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MINING AND TOURISM:
COMPARING SPATIAL PATTERNS, SOCIOECONOMIC CONTRIBUTIONS, AND
ENVIRONMENTAL IMPACTS IN CHINA

A Dissertation Presented

by

Ganlin Huang

to

The Faculty of the Graduate College

of

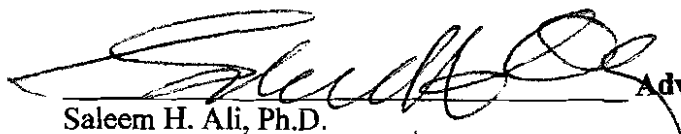
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In Partial Fulfillment of the Requirements
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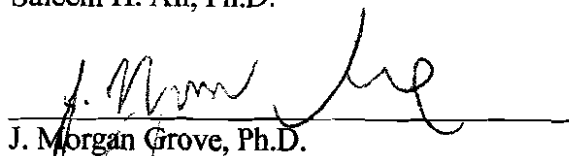
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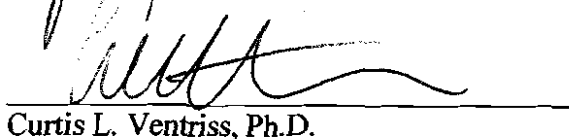
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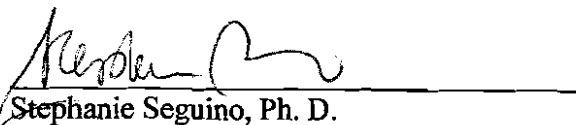
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ABSTRACT

This dissertation examines the environmental and socioeconomic impacts of mining and tourism industries in China with a goal of understanding whether or not these two sectors are mutually compatible in achieving sustainable development. Yunnan, a province in southwest China was selected as the study area because of its high potential for growth in both sectors. A macro-level Geographic Information System (GIS) analysis and a case study were employed to understand patterns of change and linkages.

Paper 1 addresses the spatial patterns of mining and tourism activities by a GIS analysis. Spatial cluster analysis of major tourism attractions and mining sites concludes that 1) mining sites tend to be clustered, whereas locations of tourism attractions do not exhibit any significant evidence of aggregation. 2) Mining and tourism sites tend to cluster at the scale of 25 kilometers to 45 kilometers. However, 3) mining/tourism sites relatively far away from each other attain more economic income. Incorporating the social context and development history of the study area, the results imply that although mining activities may have some negative impact on tourism attractions making those nearby a mining site earn less income; some factors tie the two industries together such as investing capacity of and policy support from local government.

Paper 2 considers the environmental health and socioeconomic status of the areas where mining or tourism activities cluster. Statistical analysis on prefecture level and county level detects no significant difference between areas of mining and tourism in terms of economic status (GDP and poverty rate) and social development (ratio of researchers, agricultural technicians, teachers and doctors, and access to pipe water, major roads and telephone). For environmental indicators, the air pollution and soil erosion index perform better in tourism areas than mining areas, while other variables including forestry coverage, water quality and an overall ecological health index detect little difference between mining and tourism areas. The paper concludes that sector difference in economic and environmental performances may be over-emphasized. How mining and tourism contribute to or impact the sustainability of regional development needs to be further studied within the local context.

Paper 3 develops a case study of a Tibet village called Jisha in northwest Yunnan to explore management as a factor influencing tourism impacts on environment and local economic productivity. Jisha village experiences two types of tourism development. A community based small-scale tourism development project, initiated by a local non-government organization, aims to partner with Jisha residents to build a Tibetan style hostel which will bring tourism income to the villagers. An external company plans to construct a hotel, golf course and chair-lift by making a large investment in the community. Although some aspects of this project are likely to benefit the local community better than others, local residents are resisting all development efforts. Results of the ethnographic study show organization-led projects work better in benefiting local people and conserving environment than corporation businesses. However, such ventures may not have the multiplier effect on the local economy as external corporate businesses because of the moderate size of the investment.

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Chapter I Mining, Tourism and the Communities: An Introduction

1 Mining: High profit with high cost

From gold to limestone and copper to oil, mining activities have been extracting commodities from the earth and providing them to human societies for thousands of years. By convention, these materials could be divided into metals, fuels, construction materials and industrial materials. In recent years, the process of exploring, mining and processing various minerals, “has come under tremendous pressure to improve its social, developmental and environmental performance” (MMSD 2003).

Complaints around its social performance focus on issues of indigenous rights, social justice and negative impacts on the local community (sexually-transmitted diseases) [The World Bank 2004]. It has been recognized that government and elites rather than local people and communities usually grab wealth brought by mining. Thus mining intensifies local inequity. Issues about environmental impacts include physical landscape change, land degradation, ecosystem disruption, and waste management and pollution.

Concerns of its developmental performance lie in that mining industry usually boosts up economy of the hosting country in a short-term and cumber the long-term economic growth. Discussions around the Dutch disease and “resource curse” provide a classic example (e.g. Krugman 1987; Sachs and Warner 2001). In numerous studies, mining has been found to impede the overall economic performance (Power 1996, Davis 1998, Auth 1993, Auth 1991, 1998, Gelb 1988, Kremers 1986) because of the exhaustible characteristic of mineral resource and the sole reliance of mining industry to support a

country's economy. Mineral resource tends to have less and less economic advantage while the technical difficulty for extracting increases and so does the cost, and finally runs out. Therefore, the economy relies on mining will have less and less advantage over others and finally need to switch to other sector which will be very weak if it has been evolving in the strong extractive industry's shade. However, mining have brought positive impacts on incomes and jobs as an important supplement rather than the principal support of the local economy (Shen and Gunson 2006).

Although opinions diverge on if and how negative impacts of mining practice can be reduced through management, it is generally agreed that the high profit of mining industry comes with a high risk and cost. Taking places in many places that are socially vulnerable, have severe poverty or contain great ecological values (Miranda et al. 2003), how to incorporate mining activities into a sustainable future with a conscious outreach to benefit local people and an alert to minimize negative impacts on the environment remains a question.

2 Tourism: A green alternative?

Tourism is probably the fastest growing industry globally. According to the World Travel and Tourism Council's (WTTC) estimation (2007), world tourism is expected to generate USD 7,060.3 billion of economic activity in 2007 and contribute 3.6% of global Gross Domestic Product (GDP). Total demand is predicted to grow by 4.3% per annum, in real terms, over the next ten years (WTTC, 2007).

Tourism appeared as a clean industry associated with a higher economic multiplier as a service sector. The negative impacts tourism has on society and environment were recognized later on when intensive visitation and infrastructure construction became popular. The environmental impacts of tourism include water pollution, waste and noise brought by tourists. Moreover, soil becomes vulnerable to erosion when the vegetative cover is disturbed or removed by intensive trail use, off-trail activities and facilities construction activities including road, visitor center, restaurant and hotel.

Ecotourism or nature-based tourism is promoted to maintain some of the positive effects of tourism, and eliminate or reduce the negative environmental impacts. This type of tourism is promoted by environmental organizations (such as Conservation International, World Wild Foundation, and The Nature Conservancy) to educate visitors, finance conservation work and provide income to local communities (such projects can be found on their websites) [WTTC and IHRA 1999, Brandon 1996, Christ et al. 2003]. While many problems concerns mining industry exist in tourism, such as social/cultural influence on local communities, environmental impact on ecosystem and income distribution within host community and between it and outsiders, tourism is still widely regarded as probably the one with most potential to provide a green alternative to communities live on agriculture, herding and mining. It is probably because tourism is highly dependent on the natural environment and cultural assets that the poor has and is able to capitalize. Strategies for making tourism more “pro-poor” have shown some success at the local level (Ashley et al. 2001; Roe et al. 2004). Scaling these approaches

up and applying them to biodiversity-based tourism could result in positive synergies between tourism growth, biodiversity conservation, and human development in the future.

3 Mining and tourism on one globe

While it is well understood mining and tourism are happening on one global and affect people and the environment together through complex energy-flow and substance exchange systems, the fact having received scant attention is both industries have been expanding into same areas where high level of biodiversity and poverty coexist in the recent two decades.

In the last twenty years, mining and tourism industries have shifted investment to areas with high-level biodiversity or critical ecosystems. In particular, according to Bridge (2004) a growing proportion of mineral exploration and investment expenditures targeted the tropical Andes, the Guiana Shield, Indonesia, Papua New Guinea, the Philippines and tropical West Africa. Increased expenditure in areas that are ecologically sensitive or have high conservation values intensifies concerns about the impact of mining on global biodiversity. Miranda et al (2003) pointed out that nearly one third of active mines and exploration sites are within areas of intact ecosystems or high conservation value.

During the same time period, tourism grew much faster in developing countries. International tourism arrivals in developing countries as a group have grown by an average of 9.5 % since 1990, compared with 4.6 % worldwide (Deloitte and Touche

1999). Of the poorest 100 countries well over half have a tourism industry that is growing and/or significant (Deloitte and Touche 1999). A global trend in tourism developed primarily on the base of natural resources, called “nature-based tourism,” is a driving force in tourism growth (Su et al. 2007). “Many private, public and community landholders are turning to nature tourism as a profitable adjunct or replacement for farming, forestry or fisheries” (Buckley 2003, p. 1). In the report of mapping tourism and biodiversity, Christ et al. (2003) showed biodiversity intense areas have a great overlap with countries of an average annual tourism growth over 100% since 1990.

How the two industries interact spatially when they expand into a relatively small area? In places with mineral and tourism resources, can mining and tourism sites coexist peacefully? Tourists usually do not enjoy a trip with smoke and noise from mineral processing, or a landscape with miners. Tourism has the incentive to avoid mining activities in order to preserve the original natural beauty and provide visitors a satisfying trip. In this scenario, tourism may push or at least stay away from mining sites. On the other hand, mining and tourism may locate close to each other to share certain scarce resource, for example, a special tax exemption policy or convenient transportation.

Another question appears when both of them take place within the same socioeconomic, political and ecological context: Does tourism demonstrate itself as a better way to achieve sustainable development than mining? Although both negative and positive sides of mining and tourism industries have been recognized and studied, without solid data support from case studies that comparing mining and tourism

industries from the perspective of sustainable development, people – researchers, practitioners and decision-makers – tend to prefer tourism over mining for an environment-friendly development. With many external variables such as socioeconomic and political context, it is difficult to compare mining and tourism for their socioeconomic and environmental performances. Co-existence of the two sectors overcomes this problem and thus provides an opportunity to assess their impacts.

Finally, what role does management play in places have been or will be targeted for mining and tourism expansions? How does different management scheme relate to the social, economic and environmental impacts mining or tourism has? Using Yunnan, southwest China as a case study area, these questions will be examined in the following chapters.

4 GIS and spatial analysis

Geographic Information Systems (GIS) are essentially systems for collecting, storing, retrieving, managing, analyzing and disseminating spatial data from the real world for a particular set of purposes (Burrough and McDonnell 1998; Tomlin 1990). The ability of GIS to handle and analyze spatial data distinguishes them from other information systems. In particular, GIS can provide powerful analytical and modeling capabilities for spatial data by integrating statistical spatial data analysis techniques (Goodchild et al. 1996).

Spatial pattern is the manner of arrangement of events in space. For instance, the locations of mining sites in the world can be viewed as a spatial point pattern. A spatial

point pattern can be described as regular, random or clustered, which is the product of certain process (or processes) at a particular time and space (Diggle 1983, Li and Zhang 2007). The development of GIS and spatial modeling has significantly changed previous computer modeling approaches on spatial pattern analysis. With the emerging of technologies of GIS and spatial modeling, researchers have the ability to 1) analyze spatial autocorrelation, 2) test hypotheses on spatial patterns and linkages between spatial patterns and processes, and 3) more importantly, analyze and model spatial patterns in a spatially explicit way. Therefore, the integration of GIS and spatial modeling represents a potentially new tool for testing and improving existing theory and building new theory, and developing applications for policy making, planning and management. In this research GIS and spatial modeling are employed to examine spatial distributions of mining and tourism sites, and explore spatial relationship between them.

5 Chapter overviews

The following chapters examine the spatial relationship of mining and tourism industries, their socioeconomic and environmental impacts, and how these impacts are influenced by management in the context of China. Yunnan, a province in southwest China is selected as the study area (Figure 1.1).

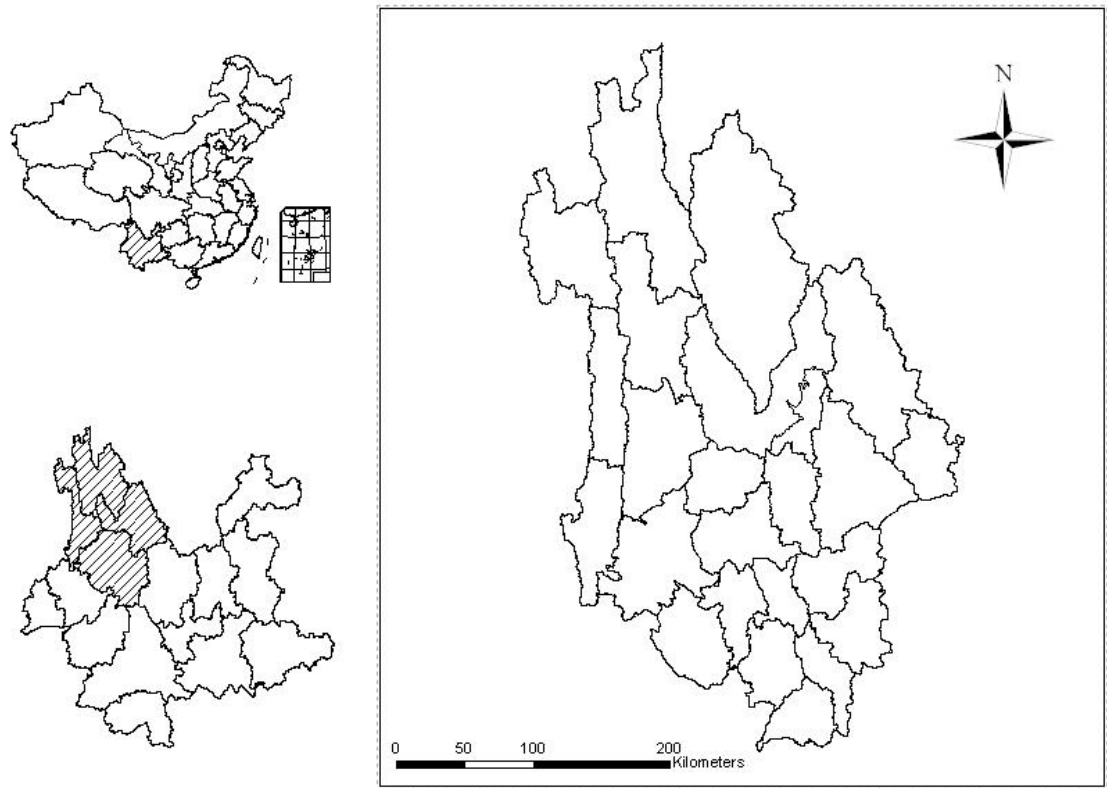


Figure 1.1 Map of Yunnan, China

Chapter Two addressed the spatial patterns of mining activities and tourism sites by a GIS analysis. It employed a distance-based spatial analysis technique to explore distribution patterns of mining sites, tourism attractions and the interaction between them. Statistical data describing economic capacity of mining and tourism sites was integrated into the analysis. Results indicated that 1) mining sites tend to be clustered, whereas locations of tourism attractions do not exhibit any significant evidence of aggregation. 2) Instead of trying to avoid each other, mining and tourism sites tend to cluster at the scale of 25 kilometers to 45 kilometers. However, 3) mining/tourism sites relatively far away from each other attain more economic income. Incorporating the social context and development history of the study area, the results implied that although mining activities

may have some negative impact on tourism attractions making those nearby a mining site earn less income; it is very clear some factors tie the two industries together such as investing capacity of and policy support from local government, and convenient accessibility to roads.

Chapter Three considered the socioeconomic status and environmental health of the areas where mining or tourism activities cluster. Using quantitative evaluative metrics, it attempted to address the question of whether tourism is in fact more economically beneficial and environmental salubrious as compared to mining. The study area, Yunnan province, provides a rare case of co-existent mining and tourism in different parts of the province. The study was conducted on two spatial scales using prefectures and counties (the administrative unit under prefecture) as research units respectively. Four prefectures in northwest Yunnan were selected to conduct the county-level study. Statistic analysis on prefecture level and county level detected no significant difference between areas of mining and tourism in terms of economic status (GDP and poverty rate) and social development (ratio of researchers, agricultural technicians, teachers and doctors, and access to pipe water, major roads and telephone). For environmental indicators, the air pollution and soil erosion index performed better in tourism areas than mining areas, while other variables including forestry coverage, water quality and an overall ecological health index detected little difference between mining and tourism areas. It concluded that sector difference in economic and environmental performances may be over-emphasized. How mining and tourism contribute or impact on regional development sustainability cannot be generalized, and has to be studied within the local context.

Chapter Four developed a case study to explore management as a factor influencing impacts of tourism on local economic productivity and environment. Jisha, a Tibetan village in northwest Yunnan, was selected as the case study area. Jisha village has been experiencing two types of tourism development. A community based small-scale tourism development project, initiated by a local non-government organization, aimed to partner with Jisha people to build a Tibetan style hostel which would bring tourism income to the villagers. An outside company planned to make a large investment to construct hotel, golf course and chair lift. The two projects represent two typical formats of tourism development in China: organization-led project and corporation business. Although the former shows great potential to preserve the environment and benefit local community better than the latter, local people resisted both of them. This chapter compared them for their tourism development visions, contributions to local economy, environmental impacts and community involvement. Since both were not successful, it analyzed their problems through a framework of cooperation among authorities, local people and business. This study showed organization-led project worked better in benefiting local people and conserving environment than corporation business did, however, it would not have the multiplier effect on local economy as corporation business had because of the moderate size of the investment. Weak working relationships – with local government and business in organization-led project and local people in corporation business were the primary obstacles that fail the planned projects.

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Chapter II Spatial Patterns of Mining and Tourism in Yunnan, China

1 Introduction

As primary ores are depleted extractive industries have increasingly shifted their investment to places that have contesting land-uses and high levels of biodiversity in critical ecosystems. In particular, according to Bridge (2004) a growing proportion of mineral exploration and investment expenditures targeted the tropical Andes, the Guiana Shield, Indonesia, Papua New Guinea, the Philippines and tropical West Africa. At the same time, a global trend in tourism developed primarily on the base of natural resources, called “nature-based tourism,” is a driving force in tourism growth (Su et al. 2007). Studies showed (Miranda et al. 2003; Christ et al. 2003) that both mining and tourism have been and will be growing in areas that are biodiversity intense.

Coexistence of mining and tourism and their competition for land use have been recognized and studied in Africa, northern Canada, and South America (e.g. Weigend 1985; Temu and Due 2000; Ironside 2000) as case studies. Most of these case studies discussed mining and tourism separately as current economic activity or potential income source without examining interactions between them and influences that the two sectors would have on each other (e.g. Weigend 1985; Temu and Due 2000; Ironside 2000). A few studies recognized conflicts in land use, management and development policy between mining and tourism. For example, as part of tourism potential in Africa arises from protected areas, tourism is often benefited from achievement in conservation and development of the system of protected areas which may restrict mining activities (Fig n.d.; Sinclair Knight Merz 2000). Nevertheless, little has been studied regarding to

the interaction between mining and tourism. Do they coexist peacefully? Does mining push tourism away by destroying the resource base tourism relies on? Or does tourism demonstrate itself as a safer, cleaner, and more sustainable income source to local people and thus attain higher develop priority over mining? This study explores these questions by analyzing spatial patterns and interaction of mining sites and tourism attractions in southwest China.

With the rapid economic growth after the economic reform and “open door” policy in 1978, China is playing a more and more important role in the global market of both mineral trade and tourism. With the large demand for mineral resource, China not only opens to investors but also increasingly look to mine abroad. In the five year plan 2006-2010 with regards to mineral and metals, influencing global mineral market and strengthening international cooperation are major objectives (China Mining 2006). In 2006, China’s tourism demand took 5.5% of the world market share and this percentage is projected to be doubled by 2016 (World Travel and Tourism Council 2006). China ranked fourth out of 174 counties in absolute size of tourism demand and second in the growth forecast (World Travel and Tourism Council 2006). However, little study has looked at the questions on how mining and tourism coexist in the context of China. This study will fill this gap as Yunnan province in southwest China is selected as the study area. It first examines mining locations or tourism sites alone to see whether they each tend to cluster or spread out within the study area and then asks how they interact spatially – gather together, behave in random form or push each other away. We propose the following hypotheses:

Hypothesis 1: Mining: mining sites tend to be situated close to each other.

Hypothesis 2: Tourism: Tourism sites tend to be situated close to each other.

Hypothesis 3: Mining and tourism: There is spatial inhibition relationship between mining and tourism sites, that is, they tend to push each other away spatially.

With development of both tourism and mining, some mining sites became tourism attractions where visitors learn about their legacy, resource history and how technology evolved from this industry. While recognizing this potential, our study focuses on these two industries as distinct sectors in temporal and spatial terms.

2. Background of Yunnan

Yunnan province located in the southwest China (Figure 2.1) is selected as the case study area due to the high biodiversity of the region, and the rapid growth of both mining and tourism in recent years. The province borders the countries of Vietnam, Laos, and Burma and is also China's most culturally diverse region. Yunnan encompasses 393,898 square kilometers and has a population of 44.5 million people (Yunnan Statistics Bureau 2006). Mining and tourism in Yunnan have been growing at a rate of 20-30% since the logging ban cut off one of the main income sources in 1998 (Yunnan Statistics Bureau 2004).

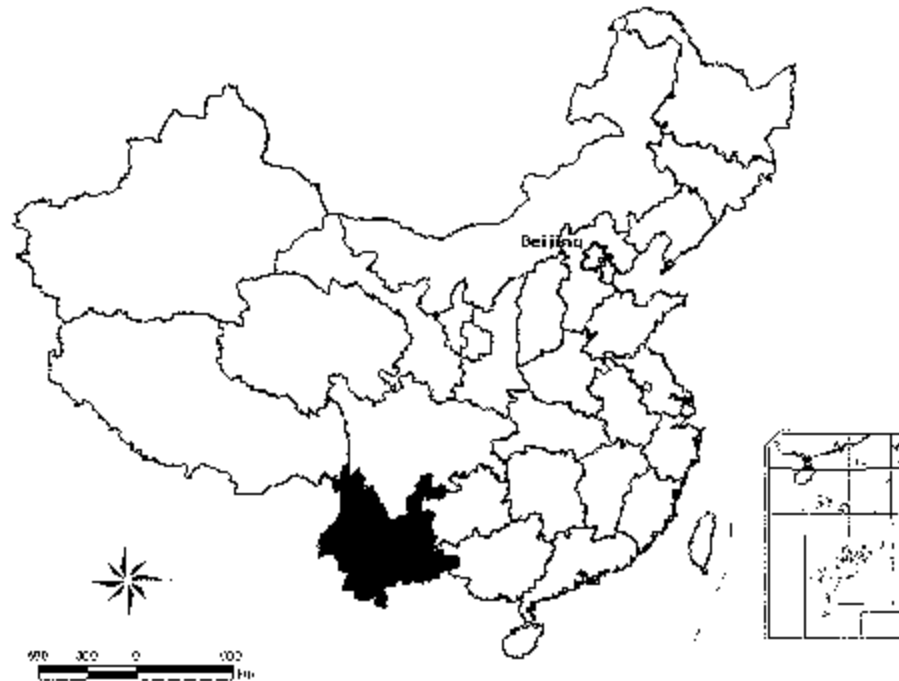


Figure 2.1 Map of the Study Area

2.1 Mining, tourism, poverty, and biodiversity

Yunnan has more than 7000 mining enterprises. The mining industry exploits more than 80 mineral resources including coal, iron, manganese, copper, lead, zinc, tin, gold, phosphorus and cement. The industry plays a prominent role in the local economy, employing roughly 350,000 workers, with gross mining output about USD 7.5 billion in 2006. This represents 9.0% of gross national gross mining output. Mining industry takes a third of the industrial added value, which is USD 21.4 billion or 42.7% of Yunnan's GDP (Yunnan Statistics Bureau 2007).

Tourism in Yunnan has experienced rapid growth since the early 1990s at an average annual rate of 347.9% during 1990-2005 (Yunnan Statistics Bureau 1991 and 2006). Tourism attractions in Yunnan include tropical forests, limestone Karst scenery, ancient towns, and diverse cultural villages. The tropical forests in Xishuangbanna, the Stone Forest in Kunming and Dali Ancient Town were the first to attract visitors in the early 1980s when China's tourism market opened. In 2006, tourism receipt in Yunnan was USD 6.3 billion, which was 6.0 % of national tourism receipts. Tourism receipt contributes 32.4% to the service sector added value, which is USD 19.3 billion or 38.5% of Yunnan's GDP. Figure 2.2 shows domestic and international tourism development in Yunnan from 1990 to 2005 (Yunnan Tourism Administration 2004, Yunnan Statistic Bureau 2006).

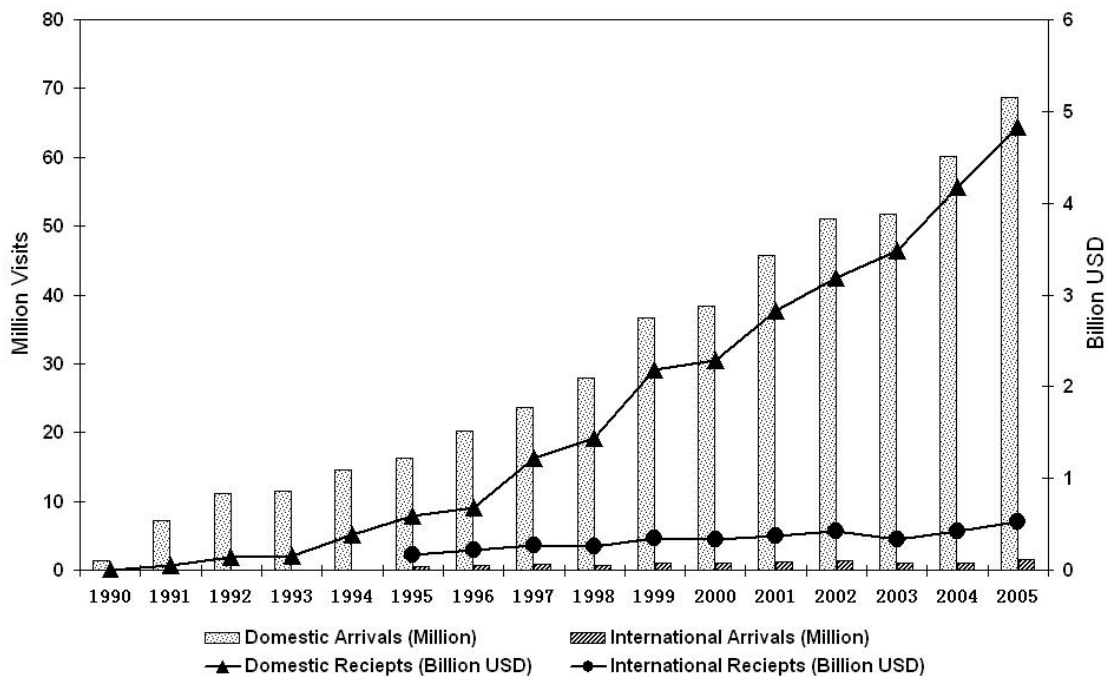


Figure 2.2 Domestic and International Tourism Development in Yunnan 1990 to 2005

In addition to abundant mineral and tourism resources, Yunnan province is characterized by extremely high poverty and biodiversity. In a study identifying overlaps between poverty and biodiversity hotspots globally (Fisher and Christopher, in press), Yunnan was recognized as one of the areas having multifaceted poverty and also being a key center of global biodiversity.

With regard to poverty, in 2004, Yunnan was the fourth poorest out of 34 provinces, municipalities, and autonomous regions with 10% of the country's poor/low income population (Liu 2005). This is based on poverty and low-income thresholds lines of USD 84 and 116 in annual income, respectively, as set by the Chinese government in 2004 (Rural Survey Department of National Bureau of Statistics 2006), which are both lower than the World Bank's a-dollar-a-day poverty threshold. Thus, 2.3 million people or 6.0% of the provinces population lived in poverty in 2004, and 11.8% was below the low-income line (Liu 2005). Yunnan is under huge pressure to generate more jobs and increase incomes.

Despite the poverty of the region, Yunnan is rich in biodiversity. The province provides the habitat for 59.4% of protected wild animals in China, as well as 62.9% of the flora and 60% of the vertebrates (Liu 2003). As a result of the global ecological importance of the region, Yunnan is included in the World Wildlife Fund's Global 200 Ecoregions (2007) and Conservation International's 34 Global Hotspots (2007).

Large and fast growing mining and tourism sectors, poverty and the pressure to develop, as well as rich biodiversity and fragile environment enable Yunnan to represent the poor, yet ecologically critical areas with great mining and tourism potentials well and

thus make an ideal case to explore the spatial distribution of and interaction between mining and tourism sites.

2.2 Factors may influence distributions of mining and tourism sites

From interviews with officials in government departments of mining and tourism and mining and tourism business, and studies on general economic growth (e.g. Chen and Wu 2005; Chen and Feng 1999) and development of mining and tourism sectors, we can infer several factors may have influence on distributions of mining and tourism sites including regulations and regional development plan, pressures governments are feeling to generate employment opportunity, reduce poverty and increase economic growth, and the time sequence issue of mining and tourism developments.

Regulations impact on distribution and mining and tourism sites by prohibiting mining activity in national natural reserves(State Council 1994a), national historical and cultural cities (State Council 1994b), and national scenic areas (State Council 2006), which all constitute major tourism attractions in Yunnan. There are 14 national natural reserves and the protective objectives cover forestry ecosystem, wildlife, wetland ecosystem, and paleontology relics (Yunnan Tourism Administration 2004). Four cities in Yunnan are listed as national historical and cultural cities (Yunnan Tourism Administration 2004). The Old Town of Lijiang, and the Three Parallel Rivers are listed by UNESCO as World Cultural and Natural Heritages respectively (UNESCO 2007 a and b). Although tourism visitation also brings pressure to preserve biodiversity, culture, ancient buildings or sceneries, little regulations has been established so far to restrict tourism development in these areas. Indeed, some places applied for natural reserves or

cultural heritages in order to develop tourism and consider the title as an advertisement. As we will discuss later, the UNESCO World Natural Heritage “Three Parallel Rivers” established in 2003 in the Diqing prefecture provides an example. Prefecture government worked hard to make the region enlisted as a World Heritage in the hope that it would boost up local tourism (UNESCO, World Heritage and IUCN 2006). Regarding the influence on distribution of mining and tourism sites, the regulations aiming to protect biodiversity, ancient culture, and scenic areas contribute to push mining activity from tourism areas.

Yunnan is under huge pressure to generate more employment opportunities, reduce poverty and increase economic growth. Yunnan government announced recently five key industries targeted for expansion: tobacco plantation and processing, mining, tourism, hydropower, and biological products including plantation and processing of edible mushroom, flowers and traditional medical plant (Yunnan Government 2007). These industries, as a result, will receive priority in regional planning and will be allotted various kinds of government supports, such as subsidies. Economic growth and poverty reduction win priority in regional planning and relevant development decision-making process. It suggests that any desire to keep mining and tourism development separated geographically would have a lower priority than economic potential. Regional development plans are usually subjected to change if a new growing potential is recognized. For example, Diqing prefecture changed their development focus from tourism to copper mining when a large copper reserve was discovered and seemed much more profitable than the tourism development boosted up by the Three Parallel Rivers

World Heritage (Diqing government 2005). In this regard, the desire to grow local economy encourages the coexistence of mining and tourism sites in a relatively small area.

Foreign direct investment has been found to have a significant effect on GDP growth (Chen and Wu 2005). Located in the west mountainous region, Yunnan province is among the less open areas in China compared with the provinces on the east coast. There is no foreign investment in tourism in Yunnan (from interview with officials in tourism department of the provincial government), and only 12 out of the 7000 mining enterprises are invested by foreign capitals (Mining Management Unit 2004). FDI in mining and tourism developments in Yunnan is ignorable.

Time sequence of mining and tourism development has an influence on how to interpret the result of the spatial analysis. Put simply, if it is indicated that mining and tourism sites are away from each other, the time sequence decides if it is mining sites that push tourism away, or tourism sites that push mining activity away. Overall, mining sector had been well established before tourism started to grow in Yunnan. The earliest mining activity could be traced back to 3000 years ago when people exploited copper (Zhang 2000). Mining appeared as an industry in Yunnan in Han Dynasty (B.C. 202 – A.D. 220) when the tin mine in Gejiu, Yunnan started to be exploited. Dongchuan, Yunnan became one of the major copper mines in China in 1525 (Yunnan Chorography Compiling Committee 1997). After the establishment of the People's Republic of China in 1949, a series of comprehensive geological investigations were carried out and tin, copper, zinc, coal, and phosphorous mines were expanded or rebuilt. Since then mining

industry has been growing steadily in Yunnan despite of various political movements during 1960's-1970's (Yunnan Chorography Compiling Committee 1997).

In contrast, Yunnan's tourism started to grow in mid 1980's and increased rapidly since 1990 (Bai 2000). Before 1980's, tourism in China was regarded as a pure political activity used to build friendship with other countries and propagandize China's achievements as a socialism country (Zhang et al. 2005). Nevertheless, this time sequence has to be considered with caution if a specific area instead of the whole Yunnan province is of interest. For instance, Diqing prefecture discussed earlier shifted its development focus from tourism to mining when a huge copper reserve was discovered.

Regulations on natural reserves, cultural heritages and scenic areas, and the impetus to develop local economy both have impacts on the distribution of mining and tourism sites albeit in opposite directions. The former tend to push mining sites away from places with great tourism attractions, while the latter prefer to have both industries in a relatively small area to maximize economic growth. Time sequence of mining and tourism development impacts on how to interpret the analysis result. All these factors will be considered and incorporated to discuss the result of spatial analysis.

Yunnan is the fourth-poorest province and has 10% of the poor/low income population in China (Liu 2005). It is thus under a huge pressure from the central government to generate more jobs and increase incomes. In 2004, about 0.4 million people under the poverty line increased their incomes and were no longer classified as a "poor population" anymore. To achieve the central government's goal of having everyone live above the poverty line by 2010, Yunnan has to triple its 2004 poverty

reduction amount during the five year-period from 2005-2010 in order to increase the income of over 7.8 million people (Liu 2005).

3 Data and method

3.1 Data

A 1:2,000,000-scale hard copy map of current mining sites in Yunnan was obtained from the Land and Resource Department in Yunnan provincial government (2003). It was digitized in ArcGISTM 9.2 to produce the locations of the 129 large- and medium- scale mines. Since the exact locations of mining sites are confidential, we agreed to only release results of spatial analysis and show the map of mining and tourism sites roughly. Locations of 33 tourism attractions were attained from the map of scenic sites in Yunnan as an attachment of the master plan of tourism development in Yunnan (WTO and others 2001).

Data about tourism and mining development for each prefecture in Yunnan were collected to supplement the spatial analysis. Tourism growth was characterized by Tourism Receipt (TR) in 2003, which was the sum of domestic and international receipts (Yunnan Tourism Administration 2004). Tourist arrivals strongly correlated to tourism receipts with a coefficient of 0.961 at the 0.01 significance level. Replacing tourism receipts with tourist arrivals did not change any of the results. Mining development was measured by Mining Production Value (MPV), which was the sum of production values of coal, ferrous metal, nonferrous metal and nonmetal minerals (Yunnan Statistical Bureau 2004).

3.2 Statistical analysis of mapped spatial point patterns on mining and tourism

A spatial point pattern can be defined as a set of locations within a region of interest, where ‘events’ of interest have been recorded (Diggle 1983, Gatrell and others 1996). For instance, as shown in Figure 2.3, locations of mining and tourism sites within Yunnan province each can be viewed as a separate spatial point pattern.

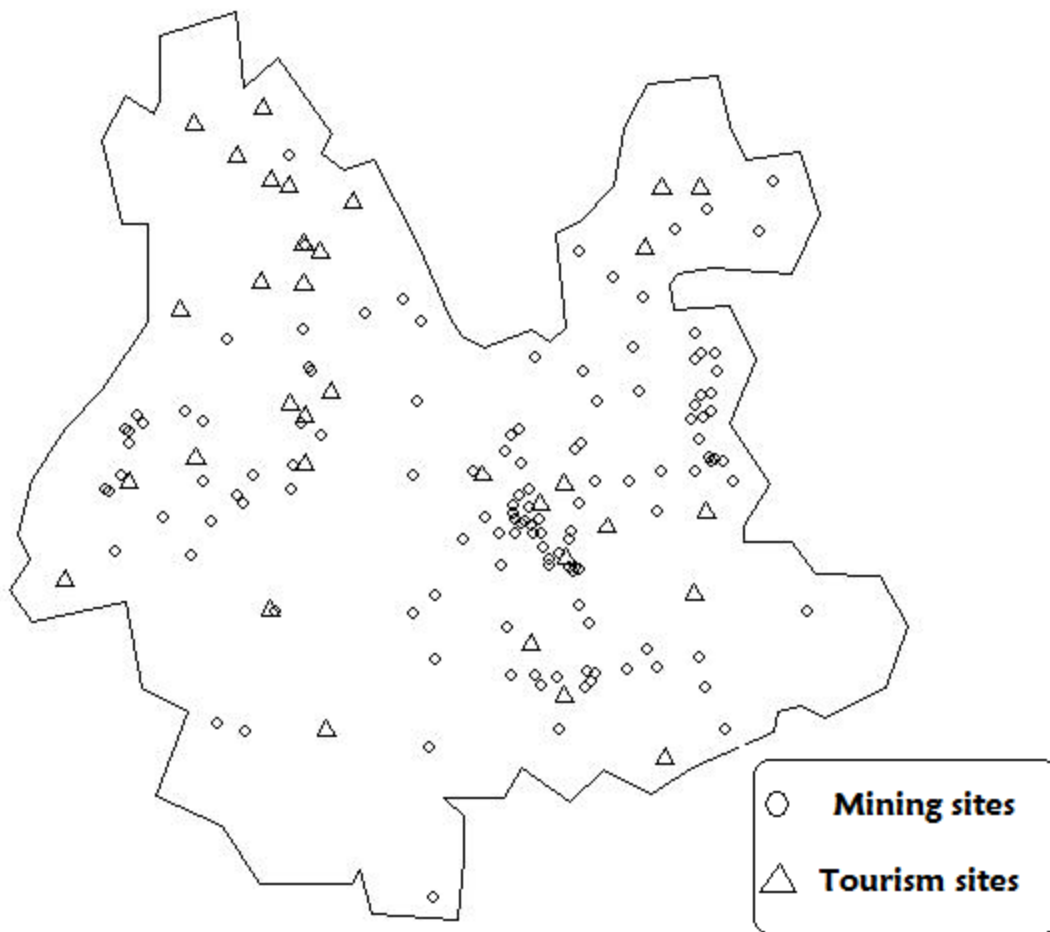


Figure 2.3 Locations of Mining and Tourism Sites in Yunnan province

A spatial point pattern can be described as regular, random or clustered, which is the product of certain process(es) at a particular time and space (Diggle 1983, Li and Zhang

2007). The spatial point pattern of mining or tourism sites alone can be viewed as a realization of one spatial point process. In this case, the question of interest could be whether the observed realization (mining or tourism sites) could have arisen from a homogeneous Poisson process, that is, the sites are distributed randomly within the study region. Alternatively, the points interact directly with each other, either clustering together or inhibiting each other. As mining and tourism sites are coexisting in the study region, we can view the complete set of data as a bivariate spatial point pattern, and investigate the possible dependence between the two univariate processes (Andersen 1992, Harkness and Isham 1983).

Various methods have been employed to investigate mapped point patterns. The methods can be classified into two broad types: distance-based techniques and area-based approaches (Diggle 1983, Gatrell and others 1996, Haggett and others 1977). Distance-based techniques use information on the spacing of points to characterize patterns, whereas area-based approaches are based on the frequency distribution of the observed numbers of points in regularly defined sub-regions of the study area (i.e. quadrats)(Diggle 1983, Gatrell and others 1996, Harkness and Isham 1983). In this study, we used distance-based approaches rather than area-based methods because the results from any area-based analysis are dependent on the particular size of the quadrat, which is generally chosen arbitrarily (Gatrell and others 1996). More specifically, we first used the function $G(d)$ as described in detail below, to investigate the mapped spatial point patterns of the mining and tourism sites separately. We then extended the univariate function $G(d)$ to the bivariate function $G_{12}(d)$, to investigate the interaction between mining and tourism

sites. The calculations and simulations of those functions were performed using the package Spatstat in R (Baddeley and Turner 2005), and described in detail below.

3.2.1 Analysis of mining and tourism sites as two separated point patterns

The $G(d)$ function, a nearest neighbor distances function provides an objective method for looking at small scale interactions between points (Baddeley and Turner 2005, Diggle 1983, Li and Zhang 2007). For a univariate spatial point process, an approximate distribution function of the nearest neighbor distance D under complete spatial randomness (CSR) is (Diggle 1983)

$$G(d) = 1 - \exp(-\lambda \pi d^2), d \geq 0 \quad (1)$$

where λ is the intensity of events (i.e., mining sites or tourism sites) estimated by n/A (n is the total number of events within the study region, and A is the area of the region).

$\hat{G}(d)$, the empirical distribution function (EDF) of the nearest neighbor distances can be estimated as the observed proportion of events having distances to their nearest neighbors d_i less than d (Diggle 1983). $\hat{G}(d)$ is defined as follows:

$$\hat{G}(d) = n^{-1} \#(d_i \leq d) \quad (2)$$

where $\#$ means “the number of”, n is the number of points within the study region, and d_i is the distance from the i th point to the nearest other point.

We can test if a mapped spatial point pattern departs from randomness either in the direction of clustering or regularity by comparing $\hat{G}(d)$ with $G(d)$, or comparing $\hat{G}(d)$ with the upper and lower simulation envelopes from simulated EDFs (Diggle 1983). In this study, we adapted the latter approach by using the Monte Carlo simulation

techniques (Diggle 1983, Baddeley and Turner 2005). We first generated 99 independent simulations of CSR with the same intensity as the point pattern of the observed data (i.e., mining or tourism sites) in the study region. We then calculated the EDF $\hat{G}(d)$ for each of the 99 simulations, and used the maximum and minimum of these functions for the simulated patterns to define the upper and lower simulation envelopes. A test then can be conducted by plotting out the EDF $\hat{G}(d)$ against the theoretical EDF $G(d)$ and the upper and lower simulation envelopes from the simulated EDFs. If the theoretical distributions function $G(d)$ is unknown, the sample mean of the 99 simulated EDFs, $\bar{G}(d)$ say, provides an unbiased estimate of $G(d)$ (Diggle 1983). In this study, we used $\bar{G}(d)$ rather than the theoretical EDF $G(d)$ for linearization of the EDF plot because 1) the theoretical EDF $G(d)$ is approximate, and 2) more importantly, the bias introduced by edge effects could be eliminated when using $\bar{G}(d)$ (Diggle 1983). We can reject the null hypothesis of CSR if the graph of the observed function lies outside of the envelope at any value of d (Diggle 1983, Gatrell and others 1996, Baddeley and Turner 2005). More specifically, if $\hat{G}(d)$ lies below the lower envelope, this indicates spatial ‘inhibition’ or regularity of the observed pattern, whereas if it lies above the upper envelope, this is evidence of clustering. This test has exact significance level $\alpha = 1/(1+k)$, $k = \# \text{ of simulations}$, which equals 0.01 in this study (Baddeley and Turner 2005).

3.2.2 Interaction between mining and tourism sites

As we are interested in the interaction between mining and tourism sites, we can view the combination of the mining and tourism sites as a bivariate spatial point pattern, and investigate the possible dependence between the two univariate processes (Diggle 1983). We extended the univariate function $G(d)$ to the bivariate function $G_{12}(d)$, to investigate the nature of any dependency between mining and tourism sites (Diggle 1983).

The distribution function of $G_{12}(d)$ can be defined as (Diggle 1983)

$$G_{12}(d) = P \{ \text{distance from an arbitrary type 1 event to the nearest type 2 event is at most } d \}$$

(7)

As in the univariate case, we used the corresponding empirical distribution function $\hat{G}_{12}(d)$ to estimate the nearest neighbor distribution function $G_{12}(d)$, and performed the significance test of the independence between mining sites and tourism using the Monte Carlo simulation techniques.

3.3 Prefecture-based statistical data analysis

In addition to spatial statistical analysis, this research incorporates statistical data to explore the distribution and interaction between tourism and mining. MPV and TR of each prefecture in Yunnan were collected and compared to investigate how the two industries distribute. In order to eliminate the effect of size, which means a prefecture having a higher MPV or TR than others simply because of its larger area, MPV and TR of each prefecture were first divided by the area of the prefecture. The obtained values of MPV and TR were then normalized to values between 0 and 1. The adjusted MPV and

TR are noted as MPV_{adj} and TR_{adj} below. Finally the 16 prefectures were plotted out in a coordinate where y-axis is MPV_{adj} and x-axis is TR_{adj} .

If mining (or tourism) distributes evenly in Yunnan, MPV_{adj} (or TR_{adj}) of the 16 prefectures will not vary much – it will be the same in the extreme scenario. If mining (or tourism) tends to cluster in some prefectures, the 16 MPV_{adj} (or TR_{adj}) will fluctuate in a relatively large range. The plot-out examines how mining and tourism interact spatially. If mining and tourism tend to exist close to each other, which means prefectures having a strong mining are likely to be developed in tourism (vice versa), spots will gather along the 45 degree line. Alternatively, if mining and tourism tend to avoid each other, which means prefectures having a strong mining are usually undeveloped in tourism (vice versa), spots will diverge from the origin – some stay close to the x-axis and others stay close to the y-axis. It is worth noting MPV and TR used here measures not only the existence of mining sites and tourism attractions but also the ability of them to produce or earn income, which has not been considered in the above spatial analysis.

4 Results

4.1 The mining sites

The $G(d)$ function shows that the mining sites are clustered. Therefore, we can speak of the validity of the hypothesis (H_1) that mining sites in Yunnan province have a tendency to be situated close to one another. Figure 2.4 shows the EDF plot of the nearest neighbor distances for the mining sites, along with the upper and lower envelopes from 99 simulations of CSR. The EDF plot clearly shows the excess of small nearest neighbor

distances which is a characteristic feature of aggregated patterns. The curve of $\hat{G}(d)$ for observed mining sites lies above the upper envelope from the simulations at the distance range of 5,000 meters to 25,000 meters, which indicates significant spatial clustering of mining sites at this scale of distance.

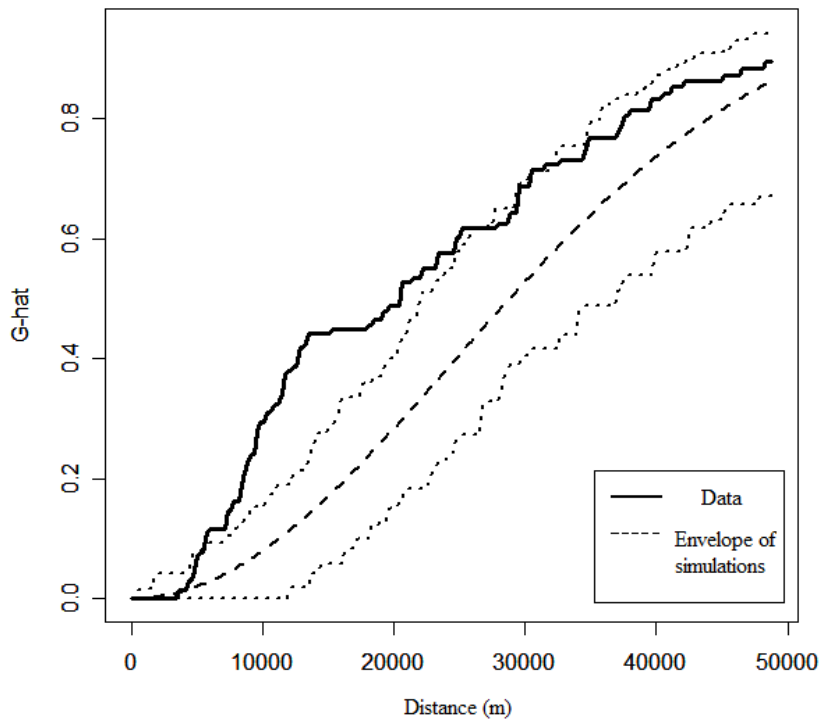


Figure 2.4 EDF plot of nearest neighbor distances for mining sites, together with the upper and lower envelopes from 99 simulations of CSR

MPV_{adj} ranges from 0 to 1 with a standard deviation of 0.34 and a mean of 0.31. The values of MPV_{adj} are shown the Figure 2.5. The fact that MPV_{adj} of prefectures vary a lot is consistent with the conclusion from the spatial statistic analysis that mining sites tend to cluster geographically.

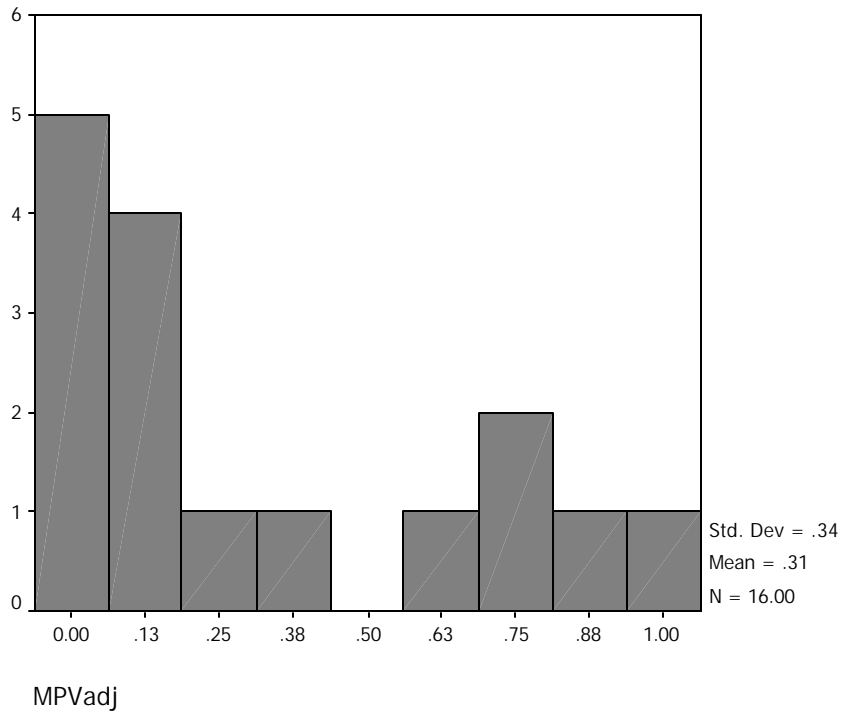


Figure 2.5 Histogram of Adjusted Mining Product Values (MPV_{adj})

4.2 The tourism sites

Figure 2.6 shows the EDF plot of the nearest neighbor distances for the tourism sites, along with the upper and lower envelopes from 99 simulations of CSR. The plot shows that the EDF $\hat{G}(d)$ for the tourism sites lies entirely within the envelope of 99 simulation of CSR, which suggests acceptance of CSR.

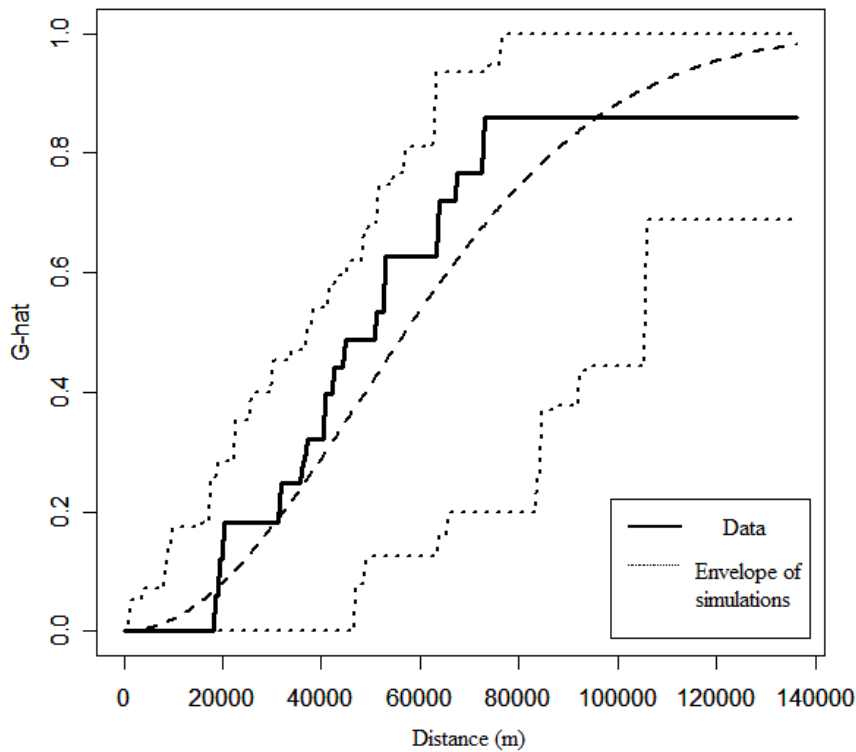


Figure 2.6 EDF Plot of Nearest Neighbor Distances for Tourism Sites, Together with the Upper and Lower Envelopes from 99 Simulations of CSR

As the $G(d)$ function for the mapped tourism sites does not exhibit any significant evidence that the tourism sites tend to be clustered or distributed regularly, we rejected the hypothesis (H_2) that tourism sites tend to be clustered, and concluded that in contrast with the result for mining sites, there is no very pronounced clustering effect between tourism sites.

Except for Kunming, the capital of Yunnan, 15 out of the 16 TR_{adj} stay within the range of 0 to 0.3 (as shown in Figure 2.7). It means most prefectures have a similar tourism receipt per unit area. It is consistent with the conclusion from the spatial statistic analysis that there is no evidence indicating tourism attractions cluster.

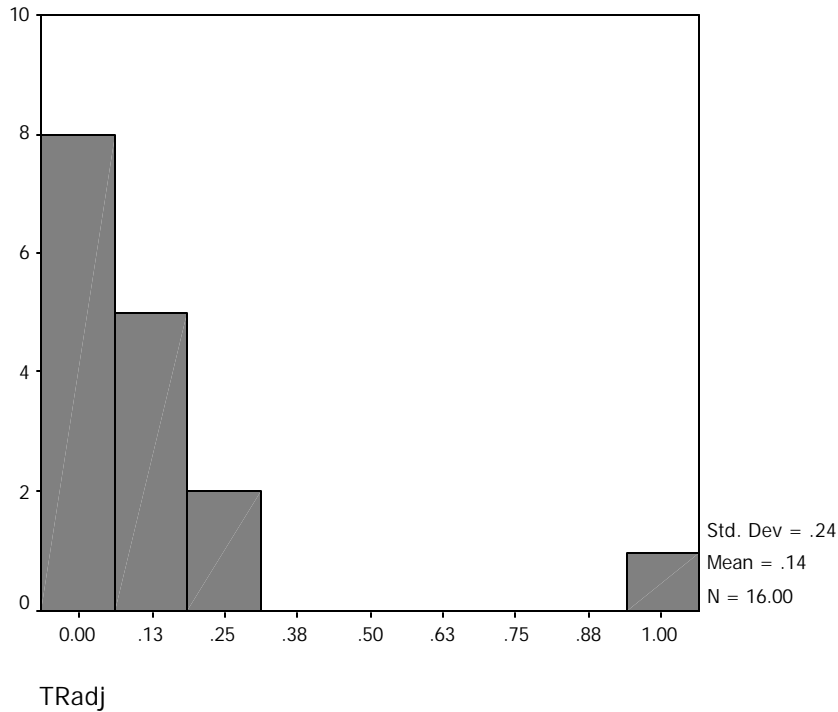


Figure 2.7 Histogram of Adjusted Tourism Receipt (TR_{adj})

4.3 Interaction between mining and tourism sites

Figure 2.8 shows the EDF plot of the “cross-type” (i.e., mining to tourism) nearest neighbor distances, along with the upper and lower envelopes from 99 simulations of CSR. The plot suggests positive dependence (i.e., clustering) between mining and tourism sites because $\hat{G}_{12}(d)$ from observed data lies mostly above $\bar{G}_{12}(d)$, the sample mean of the 99 simulated EDFs. In other words, mining and tourism sites tend to be clustered. At the distance range of 25,000 meters to 45,000 meters, $\hat{G}_{12}(d)$ lies above the upper envelope, which indicates there is significant evidence of clustering between mining and tourism sites at this distance scale.

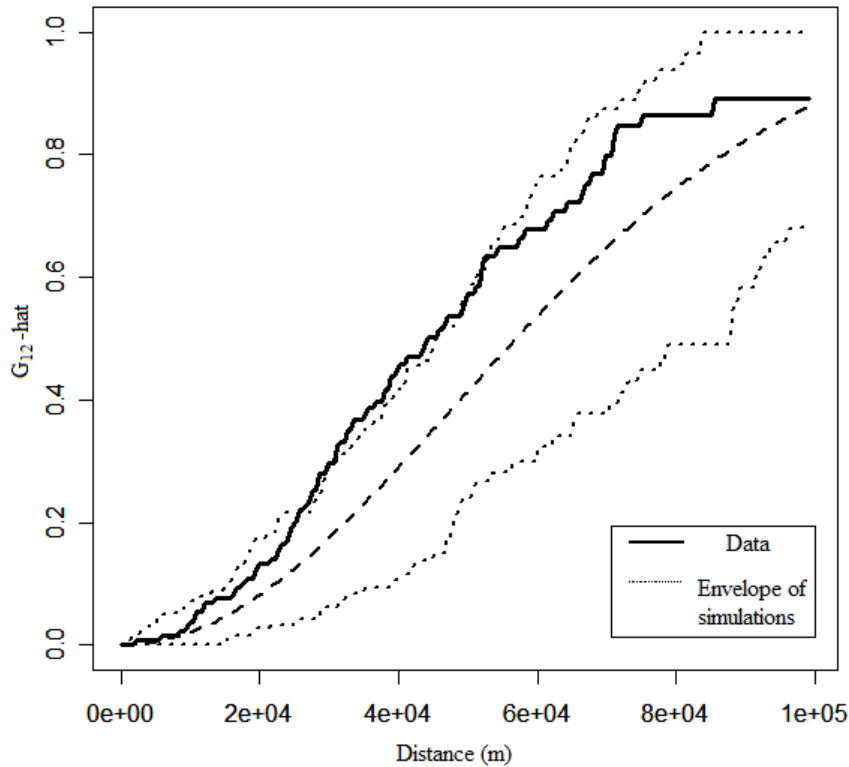


Figure 2.8 EDF Plot of Nearest Neighbor Distances for Tourism Sites, Together with the Upper and Lower Envelopes from 99 Simulations of CSR

The distributions of MPV_{adj} and TR_{adj} are shown in Figure 2.9. Kunming, the capital of Yunnan, has the highest value of both MPV_{adj} and TR_{adj} . Figure 2.10 shows more details about the MPV_{adj} and TR_{adj} distribution of the rest 15 prefectures, where Kunming was excluded. The plot-out of MPV_{adj} and TR_{adj} composes a rough “Y” shape, starting from two points near the origin with and then diverging into one branch close to y-axis and the other close to x-axis. The result indicates that prefectures tend to be strong in EITHER mining OR tourism except for Kunming (at the upper right far from the rest points), Simao and Baoshan (the two points near the origin). This is contradicted by what we found from our spatial statistical analysis.

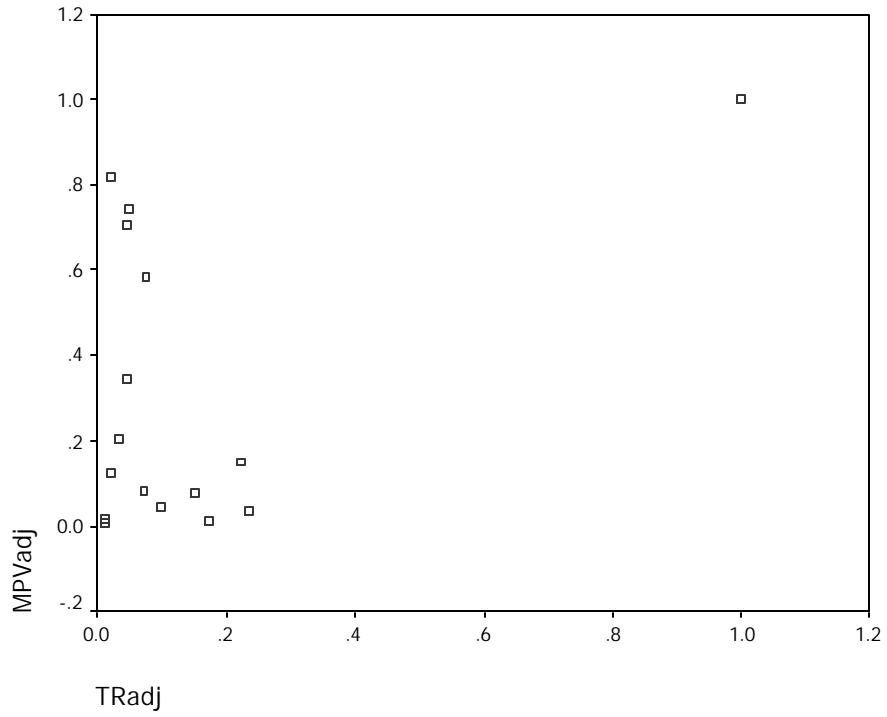


Figure 2.9 Plot of MPVadj and TRadj for the 16 Prefectures

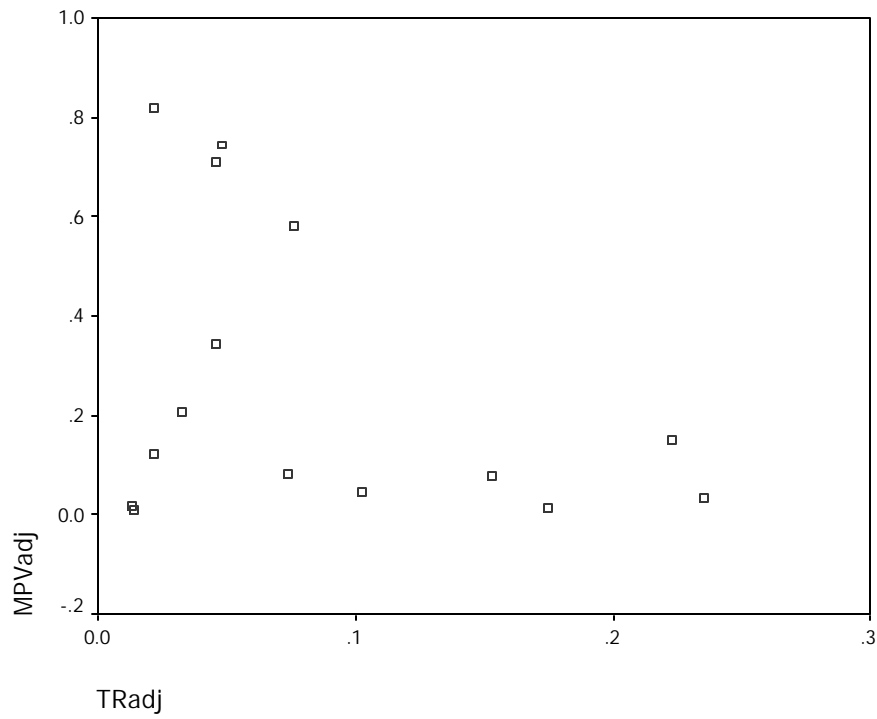


Figure 2.10 Plot of MPV_{adj} and TR_{adj} for the 15 Prefectures, with Kunming Excluded

5. Conclusions and discussions

5.1 Clustered mining sites

The results from our analysis showed that mining sites in Yunnan tend to gather spatially in line with the ore body as expected. Considering that Yunnan has been mined for a long time – the earliest mining activities was copper mining 3000 years ago (Zhang 2000), it has a better chance that most mineral reserves in Yunnan have been more or less explored. Then, it is quite natural that current mines are located close to each other. Prefectures vary significantly in their MPVs are consistent with the spatial analysis results.

5.2 Spread out tourism attractions

There was no evidence indicating tourism attractions tend to cluster in Yunnan. This is contrary to the general idea of tourism sites distribution. Tourism attractions are usually gathered on a relatively large geographic scale due to at least two reasons. First, the resources attracting visitors often exist in a small area, such as natural beauty (forest, valley, fall, etc.), exotic culture, or historical sites. Secondly, travel agencies or visitors are likely to include several tourism sites on a trip to save time and money spent on lodging and transportation. Tourism planners and developers are expected to design tourism sites within a relatively small area to take this demand into account and cut down infrastructure construction expense. Therefore, it is interesting to see why tourism attractions in Yunnan do not follow this rule.

A closer examination of the tourism resource and development history in Yunnan may help to explain the issue. Yunnan is famous for its diverse, abundant and spread-out tourism resources, which include historical sites, exotic cultures, natural beauty, and geographical spectacles. However, there were only three major tourism attractions in Yunnan before 1990: Stone forest in the capital, Kunming, Dali ancient town, and Xishuangbanna tropical forests since at that time international and domestic tourism was quite small. When tourism started to grow quickly all over China, many places instead of those adjacent to existing attractions in Yunnan began to explore their own tourism resources and developed fast. Therefore, on the tourism map of Yunnan, tourism attractions distribute “evenly” rather than cluster in a few places in the area of 393,898 square kilometers. In other words, the “random” or even distribution of tourism attractions in Yunnan is a result of abundant tourism resources and matured development.

5.3 Interactions between mining and tourism sites

Results seem to be contradictory when it comes to the spatial relationship between tourism attractions and mining sites. While the plot-out of MPV_{adj} and TR_{adj} indicated most prefectures tend to have a high value on either MPV_{adj} or TR_{adj} , which means they are well-developed in EITHER tourism OR mining, spatial analysis showed that mining and tourism clustered in Yunnan which means mining sites tend to be close to tourism attractions and vice versa. To explain the contradiction, it is important to review the assumption underlying the analysis. Spatial points represent the physical locations of mining sites and tourism attractions, while MPV_{adj} and TR_{adj} measure how much economic income a unit area gains from mining and tourism. Therefore, results show that

the locations of mining sites and tourism attractions cluster geographically but tourism attractions relatively far away from mining sites are able to earn more income. In another way, it could be interpreted as mining sites away from tourism attractions are making more money as well.

The fact that mining and tourism cluster could be a result of either tourism tending to be close to a mine or mining tending to happen nearby a tourism attraction or both. Except for mining heritage tourism (which does not exist in Yunnan), it is contrary to the general intuition that tourism would stay close to a mine, but it could be explained by the following two reasons: 1) Large and medium scale mines require convenient accessibility. Tourism developer has an incentive to have new attraction close to roads to reduce infrastructure construction expense. This may result in a location near the mines. 2) Local government usually has to invest in the initial tourism development as a developer or to improve infrastructure to attract other investors and developers. As noted above, poverty is widespread in Yunnan and many local governments rely on provincial and central governments to cover their basic budget. Mining contributes a lot to local taxation. Those local governments receiving taxes from mining activities are more likely (if they are not the only few) to be able to invest and support initial tourism development. Thus, tourism attractions usually locate in the same administrative boundary with mines.

The spatial cluster of mining and tourism sites also indicates that local governments in Yunnan do not want to compromise economic potential by separating mining and tourism sectors. Incorporating the background that both mining and tourism are listed as key industries to develop and the result that tourism sites are quite spread out in Yunnan,

it can be concluded that local governments encourage both sectors under the pressure to reduce poverty and grow local economy. The economic impetus to have both mining and tourism in one area has greater impact than regulations keeping mining activity away from natural and cultural tourism attractions. This result poses a question for future study: Does the economic impetus win because of various tourism attractions existing in places mining is allowed? Or the regulation force failed due to ineffective implementation?

Although mining and tourism tend to cluster spatially, the MPV_{adj} and TR_{adj} analysis suggests prefectures tend to be strong in either tourism or mining. In other words, the spatial cluster tendency does not make the two industries reinforce each other. Instead, it seems one would be better developed or attain more economic income when it is away from the other. From the tourism point of view, most visitors are attracted by the undisturbed nature and exotic culture of Yunnan. They expect to enjoy a pristine natural cultural experience and want to avoid any sign of the modern world during their trip. Mining activities would destroy the trip not only by reminding people about the modern life but also make it physically unpleasant for visitors due to the associated noise, waste and its open air working landscape. Thus those tourism locations relatively far away from mines attract more people and are able to gain more economic income.

While mining odes have an ancient past in Yunnan, modern mining with large infrastructure has happened concurrently with the growth of tourism in recent years and this it is important to also consider the prospect that mining might perhaps be driven by tourism infrastructure as well. However the reverse causality of mining sites being attracted to a tourism attraction is more difficult to explain. Such an endogenous

explanation is plausible if there is another variable associated with tourism that may reciprocally be attracting mining activities. For example, Yunnan has quite a few geographic spectacles as tourism sites including the Nujiang valley, Three Parallel Rivers World Heritage and Stone Forest. They all came from complicated geologic processes and the tourism may lead to exposure of some kinds of outcrops or rumor digging (especially in the case of gemstone deposits) that in turn leads to mineral development. While this causal trajectory is less likely, a time series analysis studying how mining and tourism sites evolve over time is needed to full understand this dynamic in future research.

Findings of this study have several implications in research of mining and tourism and policy design regarding regional planning. First, it provides empirical evidence to show mining and tourism can co-exist and cluster in a relatively bio-diverse and sensitive ecosystem which is contradictory to the general criticism that mining activities destroy the resource base tourism built on. Therefore, with careful planning it is possible to have both mining and tourism in one administrative area, albeit the pollution impact of both sectors and appropriate environmental management regimes must still be studied to ensure sustainability. Secondly, although the spatial point pattern analysis shows that tourism and mining sites appear to be clustered, the results from the prefecture-based analysis indicate that those sites relatively away from each other are making more money. It implies that mining activities may compromise attractiveness of nearby tourism sites.

This research is confined by limited data availability. The analysis is based on static data of the year 2003. Future studies may include time series data to examine trend of

how tourism and mining sites have been growing in Yunnan. To study the impacts tourism and mining have on each other, other environmental indicators such as soil erosion, landscape change, noise and air quality could be integrated into the analysis. However, those data are not available at this point and given the limited dataset availability, the findings from this research still provide some preliminary guidance for development planners and policy-makers.

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Chapter III Comparing Mining and Tourism for socioeconomic contribution and Environmental Impact

1 Introduction

In the last twenty years, mining and tourism industries have shifted investment to areas with high-level biodiversity or critical ecosystems. In particular, according to Bridge (2004) a growing proportion of mineral exploration and investment expenditures targeted the tropical Andes, the Guiana Shield, Indonesia, Papua New Guinea, the Philippines and tropical West Africa. Increased expenditure in areas that are ecologically sensitive or have high conservation values intensifies concerns about the impact of mining on global biodiversity. Miranda et al (2003) pointed out that nearly one third of active mines and exploration sites are within areas of intact ecosystems or high conservation value.

Tourism is probably the fastest growing industry globally. According to the World Travel and Tourism Council's (WTTC) estimation (2007), world tourism is expected to generate USD 7,060.3 billion of economic activity in 2007 and contribute 3.6% of global Gross Domestic Product (GDP). Total demand is predicted to grow by 4.3% per annum, in real terms, over the next ten years (WTTC, 2007). A global trend in tourism developed primarily on the base of natural resources, called "nature-based tourism," is a driving force in tourism growth (Su et al. 2007). "Many private, public and community landholders are turning to nature tourism as a profitable adjunct or replacement for farming, forestry or fisheries" (Buckley 2003, p. 1). In the report of mapping tourism and biodiversity, Christ et al. (2003) showed current and projected tourism development in 20

years to have a great overlap with areas that are biodiversity intense. Figure 3.1 shows overlaps among expansions of mining and tourism, and biodiversity intense areas.

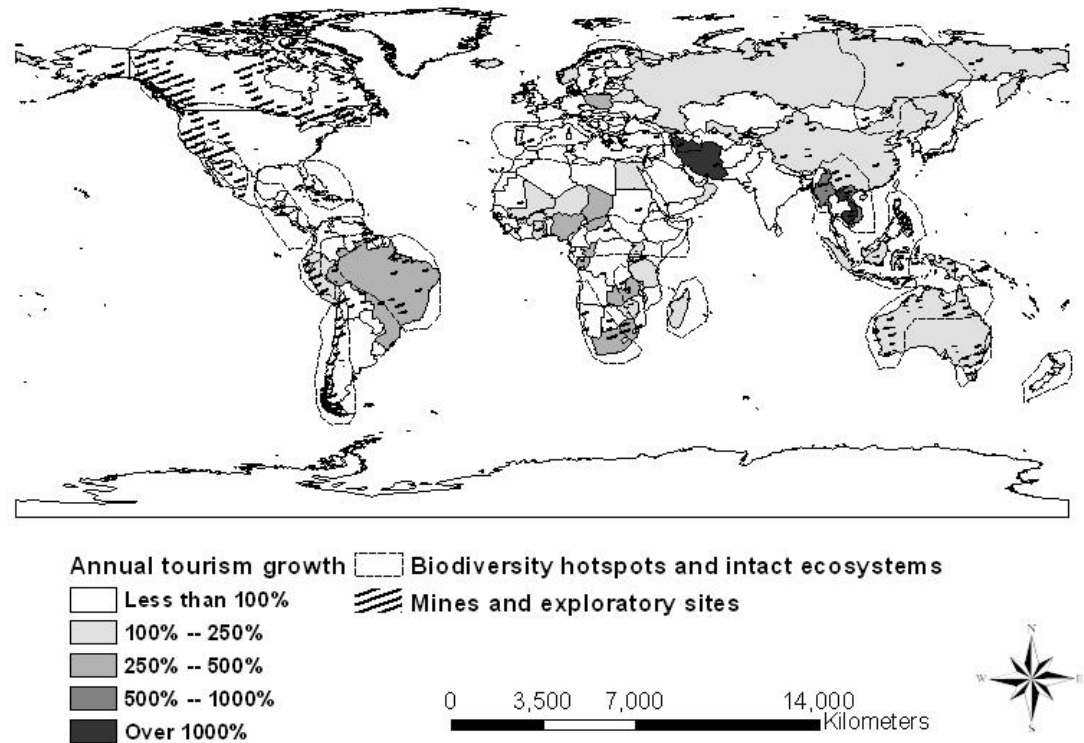


Figure 3.1 Overlaps among Areas with Great Potentials for Mining and Tourism Expansions and Ecological Importance

Source: Miranda et al. 2003; Christ et al. 2003.

Many studies have examined the social, economic and environmental impacts of mining or tourism on local communities. Positive and negative impacts were found for both industries, although tourism seems to have a “greener” image than mining in the minds of the general public. The negative impacts associated with mining include land degradation, ecosystem disruption, and negative impacts on the local community (sexually-transmitted diseases) [The World Bank 2004]. In numerous studies, mining has been found to impede the overall economic performance (Power 1996, Davis 1998, Auth

1993, Auth 1991, 1998, Gelb 1988, Kremers 1986) because of the exhaustible characteristic of mineral resource and the sole reliance of mining industry to support a country's economy. Mineral resource tends to have less and less economic advantage while the technical difficulty for extracting increases and so does the cost, and finally runs out. Therefore, the economy relies on mining will have less and less advantage over others and finally need to switch to other sector which will be very weak if it has been evolving in the strong extractive industry's shade. However, mining have brought positive impacts on incomes and jobs as an important supplement rather than the principal support of the local economy (Shen and Gunson 2006). The environmental impacts of tourism include water pollution, waste and noise brought by tourists. Moreover, soil becomes vulnerable to erosion when the vegetative cover is disturbed or removed by intensive trail use, off-trail activities and facilities construction activities including road, visitor center, restaurant and hotel. On the positive side, tourism generates income and job opportunities. Ecotourism or nature-based tourism is promoted to maintain some of the positive effects of tourism, and eliminate or reduce the negative environmental impacts. This type of tourism is promoted by environmental organizations (such as Conservation International, World Wild Foundation, and The Nature Conservancy) to educate visitors, finance conservation work and provide income to local communities (such projects can be found on their websites) [WTTC and IHRA 1999, Brandon 1996, Christ et al. 2003].

Although both negative and positive sides of mining and tourism industries have been recognized and studied, without solid data support from case studies that comparing

mining and tourism industries from the perspective of sustainable development, people – researchers, practitioners and decision-makers – tend to prefer tourism over mining for an environment-friendly development.

The cases of mining and tourism's expansions to the same areas provide a unique opportunity to compare their impacts in the same socioeconomic context and the ability to assess relative performance. This paper presents results of a case study that compares socioeconomic status and environmental health in Yunnan province, southwest China, where tourism and mining have developed in different parts of the province. Statistical techniques such as t-test are used to evaluate the socioeconomic status and environmental health of areas dominated by tourism development and as compared to mining activities.

The study compares tourism and mining at two spatial scales: the prefecture and county (Figure 3.2). China has five administrative levels: the centralized state, the province, the prefecture, the county and the township. The prefecture-level portion of this analysis includes the 16 prefectures in Yunnan Province. The county-level study includes the 24 counties of four prefectures in Northwest Yunnan, where the characteristics of the whole province remain coherent: abundant tourism attractions, rich mining resources, high biological diversity and poor population.

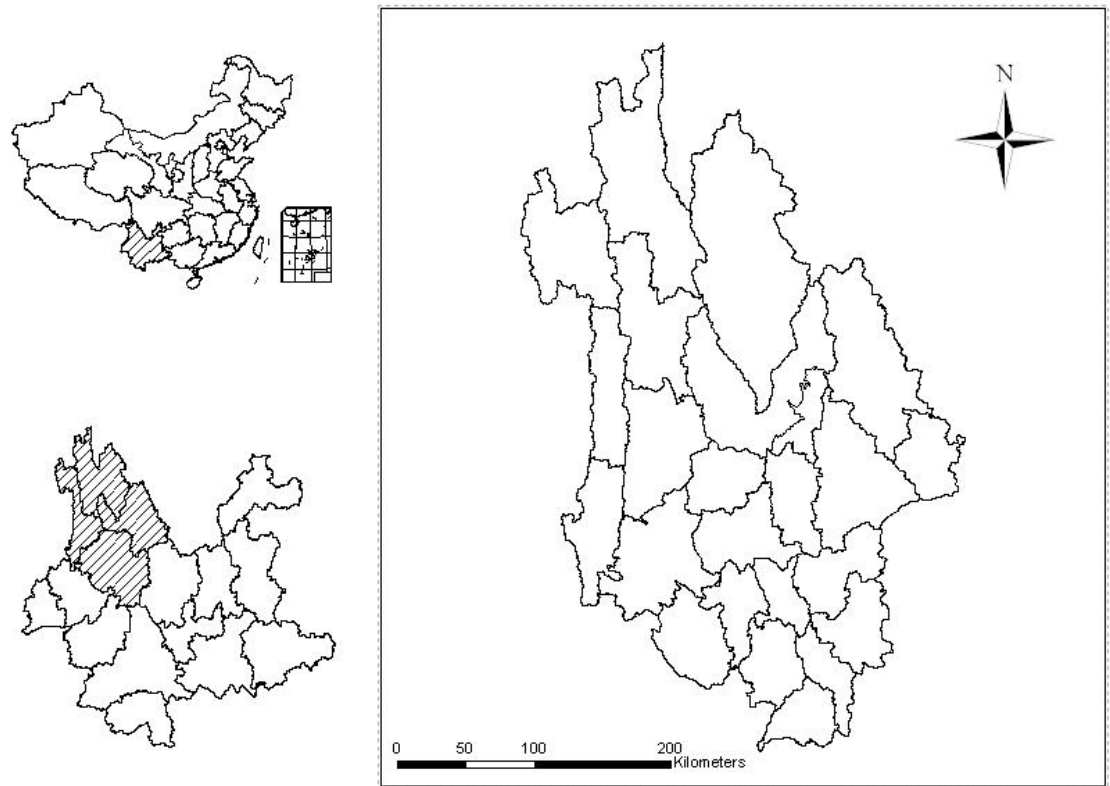


Figure 3.2 Case Study Area: 16 Prefectures in Yunnan and 24 Counties in Northwest Yunnan

Anticipating the results of the analysis, we find little significant difference in socioeconomic status between the mining and tourism areas. Environmental indicators for soil erosion and air pollution indicate a better performance of tourism areas than those of mining, while other environmental indicators including forestry coverage, water quality and an ecological index showed little difference between the two. It implies that according to these indicators tourism does not provide a significantly more sustainable growth path than mining, which may overthrow many people’s assumptions of a relatively green tourism sector and a messy mining industry. Results from this study

opponents this general belief and calls for an in-depth examination of mining and tourism industries' impacts on socioeconomic development and environment conservation within the local context where they are both expanding into. Such understanding is essential for practitioners and decision-makers facing the situation to base their decisions on scientific findings instead of intuitional public images of the mining and tourism.

2 Background: Economic growth, mining and tourism in China

China encompasses 9600,000 kilometers square and has a population of 1.3 billion (National Bureau of Statistics of China 2007). Administrative areas under the direct central authority are divided into four categories: provinces, municipalities under the central administration such as Beijing, Shanghai, Tianjin and Chongqing, minority nationality autonomous regions such as Xinjiang Uyghur Autonomous Region, and the special administration regions such as Hong Kong and Macao. Since the establishment of the People's Republic in 1949, China has been under the leadership of the Communist Party of China. Until the reform began in 1978, China had been closed to the outside world and practiced its socialist planned economy.

In the late 1970s, China embarked upon its economic reform and has been broadening its openness ever since. As a result of the economic reform and opening to the outside world, China is one of the few countries in the world that has achieved fast economic growth. The country's GDP growth rates were between 5% and 14%, with an average rate of about 10% between 1979 and 2006 (Yang 2008). China's long-term

economic development goal is to reach a GDP of USD 4 trillion (constant 2000 price) by 2020, which would quadruple per capita GDP of 2000.

Many researches studied at various development issues in China, among which two topics have attracted most attention: regional inequity and environment deterioration. Many studies looked at how the reform and economic development associate with regional inequity between coastal and inland areas. The income gap between coastal and inland areas has risen dramatically since 1980s (Kanbur and Zhang 1999; Zhang and Kanbur 2001). During the time period of 1992-1998, average per capita GDP in ten coastal provinces is as twice as that in the rest inland provinces (Zhang and Zhang 2003). Factors contribute to regional inequality include geographic and institutional barriers in product and factor markets (e.g., Tsui 1991; Jian et al. 1996; Fleisher and Chen 1997; Kanbur and Zhang 1999), and unbalanced foreign trade and foreign direct investment induced by the open-door policy and globalization (Zhang and Zhang 2003).

Besides increasing regional disparity, a national wide environment pollution and ecological deterioration is another undesirable by-product brought by the rapid economic growth (Zhang and Wen 2007). According to Ma (2004), China accounted for 4% of the world's GDP in 2003 while consumed 31% crude oil, 30% ironstone, 27% steel, 25% alumina and 40% cement of the world totals respectively. Moreover, China's emissions of pollutants are also high. China's NO_x and SO_2 emission load per unit GDP in 2003 were 27.7 and 68.7 times those of Japan respectively (Fan 2004). Traditional measurement of economic growth, represented by GDP, does not take the environmental cost into account and thus only provides a partial image of the overall national welfare.

Innovative measurement, such as green GDP, has been studied to appraise overall development including economic growth and environmental and social cost (e.g. Wen and Chen 2007; Lu and Lo 2007). Net progress proceeds including economic, social and ecological accounts had been growing slowly from 1980 to 2002 although negative for most time (Wen and Chen 2007). Long-term impact the open-door policy, specifically the WTO accession, had on the environmental cost were estimated (e.g. Vennemo et al. 2008; Jiang et al. 2004; Cheng et al. 2004; Hu 2004). Both negative and positive environmental impacts were predicted since models held different measurements of the environment and assumptions on which sector (agriculture, industry or commerce) will benefit most from the openness and grow most quickly.

Statistic reports and studies deconstructed the GDP into three value-added sectors: agriculture, industry and commerce/service (e.g. National Bureau of Statistics of China 2007; Yang 2008). The share of the agricultural sector's contribution to GDP has been decreasing over time and its growth rate of value added has been lower than 5% since 1985. It is widely believed that growth in commerce/service sector will contribute to reduce the regional disparity and environmental impact because of the multiplier effect and the relatively small environmental cost per GDP unit compared with industry sector. The industrial sector, however, has been playing an important role in China's economic development since 1979. Both the industrial sector and national GDP have growth rates of 10% in 1979-2005 and similar growing patterns with a correlation factor of 0.89, whereas the commercial sector has kept its share of value added almost unchanged since 1988 (Yang 2008).

China has recognized that the current investment-driven and industry-dominated growth path have been depleting resources, and caused social problems (Zhang 2007). Besides increasing energy/resource efficiency, it is trying to promote commerce/service sector growth to presume a cleaner economic growth. Tourism has been recognized and promoted at the national level as a sector with promising potential to reduce regional inequity, continue GDP growth at less environmental and ecological cost because of the abundant tourism attractions located in inland areas, the multiplier effect of commerce/service sector, and the relatively green/clean reputation tourism has. Both at central and local levels, officials support to develop tourism as a way to indicate their dedication to environment protection and sustainable development.

Within the context to develop commerce/service sector, mining is at a delicate place. On one hand, it symbolizes the traditional problematic industry sector which has no place in a “harmony society” built through “scientific development” advocated by the President Hu Jintao and Prime Minister Wen Jiabao (Central Committee of the Communist Party of China 2003 and 2004). Considering the massive degradation and pollution caused by mining activities (e.g. Liu et al 2003), the shocking number of people die from mining accidents (Asia-Pacific News 2007; CBC news online 2006), and the economic and social challenges facing mining cities after the mineral resource is depleted (e.g. Zhang 1998; Zhou et al 2002), mining shows vividly the consequences of sacrificing environmental and social capitals to gain economic benefit. On the other hand, China has been increasing its annual gross mineral output value, attracting international investors to prospect and exploit mineral reserves by favorable policies, and investing actively

oversees to meet the growing demand. How does the relatively new, green, fast-growing tourism interact with the traditional, messy, strong mining industry? How do these two industries distribute geographically? How do they differ in their economic, social and environmental impacts? Answers to the above questions all relate to if and how China would adjust its development strategy to achieve a more balanced economic growth taking social and environmental aspects into account. This study aims to explore the last question in a case study of Yunnan province.

2.1 Tourism in China

Traditionally, frequently travel away from home is not regarded as a good thing. Zhang et al. (2005) summed tourism in ancient China as travel by emperors, by officials, by scientists, for trade, for religious reasons and for festivals. Tourism development in China experienced three stages since 1949 when the People's Republic of China established. From 1949 to 1978, tourism at the first stage was regarded as a pure political activity used to build friendship with other countries and propagandize China's achievements as a socialism country (Zhang et al., 2005).

At the second stage from 1978 to early 1990's, tourism's ability to earn foreign currency was recognized after the emphasis changed from political struggle to economic development after the "reform and open-door" policy. Under Deng Xiaoping's leadership, tourism evolved from a diplomatic tool to an economic activity (Xiao, 2006). So far, tourism development had been concentrating on attracting international visits and domestic tourism was ignorable.

At the third stage from 1990's till now, domestic tourism has been growing fast and starts to be recognized as a growth pole both at national level and in many regions (Xu 1999; Wen and Tisdell 2001; Jackson 2006). International tourism keeps growing during this time period. Domestic tourism receipt (TR) was USD 77.9 billion in 2006, which was six times of that in 1994. International TR was USD 34.0 billion in 2006, which was four times of that in 1996. Except for a drop in 2003 because of the outbreak of the Severe Acute Respiratory Syndrome, both domestic and international tourism has been growing at a steady rate. Although started much later than the international counterpart, domestic tourism brought more income and played a more important role in Chinese economy. In 2006, Domestic TR was more than doubled that brought by international tourism (National Bureau of Statistics of China 2007).

2.2 Mining in China

Mining activities in China can be traced back to 3000 years ago (Zhu 2002) but the technology had remained primitive until the end of the 19th century as a consequence of the influence of European industrialization (Golas 1999). Ni Yuanlu, an important high administrator in the Ming dynasty (1368-1644 A.D.), once stated five reasons why mining is not beneficial: 1) mining requires great investment and thus involves high economic risk; 2) mining injures the landscape and desecrates grave sites; 3) it has adverse effects on the geomantic patterns of the countryside; 4) mining officials usually levy excessive tax; and 5) mines encourage banditry (Ottens 2005). It is worth noting that these statements are still valid and make essential arguments against mining all over the world.

After the establishment of China in 1949, mining was recognized as an essential sector not only to meet the demand of industry development but also as a symbol of self-sufficiency (Shapiro 2001). In 2006, the gross mineral output value (GMOV) was USD 83.87 billion and 7.98 million people working in the mining sector (Zhao 2007).

3 Case study: Yunnan and northwest Yunnan

3.1 Background of Yunnan

Yunnan province, located in the southwest of China (Figure 3.2) bordering the countries of Vietnam, Laos, and Burma, encompasses 393,898 square kilometers and has a population of 44.5 million people (Yunnan Statistics Bureau 2006). When the People's Republic of China was established in 1949, Yunnan's economy was agricultural and largely self-sufficient. Figure 3.3 showed its GDP growth during 1950 to 2005. Industrial production emerged as an important sector after the 1978 economic reform. Tobacco growing and processing for cigarettes, processed minerals including coal, steel, copper and concrete comprise the major industrial endeavors. The service sector, especially tourism, has increased dramatically since 1995 in terms of both revenue and employment, while agriculture as a share of GDP has been declining (Figure 3.4). By 2005, agriculture contributed 18.9% to GDP as compared to 41.7% from industry, and 39.4% from services (Yunnan Statistics Bureau 2006).

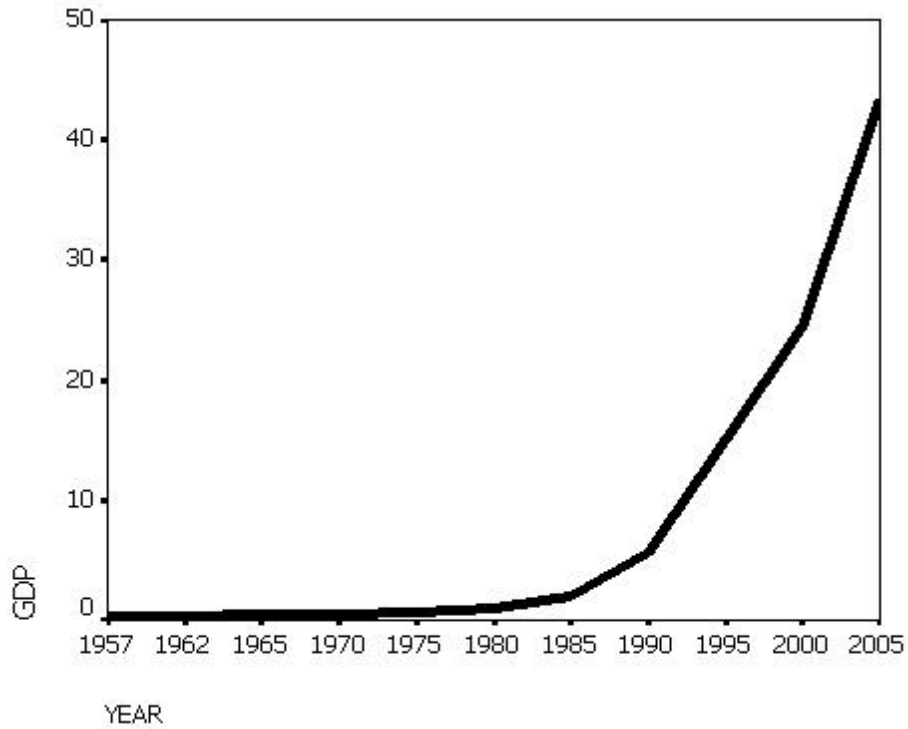


Figure 3.3 Yunnan GDP Growth 1957-2005 (Billion USD)

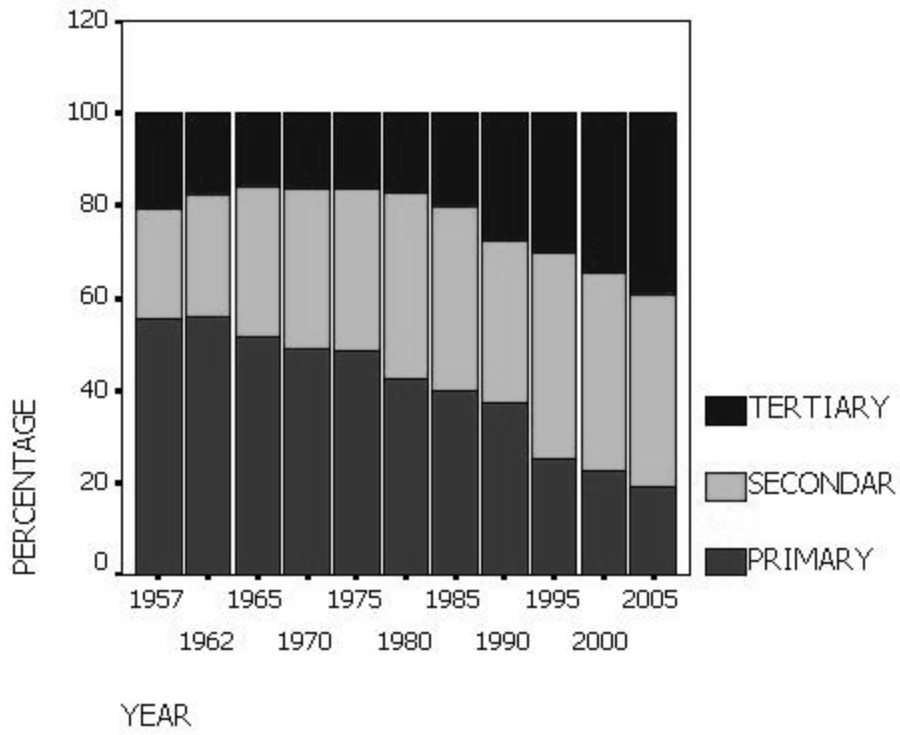


Figure 3.4 Percentages Change of Primary, Secondary and Tertiary Industries 1957-2005

Under pressure to reduce the population living under the poverty line, the Yunnan government announced recently five key industries targeted for expansion: tobacco, tourism, mining, hydropower, and biological products including medicine, food (such as edible mushroom) and nutriment made from wild plants. (Yunnan Government 2007). These industries, as a result, will receive priority in regional planning and will be allotted various kinds of government supports, such as subsidies.

Mining and tourism in Yunnan have been growing at a rate of 20-30% since a logging ban in 1998 cut off one of the main sources of income (Yunnan Statistics Bureau 2006). The rapid expansion of both mining and tourism make Yunnan an ideal area to explore mining and tourism's relative impacts on socioeconomic situation and environment.

Yunnan has more than 7000 mining enterprises. The mining industry exploits more than 80 mineral resources including coal, iron, manganese, copper, lead, zinc, tin, gold, phosphorus and cement. The industry plays a prominent role in the local economy, employing roughly 350,000 workers, which takes 9.9% of total employment, with GMOV about USD 7.5 billion in 2006. This represents 9.0% of national GMOV. Mining industry takes a third of the industrial added value, which is USD 21.4 billion or 42.7% of Yunnan's GDP (Yunnan Statistics Bureau 2007).

The tourist industry has grown rapidly since the 1990s, at an average annual rate of 347.9% during 1990-2005. In 2006, tourism receipt (TR) in Yunnan was USD 6.3 billion, which was 6.0 % of national TR. TR contributes 32.4% to the service sector added value,

which is USD 19.3 billion or 38.5% of Yunnan's GDP. Figure 3.4 shows domestic and international tourism development in Yunnan from 1990 to 2005 (Yunnan Tourism Administration 2004, Yunnan Statistical Bureau 2006).

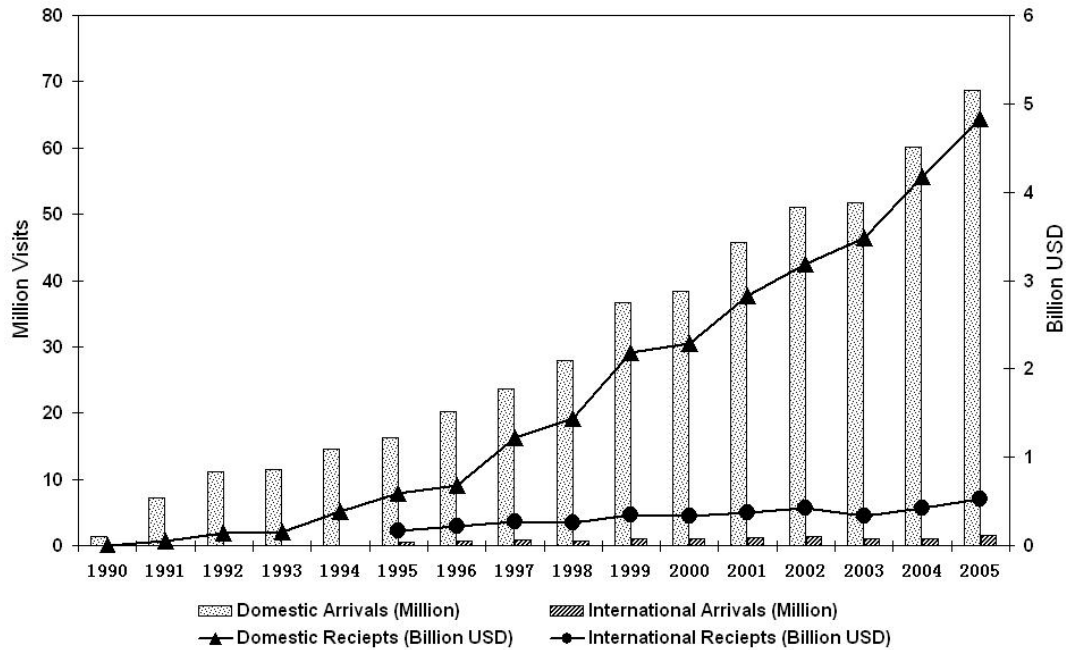


Figure 3.5 Yunnan Tourism Development 1995-2005

In addition to abundant mineral and tourism resources, Yunnan province is characterized by extremely high poverty and biodiversity. With regard to poverty, in 2004, Yunnan was the fourth poorest out of 34 provinces, municipalities, and autonomous regions with 10% of the country's poor/low income population (Liu 2005). This is based on poverty and low-income thresholds lines of USD 84 and 116 in annual income, respectively, as set by the Chinese government in 2004 (Rural Survey Department of National Bureau of Statistics 2006), which are both lower than the World Bank's a-dollar-a-day poverty threshold. Thus, 2.3 million people or 6.0% of the

provinces population lived in poverty in 2004, and 11.8% was below the low-income line (Liu 2005). Yunnan is under huge pressure to generate more jobs and increase incomes.

Despite the poverty of the region, Yunnan is rich in biodiversity. The province provides the habitat for 59.4% of protected wild animals in China, as well as 62.9% of the flora and 60% of the vertebrates (Liu 2003). As a result of the global ecological importance of the region, Yunnan is included in the World Wildlife Fund's Global 200 Ecoregions (2007) and Conservation International's 34 Global Hotspots (2007).

Large and fast growing mining and tourism sectors, poverty and the pressure to develop, as well as rich biodiversity and fragile environment enable Yunnan to represent the poor, yet ecologically critical areas with great mining and tourism potentials well and thus make an ideal case to explore the relative economic and environmental performances of mining and tourism.

3.2 Background on Northwest Yunnan

Northwest Yunnan was selected to consider the research question at a more detailed level because this area's characteristics are similar to the whole province but are further accentuated by the mountainous landscape. As a result, the region is home to abundant tourism attractions, rich mining resources, high biological diversity, as well as a very poor population. Four prefectures in this region – Dali, Lijiang, Diqing and Nujiang – together encompass 89,251 square kilometers (Figure 3.2) and have a population of 5.6 million people (Yunnan Statistics Bureau 2006). With 22.6% of the land area of Yunnan province, and 12.8% of the population, this region has half of the copper reserves and attracts 38.1 % of tourist visits (Shen 1998; Yunnan Statistics Bureau 2006). Yunnan is

regarded as a poor and underdeveloped region compared with other provinces in China, and Northwest Yunnan is viewed as “ a poor area” of the poor and underdeveloped Yunnan province. In 2006, the per capita GDP of Northwest Yunnan is USD 908.2, which is 81.4% of that of Yunnan province or 45.6% of that of the whole China (Yunnan Statistics Bureau 2007, China Statistics Bureau 2007).

As a series of mountain canyons, Northwest Yunnan contains the middle part of Hengduan Ranges and the upper reaches of the Three Rivers (i.e., Nujiang River, Lancangjiang River and Jinshajiang River). The natural environment of Northwest Yunnan has a very complex topography with rich biological variety and a high degree of biodiversity endemism. The highest and lowest altitudes are 6,740 meters at the Kagebo Peak of Meli Snow Mountains and 720 meters around where the Nu river flows out of China. Due to the unique natural environment, Northwest Yunnan has a variety of ecosystems: alpine and sub-alpine forests, shrub grasslands, meadow grasslands, riparian wetlands and desert valleys (Wu 2000). Agriculture has been practiced at various levels for several millennia in parts of the region that may be considered an anthropogenic ecosystem. Corn is the major crop. The region is home to over 75% of Tibetan medicinal herbs and at least 30 endangered species including the snow leopard, red panda, and black-necked crane (The Nature Conservancy 2004).

The major mining sites in Northwest Yunnan include copper, iron, manganese, gold, tin, coal, lead, zinc and marble (Mining Management Unit 2004). In addition, there are 36 moderate to large mineral reserves ready for future development (Mining Management Unit 2004). Total sales for the largest 10 mining companies was approximately USD 27

million in 2000, which took 2.4% of the gross industrial output value (Mining Management Unit 2004). The four prefectures in Northwest Yunnan were all listed as development areas in the provincial mining plan from 2000-2010. Except for Dali Prefecture where mining is relatively well developed, the other three were listed as key areas to develop (Yunnan government 2003).

Compare with the whole province, tourism in Northwest Yunnan has been growing even faster. The number of international tourists visited Northwest Yunnan was 19.5% of that visited Yunnan province in 1995 and this proportion grew to 38.1% in 2005. During 1995-2005, international tourism visits in Northwest Yunnan has been increasing with an average rate of 18.7% and the rate for Yunnan province was 11.2%.

4 Research methods

This study aims to compare mining and tourism areas in Yunnan for their economic situation, social development status and environmental and ecological health. In order to cover the entire province as well as preserve details at the fine scale, this study was conducted at two scale levels: the prefecture and county. At each scale, five sets of indicators were employed to describe the size of mining and tourism industries, economic growth, social development, and environmental health. Table 3.1 presented a completed list of indicators. Due to data availability, indicators employed in prefecture and county analysis were not identical. At the prefecture level, tourism was described by TR, mining was described by gross output value, economic growth was described by per capita GDP and percentage of poor counties designated by the central government, social

development was described by percentage of researchers and villages accessible to roads, phone and pipe water, and environmental health was described by an ecological index, forest coverage, water quality and Air Pollution Index (API). At the county level, tourism was described by development category which will be explained later, mining was described by major mineral production value, economic growth was described by per capita GDP and percentage of poor villages designated by Yunnan provincial government, social development was described by percentage of agricultural technician, doctor, and teacher, and environmental health was described by an ecological index, forest coverage, water quality and soil erosion index.

To assess whether the impact of tourism and mining differed on the economic growth, social development and environmental health, prefectures and counties were first divided into three groups: tourism areas, mining areas, and areas in which tourism and mining industries had the similar weight in economy by comparing indicators describe mining and tourism. Then, a two-sample t-test was conducted using SPSS, based on the means of the indicators from the tourism and mining areas. T-test assesses whether the means of two groups are statistically different from each other. Typically, the values of each indicator will differ from site to site, and therefore the two groups are unlikely to have the same distributions or means. T-test is used to determine whether the difference between the two groups is larger than variances within groups. If it is, the two groups are considered statistically different in terms of their performance on the various indicators.

The next section describes the selected indicators (shown in Table 3.1), and discusses the methodology used to categorize prefectures and counties as mining, tourism and neither-areas.

Table 3.1 Five Sets of Indicators at Prefecture and County Scales

	Prefecture	County
Tourism	Estimated TR	Level of tourism development
Mining	Estimated GMOV	Level of mining development
Economic Development	GDP per capita	GDP per capita
Environmental Status	Percentage of Poor Counties	Percentage of Poor Villages
	Prefecture ecological index	County ecological index
	Water quality index	Water quality index
	Forest coverage	Forest coverage
Social Development	-	Erosion Index
	Percentage of villages having accessibility to major roads	-
	Percentage of villages having accessibility to pipe water	-
	Percentage of villages having accessibility to phone	-
	Ratio of scientific researchers	-
	-	Numbers of agriculture technicians per 10000 people
	-	Numbers of doctors per 10000 people
-	Numbers of teachers per 10000 people	

4.1 Describe and compare mining and tourism

The ideal measurements of mining and tourism industries are GMOV, which is the total production value of mineral exploration and primary processing, and tourism receipt (TR) including incomes brought by both domestic and international visitors. Both GMOV and TR are in current currency and used extensively in government reports and statistics to indicate the size or growth of the two industries. However, neither of them was available at the level of prefecture. Instead, this study used estimated GMOV and TR. As

shown in Eq. (1), GMOVs of prefectures were estimated from GMOV of the whole province, and Major Mining Outputs (MMOs) of prefectures, which are the sum of product sales at current price of all the state-owned mines and non-state-owned mines of annual product sales above USD 625,000 at current price, in mining and dressing of coal, ferrous metal, nonferrous metal, and nonmetal minerals (Yunnan Statistics Bureau 2007).

$$GMOV_{esti} = GMOV_t \times \frac{MMO_i}{MMO_t} \quad (1)$$

where, $GMOV_{esti}$: estimated GMOV of prefecture i ;

$GMOV_t$: total GMOV of Yunnan province;

MMO_i : mineral production value of prefecture i ;

MMO_t : total mineral production value of Yunnan province.

The assumption taken here is that MMO highly correlates with GMOV or, put it in another way, MMO measures mining development among prefectures well and the ratio of MMO is close to that of GMOV. MMO measures mines that are owned by the state or have a annual product sale above USD 625,000 at current price, which together take about 70% of the total mineral production value (Yunnan Statistical Bureau 2004 and Mining Management Unit 2004). In Yunnan, provincial government only contracts mining rights and land use rights with state-owned and large/medium non-state-owned mining companies, which are counted by MMO. Small mines come to extract low-density minerals in a labor intensive way after large/medium mining companies have explored the minerals and left. Thus, outputs of small mines left out by MMO highly associated that of large and medium scale mines. Therefore, it is valid to assume the rest

30% mineral production from small private business distribute proportionally with the 70% production counted by MMO. Hence, MMO is a legitimate indicator to represent the relative development pattern among prefectures/counties. Interviews with local officials in mining and statistic departments echoed this conclusion.

In a similar way, TRs of prefectures were estimated from TR of the whole province, and International Tourist Arrivals (ITAs) of prefectures as shown in Eq. (2).

$$TR_{esti} = TR_t \times \frac{ITA_i}{ITA_t} \quad (2)$$

where, TR_{esti} : estimated TR of prefecture i ;

TR_t : total TR of Yunnan province;

ITA_i : international tourist arrival of prefecture i ;

ITA_t : international tourist arrival of Yunnan province.

TR and tourist arrival are the most commonly used indicators of tourism growth in statistic report and research (eg. National Bureau of Statistics of China 2007; Lew 2003). Using data in 2003, correlations between ITA and other indicators including total TR, domestic TR, international TR, domestic tourist arrival, and total tourist arrival of 16 prefectures were tested. The results showed ITA highly correlated to all the tested indicators and the coefficients are 96.3%, 95.6%, 94.4%, 91.0%, and 91.5% respectively. Therefore, ratio of ITA should be close to that of TR.

Prefectures' $GMOV_{est}$ and TR_{est} in 2005, 2003 and 1999 are listed in Table 3.2. In order to compare the economic and environmental performances of tourism and mining activities, the prefectures/counties are divided into three groups: 1) areas in which

tourism activities the economy with little mining; 2) areas in which mining activities dominate with little tourism; and 3) areas where neither tourism nor mining is dominant. To measure if the gap between a prefecture's GMOV and TR is large enough, we compared it with the higher value of GMOV and TR by dividing the differences by the maximum values of $GMOV_{est}$ s and TR_{est} s as shown in Eq. (3). The result was a percentage referred as Diff/max, which were also included in Table 2. As shown in Figure 3.6, 42 out of the 48 Diff/max percentages were larger than 50%, two were between 20% and 50%, and four were lower than 20%. 50% was set as the standard. Prefectures having Diff/max lower than 50% were grouped as neither mining nor tourism areas, and others were grouped as mining or tourism areas according their $GMOV_{est}$ and TR_{est} .

$$\text{Diff/max} = \frac{|GMOV_{est} - TR_{est}|}{\text{Max}(GMOV_{est}, TR_{est})} \times 100\% \quad (3)$$

Table 3.2 Compare Prefectures' Estimated TRs and GMOVs
(Unit: Million USD)

Prefectures	2005			2003			1999		
	TR	GMOV	Diff/max (%)	TR	GMOV	Diff/max (%)	TR	GMOV	Diff/max (%)
Kunming	2482.0	1650.4	33.5	1644.8	786.9	52.2	1351.8	696.0	48.5
Qujing	18.6	1369.1	98.6	19.1	770.4	97.5	2.2	446.0	99.5
Yuxi	8.1	1051.3	99.2	4.3	324.2	98.7	2.9	316.8	99.1
Baoshan	178.8	160.8	10.1	150.2	56.8	62.2	109.2	0.0	100.0
Zhaotong	0.8	281.5	99.7	0.8	103.0	99.2	0.2	51.9	99.6
Lijiang	651.5	230.4	64.6	375.5	115.8	69.2	169.9	68.7	59.6
Chuxiong	12.9	569.4	97.7	30.8	367.6	91.6	2.7	290.9	99.1
Honghe	108.1	767.4	85.9	85.4	892.7	90.4	114.9	701.4	83.6
Wenshan	14.0	446.1	96.9	5.9	243.1	97.6	4.4	129.1	96.6
Simao	99.7	86.3	13.4	127.2	28.1	77.9	86.6	193.7	55.3
Xishuangbanna	110.8	117.5	5.7	130.3	7.9	93.9	130.9	7.4	94.4
Dali	619.8	129.9	79.0	500.4	83.9	83.2	262.1	87.8	66.5
Dehong	170.2	18.9	88.9	147.2	14.4	90.2	97.8	33.1	66.2
Nujiang	26.9	498.6	94.6	8.3	437.7	98.1	1.5	252.7	99.4
Diqing	740.2	70.3	90.5	501.5	37.9	92.4	156.5	0.0	100.0

Lincang	113.1	52.0	54.0	87.1	6.7	92.3	44.8	40.5	9.7
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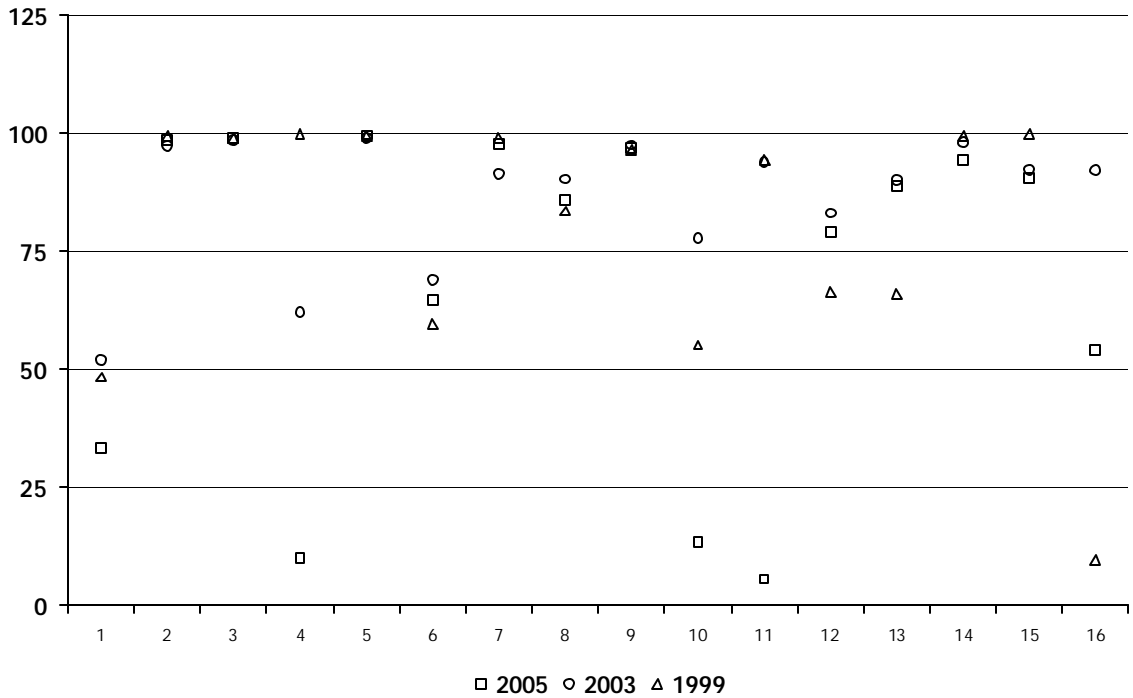


Figure 3.6 Distribution of Diff/max percentages

At the county level, measuring tourism development is more complicated since prefectures use their own indicators to measure tourism growth, including hotel stays, major tourism sites visits and the numbers of people local travel agencies serve. In this study, the level of tourism development for each county was measured by an ordinal categorical variable, Level of Tourism Development (LTD), with value of 1 being the least developed, and value of 5 the most developed. For each county, LTD was determined based on their tourism statistics, interviews with local officials, their tourism development history documented by local ethnographies, and research of Northwest Yunnan’s tourism development stage (for example, Bai 2000).

MMOs were used to describe mining industry in counties. To compare with LTDs, Jenks Optimal Method, a statistical method used most often for natural break, was used to divide MMOs of counties into five groups. Natural break is a commonly used form to classify quantitative data. It attempts to find the most suitable class ranges so that the resulting class range reflect the structure of the distribution. Jenks Optimal Method involves an iterative process so as to create classes that are internally coherent but distinctive from other classes (Jenks and Caspall 1971). Each group was assigned an ordinal categorical variable, Level of Mining Development (LMD), with value of 1 being the least developed, and value of 5 the most developed. Counties had LTD and LMD of same value were regarded as areas neither mining nor tourism dominate. Others were grouped as mining or tourism areas according to their LTD and LMD comparisons.

4.2 Describe economic status

GDP is the primary indicator used to capture the economic status of both prefectures and counties. Percentages of poor counties/villages measure the poverty level of prefectures or counties. While GDP focuses on overall level of development, Percentages of poor counties/villages reflect the degree of inequality by measuring share of households that fall below a certain standard. Poor counties are determined by the central government. The primary measurement is average household annual income with a threshold varies from USD 50 to USD 87.5 in different areas. Other factors including wealth distribution, geographic location, and economy structure are all considered along with average income. Poor villages are designated in a similar way by provincial government. Measured by the percentage of poor counties/village, poverty not only

indicates existence of the low-income population, but also associates with difficult transportation and communication, low literacy, little social welfare, and a lack of income sources to improve their economic situation.

4.3 Describe environmental status

Environmental status of both scales was measured by ecological index, water quality in rivers and lakes, forest coverage. As shown in Table 3.1, land erosion index is only available for county-level analysis and air pollution index is only available for prefectures.

Yang et al. proposed an ecologically integrated appraisal indicators system (1999) to assess the overall ecological and environment health in Yunnan considering a number of indicators including forestry, farming land, water, land erosion, natural disasters, noise, waste, air quality and population density. Counties were graded within a range from the worst situation noted as 0 to the perfect one noted as 1. Ecological index on prefecture level was calculated as an average of the county ecological indices.

In 2005, the Center of Yunnan environment information produced an online Geographic Information System of the rivers in Yunnan (Center of Yunnan Environmental Information 2007). It included the location, length, river water quality and predicted future river water quality in five years based on current urban planning for the 124 rivers in Yunnan. River water quality was shown in five categories from 1 as the least polluted and 5 as the most polluted according to the regulation of environmental quality assessment (CNEMC 2004). Current or predicted future river water quality for

prefecture or county was calculated as an average of river water quality within the administrative boundary weighed by the river length.

The most recent forest coverage study at the county level was conducted in 1998. The result was obtained from Yunnan Forest Bureau (1998) and employed in this study. Since commercial logging was banned in 1998, forest coverage is expected not to change dramatically. Forest coverage in prefectures was obtained from the Chinese natural resources, environment, economic and population database (2007), which is open to the public.

Data describing soil erosion was from 1999 land and soil survey (Yunnan Soil Survey Office) and only available at the county level. Modulus of erosion measures how much soil is eroded annually per square kilometer and divided soil erosion into four levels: slight, medium, strong and extremely strong (Zhou and Tang 2000). In this study, Erosion Index I to IV and Erosion Total were used to represent the percentages of land area suffering from the four levels erosion from slight to extremely strong and the total area suffering from erosion respectively (Table 3.3).

Table 3.3 Measuring Soil Erosion

Modulus of Erosion (ton/km²*year)	Soil Erosion Level in the Survey	Erosion Index in This Study
500-2500	Slight Erosion	Erosion I
2500-5000	Medium Erosion	Erosion II
5000-8000	Strong Erosion	Erosion III
8000-15	Extremely Strong Erosion	Erosion IV

Air pollution index (API) is the maximum value of the indices of SO₂, NO_x and the total suspending particulate (Zeng 1997). Starting from 2004, Yunnan Provincial Environmental Protection Bureau published daily API and saved weekly API (2004 to

present) on their website. The year round API was calculated as an average from the first week API of each month. Since the API data of September 2004 to February 2005 in Zhaotong Prefecture was not available due to equipment maintenance, those from January to August in 2004 and September to December in 2005 were combined to calculate the average. It is worth noting that there is only one monitoring site in each prefecture, so the API covers a limited area and may not be representative of the entire prefecture it stands for. Data about the air quality at the county scale was not available

4.4 Describe social development

Using GDP as a single indicator to measure the well being of a nation or people often leads to biased conclusion since it does not consider many other important aspects influencing people's welfare. Many indicators were developed to measure overall welfare and development. Examples include the United Nation's Human Development Index (UNDP 1998), Genuine Progress Indicator (Anielski and Rowe 1999), and Human Welfare Index (Prescott-Allen 2001). Indicators supplement traditional economic indicators such as GDP or gross national product by factors concerning various aspects including education, health, wealth distribution and the environment. These can be summarized as the opportunities to meet human needs in the forms of four capitals: built, human, social and natural capitals (Costanza et al. 2007; Vemuri and Costanza 2006).

Based on the availability of data, we selected four indicators for prefectures and three for counties to measure the general social development. As shown in Table 3.1, the number of researchers per 10,000 people and percentages of villages that are accessible to major roads, pipe water and telephone service (Yunnan Statistical Bureau 2004) were

used to describe prefecture social development status. The numbers of agriculture technicians, teachers and doctors per 10,000 people (Yunnan Statistical Bureau 2004) were used at county level. These data was on the level of town (the administrative unit under county) and was scaled up to the county level as an average weighed by population. These indicators measured human capital (by ratios of researchers, agriculture technicians, teachers and doctors) and built capital (by accessibility of road, pipe water and telephone service). Natural capital was described by the environmental indicators discussed in the next session. Social capital was not included in this study due to the lack of data.

These indicators provide an important dimension of development and poverty reduction. Research institutes and researchers tend to locate in more developed areas where transportation and communication are convenient. Yunnan has 114 research institutes and 7834 researchers (Yunnan Statistics Bureau 2006). It is unlikely that one research team would have a determining impact on the dataset. Access to roads, pipe water and phone has a great impact on local people's quality of life. On one hand, villages that are richer or better developed usually invest to improve their access to roads, pipe water and phone. On the other hand, villages with better access to these facilities have a better chance to further development benefiting from easier communication. In a similar sense, agriculture, education and healthcare represent the things people most concern with and where local governments spend a considerable portion of their budget. Relative numbers of agriculture technicians, teachers and doctors provide a good sign of the well being for a county.

4.5 Temporal dimension of data and time-series analysis

It is worth noting that the data in this study was collected at different years including 1998, 1999, 2003, 2004 and 2005 (Table 3.4). This is primarily due to the limited data availability. Environmental monitoring, when concerned with measuring landscape changes in particular such as forest coverage, is carried out once a period of time. Although statistic data is collected at lower level governments and then assembled by upper level governments, detailed statistic data was seldom achieved. The chief task of the statistic unit in county and prefecture governments is to send the “total numbers” to upper level governments. Statistic work in counties is done either by individual departments or a team from prefecture government. For example, agriculture department in county government collects data around farming and farmer’s lives, and then submits them to relevant department in prefecture government. Prefectures assemble data from counties and preserve some of them. While the provincial government publishes a detailed statistic book containing some information on the prefecture level, most prefectures only have a brief statistic report annually as internal document and do not archive all the data from counties. Many counties do not assemble or archive statistic data at all.

Table 3.4 Years of Data

Northwest Yunnan	Year	Yunnan	1999	2003	2005
Tourism development category	2005	Tourism Income	X	X	X
Mining development category	2003	Mining production value	X	X	X
GDP	2004	GDP	X	X	X
Percentage of Poor Villages	2005	Percentage of Poor Counties			X
		Gender Ratio	X	X	X
County ecological index	1999	Prefecture ecological index	X		

Water quality index	2005	Water quality index			X
Forest coverage	1998	Forest coverage	1998		
Erosion Index	1999	Air pollution index			2003-2004
Numbers of agriculture technicians per 10000 people	2003	Percentage of villages having accessibility to major roads	X	X	X
Numbers of doctors per 10000 people	2003	Percentage of villages having accessibility to pipe water	X	X	X
Numbers of teachers per 10000 people	2003	Percentage of villages having accessibility to phone	X	X	X
-		Ratio of scientific researchers	X	X	X

To make best use of the available data, on the prefecture level we conduct a time-series analysis of three years: 1999, 2003, and 2005. On the county level, while the mix of variables from 1998 to 2005 make it difficult to interpret the result at a completely congruent level, we hope it could provide some insights at the finer scale and keep the temporal issue in mind when interpreting the result.

5 Results

The distributions of $GMOV_{est}$ and TR_{est} in 1999, 2003 and 2005 are shown in Figure 3.7. Kunming, the capital of Yunnan, has an extraordinary high values of both $GMOV_{est}$ and TR_{est} . Figure 3.8 excludes Kunming to show more details in distribution of the rest 15 prefectures. The plot-out composes an ‘L’ shape. It means most points are closer to one of the two axes, indicating most prefectures have a higher value in either $GMOV_{est}$ or TR_{est} , that is, they are stronger in one of the two industries. In a similar way, variables measuring tourism and mining in counties, LTD and MMO, were plotted out. Results of dividing prefectures and counties were shown in Table 3.5.

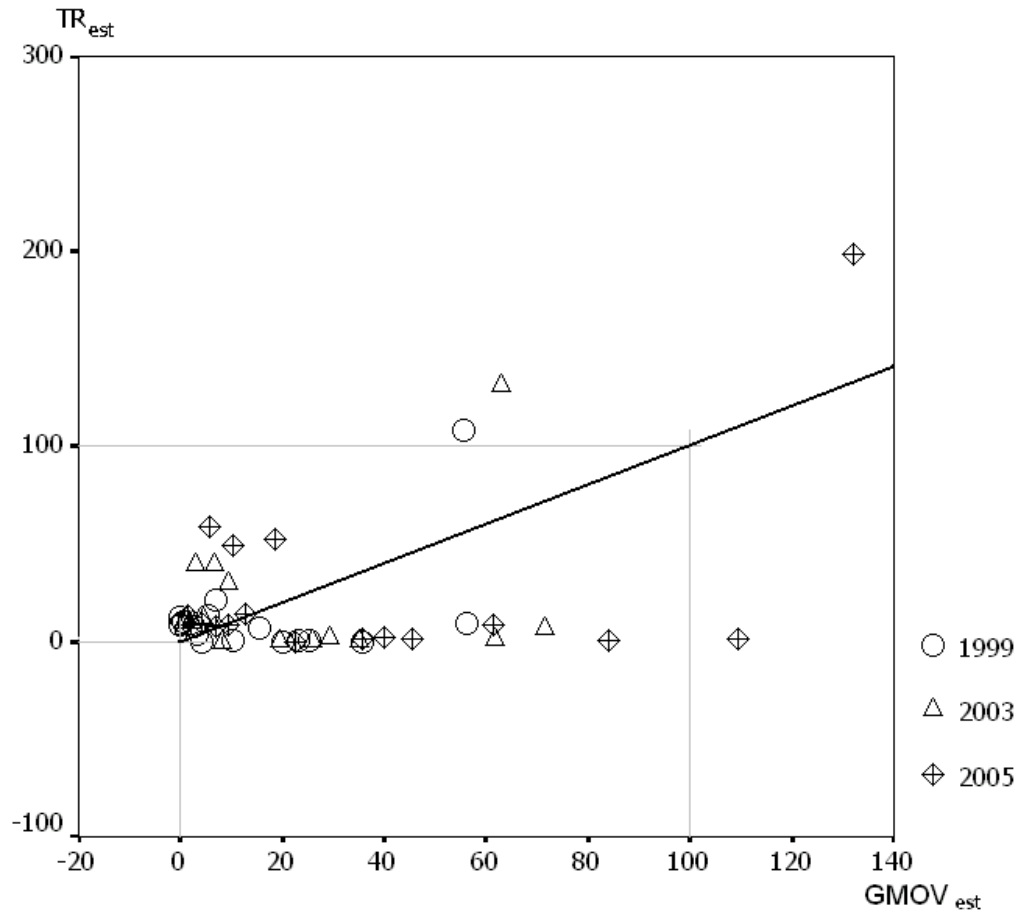


Figure 3.7 Estimated Tourism Receipt vs. Estimated Gross Mineral Output Value in 16 Prefectures

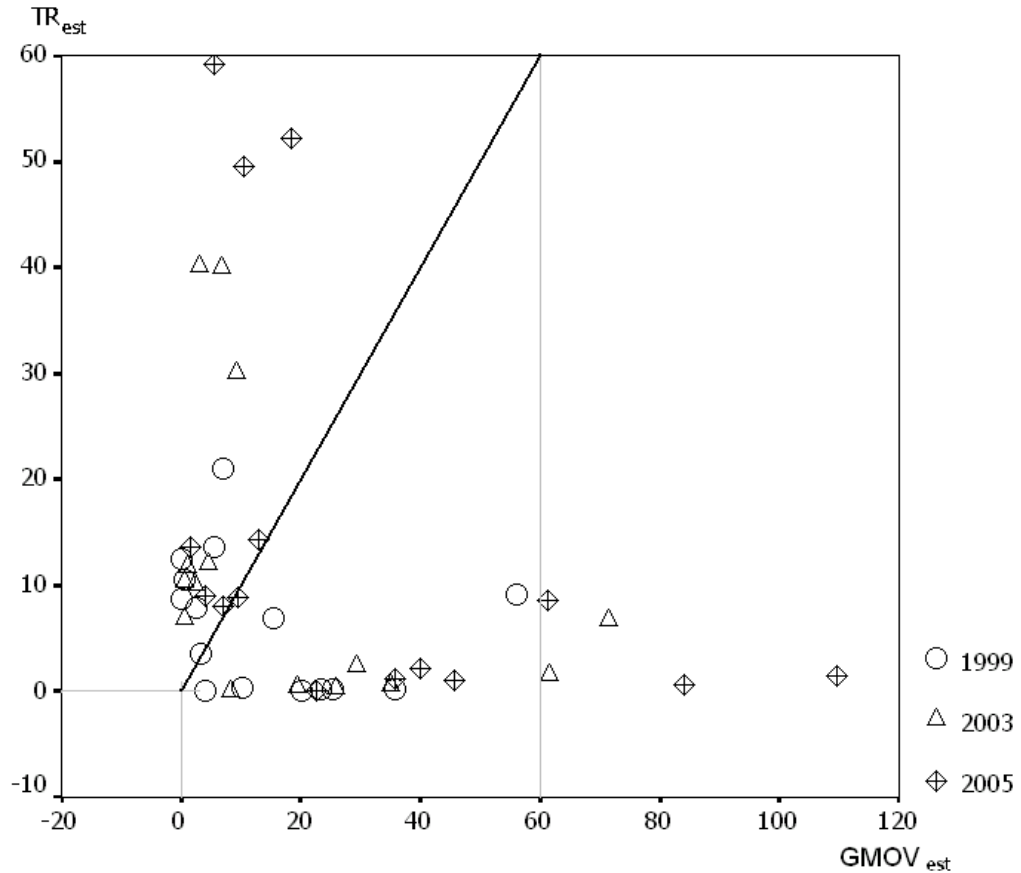


Figure 3.8 Estimated Tourism Receipt Vs. Estimated Gross Mineral Output Value in 15 Prefectures (Excluding The Capital)

Table 3.5 Group Prefectures and Counties into Mining and Tourism Areas

Groups	Prefectures 2003	Counties
Mining Areas	Qijing, Yuxi, Zhaotong, Chuxiong, Honghe, Wenshan, Nujiang	Xiangyun, Heqing, Yunlong, Eryuan, Lanping
Tourism Areas	Kunming, Baoshan, Lijiang, Simao*, Xishuangbana, Dali, Dehong, Diqing, Lincang	Deqin, Weixi, Binchuan, Dali City, Jianchuan, Gucheng, Yulong, Yongsheng, Huaping, Ningliang, Fugong, Gongshan, Lushui
Neither		Zhongdian, Midu, Nanjian, Yangbi, Weishan, Yongping,

*Grouping prefectures changes over time. For 1999, Kunming was in the “neither” group where mining and tourism had similar weights. For 2005, Kunming, Baoshan, Simao and Xishuangbanna moved from tourism areas to the neither group.

T-test result at the prefecture level was shown in Table 3.6. API, the average of the monthly air pollution index from 2004-2005, indicated that tourism areas had significantly better air quality than mining areas at the confidence level of 0.99. Mean of APIs in the nine tourism-dominated prefectures was 51.6 while that of the seven mining-dominated prefectures was 61.5.

Table 3.6 T-test Result of Analysis at Prefecture Level

Socioeconomic Indicators	Sig.	Environmental Indicators	Sig.
Per capita GDP	.716	API	.007*
Poor Counties %	.776	Current river water quality	.454
% Villages that accessible to Pipe water	.759	Future river water quality	.814
% Villages that accessible to phone	.634	Ecological Index	.251
% Villages that accessible to road	.507	Forest Coverage	.102
Ratio of researchers	.204		

* Indicator differed between tourism and mining counties at the 99% confidence level.

T-test result at the prefecture level was shown in Table 3.7. Three out of the five erosion indicators, Erosion I, III and Total indicated mining areas had significantly more erosion than tourism areas. Table 3.8 compared the five soil erosion index between mining and tourism areas. Means of the entire soil erosion index are larger in the mining areas than tourism areas while the differences in Erosion II and IV are not statistically significant.

Table 3.7 T-test Result of Analysis at County Level

Socioeconomic Indicators	Sig.	Environmental Indicators	Sig.
Per capita GDP	.456	Current river water quality	.589
Poor Villages %	.412	Future river water quality	.333
Number of agriculture technicians per 10000 people	.396	Ecological Index	.604
Number of teachers per 10000 people	.196	Forest Coverage	.992
Number of doctors per 10000 people	.442	Erosion I	.003*
		Erosion II	.206
		Erosion III	.029**
		Erosion IV	.105
		Erosion Total	.007*

*Indicator differed between tourism and mining counties at the 99% confidence level.

** Indicator differed between tourism and mining counties at the 95% confidence level.

Table 3.8 Comparing Erosion Index Means in Areas Dominated by Tourism and Mining

Erosion Index Modulus of Erosion (ton/km ² *year)	I 500-2500	II 2500-5000	III 5000-8000	IV 8000-15000	Total
Tourism Areas (%)	14.72	10.36	2.11	0.04	27.23
Mining Areas (%)	23.01	13.80	4.17	0.14	41.11
Sig. In t-test	.003	.206	.029	.105	.007

Except for API and soil erosion indicators, other variables including forest coverage, water quality, the ecological index, and all the socioeconomic variables at both prefecture and county levels did not show any significant difference between tourism and mining areas at the confidence level of 0.05 from the t-test.

6 Discussions

This research compared areas with large tourism and mining industries in Yunnan, China for their economic status, social development and environmental health. To cover a relatively large geographic area as well as preserve details, the study was conducted at two spatial scales and scopes: 16 prefectures of the entire province and 24 counties in four Northwest prefectures.

6.1 Mining and tourism in socioeconomic development

Results did not show significant difference between mining and tourism areas in the economic and social development. It is quite interesting to see that indicators of both economic and social development do not vary much between the two categories since it is usually believed that tourism, as a service sector, would have a larger multiplier, spread the profits to local communities, and drive the local economy better than mining.

However, the results showed that none of GDP, the existence of national enlisted “Poverty Counties”, and important rural development such as road accessibility, telephone network construction and pipe water service, have any statistical difference between mining and tourism areas. Tourism did not result in less poverty, richer communities, or more rural development than mining.

Multiplier effect indicates how a growth in one sector also encourages growth in other sectors, and multiplier coefficient is used to describe this effect quantitatively. Tourism not only creates jobs in the service sector, it also encourages growth in the agriculture and industrial sectors, which is known as the multiplier effect. In its simplest form, the multiplier effect is how many times money spent by a tourist circulates through a country's economy. For example, employment and income multiplier of tourism in Peru was estimated to be 2.76 and 1.67 respectively (Arabsheibani and Labarthe 2002). Employment multiplier of tourism in Washington DC was estimated to be 9.06 in another study (Frechtling and Horvath 1999). Although many researches focus on how tourism growth helps to increase local economy growth in China, specific multiplier coefficient of tourism in China has not been found.

Despite the fact that mineral resources are nonrenewable, it has been recognized that growth based on resources could be sustainable with proper management. Wright and Czelusta (2007) argued that it is the nature of the learning process instead of the inherent character of resource (such as nonrenewable) determines if and how the economic potential is achieved. Successful examples include the United States in early 1900's, Peru, and Chile. Through active investment in appropriate knowledge and technology

progress, lifespan of nonrenewable resources can be progressively extended. Furthermore, with proper institutional arrangement and knowledge cluster, resource based growth provides foundation for other sectors in the economy to grow. For example, US became a world leader in manufacturing in late 1800's and early 1900's benefiting from its abundance of mineral resources and dominant position as an industrial mineral producer (Wright and Czelusta 2007). Sweden and Finland are good examples demonstrating how they moved from the poorest countries in Europe to the world's richest and most developed economies today through iron ore and timber production, and growing high technology sectors out of the resource based growth (Blomstrom and Kokko 2007),

6.2 Mining and tourism's environmental impacts

Among the five environmental indicators, soil erosion and API indicated better situations in tourism areas than mining areas, while others describing forestry coverage, water quality and overall ecological health did not show significant difference between the two categories. It is not surprising to see mining cause more soil erosion than tourism since mining is notorious for its negative impact on topsoil and landscape change. Mining activities in Yunnan usually involve digging and removing the topsoil. Along with related road and temporary living place construction, mining activities result in less vegetation and more topsoil tends to be eroded during the rainy season. Nevertheless, tourism also causes soil erosion by bringing more people to a fragile environment and constructing roads, hotels and facilities. The result was less severe than mining area as shown by the data probably because tourism had not been established long enough in 1999 when the erosion data was collected. Mining activities in Yunnan could be traced back to 3000

years ago (Zhang 2000) when people explored for copper. As a modern industry, mining has been well established since 1950's and has been growing steadily over decades. In a contrast, tourism was initiated around 1985 and started grew fast in 1990's. Tourist arrival of Yunnan was 68.61 million in 2005, which doubled that in 1999. Therefore, the difference appeared in this study could be a matter of time.

Another possible explanation is that the difference is caused by a third variable rather than mining and tourism industries. Soil erosion is associated with a series of variables, such as vegetation cover, slope, annual precipitation and agriculture practice etc. Distribution of tourism and mining site may coincide with one or more variables causing soil erosion. In this way, erosion caused by the third variable appeared to relate to tourism and mining. For example, assume agriculture is the real factor that is causing soil erosion since it is done on a terraced slope. Tourists are attracted to the ancient buildings and the diverse cultures in Yunnan, so the tourism sites usually avoid agricultural field which is a typical practice of Han Chinese - the majority nationality taking 90.6% of the Chinese population (National Bureau of Statistics of China 2007). Therefore by avoiding agriculture practice, tourism sites have less soil erosions than mining sites. In this case, tourism picks places having less soil erosion rather than causing less soil erosion itself. Which explanation is appropriate in Yunnan requires further research. A time series analysis would be helpful to articulate whether temporal factors have affected how tourism and mining activities relate to soil erosion problems in Northwest Yunnan.

API is significantly better in tourism areas than mining areas. It is consistent with common knowledge that mining activities cause air pollution while tourism is originally

regarded as a “smoke-free” industry. However, it is worth noting there is only one monitoring station in each prefecture, so the air pollution index actually only measured a small portion of the whole prefecture. Therefore, the conclusion that mining causing more air pollution has to be attained with caution especially when indicators measuring other aspects of environmental health including forest coverage, water quality and an overall ecological index did not show significant difference between tourism and mining areas. Whether and to what extent mining and tourism activities impact air qualities requires additional monitoring and research.

Environmental indicators describing forestry coverage, water quality and overall ecological health did not show significant difference between mining and tourism areas. However, this study, by no means, intends to argue mining’s impacts on the environment are as mild as tourism’s. Instead, the conclusion is the other way round. Many studies showed the environmental impacts mining brought to Yunnan (e.g. Liu, Coveney, and Chen 2003). Although research about tourism’s environmental impacts in Yunnan is scarce, with result from this study and those looking at mining’s impacts, it can be inferred that tourism’s environmental impact is probably less on soil erosion and air quality but is similar to mining when it comes to deforestation, water quality and overall ecological health.

This result is worth attention since developing tourism is widely regarded as a guaranteed green path by local officials in Yunnan (from personal interviews with officials in provincial, prefecture and county governments in Yunnan). While factories have to meet certain emission standards according to the Environment Law, there is little

environmental monitoring or standard for tourism sites and facilities. Except that some tourism or regional planning considered environmental impacts and ecological carrying capacity, environmental impacts of tourism in Yunnan has not been considered extensively by either decision-makers or academic community. Recognizing and restricting tourism's impacts not only contribute to the ecological health but also compose an essential necessity for long-term tourism growth as Yunnan attracts visitors by its natural beauty and original landscape.

6.3 Data availability and limitations

Due to limited time and resource, this study highly relies on existed data such as environmental monitoring data, data from other studies and statistic data collected by the government. This results in two limitations. Data sets important to this research while not interesting to the government or other researchers were lacked. Describing tourism development at county level provides an example. Since TRs or arrivals were not available on the level of county, ordinal variable was used to describe tourism development in counties. Although various explanatory materials from the perspectives of tourists, government and the stages of development of the sector were included, the categorization is still somewhat arbitrary. Having more specific data describing tourism development status of counties, such as tourist arrivals, will improve this measurement in future studies. The second limitation is that data sets used in this study were not consistent due to the limited availability. The time-series analysis at prefecture level failed to have the same environment indicators to examine how the environment changed over time. At the county level, available data sets were so scarce that data from different

years were put into one model to analyze. This study would be greatly improved with data specially collected to meet the needs of the analysis. Specifically, data describe the following items would largely improve the analysis: 1) data for tourism development at county level; 2) a set of variables describe environmental health including land cover and land use change images for soil erosion study; 3) data for all the variables from several years so that time series study can be conducted to examine how tourism and mining development change economic and environmental status over time; and 4) if resources allow, increasing the sample size by studying on a finer smaller scale or covering a larger area will usually improve the quality of statistic analysis.

In spite of these data limitations, several important conclusions were reached, which called and provided a foundation for further research. Contrary to the general opinion, in the case of Yunnan, mining and tourism contribute to local economy and rural development to a similar extent. In the areas where mining or tourism dominated, on average mining and tourism contributed about 40% and 70% respectively of the GDP. Some environmental indicators (API and soil erosion index) showed difference between mining and tourism areas while others (forestry coverage, water quality and ecological index) did not. This case study exemplified that it is unlikely to reach a generalized conclusion on how mining or tourism contributes to sustainability from theory since specific local political and socioeconomic context matters. While areas such as Yunnan with server poverty, high level biodiversity and fragile ecosystems will be or have been targeted for expansions of mining and tourism, local decision-makers necessitate the

scientific findings and knowledge on how to incorporate the two industries into a sustainable development path, and how to utilize them to benefit local economy and protect the environment.

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Chapter IV Comparing corporate and community tourism developments in China:

A case study of Jisha

1 Introduction

As China converted from a command economy to a market-oriented economy, state-owned enterprise and government-initiated business no longer play the dominant role in tourism development, although government still intervenes in tourism development in different aspects such as pricing (Luk 2005). As in other developing countries, two types of projects characterize tourism development in China. One is profit-driven tourism development by corporations, characterized by large investment and infrastructure construction. The other is a project led by various organizations, which usually aims to alleviate poverty, sustain local capacity and conserve natural resources. This study defines profit-driven tourism development by corporations as corporate tourism, and tourism developed as a part of an organization project as organization-led tourism.

Organization-led tourism projects are different from corporate tourism development in terms of goal, finance and project design. A number of organizations aiming to reduce poverty, develop local community, conserve natural resource, or document indigenous knowledge and culture all use tourism as a tool in their projects. "Organization" refers to international and domestic non-government organizations, development banks, and foundations. Examples in China include international and domestic organizations, such as the World Bank, the Nature Conservancy, and Center of Biodiversity and Indigenous Knowledge (CBIK) based in Yunnan, southwest China. Tourism incorporated into project design usually has one or several objectives: bringing cash income to local people,

lessening traditional/direct resource use, building local capacity, and educating general public about nature and local culture (Li & Han 2001; Huang 2002). Those projects focus on the local community and most of them have a local participation component in their design. They pay attention to possible impacts on the environment and local culture. To minimize the adverse impact, tourism in these projects is moderate in scale.

There is little data about the overall size of organization-led tourism development in China. The level of investment and scale of organization-led tourism is unlikely to be comparable to the corporate development and might be ignorable compared with the overall tourism development in China. Nevertheless, organization-led tourism takes place in areas with extreme poverty, abundant cultural resource and fragile yet scenic environment and is therefore worth noting when studying tourism's effects on poverty reduction, community capacity building, environmental impact and indigenous culture. However, how the two types tourism differ in bringing economic benefit to host communities, balancing tourism development with environment/culture conservation, and involving local people has received scant research attention.

Not surprisingly, with different rationale and characteristics, the two types of tourism have their own problems and encounter different obstacles in the development. Yet, the existed literature addressing problems in tourism development seldom acknowledges the difference between organization-led and corporate tourism and thus only identifies broad problems and provides solutions without a specific target. This paper aims to compare the differences between corporation and organization-led tourism from four aspects that have been attaining most tourism research interest: 1) economic contribution to local

community and the broader region; 2) impact on the environment; 3) the way tourism incorporates and influences local culture; and 4) local people's involvement in benefit-sharing and decision-making.

After comparing corporate and organization-led tourism, this study borrows the framework from the extended concept of ecotourism to analyze what impediments the two types development each have. The framework emphasizes the cooperation among four parties: authority, local people, enterprise and tourists (Bjork 2000). After reviewing many cases and research on relationships among essential actors in tourism development (for example, see Hetzer 1965; Ziffer 1989; Young 1992; Wright 1993; Wallace and Pierce 1996), Bjork (2000) incorporated cooperation into the extended concept of ecotourism and argued that successful ecotourism development requires cooperation among the four central actors: the tourists, the tourism companies (the tourism industry), the authorities and local people. Although it refers to ecotourism specifically, the four-actor framework has the potential to be extended to general tourism projects pursuing sustainable development. In this framework, working relationships among the central actors in the two types of tourism are examined and compared. It points out the weak working relationship, and how it impediments the development.

For practical reasons, tourism in Jisha village, Yunnan Province is used as a case study where corporate and organization-led tourisms have been in parallel existence since 1997. This choice is justified on the basis that Jisha represents places with little cash income, unique culture and fragile environment. Much research attention has been devoted into how to utilize the rapidly increasing tourism to help with areas like Jisha to

grow the economy, and save the culture and the environment at the same time. As presented in the section “case study area”, the significance, sensitiveness and fragility of Jisha’s environment and culture make tourism development there more demanding and thus justify the application of the four-actor framework of ecotourism in this study. Tourist is not considered as an important actor here since tourism in Jisha has not opened to the public. This study refers “authorities” to local governments at township, county and prefecture levels that could provide top-down support for or intervene tourism development. As it shows in the case study part, local governments at different levels have similar interests and could be regarded as one entity in this study.

2 A comparison of corporate and organization-led tourisms

Tourism has been growing rapidly in China since the advent of Deng Xiaoping’s “open door” policy in 1978 (Sofield and Li 1998). Revenues from tourism are expected to reach USD 353.7 billion in 2006 contributing 2.9% to GDP, and to continue growing by 8.7% per annum over the next ten years (WTTC 2006). Researches on tourism in China have considered a variety of topics: (1) tourism economic effects – its contribution to the balance-of-payments, quantity and quality of tourism employment, the extent of multiplier effects of tourism growth, and the role of tourism in balancing sub-national development (Jackson 2006; Oosterhaven and Fan 2006); (2) socio-cultural consequences – erosion of local cultures and traditions (Xie and Wall 2002; Doorne et al. 2003); reducing values of arts and crafts; and rising consciousness of relative deprivation; and “who benefits from tourism?” problem (Li 2006; Li 2004; Ying and Zhou 2007;

Nyaupane et al. 2006); and (3) environmental impacts – developing environmental indicators to measure how tourism visitation impact on the physical environment; environmental planning and sustainable use of tourism resources (Hu and Wall 2005; Deng et al. 2003; Li 2004).

Tourism development in China experienced three stages since 1949 when the People's Republic of China established. From 1949 to 1978, tourism at the first stage was regarded as a pure political activity used to build friendship with other countries and propagandize China's achievements as a socialism country (Zhang et al. 2005).

At the second stage from 1978 to early 1990's, tourism's ability to earn foreign currency was recognized after the emphasis changed from political struggle to economic development after the "reform and open-door" policy. Under Deng Xiaoping's leadership, tourism evolved from a diplomatic tool to an economic activity (Xiao 2006). So far, tourism development had been concentrating on attracting international visits and domestic tourism was ignorable.

At the third stage from 1990's till now, domestic tourism has been growing fast and starts to be recognized as a growth pole both at national level and in many regions (Xu 1999; Wen and Tisdell 2001; Jackson 2006). International tourism has continue to grow during this time period. As shown in Figure 4.1, domestic tourism receipt was USD 77.9 billion in 2006, which was six times of that in 1994. International tourism receipt was USD 34.0 billion in 2006, which was four times of that in 1996. Except for a drop in 2003 because of the outbreak of Severe Acute Respiratory Syndrome, both domestic and international tourism has been growing at a steady rate. Although started much later than

the international counterpart, domestic tourism brought more income and played a more important role in economy. In 2006, domestic tourism receipts were more than double that brought in by international tourism.

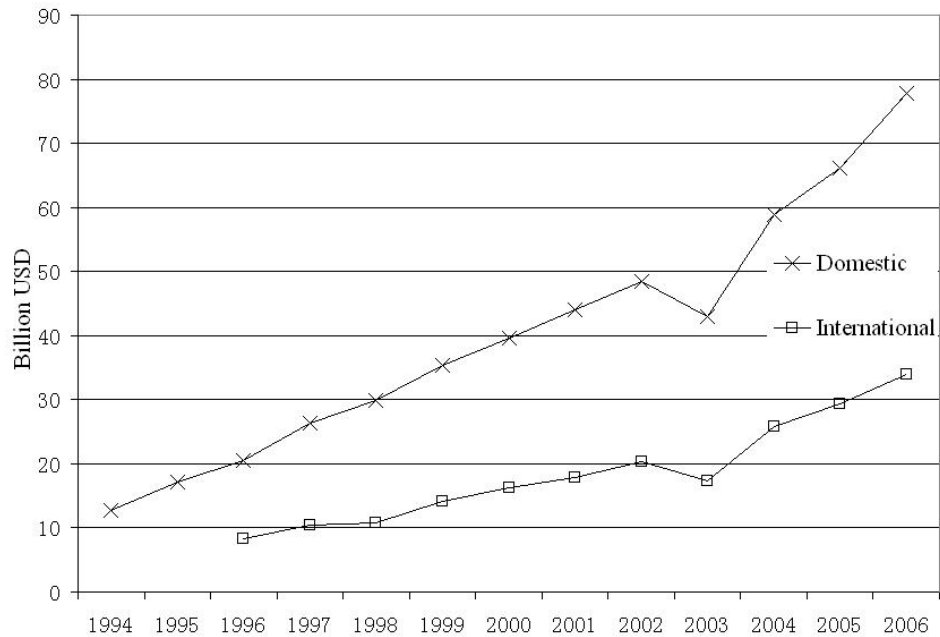


Figure 4.1 Domestic and International Tourism Development 1994-2006
Source: State Statistic Bureau.

2.1 Study method

In order to understand the process of tourism development in Jisha, Yunnan, qualitative field research is employed as the main study method. Two fieldtrips to Kunming, the capital city of Yunnan province were conducted respectively in the summer of 2005 and 2006. One fieldtrip to Diqing, where Jisha is located, was made in the summer of 2006. This study focuses on the process of Jisha tourism development from 1997 to 2006. Since it covers a relatively long time span, information and data was

collected mostly from interviews to key informants. Thirty-one in-depth interviews were conducted from the fieldtrips. Interviewees included government officials, researchers, people from international and local non-government organizations (NGOs). Interviews were semi-structured around questions on tourism development, tourism's socioeconomic, cultural and environmental impact, future development plan, and current issues that impeded tourism development. Questions were adjusted according to different interviewees. Interview lasted from half an hour to two hours.

Secondary information constituted another important data source for the case of Jisha, including statistic yearbooks, local chorography books, Jisha project documents from the Center for Biodiversity and Indigenous Knowledge (CBIK), newspaper articles, and books about tourism in Jisha. Regarding the tourism developments by CBIK and Zi Yuan Inc. Group (ZYIG), internal documents from CBIK, public letters from Jisha villagers and ZYIG, the regional plan ZYIG proposed, and relevant media coverage were collected. Altogether collected data and information included local people, CBIK, local government and media as sources. The only absence was ZYIG, which did not open to inquiries from researchers. The information about ZYIG was obtained from its self-descriptions on job-hunting websites. Facts relevant to ZYIG's tourism development in Jisha were collected from information from other sources stated above. While the author tried to speculate ZYIG's interest and position from existed information, the absence of ZYIG as a data source limited this study to the perspective of CBIK, local people and local government.

2.2 Case study area

Jisha village is located in the Qianhushan Mountain Area (QMA) between 27°23' – 27°39'N and 99°34' - 99°51'E, which is one of the eight core areas of the Three Parallel Rivers World Heritage (Figure 4.2). The Three Parallel Rivers Region was approved by UNESCO as a World Natural Heritages in 2003. It covers 17, 000 kilometer square consisting of eight areas (UNESCO 2007). In Chinese, QMA means a mountain with a thousand lakes. It has an area of 380 kilometers square (Li et al. 2000). It is a transition area with temperate conifer forest between Yunnan Plateau and Qinghai-Tibet Plateau. The altitude of Jisha is about 3,300 meters (Zhu et al. 2003). As part of the Yangze River watershed, QMA has great ecological significance for its highland lakes, wetlands, vegetations and wildlife. Around ninety species were found in a scientific survey, out of which thirty-three were listed as national protected species and twenty-three were endemic species (Li et al. 2000). QMA has important cultural meanings for Jisha village. It is the sacred mountain for Jisha people to hold religious rituals. Jisha people deeply respect the area and believe any damage to it will bring them bad luck, agricultural loss, sickness or even death (Feng 2006). In addition, Qianhushan Mountain and the lakes are a sacred area for Tibetans. For instance, Qiuyu Lake, one of the lakes in the mountain, is the place for Tibetan people to pray for rain (Li et al. 2000). In addition to cultural meanings, QMA also provides the resources that Jisha people live on such as water source and the summer pastureland (Deng 2005).

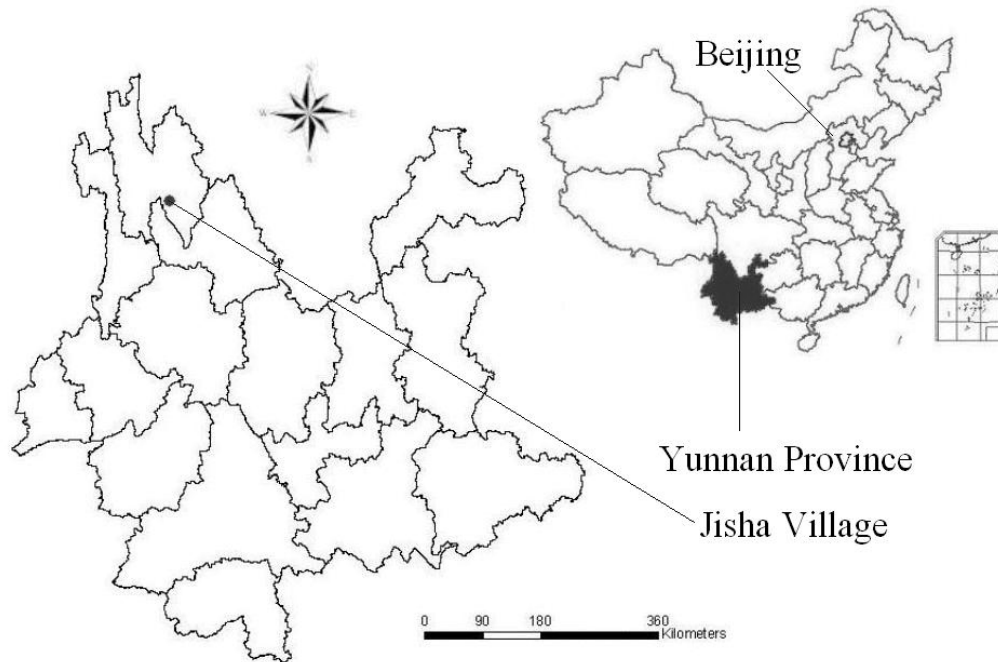


Figure 4.2 Location of Jisha

Administratively, Jisha is a village under Xiaozhongdian Township, Shangri-la County, Diqing Tibetan Autonomous Prefecture, Yunnan Province. It has 94 households. Ninety-nine percent of the residents are Tibetan except for a few Han Chinese who have married Tibetans and a Naxi teacher working at the local school (Deng 2005). Han Chinese constitutes the majority of Chinese people, about 90.56% (National Bureau of Statistics of China 2007). People have been living on highland agriculture and pasture for generations. From 1976 to 1998, timber production is the primary industry in Diqing Prefecture where Jisha belongs. Despite of local resistance, the timber corporation cut down most of the forests around Jisha. During that time, Jisha had timber cutting as the

major cash income source. However, their agriculture suffered from more wind, hail and pest attacks due to the diminishing of the forests. In the worst years, agricultural products were less than one third of that before deforestation. By 1998 when the national logging ban cut off timber production and thus Jisha people's income source, they struggled with the much less productive agriculture with little aid from government or institution. Jisha people realized that they had to take the environmental cost solely while most economic benefits of timber production went to local government and corporations, which had a fundamental influence on Jisha people's attitude toward recent tourism development projects.

Figure 4.3 shows the tourism development in Diqing Prefecture. Diqing government started to promote tourism since 1997. When the logging ban upset Diqing's major income source in 1998, road and airport construction began immediately to facilitate tourism development. Prefecture government announced that the paradise in the novel *Lost horizon* by James Hilton – Shangri-la was found there (Hillman 2003). In 2001, Zhongdian County, one of the three counties in Diqing Prefecture where Jisha located in, officially changed its name to Shangri-la to further stimulate tourism development (Hillman 2003). Tourism visits in Jisha started in 1997 when a few backpackers came. Villagers took turns renting horses and guiding the tourists. The guide's work had little tourism component. Instead, it was to watch out tourists and make sure they would act properly in front of their sacred mountain and lakes, such as speaking in a moderate volume and not littering (Li and Xie 2003). Tourism visits to Jisha were moderate since then due to inconvenient transportation and limited lodging when domestic tourism in

Diqing increased dramatically (Figure 4.3) and the yearly tourism income was about USD 50-100 per family in 2001 (Deng 2005).

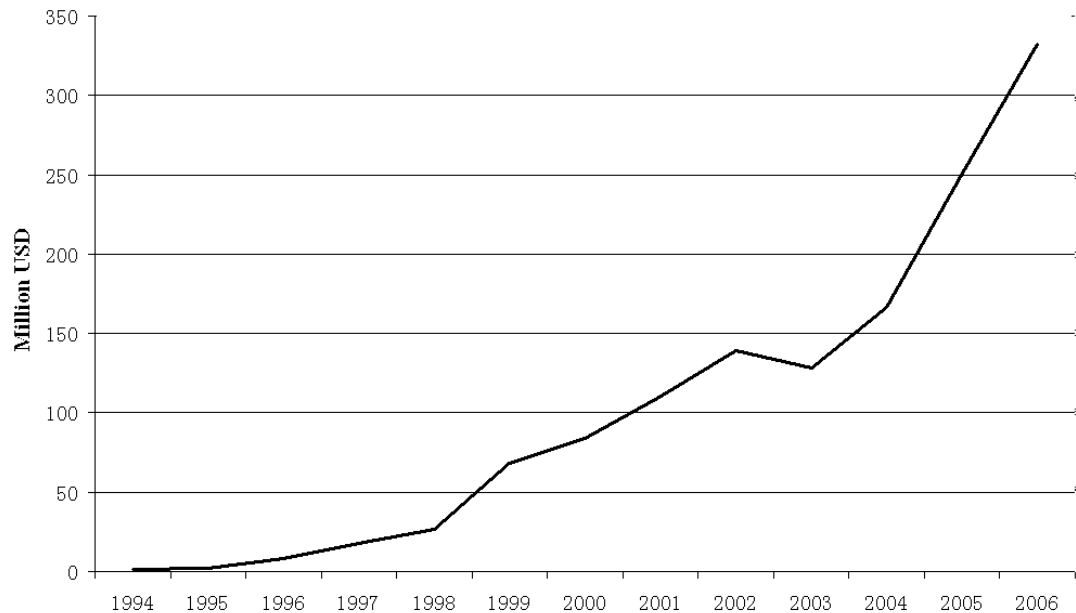


Figure 4.3 Tourism Growth in Diqing

Source: Diqing Prefecture Government annual statistic report 1998, 1999, 2001, 2004 and 2005. Data for 2002 was from Qi (2004).

2.3 Organization-led tourism project in Jisha

Founded in 1995, CBIK is a membership non-government organization based in Kunming, the capital of Yunnan. As noted on their website (CBIK 2007), CBIK is dedicated to biodiversity conservation and community livelihood development, as well as documentation of indigenous knowledge and technical innovations related to resource governance at community and watershed levels. It has more than 100 members including researchers, development practitioners and resource managers. CBIK's project in Jisha was inspired during a joint scientific survey in 2000 conducted by Yunnan government,

CBIK, Yunnan Social Science Institute, Chinese Academy of Science - Kunming Botany Institute and The Nature Conservancy. The survey aimed to explore how to design community-based development balancing biodiversity conservation as well as local economic growth. Jisha was one of the study areas.

Based on the survey result, CBIK designed a community-based ecotourism project in Jisha which was funded USD 30,000 by ICCO, a Holland organization. The project had three parts: 1) constructing a Tibetan style hostel which would be owned by Jisha people collectively; 2) forming a management committee by local people to run the hostel: and 3) educating local people about their legal rights and sustainable tourism development (Li n.d.). It aimed 1) by having a hostel Jisha people would be able to attain some economic income from tourism; 2) by incorporating characteristics of local Tibetan housing, the hostel would help to document, conserve and promote the culture; and more importantly, 3) the education component would enable Jisha people to benefit from tourism and choose to develop it in a sustainable way (Li n.d.).

Jisha people understood the potential income brought by the hostel and cherished the opportunity; however, they were concerned with various issues, which were expressed on public meetings and personal communications. At the very beginning of the project, they could not believe that a few outsiders would help them to build a hostel without sharing the profits. Their lesson from working with outsiders in timber industry was they had always been the “losing part” bearing the cost. Some of the villagers suspected the CBIK or a few people in Jisha might embezzle some project funding since financial transparency had been a problem in Jisha for a long time. The hostel construction

required labor match-up from the village. Another issue the villagers were worried about was that after they worked hard to build the hostel, someone might claim it as personal property (Li and Xie 2003). CBIK organized several public meetings and made many personal communications to explain the project rationale, the relationship among the donor, CBIK and Jisha people, the way to keep financial transparency of the project, and how the laws could protect their collective property rights for the hostel in the future. As a result, CBIK gained trust from Jisha people and became a predominant source for suggestions and help when they confront with ZYIG's development (Feng 2006).

CBIK contacted Xiaozhongdian Township government after its initial contact with Jisha people and decided Jisha as the project area. Xiaozhongdian Township government welcomed CBIK's project but suggested moving it to another village since the tourism development right of the land around Jisha had been already contracted to ZYIG as we will discuss later (Feng 2006). CBIK insisted on working in Jisha for the following three reasons: 1) it already had some knowledge about Jisha from the previous survey; 2) Jisha was unique in its ecological and cultural significance; and 3) more importantly, it is part of the project goal to enable local people to deal with outside developer properly so ideally ZYIG's development would provide a change to test the education component of CBIK's project. Although the township government respected CBIK's decision on working in Jisha, as we will see later, the co-existence with ZYIG did diminish the support CBIK could gain from the government.

The hostel was built at the end of 2004. However, the management committee never formed due to various reasons. CBIK attempted to hand over the hostel to Jisha people as

a collectively owned property several times but failed. In October 2006, CBIK closed the project in Jisha by a public letter to the villagers declaring that the CBIK's project in Jisha is finished and the hostel belongs to Jisha village (CBIK 2006).

2.4 Corporate tourism in Jisha

As mentioned earlier, ZYIG provided little information to this study. Information about ZYIG were obtained from their posts on two job hunting websites (JobCN 2007 and YNInfo 2007). Founded in 1994 in Yunnan, ZYIG includes ten subsidiary companies. Having an asset of about USD 62.5 million, ZYIG works in Yunnan mainly in real estate construction. Other business included tourism development in QMA and biological medicine production in Diqing Prefecture. ZYIG planned to develop tourism in QMA since 1999. It signed contracts with Xiaozhongdian Township in 1999 and with Shangri-la County in 2000. According to the contracts, ZYIG had the exclusive tourism development right over QMA for forty years. By signing out the resource use right, the township and county governments became shareholders in ZYIG's subsidiary company in charge of QMA's tourism development. Jisha villagers, although would be impacted greatly by any project in QMA, were not informed about the contracts (Feng 2006).

After signing the contracts, ZYIG did not have any real development in QMA until CBIK and the villagers started to construct the hostel in 2002. ZYIG felt CBIK's ecotourism project challenged its exclusive tourism development right and complained to the government. Xiaozhongdian Township government held a meeting with both CBIK and ZYIG. It was clarified at the meeting that the government supported CBIK's work in

Jisha as a poverty relief project; at the same time, ZYIG had the exclusive right to develop tourism in QMA for forty years.

There were two contracts related to ZYIG's project in Jisha. They both followed the same rationale: ZYIG would have the resource use right over about 40 square kilometers in QMA for 40 years by paying a certain amount of compensation fee to Jisha village. The major difference between the two contracts was the compensation rates increased. The first one was signed in 2002 among Xiaozhongdian Township government, ZYIG and seven people from Jisha. Since the literacy rate is low in Jisha, people use fingerprints as signatures. It indicated that about USD 1,900 would be paid to Jisha by the Township government during 2002-2005 but did not mention the compensation amount after 2005. In 2004, the second one was signed by ZYIG and 85 out of 93 households from Jisha and increased the compensation amount to USD 31,000/year from 2005 to 2007 and USD 50,000/year from 2007 to 2043. Jisha people did not acknowledge the legitimacy of the contracts and released public statements after signing both contracts (Table 4.1), arguing that their signatures were attained without fully understanding the contracts since most of them could not read. Jisha people did not accept the rationale to sell the QMA resource use right to ZYIG and insisted on they have the right to (1) know the details about ZYIG's development plan, (2) participate in important decision-making in tourism development, (3) keep their agriculture, farming and horse-guiding, and (4) ZYIG's project cannot damage the environment in QMA. Jisha people expressed their views by writing letters to ZYIG, township and government governments (Table 4.1).

ZYIG and Jisha people never reached an agreement. Nevertheless, ZYIG started construction with the support from County and Prefecture governments.

Table 4.1 List Of Documents

Year	Title
2002	Aug 31. The agreement about Jisha's benefit sharing in QMA development signed by Xiaozhongdian Township Government, ZYIG and Jisha villagers.
2002	Jisha's statement about the legal issues of the 2002 agreement.
2004	Aug 24. The contract of QMA development signed between ZYIG and Jisha villagers.
2004	May 1. A letter to ZYIG from Jisha villagers.
2004	July 22. A letter to the Diqing Prefecture and Shangrila County Governments from Jisha villagers.
2004	July 22. Preliminary opinions about the economic compensation to Jisha villagers for tourism development in QMA (revised version) by Li, Q., the lawyer from Yunnan Rui Xiang Law Office hired by Jisha villagers.
2004	Aug 24. Problems of the contract and feedbacks from Jisha villagers by Li, Q., the lawyer from Yunnan Rui Xiang Law Office hired by Jisha villagers.
2005	A letter to the government from Jisha villagers.
2005	April 12. Response to ZYIG's opinion solicitation for QMA tourism development from Jisha villagers.

Note: Listed documents are in Chinese and available at <http://jisha.bokee.com>.

In the process Jisha people negotiated with ZYIG, CBIK helped the villagers by introducing relevant laws and policies, increasing media exposures (for example, see Zhang 2004; Li 2005) and facilitating public meetings. Although not confront with each other directly, government, CBIK, ZYIG and Jisha people all felt there was tension between the two sides: ZYIG and government on one side, and CBIK and Jisha people on the other. CBIK's ecotourism project and ZYIG's commercial development thus had impacts on each other. Table 4.2 shows a timeline of both projects. When Jisha people were pressed by the government for opposing ZYIG's development, they suspected that taking the hostel built by CBIK's project would be something opposing ZYIG. Such concerns deferred the ownership transition mentioned above.

Table 4.2 Timeline of ZYIG and CBIK's Activities in Jisha Village

Year	Activities
1999	ZYIG: Contracted with the Township Government
2000	ZYIG: Contracted with the County Government CBIK: Participated in the joint scientific survey Jisha People: Promised to protect the environment for future generations at a public meeting
2001	CBIK: ICCO decided to fund Jisha ecotourism project.
2002	ZYIG: Contracted with the Township Government and Jisha people CBIK: Started Jisha project; Clarified project rationales to Jisha people; Finalized the hostel design Jisha People: Denied the legitimacy of the contract in their statement
2003	CBIK: Hostel construction Jisha People: Input labor to hostel construction
2004	ZYIG: Received the letter from Jisha people requesting to be a partner of the development; Signed the 2nd contract with Jisha people; Discussed the contract with Jisha people CBIK: Finished the hostel construction at the end of 2004 Jisha People: Requested to be a partner in ZYIG's tourism project; Hired a lawyer and wrote letters to county & prefecture governments; Discussed the contract with ZYIG; The lawyer drafted a report to deny the legitimacy of the 2 nd contract
2005	ZYIG: April, initiated a public opinion solicitation in Jisha; April, started construction with county government's support but stopped shortly due to the resistance from Jisha people; June, the prefecture government intervened to support ZYIG to resume construction. CBIK: Several attempts to hand over the hostel to Jisha people failed. Jisha People: April, a survey was conducted to respond ZYIG's public opinion solicitation and the feedback was sent to ZYIG; April, Jisha people resisted ZYIG's construction by blocking the road and destroying some tools; June, Jisha people gave up under prefecture government's intervention.
2006	ZYIG: Construction continued. CBIK: October, CBIK claimed the hostel was owned by Jisha people collectively and closed the project in Jisha.

2.5 Compare the two types of tourism in Jisha

CBIK and ZYIG's projects in QMA are compared below in terms of the tourism development vision, potential economic contribution to Jisha and a broader community, environmental impact, involvement with local people and influences on indigenous culture.

2.5.1 Tourism development vision

CBIK and ZYIG had very different visions on tourism development in QMA. CBIK valued local culture, lifestyle and the environment supporting them. It viewed tourism as an irresistible trend and tried to help local people to adapt to and benefit from it. The development scale is small in order to reduce environmental and cultural impacts. Tourism in QMA is designed to provide additional income to local people as well as an opportunity for a small amount of tourists to experience nature and learn from local culture. Jisha project manager in CBIK once said: “QMA is suitable for ecotourism and a nice place for backpackers to experience nature. But a large-scale tourism bringing a huge amount of tourists will destroy the fragile ecosystem. ” In contrast, ZYIG saw Jisha’s unique natural and cultural attraction as a “selling spot” to gain profit. It planned to construct a series of facilities including paved roads, parking lots, hotel and chair lift and hoped to attract as many tourists as possible by providing convenient transportation and comfort accommodation. Their project requires an intensive visitation to pay off the investment. Led by different perspectives, CBIK’s attempt centered the interests of local people and environment while ZYIG tried to maximize profits.

2.5.2 Economic contribution

In CBIK’s project, the hostel will bring more tourism income to Jisha village. It will help to improve the accommodation situation in QMA and induce a slight increase in visitation. The annual tourism income was about USD 50-100 per family in 2001 (Deng 2005). Considering 74% Jisha households have an annual income lower than USD 500 and 36% of them have an annual income lower than USD 250 (Deng 2005), the tourism income increase is likely to be significant for Jisha people. Nevertheless, the hostel only

has a few dozen beds and won't boost up tourism visits dramatically. The tax contribution to local government and the multiplier impact to the region will be small. By bringing a large amount of investment and tourists, ZYIG's development will have a considerable tax contribution and help to build tourism as a major industry in the region. However, the benefit Jisha people can attain is quite limited. According to the second contract between ZYIG and Jisha people, Jisha people will not be allowed to farm or do their own tourism business in QMA (such as horse-guiding) in the scenic area and be benefited from tourism by receiving compensation and a few low-pay jobs from ZYIG.

2.5.3 Environmental impact

CBIK's project will have a relatively low impact on the environment. As the hostel only increase accommodation capacity by a few dozens beds and CBIK does not plan to improve roads, the current situation that limited transportation and accommodation capacity restrict visitation will not change. CBIK put significant attention on the environmental issues during the hostel design and construction process. For example, one of the essential changes made to the traditional style hostel was to add an energy saving heating system since local house usually requires a huge amount of firewood (Li and Xie 2003). Local people emphasize environment protection in their religion and culture. Their involvement in management committee will help to make sure that tourists won't damage the environment. ZYIG's project tends to have a much higher environmental impact. High visitation required to return the initial investment is likely to bring irreversible impacts on the highland lakes, vegetations and wetlands. To make it worse, there has been little sign that ZYIG will take necessary measure to reduce the environmental

impacts. So far, it did not release any detailed environmental management plan or the environmental impact assessment as required by law.

2.5.4 Local involvement

Local participation was high in CBIK's project. CBIK aimed to build up local capacity and thus invested time and resource to work with local people. It took a lot effort to explain to local people about the project rationale and invited comments. The hostel design absorbed local construction style and opened to opinions from local community. Most of the villagers input labor in the construction process. All the decisions such as designing, financial management and future management plans were made in public meetings. The hostel now is owned collectively by Jisha people and will be operated by a committee formed by election. ZYIG has been trying to avoid working with local people in their project. It tried to work with the government and had the government deal with local people first. After this approach failed, ZYIG started to talk to local people directly but only focused on buying the resource use right at a one-time contract. ZYIG did not want to include local people into any future development or decision-making process. After QMA opens to tourists, ZYIG does not want Jisha villagers farm or run any business related to tourism within the scenic area as indicated in their second contract with Jisha people. Despite of the fact that Jisha community had been requesting to be involved into the tourism development several times, the rationale "get rid of local people at a one-time price" never changed.

2.5.5 Cultural impact

For CBIK, conserving local culture is one of the project objectives. It conserved the Tibetan construction knowledge by documenting local houses and designing a modified Tibetan style hostel. It also incorporated local values into the project design and used local sayings to explain the project rationale to Jisha people. To build up self-esteem and publicize the Tibetan culture in Jisha, CBIK produced two posters with local stories and beliefs and gave them away to local households and tourists (Li and Xie 2003). ZYIG did not pay special attention on local culture. It regarded the natural environment instead of local culture as tourism attraction. By excluding local people from tourism development, it is unlikely that future tourism will have an authentic cultural component. The foundation of the unique Jisha culture, the traditional livelihood may have to change due to tourism construction, restriction to use upland summer pastureland in QMA, and heavy tourist visitation.

CBIK projected a tourism development that can involve Jisha people aiming to sustain the current livelihood with tourism income as an addition and minimize the potential impact tourist will have on local culture and environment (Li and Xie 2003). Because of the moderate size, although tourism will provide considerable cash income through horse guiding, catering and accommodation for local people, it is not likely to become a regional growth pole pulling upstream and downstream industries. In contrast, ZYIG planned to exploit the maximum potential of QMA to attract tourists and gain profit in the forty-year time frame. The huge investment will stimulate local economy and have secondary effects on related industries (Jackson 2006). It tried to exclude local people from the scenic area (for tourism business and traditional farming) because it

thought working with local people requires extraordinary time and financial resource. The impacts on local culture, livelihood and the environment are not the focus of ZYIG's consideration, which are likely to be intensive in both natural and cultural settings in Jisha. It is obvious that the organization-led project and corporation business have substantial difference in their tourism development vision, economic, environmental and cultural impacts, and local involvement. Both of them are taking place in current China and meet with various problems. It would be argued that due to the significant differences indicated by CBIK and ZYIG's work in Jisha, tourism development initiated by organizations and corporations usually have very different problems. To illustrate how the problems in the two approaches may differ, the next section analyzes the major problems in CBIK and ZYIG's projects in Jisha by the framework of four-actor cooperation.

2.6 Obstacles to successful corporation and organization approaches

As indicated above, both CBIK and ZYIG's projects in Jisha encountered various problems, postponed the original timelines and have not opened to tourist. The cooperation framework from extended concept of ecotourism is used here to analyze the obstacles in both projects. The extended concept of ecotourism emphasized cooperation among the central actors: local people, authorities, tourism business and tourists (Bjork 2000). The framework examines the working relationships with the four central actors. Since both CBIK and ZYIG's project have not opened, the tourist section was eliminated in this study. CBIK and ZYIG's working relationships with local people, authority, and tourism business will be examined below. As it will point out, the weak relationship with,

government and business in CBIK's project and local people in ZYIG's development contribute to the problems in their project development process.

2.6.1 Authority

Authority refers to the township, county and prefecture governments in Jisha's case. ZYIG had a better and closer working relationship with governments than CBIK. CBIK started initial survey and research with little communication with local governments, learned about ZYIG's project from township government after selected Jisha as the project area and insisted on working in Jisha against township government's suggestion to choose another village. Thus, it only obtained an "official welcome" from the township government since their project had a substantial "poverty alleviation" component aiming to increase Jisha people's income by building up the hostel. Being in the same area, the township and county government prefer ZYIG's project over than CBIK's for its huge investment and potential pull-up influence on the regional economic development. They would not support CBIK when its project conflicted with ZYIG's. ZYIG worked closely with the township, county and prefecture governments from the initial stage of the project. It regarded good communication and relationship with them as prerequisites to a successful business. Although governments would welcome ZYIG's investment anyway, the attention ZYIG paid, the efforts it made and early communication with local governments all contribute to its close and smooth working relationship with authorities.

2.6.2 Jisha community

CBIK worked with local community in an active way whereas ZYIG only talked to local people passively. CBIK set local capacity building as one of project objectives and

worked with local people at all stages of the project. There were suspicions, misunderstandings and rumors about the project among local community. CBIK managed to explain the project to Jisha people clearly and obtain their trust through many public meetings, personal communications and transparent project management. When local people felt helpless in front of ZYIG's contract and under the pressure to sell their use right of the natural resource in QMA, they turned to CBIK for advice. Media exposure of Jisha and hiring a lawyer are good examples. As a result, ZYIG increased the compensation rate substantially from the first contract to the second one. ZYIG tried to avoid working with local people directly at the beginning stage hoping that local government would make the arrangement so that it could attain the exclusive tourism develop right and totally exclude local people. After local government failed to do that, ZYIG made only a few attempts to work with local people: i.e. it provided a revised contract, sent two representatives to talk to Jisha people and accepted a letter from them. The goal was still to buy the resource use right and exclude local people from future development. When realizing no agreement could be reached without involving local people in future tourism development ZYIG considered giving up the project seriously. Support from prefecture government eventually enabled ZYIG start construction without local people's agreement.

2.6.3 Tourism business

CBIK overlooked business experience in their project, which counted as one of the major reasons that encumbered the Tibetan hostel from opening and gaining profit for local people. CBIK put an advertisement on the website looking for a hostel manager,

which is unlikely to be filled by an outsider considering the geographical isolation and limited economic return. Working closely with business will enable CBIK to arrange some training in this aspect for local people.

CBIK built up the Tibetan style hostel with local people and achieved the education objective. Throughout the project, Jisha people became much more aware about their rights and how to protect themselves by various tools. For example, they hired a lawyer to examine the contract and negotiate with ZYIG and exposed the issue to many media to attain public attention. The part failed in CBIK's project was that the hostel managing committee never formed, and the hostel never opened and thus did not generate any income. The reasons are twofold. First, as discussed above, the tension between local people and ZYIG expanded to CBIK and local government. As the Prefecture government intervened to support ZYIG, local people afraid that CBIK was at opposition of the government and accepting the hostel would be a sign to ally with CBIK and thus against ZYIG and the government. Secondly, local people did not possess the business expertise to run a hostel. The reasons clearly link to the fact that CBIK spent most of the effort working with local people and did not develop close cooperation with local government and business.

ZYIG failed to reach an agreement with local people despite of the compensation amount increase. The major discrepancy between ZYIG and local people was whether to have local people involve into decision-making process in tourism development. Local people insisted on they should be a partner of the developer and have a say in the development plan. ZYIG regarded the exclusive development right as the prerequisite for

their project in Jisha and tried to work with local people as little as possible. ZYIG hoped to let the township government deal with Jisha people initially and started talk to local people only after that did not work. Although ZYIG started the construction with support from the prefecture government without an agreement with Jisha people, the discrepancy and conflict between ZYIG and Jisha people still has to be solved before the tourism area opens otherwise QMA tourism area may lose its hospitable host, one of the major tourism attractions. The misjudgment that the project would go well as long as it had good relationship with local government made ZYIG ignore the importance to work with local people. Unless ZYIG is willing to work with them, the discrepancy and conflict are unlikely to be solved.

3 Conclusion

This study examined the developing process for both CBIK and ZYIG's projects in Jisha through the four-actor framework. Although it seemed that the co-existence of CBIK and ZYIG caused most of problems for both at the first glance, a closer look indicated that weak working relationships with central actors contribute to their failures even without the presence of the counterpart. Suppose CBIK did not have the project, Jisha people took compensation and ZYIG attained the exclusive development right, the built-up destination would not have an authentic cultural element since few local people could enter the scenic area. Lost the upland grazing farm as required in the contract, local people would have to find other income source and might break the contract to compete with ZYIG for lodging, catering and souvenir business. Working with local people cannot

be avoided by a contract since ZYIG's project shares the place with Jisha village. Its attempt to exclude local people in a destination where culture is the main attraction will result in a problematic tourism planning. Similarly, put ZYIG's project aside, Jisha people may happily accept the collective ownership of the hostel, but it is unlikely they can run it well and attain profits with their limited business expertise unless CBIK works with business to provide them relevant training. Assume Jisha people run the hostel well, things may still get complicated if the project does not receive support from local government. Ownership is one example. During the transition period in China, many laws and policies about ownership are forming or changing. In Jisha, as in many rural areas, local government is the authorized power to interpret laws and regulations and tone them for their needs. Without vigorous support from local government it would be very challenging for Jisha people to own the hostel collectively and earn benefit from tourism in a long run.

Through comparing the tourism projects of CBIK and ZYIG in Jisha village, this paper examined the two typical tourism developments in China – the organization-led project and the corporation business. Organization-led tourism development is usually project-oriented and focuses on a relatively small area. It puts local community central and uses tourism as a tool to achieve culture and biodiversity conservation and poverty reduction. It does not have a widespread regional effect since the development usually has to be moderate to keep the negative impact low. Accordingly, it makes the effort to build a trustful working relationship with local people. It may ignore the importance to work with local government and business or fail to do so due to limited time and

resource. In contrast, corporation going after the profits from tourism often makes huge investment and is able to build tourism as a regional economic growth pole. It may not care whether local people would benefit from the tourism or how the development would impact on the environment and culture. Corporations regard a good relationship with local government as highly important to ensure a smooth implementation process. Local government usually welcomes investment and would like to collaborate with corporations. Working with local people especially having them involve into the decision-making process means important changes to the traditional management and project planning scheme in corporations and requires time, financial and other resources. Therefore, corporations tend to work with government closely but are reluctant to involve local people in their project process.

Jisha case shows how the two types of tourism vary in development vision, economic effect, environmental impact, cultural influence and local involvement. Differentiating the two types of tourism is essential to study the socioeconomic consequence tourism causes especially in poor and resource-dependant areas where organization-led tourism co-exists with corporate tourism. In the case of Jisha, working relationships with government, local people and business are examined as an example to illustrate how the problems in CBIK and ZYIG's projects have to be addressed differently. Furthermore, understanding the characteristics of both plays an important role in improving research and practices on tourism planning and impacts control. It will better equip governments choose the suitable one to a region and be aware to the aspect that needs to be monitored. Put simply, organization-led tourism works well for fragile environment and poor areas

where bringing tourism income to local community and conserving the natural/cultural environment of the destination are the main objectives. Corporate tourism development fits into a larger picture where tourism is regarded as a regional growth pole and the environment has a relatively high carrying capacity.

This study identifies the characteristics of the two approaches in tourism development in China and illustrated them through a thorough case study in Jisha. It does not intend to argue that all the tourism can be divided exclusively as either organization-led or corporation-led. Neither does it conclude CBIK and ZYIG's work in Jisha can represent all the organization-led projects and corporation business tourism. Rather, it is to argue before studying the socioeconomic consequences of tourism, each type has to be identified and their characteristics have to be recognized. Jisha's case is one example to show how much difference could exist and how it could impact on economy, environmental, culture and the tourism management mode. Jisha's case bears the limitation that most case studies have. The research scope was within one area in Northwest Yunnan, China. There are certainly exceptions: international environmental NGOs such as The Nature Conservancy and World Wildlife Fund work closely with both local people and governments in China¹. Nevertheless, the way to differentiate tourism development types and issues discussed in this study will shed lights on studies in tourism development issues in China. †

¹ From interviews with project managers in The Nature Conservancy and World Wildlife Fund. See their work in Yunnan at <http://www.nature.org/wherewework/asiapacific/china/> and http://www.wwfchina.org/english/sub_loca.php?loca=12&sub=93

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