landscape resources

Sustainable use of landscape resources is the precondition for sustainable tourism development. Sustainable tourism was defined by the Globe'90 Conference on Environment and Industry as "... the management of tourism resources in such a way that fulfills economic, social and aesthetic needs while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems" (Tourism Stream Action Strategy Committee of the Globe'90 Conference, 1990). Continuous maintenance of environmental resources and cultural integrity while still bringing equitably distributed socio-economic benefits of tourism to residents of the tourism area is the essence of sustainable tourism development (Inskeep, 1992). Eco-tourism, which balances economic benefits with a reduction of

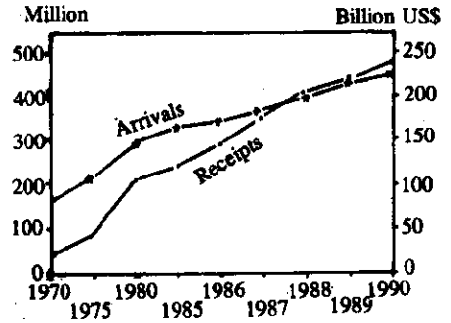


Fig. 1 International tourism development in the world from 1970—1990

Source: World Tourism Organization

environmental stress factors, fits in with the conditions for sustainable tourism.

Table 1 illustrates the differences between the traditional tourism and eco-tourism, and indicates the objectives, benefit recipients, positive and negative impacts of the two tourism forms.

Table 1 Differences between traditional tourism and eco-tourism

	Traditional tourism	Eco-tourism
Objectives	Profits maximization; Price-directed; Enjoyment-based; Cultural and resource exhibition oriented.	Satisfactory profits and continuous maintenance of environmental resources; Value-directed; Nature-based enjoyment; Environmental and cultural conservation.
Benefit recipients	Developers and tourists	Developers, tourists, local governments and residents
Positive impacts	Short term local employment creation; Short-term local economy stimulation; Short-term hard currency generation; Transportation, infrastructure and recreation facilities development and improvement stimulation.	Long-term local employment creation; Long-term economy stimulation; Long-term hard currency generation; Transportation, infrastructure and recreation facilities development and improvement stimulation; Integration of economic, social and environmental benefits.
Negative impacts	Density-related problems in land use and infrastructure; Problems with vehicular circulation; Such acute basic infrastructure problems as water and electricity shortages; Sewage pollution results from waterfront development; Littering and solid wastes; Tourism-related activities affect habitats.	Tourist amount reduced in a short term; Only some modes of transportation (bicycle and walk) permitted; Water recycling and saving, electricity saving and solar energy emphasized; Landscape corridor along the waterfront prevents the waterfront development; No littering and solid wastes treatment needed; Such activities prohibited.

For the traditional tourism, profits maximization is the main objective of the developers, while seeking enjoyment and fun is the main objective of the tourists. Price is the main stimulus for the local tourist activities and the linkage between tourists and tourist activities. The developers and tourists who gain more from tourism are not the ones who have to bear the costs for solving the environmental problems resulted from the tourist activities. The tourism itself is, in essence, cultural and resource exhibition oriented.

Eco-tourism is intended to seek satisfactory profits and continuous maintenance of envi-

ronmental resources while fulfilling economic, social and aesthetic values. Eco-tourists come to the destination area not just for fun but for enjoying nature. Not only the developers and tourists but also the local government and residents benefit from the tourism through compromise among them, the developers and tourists share the costs for eliminating the negative tourism impacts. It can actually be used as a means to achieve environmental and cultural conservation.

Eco-tourism development does not happen spontaneously. It requires careful planning in the context of sustainability, based on analysis of the environmental and cultural resources of an area and analysis of the specific characteristics and development objectives of the area. In this paper, the ecological planning for Kangyuan recreation area is taken as an example to demonstrate how to make an eco-tourism industry development plan from a system's point of view.

3 Planning for eco-tourism development-Kangyuan recreation area as an example

Kangyuan recreation area is located in the northeastern part of the coastal city, Huiyang City, Guangdong Province, China. It is about 100 kilometers away from Hong Kong and Shenzheng, 200 kilometers away from Macao and Guangzhou, the capital city of Guangdong Province. It has a very convenient and advanced air, sea and land transportation and communication system within the area of 517 square kilometers.

3.1 Status of local landscape resources

3.1.1 Various landscape resources

It is a hilly area with some small plains and basins. It enjoys a moderate temperature all the year round with the highest 28.4°C and lowest 12.3°C. It has more than ten rivers with the Dongjiang River as the main river. There are eight hills and mountains higher than 500 meters above sea level, nine reservoirs and water bodies, Huangshadong thermal spring, Longtan waterfall, some small islands and other beautiful natural landscapes and scenic spots. Some 71.8% of the total area is lower than 200 meters above sea level, which is available and suitable for eco-tourism development.

3.1.2 High biological diversity

It has an abundant biological resource inventory. According to estimation, there are more than 300 kinds of plants belonging to 99 families and more than 60 kinds of wildlife species. The area has a forest coverage rate of 67.9%, and most of forests are artificial wetland pines and other cash forests planted in the past ten years.

3.1.3 Unique cultural landscape

It is one of the concentration areas of Kejia minority people. There are many residential buildings of more than one hundred years old with the typical local and ethnic characteristics.

3.1.4 Good environmental quality

Because there is no industrial pollution source there, atmosphere and water environmental quality is very good, exceeding the first standard set by the central government.

3.1.5 Big tourism carrying capacity

It has a permanent population of 85 thousand now, 160 people per square kilometers. According to estimation, it can carry 100 thousand tourists spending their leisure days.

3.2 Eco-tourism industry structure suitable to the locality

For a long time, the primary production of the natural ecosystem has maintained the characteristics of the regional ecological landscape, and thus provided a good basis for the eco-tourism development. In terms of the composition of GNP and labor input, the natural ecosystem primary production plays a predominant role, it reflects on the highest percentage taken by the first industry. As shown in Table 2, the second and tertiary industry took a very little percentage, and the GNP of the second and tertiary industry was gained at the cost of very much labor input, attributed very little to the technology and capital input. Based on the analysis of the composition of social gross production value, as indicated in Table 3, the first industry is farming, the second industry is light and building industry, and the third industry consists currently of commerce, catering, transportation, post and telecommunication. This structure is completely derived from the local physical geography and human environment.

Table 2 Distribution of GNP and labor input, %

	1st industry	2nd industry	3rd industry
GNP	81	10.3	8.7
Labor input	82	3.9	14.1

Source: Computed from Main Township Economic Index Statistics of Huizhou City, 1993.

Table 3 Composition of rural social gross production value in 1993, %

Farming	Industry	Building	Transport, post and communication	Commerce and catering
61.2	21.1	6.4	4.4	6.9

Source: Computed from Main Township Economic Index Statistics of Huizhou City, 1993.

In terms of the local natural resources, there are a little amount of lime stone, quartz, brick mud and iron ore, it is not suitable for manufacturing and processing industry development in a large scale. But because the Kangyuan recreation area is located in the rapidest economic development region in east Asia, it has a great potential for the tertiary industry development, especially eco-tourism industry development. The Kangyuan recreation area is situated in the center of conurbation of Guangzhou and Shantou, where the processing industry and trading develop very rapidly and there is a high population density with tense working intensity and high personal income. There is a great need for an area for spending leisure

time in the neighborhood. While there is no such a large area to the east of Japan and Taiwan and to the south of Hong Kong. The Kangyuan area is the only no-pollution area full of exotic hills, beautiful lakes, turquoise waters and rural pastoral landscape in the region. Eco-tourism related industry development should become its long-term development policy.

Eco-tourism industry consists of a number of industrial sectors, it is developed for the people's enjoying wild plants and animals, inhaling fresh air and keeping close contact with natural environment. Sustainable eco-tourism development, to a large extent, depends on conservation of natural ecosystem and maintenance of ecological diversity. In this regard, the first industry, the primary production of the rural ecosystem and the development of animal and plant gardens, should still be a mainstay industry.

The industrial sectors which are suitable to the objectives of the sustainable eco-tourism development are:

(a) Travel; travel agents (tourist attraction and tour guides), airlines, cruise companies, bus and passenger carrier companies, taxi companies, railways, tourist attendants, reservation and sales staff;

(b) Accommodation and catering; restaurants, hotels, hostels, camping sites, guest houses, cafes, bars;

(c) Leisure and recreation; bicycling and indoor stadium, (physical and mental) rehabilitation center (including hot spring sanatorium), ecological exhibition and education center, zoo, botanical park, garden, hunting place, children's playground, museum, art gallery, indoor recreation center;

(d) Relevant industrial sectors; green food processing, advertising and information service, building (housing building and road construction), sportswear and sports equipment manufacturing, goods sales, real estate (garden villas) development, sports equipment repair and maintenance.

In accordance with the above development framework, the currently predominant role of the first industry will gradually be replaced by the tertiary industry. The ultimate ideal industry structure will be that the tertiary industry take a predominant role while the first and second industry take the second and third place respectively.

3.3 Ecological suitability of eco-tourism activities

Ecological suitability analysis is a useful means for selecting suitable location for specific land use, it is based on the balance between ecological capacity and ecological constraint of the specific land use. Ecological capacity for land use is the development opportunity provided by the comprehensive environment (combination of social, economic and natural factors) for the specific land use, while ecological constraint is the constraint provided by the comprehensive environment for the specific land use.

In analyzing the land use suitability, these types of land use such as landscape conservation, ecological agriculture, cultural recreation, shopping and residence, sports, physical and mental rehabilitation, waterborne recreation activities and cleaner production were taken into account, the landscape features, location, environmental sensitivities, soil and land con-

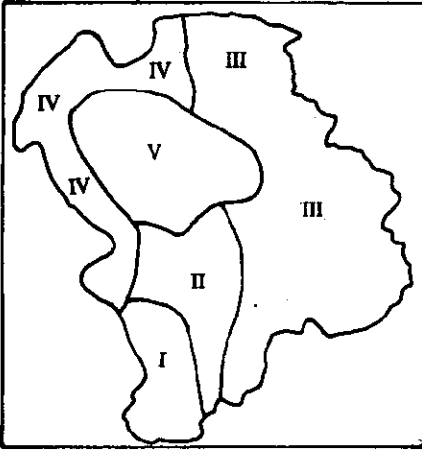


Fig. 2 Sketch map of eco-tourism industry distribution

- I: Entertainment and business;
- II: Sports and rehabilitation;
- III: Landscape reserve;
- IV: Waterborne recreation activities;
- V: Wildlife park and gardens

ditions were used as analysis indices. The analysis results are shown in Fig. 2. The landscape reserve is mainly located in the east part of the area with uplands and hills, within which the emphasis should be put on the development of forest park, wetland garden, zoo for wild animals, botanical garden, mountaineering and other eco-tourism activities. Ecological agriculture should be based on the current farming land and the available arable land around the farmers' house. Cultural recreation is best distributed in the south of the area with traffic convenience, and the folk culture should be based on the existing Kejia ethnic residences. Shopping and residence should be located in the comparatively plain area with traffic convenience. The best place for sports will be located in zone II which is in the middle of the Kangyuan recreation area with very convenient communications and various types of soil and land. The best location for physical and mental rehabilitation is the place around the Huang-

shadong hot spring and close to the water bodies. Waterborne recreation activities should take place in the waterbodies with easy access. Cleaner production will be best located in the south board line of the Kangyuan recreation area.

3.4 Opportunities and risks for eco-tourism development

According to the World Travel and Tourism Council, eco-tourism industry is now in the beginning stage, it catches the trend of tourists' enjoying nature and desiring to have a close symbiotic relationship with nature. In this condition, the Kangyuan recreation area takes the lead in developing the eco-tourism industry taking full advantage of its own landscape characteristics and advantageous geographic location, it will bring both opportunities and challenges.

3.4.1 Opportunities

Although it takes some risks in developing a new venture, the higher the risks, the more the returns. Table 4 and Table 5 show the main economic indices of tourism industry in China and Guangdong Province in 1993. It was shown that, whether the state-run tourist enterprises or other types of tourist enterprises, their labor productivity, profits and tax per capita and sales income generated by one hundred RMB Yuan fixed asset were higher than that of any other industries. While the value of each index of Guangdong Province was much higher than its counterpart of the national average, particularly the annual sales income generated by one hundred fixed asset reached 90 RMB Yuan. Assuming that the economic benefits of the Kangyuan recreation area be the same level as that of the Guangdong Province, the investment with its interest could be gained back after one or two years. In fact, the ben-

efits of the eco-tourism industry could be even higher because it is a new venture, normally, the tourists would like to pay more for the new things. Of course, some of the profits should be used for eliminating any possible negative impacts. But, in practice, how much you benefit depends on how quickly you respond to the market changes.

Table 4 Main economic indices of tourist enterprises with stars in China in 1993

	Labor productivity (RMB Yuan/person)	Profits and tax per capita (RMB Yuan/person)	Sales income generated by one hundred RMB Yuan fixed asset (RMB Yuan)
National average	64600	8800	63.01
Guangdong Province	76900	11700	90.44

Table 5 Main economic indices of state-run tourist enterprises in China in 1993

	Labor productivity (RMB Yuan/person)	Profits and tax per capita (RMB Yuan/person)	Sales income generated by one hundred RMB yuan fixed asset (RMB Yuan)
National average	46300	7000	66.96
Guangdong Province	54500	7200	88.14

Source: Computed from China Tourism Statistic Almanac in 1994

3.4.2 Response to market risks

Because the Kangyuan recreation area is not known to most of the world tourists, though the potential market demand for the eco-tourism activities is big, it needs to develop. To expand the market, at first, it is necessary to publicize the characteristics of the natural ecosystem and landscape under the careful management and planning to attract more tourists and nature lovers; Secondly, leisure and recreation activities should be arranged according to the tastes of the tourists at different levels; Thirdly, the tourists should be kept attracted by not only the beautiful landscape but also the wholehearted services. The first and third points are not difficult to do. For the second point, it needs a quick response to the market changes based on the in-depth analysis of the market demands.

The eco-tourists come from a variety of countries and regions with different backgrounds. Not only the demands of the traditional tourists from Japan, the U.S.A., Canada, UK., Germany, Australia and Singapore but also the demands of the tourists from the neighbor countries and regions such as Hong Kong, Taiwan, Macao and Malaysia should be met. Most important is that the demands from the neighbor developed areas in China should not be ignored.

In order to meet the needs of all the eco-tourists, it will be most attractive to arrange eco-tourism activities with typical rural pastoral features and local landscape and cultural characteristics. It is also necessary to arrange the eco-tourism activities according to the tourists' age, sex and occupation. According to the China Tourism Statistic Almanac (1994), the tourists visiting China from age 17 to 50 took 70 percent of the total in 1992 and 1993, and males also took nearly 70 percent (Table 6). For these tourists, the most attrac-

tive are those activities they can participate in as a part and gain a lot of funs and enjoyment. For the 5 percent of the youngsters under the age of 16, the most attractive are game-oriented activities. For the old tourists, almost 25 percent, the most attractive are not only the local landscape but also the physical and mental rehabilitation activities with typical Chinese local characteristics. As indicated in Table 7, except for farmers, the distribution of tourists is almost even in other occupations than businessmen. Businessmen took only one half, smaller than the percentage we expected. Therefore, the demands from all the tourists should be taken into equal account while making plans for either investment in facilities or arrangement for eco-tourism activities.

Table 6 Sex and age groups of tourists visiting China in 1992 and 1993, %

Year	Under 16	17-30	31-50	Above 51	Male	Female
1992	3.9	26.2	44.1	25.8	66.3	33.7
1993	4.15	26.53	44.82	24.50	69.9	30.1

Table 7 Distribution of tourists visiting China in occupation in 1992 and 1993, %

Year	Professional Administrator	Clerk	Businessman	Serviceman	Farmer	Worker	Others	Unemployment	
1992	10.2	11.9	11.0	22.5	5.7	2.1	13.8	15.5	7.3
1993	8.5	6.6	11.6	26.5	8.1	1.7	12.2	17.1	7.9

Source: Computed from China Tourism Statistic Almanac in 1994

4 Policy instruments for eco-tourism industry development

4.1 Economic policy

From the system's point of view, the optimal integrated economic benefits of the whole industry rather than its single sectors should be emphasized. To maintain the beautiful landscape and rural pastoral features and to realize the sustainable eco-tourism industry development, some industrial sectors, if they do harm to the natural environment, should not be introduced whether how high their economic benefits are. While such sectors as the primary production of agricultural ecosystem and development of wild animal and plant gardens, through their economic benefits can not be gained in a short time, their development increases the diversity of the landscape ecology and strengthens the local pastoral features, should be the first priority for the government to support. In the long run, it will attract more eco-tourists to come.

4.2 Technical policy

Natural purity is the main objective of eco-tourists to the destination area, sophisticated technology is not necessary for eco-tourism industry, appropriate technology would be an optimum alternative. For transportation and communications, advanced technology is needed for attracting and accessing tourists. But for other industrial sectors, it is not the truth. As advanced technology, equipment and products are ubiquitous nowadays, they have lost the attraction for the eco-tourists. While some old technologies derived from the law of nature or

such production technologies with the local pastoral features are fantastic to the tourists living in cities and towns. Therefore, some folk technologies and production sectors, though with little technical content, should be kept. In a long term, a technology system with the oldest and state-of-the-art technologies, if well-conserved, will also be an attractive landscape.

4.3 Environmental policy

Eco-tourism is the tourism development in an environmentally sound way, aimed at facilitating the regional development without any harm to the environment. It not only meets the needs of the contemporary tourists and locality but also provides more opportunities for the future development.

In order to prevent any environmental pollution and degradation arising from the tourism activities, some potential environmental impacts should be made clear while formulating the eco-tourism plans. The following aspects should be taken into account; (1) Pollution of regional fresh and marine water by sewage; (2) Soil erosion due to unsuitable land uses such as offroad vehicle driving; (3) Acid rain and global warming related to transportation emissions, air conditioning and heating emissions; (4) Loss of wildlife habitats and aesthetic values in the built environment caused by urbanization and road building; and (5) Reduction and disruption of biological diversity due to over-development or/and pollution. With this in mind, for every project to be proposed, environmental impact assessment should be made. Those projects which are not suitable in terms of environmental standards should be canceled without hesitation.

Those projects selected through feasibility study and environmental impact assessment should be arranged in suitable places in terms of environmental, social and economic conditions, based on analysis of ecological suitability of land uses. If a project is good, but it is difficult to find a suitable location for the project, it can not be arranged either so as to avoid the environmental problems due to the unsuitable land use.

For those projects under construction or operation, "environmental tax" should be collected and "no pollution prize" awarded to reduce the environmental pollution to a minimal level in compliance with the relevant state and local environmental laws and regulations.

References

- Boo E. Ecotourism, The Potentials and Pitfalls, Volume 2, WWF. 1990
- Cleverdon Robert. Prospects for international tourism through the year 2000. World Tourism Association. 1992
- Inskeep Edward. Tourism Planning, An integrated and sustainable development approach. Van Nostrand Reinhold. 1991
- Inskeep Eddward. Sustainable tourism development in the Maldives and Bhutan. UNEP Industry and Environment July-December 1992. 1992
- Jenner Paul, Smith Christine. The tourism and the environment. The Economist Intelligence Unit. 1991
- Mason Peter. Tourism, Environment and development perspectives. The Worldwide Fund for Nature. 1990
- Tourism Stream Action Strategy Committee of the Globe'90 Conference. An action strategy for sustainable tourism development. Vancouver, British Columbia. 1990