



LUND UNIVERSITY

# To Develop or Conserve?

## A Case Study on Biodiversity Protection and Local Sustainable Development in Jiuzhaigou, China

A thesis submitted in fulfillment of the requirements  
for the degree of Master of Science

LUMES International Master's Programme in  
Environmental Studies and Sustainability Science

Lund University Center for Sustainability Studies  
Lund University

Lund, Sweden  
August 2009

*Author:*

Cary Y. Hendrickson  
[cary.hendrickson@gmail.com](mailto:cary.hendrickson@gmail.com)

*Supervisor:*

Sara Brogaard  
[sara.brogaard@lucsus.lu.se](mailto:sara.brogaard@lucsus.lu.se)

# Abstract

The way natural resources are managed is one of the most important sustainability challenges we face at a global level. In particular, the Chinese experience illustrates many of the complexities within current approaches to biodiversity conservation and sustainable development elsewhere in the world. This research seeks to contribute to an understanding of the way China is addressing human-nature interactions, by providing an in-depth case study of Jiuzhaigou Biosphere Reserve, Sichuan Province.

The research strategy applied combined quantitative data, measuring the outcomes of socio-economic and natural resource management (NRM) policies - collected through a literature review - with qualitative perspectives from local residents and staff - collected via semi-structured interviews and participatory observation.

Although Jiuzhaigou is often promoted as the “success story” of Chinese nature-based tourism, the findings of this study suggest that it should also be seen by taking into account the “unintended consequences” of the Chinese approach to combining tourism and NRM. A number of shortcomings which might prevent the Jiuzhaigou reserve from reaching the goal of reconciling conservation with development are thus identified and analyzed; namely: the distribution of the benefits of tourism; the distribution of the environmental burdens of tourism; and participation issues in managing the biosphere reserve. By assessing both positive and negative impacts of the NRM strategies applied in the case of Jiuzhaigou, this study seeks to extract a valuable lesson for both policy-makers and researchers.

# Contents

1 INTRODUCTION .....	6
2 BACKGROUND: FROM PROTECTING AREAS TO MANAGING BIOSPHERES .....	7
3 ANALYTICAL FRAMEWORK.....	9
3.1 Research Aim.....	9
3.2 Research Questions.....	10
3.3 Methods and Materials.....	10
3.3.1 Overview .....	10
3.3.2 Ontological and Epistemological Considerations.....	10
3.3.3 Data Collection.....	10
3.3.4 Data Analysis.....	12
3.3.5 Research Limitations .....	12
4 THE CHINESE MODEL OF NRM AND TOURISM DEVELOPMENT .....	13
4.1 Decentralization and the 1978 “Open Door” Reforms .....	13
4.2 Contemporary Chinese NRM Policy for Protected Areas .....	14
4.3 Chinese Tourism Development.....	15
5 THE CASE STUDY: JIUZHAIGOU .....	16
5.1 The Setting.....	16
5.2 NRM Strategies.....	18
5.2.1 Regulations to Protect the Environment.....	20
5.2.2 Community Participation Approach.....	22
6 ANALYSIS.....	23
6.1 Economic Impacts of NRM .....	23
6.2 Environmental Impacts of NRM.....	25
6.3 Social Impacts of NRM .....	27
7 DISCUSSION .....	30
7.1 Environmental Objectives.....	30
7.2 Community Participation Objectives.....	31
7.3 Economic Objectives .....	33
8 CONCLUSION.....	34
9 BIBLIOGRAPHY .....	36
10 APPENDIX.....	41

## List of Figures

Figure 1 Location of Jiuzhaigou .....	16
Figure 2 Number of Annual Tourist Visitors.....	17
Figure 3 JAB Annual Revenue (2001-2008) .....	23
Figure 4 Average per capita income for resident of JZG.....	24

## List of Tables

Table 1 Important dates in the park's development.....	19
Table 2 JAB habitat conservation efforts in Jiuzhaigou Nature Reserve since 1990's .....	21
Table 3 Community-based co-management initiatives.....	22
Table 4 Land-use change in Jiuzhaigou County 1987-2002.....	25
Table 5 Transport emissions related to Jiuzhaigou's tourism in 2004.....	26
Table 6 Ecological Footprint of tourist wastes at Jiuzhaigou .....	26
Table 7 Ethnic Minority JAB staff.....	28

## **Acknowledgements**

The thesis writing process has been supported by so many people from all over the world. First of all, I would like to thank my immediate family for their constant generous love and support. My sincerest thanks go to my supervisor, Sara Brogaard, and the LUCSUS Centre for Sustainability Studies for their generous support in helping me get to China in the first place. I would also like to thank Tang Ya, of Sichuan University, for all of his brainstorming, support and organization, the staff at Jiuzhaigou for taking me in and helping me throughout my time in China, and especially to Andrew Scanlon without whom most of the “real” work would not have been possible. I would also like to show my appreciation to my LUMES family – having experienced LUMES with you as my colleagues and friends, intellectual opponents as well as supporters, has made the journey all the more rewarding. Finally a big thank you to the late-night crew – you know who you are. And a special thank you to Luca.

# 1 INTRODUCTION

The way natural resources are managed is one of the most important sustainability challenges we face. The expansion of human activity in the last 250 years has been dramatic, driving major transformations in the biosphere. Changes that occurred in the past were softened by life-support mechanisms provided through ecosystem functions, many of which have been lost or are currently under threat (Folke *et al.*, 2004).

In the 2005 *Millennium Ecosystem Assessment (MEA)*, scientists warned that “human activities have taken the planet to the edge of a massive wave of species extinctions, further threatening our own well-being” (MEA, 2005). Furthermore, calls have been made for safeguarding biological diversity<sup>1</sup> not only for protection of the biosphere but also as a way to battle poverty and improve human well-being (Stoll-Kleeman & Job, 2008). Within this context, the task for natural resource management (NRM) to try and reconcile the continued pursuit of human development and the conservation of biodiversity has never been greater.

Thirty years of being the fastest growing economy in the world has taken its toll on the China’s natural resource base and ecosystem services provided by forests, grasslands, water resources and biodiversity are under serious threat (Liu *et al.*, 2008). Environmental destruction is taking place at unprecedented rates: China is already one of the most forest deficient countries per capita (0.1 ha of forest per person compared with the global average of 0.6 ha) (Liu and Diamond, 2005), 90 percent of its grasslands are considered degraded (*ibid*) and at its present rate will lose all wetlands within 20 years (SEPA, 1999) further endangering 15 to 20 percent of its endangered species (WB China, 2001). Liu *et al.* (2003) estimated that nearly one half of the biodiversity in China is endemic to the country and one fourth of China’s species are being threatened.

The rapid economic growth, influence in global trade and a role as the largest greenhouse gas emitter are just a few of the ways in which what happens in China impacts surrounding regions as well as the rest of the world. China, having the largest population in the world and the fourth largest area, is also one of the most biologically rich countries in the world. This large territory is home to more than 10 percent of the world’s terrestrial and vascular plant biodiversity, increasingly suffering from the intense use of natural resources for human-based activities.

In response to public calls to address growing environmental issues, the government has succeeded in establishing more than 2000 nature reserves (Liu and Diamond, 2005), about 80 percent of which have been developed for tourism (Li & Han, 2001). The cooperation of local communities and their engagement in active participation is often cited as crucial for effective NRM policy. However, as many researchers have concluded, community participation is often

---

<sup>1</sup> One of the most serious environmental problems identified at the 1992 United Nations Conference on Environment and Development (UNCED) and resulting “Rio Declaration on Environment and Development” was the loss of species, or biological diversity, at a rate higher than natural extinction. According to the key international environmental legislation on biodiversity, the United Nations’ Convention on Biological Diversity (CBD), biological diversity (or *biodiversity*) is defined as: “*the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.*” (CBD, 1992)

neglected or excluded by central authorities (Adger, 2006; Folke *et al.*, 2005a; Posey, 1996). China's NRM policy faces a similar dilemma: Chinese political and cultural systems often limit community participation in controlling the pace and path of development.

Realizing a protected area's value on the ground is a complex challenge which requires an understanding of socio-economic and biological systems and an ability to negotiate a number of stakeholders with a wide variety of interests. The Chinese experience managing natural resources illustrates many of the challenges and complexities within current approaches to biodiversity conservation and sustainable development elsewhere in the world and forms the central theme of this study. The approach taken here is based on the idea that the way nature has been transformed by society and the analysis of that interaction is greatly influenced by the assumptions we have about the world.

This research presents some of the challenges, successes, and shortcomings in addressing natural resource management issues in China and how these have been shaped by the country's unique approach to governance and stakeholder participation. Section 2 introduces the discourse on protected areas and how the objectives for protected area management have evolved from preserving landscapes to stimulating sustainable development. The way we conceptualize human-nature interactions and our current approach to protecting ecosystem services is exemplified here by the UNESCO Man-and-Biosphere (MAB) Program. The recognition of MAB biosphere reserves on a national and international scale has helped make the protection of biological diversity synonymous with objectives for sustainable development. Section 3 then presents the analytical framework and methodology used in the research. In Section 4 I explore the rise of Chinese protected areas following the 1978 "Open Door" reforms, the current institutional arrangement for managing protected areas, and their role as a tool for regional economic development. The relationship between Chinese conservation and environmental policy and Western<sup>3</sup> conservation approaches is described. Section 5 introduces the case study site and the natural resource management approach in place. Section 6 presents the analysis of policy impacts in the case study highlighting three shortcomings: the distribution of the benefits of tourism; the distribution of the environmental burdens of tourism; and participation issues in managing the biosphere reserve. The discussion in Section 7 examines these outcomes in relation to wider trends in China's approach to environmental and socio-economic policy as well as to global issues facing biodiversity conservation and natural resource management. Finally, the contribution of the research and the conclusions drawn from the study are summarized.

## **2 BACKGROUND: FROM PROTECTING AREAS TO MANAGING BIOSPHERES**

Since the establishment of the first national park in world, the United States' Yellowstone National Park, nearly a century and a half ago, the way we think about nature and the relationship we have with it has shifted. Nature conservation was traditionally about preserving certain areas with high nature values from human impact through a system of protected areas. Over the past few decades, the mindset of scientists and policy-makers concerning the human-

---

<sup>3</sup> In using the term "western", this is meant to refer to theories and policies which have derived from experience or research in places outside China, e.g. those which are not based on Chinese traditional views on nature.

nature relationship shifted, expanding the objectives and goals for these protected areas. Conservation became less about preserving beautiful landscapes and endangered species by restricting human activities and instead began to focus on managing human-ecological systems, aiming at goals such as reducing the current rate of biodiversity loss and contributing to sustainable development<sup>4</sup>. According to Mose (2007) the main goals of a protected area generally include:

- Regulatory functions (e.g. preservation of biodiversity)
- Habitat functions (e.g. welfare effects)
- Support functions (e.g. lowering natural disaster risk)
- Development functions (e.g. sustainable development)
- Information functions (e.g. environmental awareness and education).

Protected areas have been progressively internationalized to include a wider set of stakeholders functioning on multi-scale platforms. The role of protected areas in halting the loss of biodiversity is underscored by the signing of the United Nations *Convention on Biological Diversity (CBD)* in 1992 and agreements reached at several international conferences (see V. World Parks Congress in Durban, 2003; *World Summit on Sustainable Development (WSSD)*, 2002; IV. World Congress on National Parks and Protected Areas in Caracas, 1992) including the adoption of specific targets to reduce the current rate of biodiversity loss by 2010.

From the beginning, the UNESCO MAB Program played a major role in shifting the view on protected areas beyond their role in traditional, nature protection (Batisse, 1997). A network of biosphere reserves was conceived of by UNESCO in 1970 and was initially comprised of 14 different projects addressing human-ecological interactions in a relatively unconventional, innovative, and problem-oriented approach. Biosphere reserves represent “more than just a protected area” (UNESCO, 1996) – they take a ‘full ecological’ approach and facilitate scientific research, training, and enhance local communities’ capabilities and participation in managing them. The UNESCO MAB program is specifically concerned with protecting biodiversity in its biosphere reserves while managing the sustainable use of natural resources in an equitable way. Today, the number of reserves continues to grow, currently over 500 biosphere reserves, covering over 200 million hectares of land in more than 100 participating countries, encompassing a wide range of ecosystems including areas which were already degraded or damaged by human interventions prior to entering the MAB program. (UNESCO, 2009b)

The core objectives of the MAB Program have continually evolved from an initial focus on strictly protecting nature reserve areas to contributing to the Millennium Development Goals (MDG), especially MDG 7 on environmental sustainability, and encompassing issues such as

---

<sup>4</sup> Sustainable development has been interpreted in different ways by the various sectors that use the concept. However, this research takes the United Nations Brundtland Report’s (1987) definition as “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. The 1992 United Nations Conference on Environment and Development (UNCED) and resulting “Rio Declaration on Environment and Development” introduced the concept of a dependent relationship between natural and human systems. This concept has been applied in terms of developing human welfare by sustainably using natural resources in the economy. In principle, sustainable development says we can have it all: social, environmental and economic sustainability.



climate change. The MAB Program's vision statement, formulated at the 2<sup>nd</sup> world conference on biosphere reserves held in Seville, Spain in 1996, emphasized, among other criteria, the importance of collaborating with local people from the area surrounding the biosphere reserves. The resulting Seville Strategy (1996) articulates a vision for biosphere reserves as potential "theaters for reconciling people and nature" not only as a means to balance sustainable use or to involve local people as custodians but to "bring knowledge of the past to the needs of the future". Informing society on global environmental problems through inter-disciplinary education is also an important part of UNESCO's MAB and World Heritage Site programs. The MAB biosphere reserves, as well as World Heritage Sites, provide a permanent protected area which can be used as part of an international network of information exchange and research for researchers and educators alike. Since the Seville Conference, the MAB Program has played an especially influential role giving many existing parks and protected areas additional titles, designation, and significance as well as legal status.

As a result, this strategic and instrumental use of nature conservation has created a new general framework for NRM and set of practical tasks for planning and policy. (see the latest UNESCO MAB revisions (2009) in the *Madrid Action Plan for 2008 – 2013*). Biosphere reserves are managed under a strategic framework, similar to the 'triple-bottom line' of sustainable development, which seeks solutions to tensions between improved livelihoods (economy), reduced biodiversity loss (environment), and enhanced social and cultural conditions for environmental sustainability (society) (UNESCO, 2009b).

The design of biosphere reserves is unique in their demarcation of 3 zones: (i) a Core Zone, (ii) the Buffer Zone, and (iii) a Transition Zone. The Core Zone is the most strictly protected with human disturbances kept at an absolute minimum. Often, it includes habitat protection or wilderness areas which are kept free from human induced pressure. This is surrounded by the Buffer Zone which is under a system of management that ensures the activities, such as tourism or recreation, are carried out in a sustainable, non-degrading manner. The Buffer Zone can be used for scientific demonstrations, recreation, tourism and/or rehabilitation projects to restore the ecological productivity of the area. The Transition Zone forms the outermost boundary of the biosphere reserve. Settlements, agricultural crop production or managed forests are some examples of activities that are allowed and managed in cooperation with the conservation efforts of the biosphere reserve.

## **3 ANALYTICAL FRAMEWORK**

### **3.1 Research Aim**

The aim is to contribute to an understanding of the way China is addressing human-nature interactions. A case study of Jiuzhaigou National Scenic Spot and Nature Reserve (JZG), lying on the edge of the Tibetan Plateau in Sichuan Province, China has been selected to examine China's natural resource management policies and practices. Often promoted as the "success story" of Chinese nature-based tourism (Fang, 2002), Jiuzhaigou is internationally recognized as the "most biologically diverse temperate forest in the world" (UNEP, 2005), listed under the UNESCO – United Nations Educational, Scientific and Cultural Organization – Man-and-Biosphere Program (MAB) Biosphere Reserve network as well as World Heritage Sites, nationally treasured one of China's flagship Nature Reserves, and highly attractive to the

millions of visitors who have come to discover its magical landscape and mystic legends. However, Jiuzhaigou may also be seen as its unintended consequences are an exemplum of the Chinese approach to combining tourism and NRM.

## **3.2 Research Questions**

The following research questions have guided my analysis:

**PRIMARY RESEARCH QUESTION:** To what extent can goals for delivering sustainable development benefits through the development of tourism be satisfied by the current policies and practices for environmental protection in Jiuzhaigou?

**SUB-RESEARCH QUESTIONS:** What is the potential for biosphere reserves to engage communities in biodiversity protection and sustainable development in China? What can the strong points and shortcomings of this case tell us about how biosphere reserves function to deliver sustainable development benefits under socio-cultural or political conditions of constraint?

## **3.3 Methods and Materials**

### ***3.3.1 Overview***

Overall, the study can be characterized as qualitative research. An in-depth case study approach was used to explore Jiuzhaigou. The research strategy combined quantitative data measuring the outcomes of socio-economic and NRM policies with qualitative perspectives from local residents and staff. In seeking to understand the life world of the local communities, the focus was on their interpretation of the changes they have experienced in the hopes of obtaining “nuanced descriptions of different aspects of the subjects’ life worlds” (Kvale, 1996).

### ***3.3.2 Ontological and Epistemological Considerations***

This study focused on the ways “social life is constructed by those who participate in it” viewing the staff as well as the local inhabitants as actors who “actively create an order to their existence” (Mikkelsen, 2005). This led to an approach characterized by elements of critical theory attempting to establish “historically constructed and strongly defined...power-asymmetries and conflicting interests” (*ibid*) in pursuit of the eventual identification of these structures.

I assumed a constructivist view that “social phenomena and their meanings are continually being accomplished by social actors...not only produced through social interaction...in a constant state of revision” (Bryman, 2004). One of my principal areas of focus was how local inhabitants and JAB staff perceived the changes taking place around them, the way they actively participated and possibly reinforced the social constructs surrounding them, e.g. in the government extension of compensation for villagers in the surrounding areas. The impacts on their livelihoods and local environment were not approached as external factors outside their control but as “emergent reality in a continuous state of construction and reconstruction” (*ibid*).

### ***3.3.3 Data Collection***

During the study, I adopted the following principle research methods for data collection:

- (1) **LITERATURE REVIEW:** A literature review was conducted on past research papers from the area as well as more general literature on the topics of: cultural tourism in China, the impact of the 1978 “Open Door” reforms and decentralization process, community participation in natural resource management, environmental issues in China, protected area management, and approaches to conserving biodiversity. Collection and review of official planning documents, historical records and Chinese natural and social science-based literature. Reports published by groups such as UNESCO, the United Nations Environment Program (UNEP), the International Union for Conservation of Nature (IUCN), the World Wildlife Fund (WWF) and the Green Globe 21 (GG21) organization, part of Australia’s governmental-sponsored Cooperative Research Centre for Sustainable Tourism (CRCST) were also reviewed.
  
- (2) **SEMI-STRUCTURED INTERVIEWS:** Conducted with the JAB management from six departments, local residents of the park, and general staff. Seven non-staff participants from two villages within the park were interviewed based on their availability and willingness to participate. Subjects of the interviews included: 1) knowledge or awareness of energy and sustainability issues such as climate change; 2) attitudes toward park management policy; 3) perceived changes in livelihoods; 4) observations on the development of the tourism industry; 5) traditional use and views of local natural resources; 6) family members’ participation in tourism-related businesses; 7) JAB regulations for nature conservation; and 8) the interrelationship between the villagers, the government and the JAB. The interview process tried to give emphasis to the interviewee’s point of view and took place as informal conversations about park management policies and regulations. Interviews were conducted in English with the use of an interpreter. The interpreter translated both the questions, posed in English, and the responses, given in Chinese, in real time. Issues were identified through their anecdotal observations from the staff and local inhabitants. The aim was to allow the interviewees to relate their perspectives on the events and processes taking place within the park through the interview process. However, it was recognized that certain elements of the responses as well as the questions were not always translatable and this influenced the exchanges of information between the respondents and myself. I attempted to register and interpret what was said in as much of a passive way as possible. I was limited to listening to their descriptions while strictly avoiding structuring the topics discussed as to allow for as little influence on the responses as possible.

The approach I strived to achieve was a construction of reality based on an interactive encounter with the interviewees. There are so many different experiences to be considered and the outcome or view created through the interviews depended greatly on how we discussed the topics at hand. The hope was to create what Bryman (2004) refers to as an ‘exemplifying case’ which can give a better impression of the experience from the perspectives of the local villagers and JAB staff in these areas. My goal as a researcher very much depended on what Kvale (1996) refers to as a “floating mind” in which I tried to retain a focus on my research goal while actively listening and continually adjusting the next questions to be asked.

- (3) **PARTICIPATORY OBSERVATION:** For the duration of the field work at Jiuzhaigou, I worked closely with the Science Department at the Jiuzhaigou Administration Bureau (JAB)

in the Jiuzhaigou International Research Center on Ecology, Environment and Sustainability, the JZG Visitors Center and the Nuorilang Service Center. Observations were made in local villages inside the Jiuzhaigou Biosphere Reserve and in the surrounding valley. I took note of the types of products, services, accommodations and activities available to tourists in the neighboring villages.

- (4) **STAFF TRAINING AND WORKSHOP:** In line with the UNESCO objectives for education, annual staff training is organized by the department of Human Resources. During the field work, it was requested that I lead a series of staff workshops on sustainability issues, concepts and share my knowledge on international approaches to conservation management. These were held over a period of three days, from March 10, 2009 to March 12, 2009. Many of the in-depth conversations and discussions took place during this time. Approximately 300 people, a mix of departmental managers and staff from every department, both men and women of various ages and some local residents attended. The lectures were aimed at gauging the staff's knowledge of sustainability issues related to the park and awareness of conservation policies or practices. These focused on information regarding management norms and values, social and economic changes, ranking lists of perceived risks and ways of insuring against/identification of potential improvements on these, moral values, and socially sanctioned goals.

### ***3.3.4 Data Analysis***

The analysis of the qualitative data was primarily inductive, as opposed to deductive (Lofland, 1995) in hopes of producing a detailed account of phenomena of the stakeholders' "general patterns and relationships" (Ragin, 1994). This was in an attempt to "uncover essential features of a case key relationships among these features" (*ibid*). Triangulation was used to try and fully explain this emergence of the management and villagers' behavior by "using who, what, why, where, and when questions to solicit the reasoning behind certain responses" (Dudwick, 2006). As such, my approach was set along the lines of "grounded theory" in terms of analysis and interpretation of the data in the hopes of producing what Bryman (2004) and Strauss and Corbin (1998) refer to as "theory that was derived from data."

### ***3.3.5 Research Limitations***

This study draws on the observations and discussions made during two months of fieldwork in Jiuzhaigou. In such a short time I did my best to try and extract as much of an understanding of the society as was possible. As a researcher who is not Chinese, it is recognized that the way I interpreted the information collected during the fieldwork was affected by my own world view. My own perceptions of what was said or what is occurring in the area is inherently shaped by my own 'cultural filter' and view of what the meanings given by the respondents were or what a local perspective might be. In addition, the use of an interpreter who often literally translated what was being said in English or Chinese has undoubtedly influenced some of the conclusions drawn from the conversations that took place. It is impossible to escape these kinds of filters or perceptions in writing such a study though I tried to avoid imposing my own perceptions in interpreting certain messages being conveyed by the interviewees.

## **4 THE CHINESE MODEL OF NRM AND TOURISM DEVELOPMENT**

Since at least the 1990s, the policies and implementation of PAs have been a controversial subject in the debate on sustainability and addressing environmental degradation in China has been especially problematic. In response to growing public concern over the environment in recent years, the Chinese government has been ambitious in enacting a series of policy reforms prioritizing socio-economic and environmental issues.

China's approach to protecting areas and conserving nature is quite unique considering their historical and contemporary policy reforms. In the last fifty years, Chinese environmental policy has been developed and influenced by a number of factors: changes in institutional authority and local management responsibilities, political and ideological shifts at the national level, and growing responsibilities and an increasing role in the global community. In part, policy-makers have made biodiversity conservation look like and conform to the NRM model set in the West.

### **4.1 Decentralization and the 1978 “Open Door” Reforms**

The principles and ideology of the socialist system embedded in Chinese social and political institutions have remained strong throughout the rise of China's economic development. China's recent astounding economic performance has come about following Deng Xiaoping's “Open Door” policy reforms in 1978. The reform process initiated a slow transition from a centrally-planned economy to a free-market economy.

China's reform trajectory has seen significant achievements from the political and economic decentralization which took place over the past thirty years. New job markets were created, entrepreneurial businesses began to thrive and the standard of living was lifted for hundreds of millions of Chinese people. The economic success of the reforms has been rooted in a capitalist world view that embraces ‘socialist values’ such as equity and equality, claiming to build a ‘socialist’ market economy (Yin, 2009). Market economy has allowed the government to create the economic controls to achieve its socialist goals (Yin, 2009). Lin (2009) clarifies this by noting that the foundation of the ‘socialist market economy’ is built on ideas that China can “use market mechanisms and advanced managerial and technological skills from the capitalist world for its own socialist purposes.”

The reform of institutions has lessened the state's centralized planning and control over natural resources. Under the centrally-planned economy, a few national parks and scenic areas were directly controlled by the government. A decentralization of NRM and decision-making processes followed the economic policy reforms in 1978 during which time a transition of management rights and fiscal responsibility was passed down to local governments. The 1988 National Wildlife Law of China (PRC 1988) makes clear the promotion and protection of wildlife and the Forest Law in 1998 effectively gives rights to local governments to sell and transfer forest resources (Xu *et al.*, 2005).

NRM responsibilities were further decentralized in 1998 under the Organic Law of the Village Committee. Accountability was given to elected village-level leaders and institutions, instead of

township-level authorities, that were granted the right to self-govern and gained unprecedented national recognition and authority. This constituted the last major shift allowing increased local participation in decision-making processes (Xu *et al.*, 2005; Xu & Ribot, 2004).

The economic reforms and decentralization process have catalyzed major institutional changes such as the reduction of societal control in the form of worker's collective or commune systems. Yet, in many ways the Communist Party and state's *authority* remains stable even if some decision-making power has been conceded to lower levels of government. Sun (2008) writes that it is this slow government decentralization which has allowed the governments' authority to remain stable even if some power has been conceded to lower levels of government as a result.

Although the management of many natural resources has been given to local authorities, national parks continue to be treated as national property and public resources. For example, the central government has prioritized environmental protection in its national policy distinctly maintaining the right to intervene in the management of the parks even if day-day operations are controlled by lower government authorities (Ma *et al.*, 2009).

## **4.2 Contemporary Chinese NRM Policy for Protected Areas**

The Chinese view of the environment has been characterized by its utilitarian roots (Kellert, 1983) viewing nature as “something to be *used* by mankind” (Harris, 1996) only recently shifting as the ramifications of using natural resources as “free” inputs has moved into the foreground and entered public debate.

The first national parks system, referred to as “nature reserves” or “scenic spots” as National Parks do not exist *per se* in China, was set up starting in the 1980's with the ratification of the Environmental Protection Law and Forest Law. China now has one of the largest and fastest growing systems of nature reserves in the world (what would be referred to as National Parks in other areas) with its vast network of more than 2000 nature reserves (Liu & Diamond, 2005).

There are a number of differences as well as similarities between Western and Chinese views on nature conservation. Chinese conservation policy has followed a traditional management perspective, i.e. an approach to balance use and preservation to protect the ecosystem goods and services of the park while ensuring sustainable recreational use. The continued transition of Protected areas from preservationist characteristics to conservationist ones has been reflected in the growing multitude of diverse expectations for Chinese Protected areas as well.

The government has enacted many environmental laws and regulations which appear to have somewhat similar approaches to what can be seen in European or American legislation (Harris, 1996). China's legislation on biodiversity conservation closely follows the model set by the UN 'Convention on Biodiversity'. The government's goals are in line with the international community's global target of designating 12 percent of terrestrial surface area as protected areas (see UNCBD, 1992).

On the other hand, China's approach to protecting areas and conserving nature is quite unique considering their historical and contemporary policy reforms. The radical shift in economic approach, social structure, and management of natural resources in the past twenty years has been dominated by the narrative of the reform process. Changes in institutional authority and

local management responsibilities, and political and ideological shifts at the national level have all greatly influenced Chinese environmental policy. Although research on protected areas' theoretical and practical dimensions has greatly influenced policies elsewhere, in China these studies generally cover a narrower field of topics and lack the historical development other countries have experienced.

A significant paradigm shift regarding the management approach to nature conservation has been taking place driven in part by the rise of tourism, often seen as a panacea to improve nature conservation and as a stimulus for regional development. Protected areas are viewed as instruments with which to stimulate regional development and provide the much needed conservation funds to protect the environment especially in peripheral areas faced with poverty problems and socio-cultural inequalities. As such, the government has prioritized environmental protection and biodiversity conservation as part of centrally planned policies for tourism development including objectives for livelihoods creation and rural economic development. (Ma *et al.*, 2009)

### **4.3 Chinese Tourism Development**

The growth of China's tourism industry has been rapidly expanding since Deng Xiaoping's policy reforms in 1978. Prior to this, under Mao Zedong's leadership, the central government was resistant towards tourism development and movements within the country were highly restricted (Yan & Bramwell, 2008). Just one year later Deng Xiaoping first highlighted the potential of tourism for economic growth and income generation stating that, "there is a lot to be achieved through tourism" (CNTA, 2000). This led to endorsements by government agencies who began to see it as "a vehicle which could help to achieve national and local economic development, especially for poor areas with rich tourism resources" (Hu, 2005; cited in Yan & Bramwell, 2008). According to the World Tourism Organization (UNWTO), in 2007 alone Chinese tourism receipts alone reached a total of US\$ 159.5 billion, roughly equivalent to 1090 billion ¥. The tourism sector's development continues to be highly valued strategically for its potential to attract foreign investment (Oakes, 1998; Zhang, 2003). Investments in infrastructure have been targeted in areas with distinct natural, cultural, and heritage value, including protected areas (Xu *et al.*, 2009), and areas of low economic growth (Liu, 2001) to be developed as tourist destinations.

Many remote and biodiversity rich areas are also inhabited by minority ethnic groups in China. The government officially recognizes fifty-six different ethnic groups, totaling about 104.5 million people in an area covering about two-thirds of China (International Office of the State Council, 2005; cited in Yang *et al.*, 2006). Following the success of the "Open Door" reforms, the state began supporting tourism as a means to help 'modernize' minority groups yet also preserve many distinct cultural and heritage value areas to be developed as tourist attractions. (Yang *et al.*, 2006) Interest in sacred religious sites such as temples or holy mountain pilgrimage sites was aroused and the government began to see these sites as "cultural attractions" potentially bringing about benefits for local and regional economic growth (Xu *et al.*, 2005). Ethnic minorities have a certain degree of autonomy from the state but a long history of tension with the majority Han Chinese (accounting for 92 percent of the total Chinese population). In areas such as Xinjiang or Tibet the state has closely followed and controlled the religious practices and cultural identity of the ethnic minority groups (Yang *et al.*, 2006).

Tourism development has occurred within multi-level governance but remains heavily influenced by the national government (Yang *et al.*, 2006) especially in developing nature-based and ethnic tourism industries areas (Swain, 1990). As part of the 1978 reforms, a decentralization process has managed to increase the number of stakeholders including publicly- and privately-owned companies, management enterprises, international and local non-governmental organizations (NGOs), tourists as well as local inhabitants. However, this has also yielded what Ma *et al.* (2009) refer to as ‘planned competition’, creating a system where regulations are often incompletely implemented. Balancing the influence and agendas of all the actors involved becomes a complex task for local managers or government institutions and also for the people living in the area who must find a role in influencing the decisions being made.

## 5 THE CASE STUDY: JIUZHAIGOU

### 5.1 The Setting



**Figure 1 Location of Jiuzhaigou**  
(Maps: MSN, 2009; Fang, 2002; Photo: Yamashita, 2009)

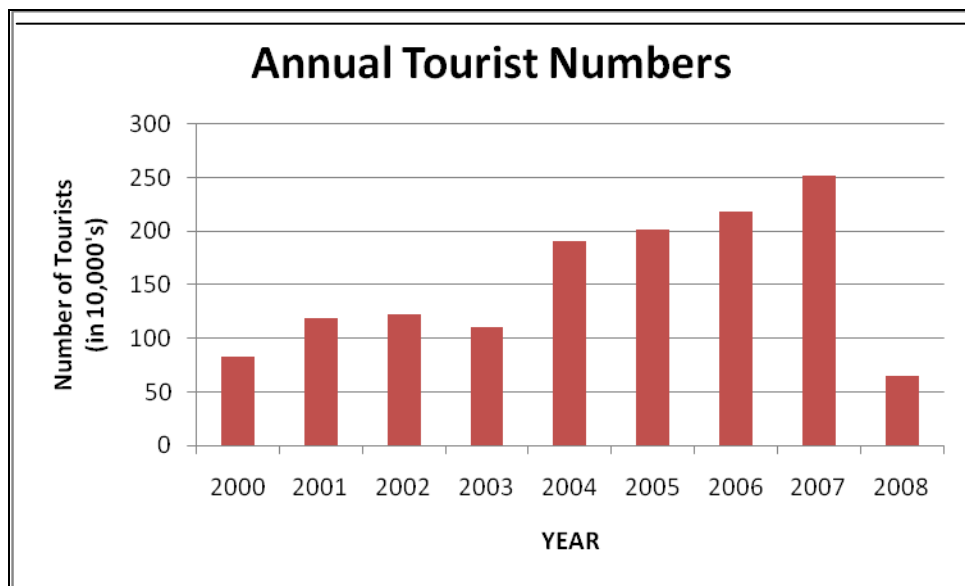
Jiuzhaigou, meaning *nine-village valley* in Chinese, lies on the southeastern rim of the Qinghai-Tibet Plateau in northern Sichuan Province, China (see Figure 1). The Jiuzhai Valley is characterized by the surrounding Minshan mountains, and the protected area covers 720 km<sup>2</sup> with an average altitude around 3300 m. The steep alpine valleys drain the Jiuzhaigou watershed (728.3 km<sup>2</sup>) into the Jiuzhaigou River eventually feeding into the Jialing and Baishu Rivers. Climate varies from cool, dry winters to mild, wet summers (January averages 2.5°C and 43 mm of precipitation; July 10°C and 104 mm). (IUCN, 2006)



The pristine forests surrounding the valley are some of the most biologically diverse and threatened alpine systems in the world. (Bauer *et al.*, 2002) The biosphere reserve is part of a habitat breeding corridor for Giant Pandas stretching through Sichuan Province and is the only known breeding habitat for Red-Headed Robins. Other endangered species include the Red Panda, Golden Takin, Golden Monkey, Snow Leopard, Argali and White-lipped Deer. More than 300 vertebrates and 2,400 total species of flora have been listed in the area including several rare monotypic species and rare orchids (*ibid*).

Large numbers of domestic and international tourists are drawn to marvel at the snow-capped peaks, unique forests, 17 impressive waterfalls, and 114 colorful lakes, and 47 springs. Tibetan cultural values and folklore are strongly associated with the site as Tibetans have settled in the area for more than 1,000 years (*ibid*). Jiuzhaigou derives its name from the nine Tibetan villages found within the Jiuzhai Valley. Traditional Tibetan-style decorated housing, costumes, ceremonies, festivals and religious and sacred sites can be found in the villages scattered around Jiuzhai Valley, further enhanced within the reserve by the presence of around 1,000 Tibetan residents within the biosphere reserve.

Tourist arrivals in Jiuzhaigou have been rapidly increasing since the late 1990's. From 1984 to 1991 the number of visitors increased by 50,000 continuing to rise sharply as infrastructure developed in the area. Once a highway was built from Chengdu, travel time decreased from two-days to 12 hours leading to a jump in visitors exceeding the 1 million mark by 2001. Before the Wenchuan earthquake in 2008, JZG was averaging around 7,000 visitors per day, reaching more than 2 million annual visitors in 2005 alone (see Figure 2). More than 90 percent of these are domestic tourists. (Li, 2006)



**Figure 2 Number of Annual Tourist Visitors**  
(SCTA, 2009)

The spring of 2008 had been a tumultuous period for Jiuzhaigou. To the west of Sichuan Province, Tibetan protests and rioting began in the Tibetan Autonomous Region in March. This

conflict quickly spread to other Tibetan-inhabited areas including Aba Tibetan-Qiang Autonomous Prefecture where JZG is located. On May 18, 2008, a 7.9 magnitude earthquake struck Wenchuan County, located in the same Prefecture as JZG. More than 68,000 perished as a result. (Jacobs *et al.*, 2009) As can be seen above in Figure 2, the number of visitor have greatly dropped following these events. Although no significant damage to the park was reported, the restricted tourist access imposed immediately afterwards resulted in significant losses for the local economy. The JAB staff and local residents were impacted by both these events and concerned about the return to a more normalized state of tourist activity in the area. These events have created an increased sense of vulnerability among all those residing in the area, especially the people dependent on the tourism industry for their livelihoods.

## **5.2 NRM Strategies**

Before being established as a Nature Reserve by the State Council in 1978, the Jiuzhai Valley was extensively logged and about one third of its lakes were reportedly “dried up” as a result. (Han, 2006) Since then, the government’s conservation efforts have successfully reforested and rehabilitated most of the area and starting in the 1980’s the tourism industry rapidly developed (see Table 1 for a list of milestones in Jiuzhaigou’s development).

**Table 1 Important dates in the park's development**

<b>1975</b>	Ministry of Agriculture and Forestry studies Jiuzhaigou and recommends its conservation.
<b>1977</b>	Sichuan Rare Animal Investigation Team proposes Nature Reserve status for Jiuzhaigou.
<b>1978</b>	Jiuzhaigou Nature Reserve established by the State Council.
<b>1984</b>	State Council listed Jiuzhaigou as a National Key Place of Scenic Interest.
	Nature Reserve Administration established, and the park opened to visitors.
	Approximately 32,000 tourists visit Jiuzhaigou.
<b>1988</b>	Unified management established by combining the staffs of three previously separate organs of Township Government, Administration and Management Bureau.
<b>1989</b>	First dismantling of 'illegal' housing in Jiuzhaigou
<b>1991</b>	165,784 tourists visit Jiuzhaigou.
<b>1992</b>	Jiuzhaigou inscribed on the World Heritage List by UNESCO.
<b>1993</b>	Jiuzhaigou Co. Ltd. established.
<b>1994</b>	Jiuzhaigou upgraded to a National Nature Reserve by the Ministry of Forestry.
	Overall Plan for the Management of Tourism promulgated by the Jiuzhaigou Administration.
<b>1997</b>	Designation as a World Biosphere Reserve (MAB).
<b>1999</b>	Green bus system initiated. Construction of a sewage disposal system begun.
<b>2000</b>	Jiuzhaigou-Huanglong approved by the State Council as a National Key Scenic Resort by the Ministry of Construction.
<b>2001</b>	Network of board walk trails established for visitors who wish to see the site on foot.
	Over 1 million tourists visit Jiuzhaigou. Measures taken to limit the number of tourists to 12,000 per day.
<b>2002</b>	Certification by Green Globe 21. All hotels within the park closed down.
<b>2003</b>	Green toilets established within the park. Renovation works conducted to widen the highways within the park, pave them in asphalt and plant adjacent slopes in grass.
<b>2004</b>	Jiuzhaigou listed as a National Geopark by the Ministry of Land and Resources.
	New tour bus fleet put in place, meeting EU III emission standards.
	Over 1.91 million tourists visit Jiuzhaigou.
<b>2008</b>	Tibetan riots begin
	Wenchuan earthquake

(Adapted from IUCN, 2006; Feng *et al.*, 2005; Jiuzhaigou, n.d)

The Chinese government has recognized JZG for its well-preserved natural beauty granting it the status of National Nature Reserve and National Scenic Reserve and Geological Park. The Jiuzhaigou Administration Bureau (JAB) is the government agency which directly manages the

area<sup>5</sup>. Jiuzhaigou's status as a UNESCO World Heritage Site and UNESCO biosphere reserve provides a framework for the protection and management of the site and has been recognized by the Green Globe 21 certification program (GG21), a set of Australian benchmarking standards for ecotourism based on Agenda 21. Forty different Chinese laws and regulations are in place related to the resource conservation and biodiversity protection in the area.

Individual, specialized master plans must be approved by the various state bodies involved, working at different government levels – Nanping (Jiuzhaigou) County, Aba Tibetan-Qiang Prefecture, Sichuan Province, the State Forestry Administration, the Environmental Protection and Resources Conservation Committee of the National People's Congress, and the Ministry of Construction and Department of Land and Resources. A ten-chapter master plan was first developed by the Sichuan Urban and Rural Planning Institute in 1987, and updated in 2000 by the Sichuan Forestry Survey and Design Institute and the Sichuan Wildlife Resource Survey and Conservation Management Station. Baseline data was compiled and contextualized within a zoning plan of the site (primarily for sightseeing and tourism facilities), and serve as a guide for conservation planning, core scenic sites, representative landscapes, tourism facilities, infrastructure development, local housing management, land-use coordination and for planning implementation. The updated master plan (2000) focuses on community co-management, covers the management, training, legal framework and enforcement for monitoring and planning tourism in the nature reserve from 2001-2020. (IUCN, 2006)

### ***5.2.1 Regulations to Protect the Environment***

The JAB has developed regulations and measures to minimize and protect the local environment from the impact of the large numbers of tourists visiting the area. Environmental management measures include spatial planning for tourism activities and infrastructure, legal mechanisms such as a logging ban in the area, the substitution of liquefied natural gas for energy & transportation in the Green Bus system, electrification, and the development of a waste water system for the villages lying within the reserve. Local inhabitants have also been subsidized by ticket revenues in order to off-set their economic losses with the land-use restrictions.

Within the biosphere reserve, over 480 million Chinese Yuan (¥) has been spent on infrastructure to minimize visitors' impact including the building of 55.5km of paved roads, viewing pavilions, eco-sanitation toilets, wooden-plank trails and pathways, service centers, and sewage systems (see Table 2). Limits have been set on the maximum number of daily visitors, currently 12,000, and all accommodations have been restricted to areas outside the park.

---

<sup>5</sup> The JAB is officially managed under the State Forestry Bureau, the National Construction Ministry, and the State Tourism Bureau. The JAB is comprised of a conservation division, a scientific research center, and a planning division.

The park is equipped with the latest communications technology and computer systems for monitoring environmental changes. Fire prevention and biodiversity are monitored by seven

**Table 2 JAB habitat conservation efforts in Jiuzhaigou Nature Reserve since 1990's**

<b>Initiative</b>	<b>Corresponding measures</b>
<b>Maintenance of ecosystem/nature</b>	Debris flow mitigation in 14 severely affected areas including Heye Valley, Shuzheng Valley, Jijiehaizi Valley, Rize Valley and Zharu Valley.
	Restored slope land > 25° to forest or pastures 600 hm <sup>2</sup>
	Conserved natural forest and prohibited residents from cutting trees
	Set up full-time fire brigade, mountain-patrol team and 6 safeguarding teams in the valley
	Ecological and environmental monitoring stations for forest pests and disease, meteorology and water resource quality
<b>Controlling carrying capacity of tourism</b>	Limited the number of daily tourists to 12,000
	Construction of 60 km of wooden plank trails for tourism to minimize tourist impacts on ecosystem
	Popularized use of liquefied natural gas as energy for local farmers and Green Bus fleet of 227 tour buses
	Constructed treatment system of household wastewater and 32 automatic, flush-free eco-toilets
<b>Industrial structure adjustment</b>	Shifted agrarian-based economy to tourism-based
<b>Infrastructure</b>	Paving of roads from Nuorilang to Rize, Yangtong to Nuorilang, Nuorilang to Long Lake
	Development of communication infrastructure including telephone and internet cables to provide mobile communications to the valley
<b>Regulation of human Behavior</b>	Relocated some business activities outside of the park and the valley
	Resettlement for residents in valley
	Controlled the number and location of horse-rental business

(Adapted from Feng *et al.*, 2005; Jiuzhaigou, n.d.)

ranger stations with patrols. Specially trained staff support the research and monitoring programs in the science and conservation departments of JAB and a fleet of service vehicles are available to the staff. Mobile phone service is available within the park. Rangers and firefighters communicate via hand-held radios. Offices are equipped with computers and internet service is available. Geographic information systems (GIS) and a Terrestrial Ecosystem Monitoring Site have been set up for meteorological observations and for controlling forest pests and disease. (see Table 2)

### 5.5.2 Community Participation Approach

One of the UNESCO MAB objectives is to “ensure the harmonious co-existence of rural populations and the ecosystems from which they derive their subsistence and income” (Batisse, 1997). As a UNESCO world heritage site<sup>6</sup> and MAB biosphere reserve, Jiuzhaigou recognizes the importance of including the local inhabitants in the decision-making process.

Participation<sup>7</sup> in designing and effectively managing the tourism industry’s development has taken the form of private or collectively-owned “shared-capital ventures” with JAB such as the Green Bus company<sup>8</sup>, with shareholdings held by local communities; compensation for park policy restrictions such as disallowing the hiring of private vehicles to tourists inside the park; afforestation programs which incentivize local inhabitants from villages within the park to plant trees in former agricultural plots (see Table 3 for a full list of community development initiatives). Hiring local staff has also been prioritized by the JAB and preferential employment is given to residents for work as part-time garbage collectors, maintenance workers and cleaners, forest rangers, etc.

**Table 3 Community-based co-management initiatives**

Major fields	Corresponding measures
<b>Training and education</b>	Trying to make local people aware of the urgency for protection and calling forth their responsibility
	Trying to raise the level of service and to nurture a community spirit among local residents
	Trying to respect local customs of ethnic minority groups
	Preserving and expanding local culture of ethnic minority groups
<b>Community economy</b>	Developing family hotels
	Developing commercial mineral water
	Developing special tourism program based on local folk customs and products
	Promoting development of eco-tourism
<b>Co-management Organization</b>	Established group of community co-management
	Promoted local residents to participate in the whole process of reserve plan, removing out of valley for business activities, resettlement, and employment decision-making

(Adapted from Feng *et al.*, 2005)

In 1998, JAB created a Community Management Office within the JAB Management department to act as its liaison to the village communities inside the park. Representatives of Shuzheng, Heye and Zharu villages sit on the Residents’ Committees, formerly the Village

<sup>6</sup> The international Convention concerning the Protection of the World Cultural and Natural Heritage, adopted by UNESCO in 1972, focuses on building public awareness for and encouraging the participation of locals in protecting and preserving cultural and natural heritage deemed “outstanding value to humanity”. (UNESCO, 2009a)

<sup>7</sup> This was limited to the communities and villages lying within the boundaries of the core zone of the biosphere reserve.

<sup>8</sup> The Green Bus system replaced more than 400 private cars and buses with a fleet of almost 200 Euro 2 buses fueled by liquefied natural gas to reduce vehicle emissions in the park.

Committees and work directly with the JAB. The Community Management Office functions as the lowest administrative level in the state management system; is in charge of handling community issues raised on behalf of the JAB; deals with daily park management issues, such as collecting statistical data; and is responsible for forming a liaison with the Residents' Committees.

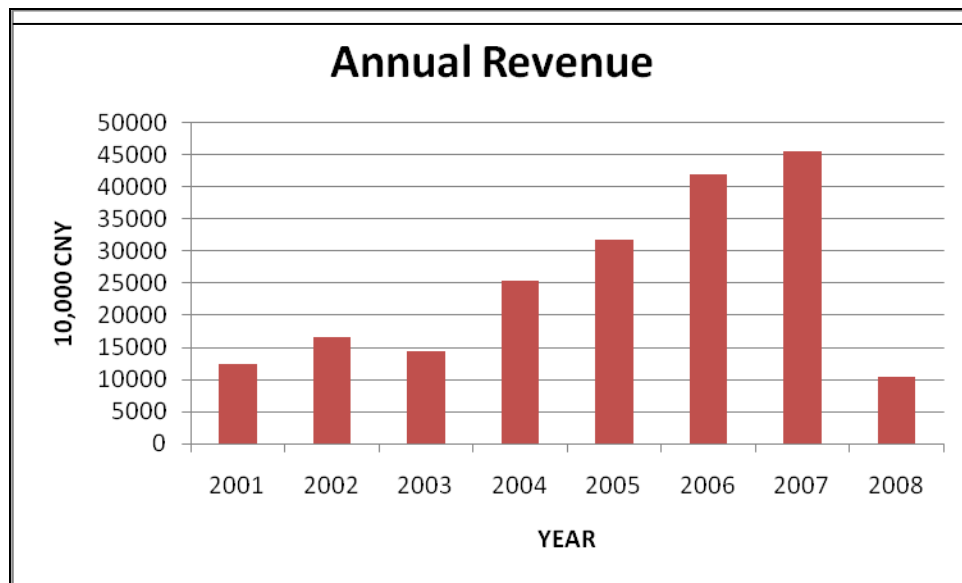
Informing society on global environmental problems through inter-disciplinary education is an important part of UNESCO's MAB and world heritage site programs. Jiuzhaigou provides information and a permanent site for research addressing the loss of biological diversity as part of the MAB international biosphere reserve network. Since 1996, more than 10 million ¥ has been spent on producing more than 100 scientific publications related to the area. (Jiuzhaigou, n.d.) Jiuzhaigou also conducts regular training of its staff, hosts training workshops on site, and exchanges information with other reserves through the MAB newsletter.

## 6 ANALYSIS

In applying a sustainability perspective of Jiuzhaigou's approach to NRM, I have structured the analysis in three spheres – economy, environment, and society. Sustainability is an integrated concept and few factors are clear cut into only one of them. However, this division still provides a way of sorting key aspects out of the positive and negative impacts.

### 6.1 Economic Impacts of NRM

Before 2008, tourism activities had been generating around US\$100 million annually for the local economy (see Figure 4) and tourism was the largest sector for local economic development. (Han, 2004) The JAB generates significant revenues through the 235 ¥ tourist entrance fee. A substantial portion of this is paid directly to the Aba Prefecture government. Credit financing for investments in infrastructure in the reserve comes from the local governments but must be approved by the provincial leaders.

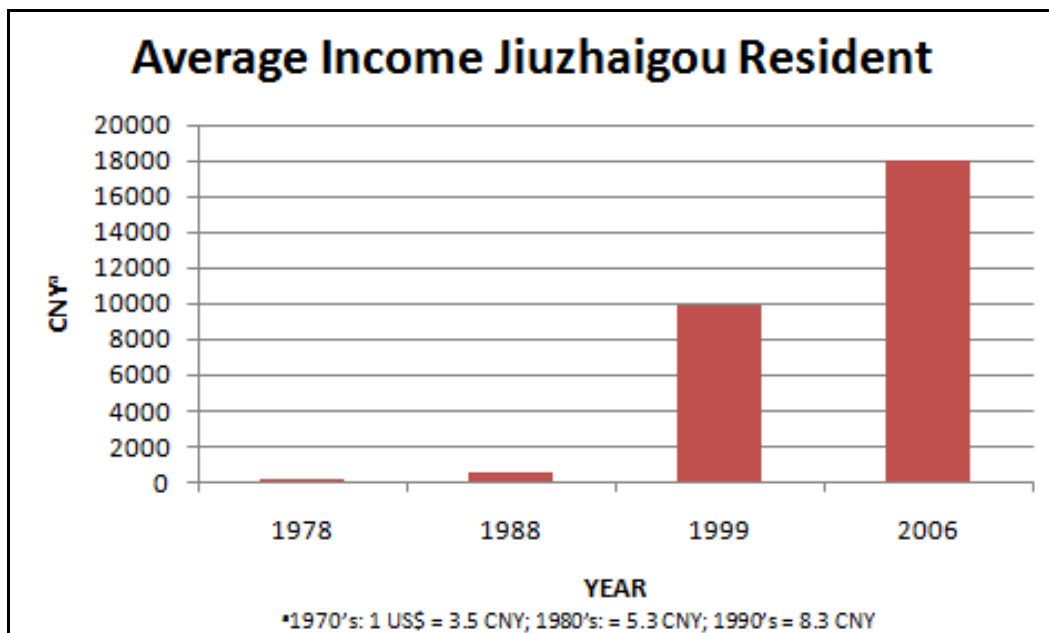


**Figure 3 JAB Annual Revenue (2001-2008)**  
(SCTA, 2009)

In 2005, JAB had an operational budget of 98 million Yuan of which 26 million was paid in staff salaries and 14 million in compensation to local inhabitants. Overhead costs such as vehicles or communications, maintenance and day-to-day operations accounted for the remaining 58 million Yuan. Future developments currently being considered are the creation of ecotourism in the Zharugou Valley to include a visitor center, conference center and hotel resort, trails and camping and planning for waste disposal and communication systems as well as an underground car park facility. (JAB, 2009, personal communication)

The people living in the Jiuzhai Valley were subsistence farmers and livestock holders for centuries. Before conservation measures were implemented in 1978, the residents of the Jiuzhaigou Valley were living a relatively low-income, agrarian lifestyle. Forestry accounted for 78 percent of the local economy (Fang, 2002) and the average local income per capita was 195 ¥. As seen in Figure 5 below, by 1988 average per capita income had increased by 188 percent and by 1999, 477 percent (Li, 2006) and by 2006, the average income was 18,000 ¥ compared with the average income of 1,200 ¥ for a resident elsewhere in the county (Dombrowski, 2006).

As tourist numbers at Jiuzhaigou have grown many local Tibetans have taken advantage of the economic opportunity to earn money from tourism using their ethnic and religious traditions for the tourist audiences. In the areas surrounding the entrance, traditional dress, foods, drinks, cultural dance and musical performances showcase the local population’s spiritual and traditional heritage.



**Figure 4 Average per capita income for resident of JZG**  
(Adapted from Dombrowski, 2006; Li, 2006)



Protecting biodiversity and stimulating regional development has required all the residents in the three MAB zone areas to face restrictions in order to preserve the natural habitats. Economic compensation is paid to the residents of the biosphere reserve for foregoing activities such as traditional yak herding or collecting fuel wood. The JAB allots 7 ¥ per entrance ticket sold to each of the park residents as part of this subsidization program (IUCN, 2006). Annual subsidy payments of approximately 7,000 ¥ per resident include a 450 ¥ monthly subsidy for forest protection, employment or shareholdings in the Nuorilang Service Center restaurant, and employment in the park's day-to-day operations or management. During the high season from May to October, the average monthly income of non-administration staff is around 450 ¥.

Before 2001 when hotels were restricted inside the park, each family received 40,000 ¥ annually from JAB. Booking of accommodations was controlled by the JAB as a means to control the market saturation of hotel development within the boundaries of the park. Since the lodging restriction was implemented by JAB each community member has received 6000 ¥ per year to compensate for the lost income.

## 6.2 Environmental Impacts of NRM

The JAB has adopted a number of sustainable development policies to ensure the impacts of tourists are within the carrying capacity of the area. Strong economic and legal support provided to the JAB has helped preserve the habitat for its many endangered species and resulted in many positive changes in the local environment: vehicle emissions have been reduced in the park after the Green Bus system was initiated; debris flow mitigation has helped protect five of the major valleys; slope land greater than 25 degrees (more than 600 hm<sup>2</sup>) has been converted to forest or pasture land; and forest cover has increased to 6.7 million ha (see Table 2).

**Table 4 Land-use change in Jiuzhaigou County 1987-2002**

Percentage changes in land use coverage 1987, 1997 and 2002, Jiuzhaigou County		
Land use coverage type	1987-1997	1997-2003
Forest	-8	+2
Shrubbery	+131	+11
Grassland	+22	0
Waters	+33	+229
Farmland	-26	-61
Residential land	-28	+119
Bare land	+5	-15

(Li *et al.*, 2006)

Land use coverage of all types has increased significantly (see Table 4), reductions in soil and water losses have been greatly reduced, and bare land cover has been reduced by 12 percent (Li, 2006). The total land area under vegetative cover is currently near 90 percent (Fang, 2002).

For all the JAB management efforts to minimize the impact of tourism, some of the impacts taking place are accruing in geographic areas far from the conservation zone. One such issue is

aviation-related emissions and climate change: much of this biophysical damage has not been visible yet due to a time lag between cause and effect. As seen in Table 5, although only 10 percent of all tourists arrived in Jiuzhaigou by air transport, they were responsible for more than 40 percent of all CO<sub>2</sub> transport emissions related to Jiuzhaigou's tourism.

**Table 5 Transport emissions related to Jiuzhaigou's tourism in 2004**

Area Travelled	Mode of transport	Proportion of tourists	CO <sub>2</sub> emissions generated (tons)	Proportion of total CO <sub>2</sub> emissions (%)
<b>Arrival to Chengdu (average figure for domestic)</b>	Rail	0.65	95775.8	37.98
	Coach	0.25	26522.5	10.52
	Air	0.1	70726.7	28.05
<b>Chengdu to JZG</b>	Coach	0.85	26913.3	10.67
	Air	0.15	31662.7	12.56
<b>Inside JZG</b>	Green Bus	1	558.3	0.22
<b>TOTAL</b>			252159.3	100

(Adapted from Zhang, 2008)

Table 5: Tourists arriving by air, both to Chengdu and then on to Jiuzhaigou, account for 40 percent of all transport-related CO<sub>2</sub> emissions.

Tourism and especially tourist arrivals by air transport have generated large biophysical impacts unaccounted for in local-level sustainability analyses. Despite the heavy air travel associated with most tourist destinations, these have been generally excluded from analyses in the literature on sustainable tourism. (OECD, 2000; Hoyer, 2000; as cited in Patterson, 2005) If decisions are made to control the size of the tourism industry in Jiuzhaigou based on an evaluation of local impacts alone, the local carrying capacity can be overestimated.

One way to assess the additional environmental burden imposed by a growing number of tourists visiting the park is to compare the outcome of local environmental management efforts and the biophysical impact of tourists' including their travel behavior. An indicator capable of assessing the impact of air travel emissions is the ecological footprint (EF). The EF relates the resource use and wastes of a population in relation to the area of biologically productive land required to support that population's consumption.

A 2008 study by Zhang on Jiuzhaigou's ecological footprint found that visitors to Jiuzhaigou have an EF more than nine times greater than the reserve's residents and generate 89 percent more waste. Furthermore, the results showed that transport related emissions accounted for 99.84 of the total EF for tourism activities associated with the reserve. The management efforts to minimize local environmental impacts may be effective but the majority of damage is taking place outside the local system.

## 6.3 Social Impacts of NRM

Environmental stewardship and conservation efforts need to negotiate and include a wide range of interests in order to be successful. Many of the managers and staff encountered during the course of this research expressed an eager and earnest desire to preserve the natural environment and make changes to help improve the status for the people living the area. Most had an added stake in protecting the local environment as they come from local communities or held traditional beliefs about Tibetan spirituality associated with the mountains and landscape.

Local community members expressed a desire to more actively participate in decision-making, to share their knowledge and experience from centuries of sustainably living off the land, and make their valuation of the resources heard. It is exactly this kind of interaction and “cooperation of local communities and their engagement” which is deemed crucial and supported by the UNESCO programs’ guiding frameworks in place.

One of the first cooperative efforts forged between the JAB and the local communities came about following an environmental ban on private vehicles<sup>9</sup> within the park including all tour buses. As a form of compensation, the Green Bus Company was created in 1999. The company held a monopoly over transport inside the park and shares were held only by the local resident communities within the park. By 2003 the fleet had grown to 350 buses, annual turnover grossed more than US\$12 million and the gross annual per capita income of the shareholders was US\$11,000. (Li, 2006) However, the company was eventually taken over by the Aba Prefecture Government and the local residents’ shares dropped to a mere 20 percent. (*ibid*; JAB, 2009, personal communication)

The JAB and local residents entered into another “shared-capital venture” with the building of the Nuorilang Service Center later that same year. The restaurant can serve up to 5000 people at any given time and a shopping mall is housed in the same facility with a souvenir stall contributing a significant amount of income to each of the local households. The Nuorilang project seemed to ease the tension and displeasure among the residents after losing majority control of the Green Bus Company shareholdings. (JAB, 2009, personal communication)

Priority for hiring is given to residents of Zharu village due to its distance from the areas most frequented by visitors (Li, 2006). In 2006, one third of the managers working in the JAB were local residents and 15 percent of the 252 minority staff members came from the communities in the reserve(see Table 7). (*ibid*)

---

<sup>9</sup> The ban was initiated to reduce vehicle emissions. The smoke and noise had also been a cause for complaint among many of the JZG villagers. A “Green Bus” runs on liquefied natural gas and has a EURO-2 standard engine.

**Table 7 Ethnic Minority JAB staff**

<b>Minority</b>	<b>No. of staff</b>
Tibetans	197
Qiang	29
Muslim	18
Man	4
Mongolian	2
Tujia	2
Local Community	15%
TOTAL	252

(Li, 2006)

In 2005, 473 full-time staff were employed along with another 200-300 day short-term laborers. Aha Prefecture has set a limit to the staff numbers at 500 though after the disruptions in 2008, the number of staff employed as well as salaries have both decreased. (JAB, 2009, personal communication) Previous policies giving preferential treatment to local applicants for managerial positions has been slowly lifted in favor of a system of merit-based recruiting. (*ibid*)

Despite the tremendous rapid economic growth experienced the past few years, the impact on communities in the valley has been extremely varied. A related issue of contention has been in defining the official resident status for inhabitants of the park in order to fairly distribute the subsidy compensation. (JAB, 2009, personal communication) According to an IUCN (2006) report, the office has claimed that, “incomes of villagers inside the park are higher than those outside, and that locals prefer to move into the park (e.g. via marriage) rather than out for this reason”.

Concerns were voiced by some residents of villages lying outside the park regarding the inequitable distribution of benefits from the rise of JZG’s tourism. A large disparity in the sizes of homes and provision of amenities can be observed between the villages inside or surrounding the entrance and those found further away. While traveling to and from the park a noticeable difference in the size, style, age and characteristics of the homes could be seen. The further from the entrance a village was, the smaller and less-equipped the houses seemed. Instead, villages within JZG or just outside the entrance had amenities such as solar-panel heating systems, internet connections or satellite dishes.

However, feelings of inequality were also present for some living inside the park. Some residents remarked that the nearby villages such as Zhangzha, were actually better off since there were fewer restrictions on housing construction and income-generating activities. (JAB, 2009, personal communication) Among the villages inside the park it was noted that the houses in Shuzheng and Zechawa Village, both lying in close proximity to bus stops on the Green Bus tour, were relatively larger than most other houses inside the park (e.g. those in Heye Village, further away from any Green Bus tour stops). Shuzheng appears to be the wealthiest of all the villages in the area and is also the final bus stop on the tour inside the park. Tourists are

encouraged to get off the bus and experience traditional Tibetan culture by trying products such as Yak-butter tea or having their photos taken in traditional ceremonial dresses. Many of the cars parked outside the homes in Shuzheng were new, expensive-looking imported cars (e.g. Japanese or European Sport-Utility-Vehicles and large sedans).

The management takes these concerns seriously and has taken measures to try and ensure that the benefits of tourism reach more families and communities (JAB, 2009, personal communication). Yet, this official stance seems to contradict some of the proprietary regulations for park businesses. Commercial businesses operating inside the park are limited to those residing within one of the park's villages. For instance, all the souvenir stands in Nuorilang Visitor's Center are owned by residents from the villages where the Green Bus does not stop. Although this regulation acts as a mechanism to give an equal opportunity to the different JZG village members, the restriction unfairly limits the competition and opportunity for people living outside the park.

Despite efforts to include the local residents in managing the area, e.g. by employing them in management positions at the JAB, issues regarding the level of influence in the actual decision-making process persist. Local governance and participatory decision-making may be legally recognized but their influence in determining management policies or in opposing regulations is often limited. (Bao & Sun, 2006; Wang & Wall, 2005;)

Although not being formally challenged, some of the reserve's regulations to protect the environment or cultural landscape contested by some of the villagers. During the field work, the issue of the park's forest regulations was brought up repeatedly. Since establishing the area as a Nature Reserve in 1978, a ban on logging and fuelwood collection has been in place to protect the natural landscape. Tibetans traditionally prepared yak-butter tea with a wood-burning stove and milk supplied by local yak herders. However, due to the ban on collecting fuelwood in the area, the nearest place to buy fuelwood supplies is about 40 km away and a month's worth of supply costs around 500 ¥, prohibitive for many local families due to the cost and distance. (JAB, 2009, personal communication) In addition, afforestation efforts have resulted in the planting of non-native tree species in formerly cultivated plots creating a much different visual landscape than previously existed or as can be seen just outside the reserve in neighboring villages. In these areas, cultivated plots are mixed with open grazing fields as well as denser forest.

An event which occurred during another of the interviews I felt epitomized the tension between villagers and reserve regulations. During this interview I was showed me the house where the interviewee was born and raised and where her grandparents' and parents' grew up. The house had the architectural style of the older, "first-generation" homes in the area and was popular with tourists as an example of a 'traditional' Tibetan home. When asked about why they moved she replied that the house had shaky foundations and was deemed unsafe by the parents. They had applied for a permit to renovate the building but were denied. The JAB must approve of all construction work including building new houses or renovating old ones in order to maintain an aesthetic which fits with the marketing of a 'traditional' Tibetan lifestyle in the area. What is good for preserving a traditional Tibetan cultural landscape and attracting visitors to Jiuzhaigou could be perceived as preventing tradition to others.

## 7 DISCUSSION

Built on UNESCO principles of interdisciplinarity, the MAB Program's dynamic view of preserving ecosystem functions and integrating conservation and economic development objectives have helped shape a vision of the biosphere reserves which "contribute to the needs of society as a whole by showing a way towards a more sustainable future" (UNESCO, 1996). It is within this context of sustainability that the Chinese government and the JAB have implemented many of the MAB Program's recommendations.

Jiuzhaigou has been presented as a successful national protected area, international biosphere reserve, and attractive tourist destination managing to induce large-scale investments in infrastructure, a rehabilitation of formerly degraded lands and water resources, and increase the livelihoods of many people. It would appear that the JAB has overcome the difficult task of coordinating the various interests of international organizations focused on conserving the area's biodiversity with those of the large number of industry representatives who heavily invested in Jiuzhaigou's tourism. However, some of the most difficult and important issues facing environmental protection in China are often constrained by sensitivity over the political, social and cultural context that surrounds its management.

Here I will relate the findings of the case study to the earlier discussion of the main issues facing China's NRM. The following section broadens the discussion by relating the environmental and social impacts to China's approach to environmental and socio-economic policy as well as to recent shifts in global approaches to biodiversity conservation and natural resource management.

### 7.1 Environmental Objectives

The millions of visitors to Jiuzhaigou have helped provide the financial means to protect biodiversity and improve the economic livelihoods of many of the local residents in the area. The government seems to be optimistic in its belief that growth in the tourism industry can help provide the necessary means to protect the environment and to some extent they are right – some environmental damage in the Jiuzhai Valley has been successfully remediated thanks to revenues provided by the tourism industry. Heavy deforestation and barren landscapes have recovered thanks to the development of biosphere reserve and the support of tourists' spending. Livelihoods have diversified and per capita income is on the rise. However, for all the success in managing to offset local environmental impacts through programs such as the Green Bus line or environmental engineering measures taken within the park (see Table 2 above), these conservation efforts may not be sufficient in the quest for global sustainability.

Resources and energy consumed are the limiting factors to the size of the global economy, as Georgescu-Roegen (1971) first established - followed by others (see Meadows et al., 1974; Georgescu-Roegen, 1993; Gossling, 2002; Daly and Farley, 2003) - by integrating the Second Law of Thermodynamics (the entropy law) in economic theory. As Munda (1997) points out, while this energy is being used up it is also increasing the wastes being disposed of into the biosphere, concluding that "all theories of development must therefore respect these natural limits on planetary economic scale."

The tourism sector is a clear example of how economic activities tend to perpetuate growth beyond these natural limits. Gössling (2002) notes that the rapidly growing trends in the scale of tourism industry “exert a notable pressure on almost all areas of the planet”. A major part of this pressure comes from the transport activities embedded in the tourism sector, which, by contributing to the global climate change, pose a serious burden to future generations to face. The OECD (2000) estimates that in the next thirty years the contribution to global warming resulting from air transport will exceed any other mode including road transport. It is also in light of this recognition, and in the face of the global trends mentioned above, that the environmental impact of biodiversity protection in JZG, as well as other areas in the world, must be (re)assessed. In fact, in 2004, the year after Jiu Huang Airport opened, the number of visitors nearly doubled, to 1.9 million and by 2005, the number of annual visitors had broken the 2 million mark. Now that so many tourists are arriving in Jiuzhaigou by air, if sustainability is measured considering local impacts alone then the analysis will also exclude this significant environmental impact, i.e. transport to and from the destination.

In studying the ecological footprint of sustainable tourism, Patterson (2005) found that “the ability to control throughput in one place can lead to inferior control over local environments elsewhere.” In other words, those worst affected are far from where the benefits are accruing. In a way, it is as though there are voiceless stakeholders being impacted by the biosphere reserve’s management that excludes the aviation travel to and from parks. It is clear that the complications of establishing responsibility for GHG emissions as well as dealing with the inter-temporal inequities of climate change is a major issue facing both local and global sustainability.

## **7.2 Community Participation Objectives**

Jiuzhaigou is a good example of how the tensions between socialist ideology and *economistic* changes exist in the state’s attitudes toward regional development. The state closely monitors the tourism sector’s development in Jiuzhaigou and limits the autonomy of the JAB. However, to a certain extent the conservation policies and support of a market-based tourism development, especially in marketing the appeal of Tibetan culture, has encouraged Tibetan involvement in managing and working at the JAB and increased the standard of living for many households and villages.

The MAB Program has continually emphasized the importance of collaboration and cooperation with local people living in and around the biosphere reserves. As such, the role of the community in developing the Nature Reserve and building a tourism industry has been recognized as an especially important issue by the JAB. Collaborative ventures focused on community involvement such as the Nuorilang Service Center have been successful; biodiversity has been conserved; the biosphere reserve has contributed to research, education, and training; many community members have economically benefitted; and employment programs have successfully brought many Tibetans to be actively involved in the management of the park. In many ways, the MAB program has helped Jiuzhaigou gain its status as a premier Nature Reserve in China and the world.

Previous social research in Jiuzhaigou reasoned that the presence of social capital<sup>10</sup> reinforced the protection of the local environmental quality and promoted social well-being in JZG (Fang, 2005). Fang's work concluded that the success of Jiuzhaigou's NRM policies was built on a trusting relationship built between the communities and management. A closer inspection of the dynamics on which that relationship is built, however, reveals a different institutional arrangement at work.

In Jiuzhaigou's case, like many biosphere reserves around the world, political and social constructs underlie the way nature is seen and ultimately determine the way its protection is managed. In the recent transformation from mountainous, traditional rural lifestyle to a national tourist attraction, international biosphere reserve and world heritage site, it is clear that different interpretations are competing to define the value of the area despite efforts to maintain the cultural landscape and include all the voices of the local population. On the one hand, international, national, and local stakeholders have been able to influence the way management activities are carried out in the biosphere reserve to some extent. For instance, in dealing with conservation and development issues, the Chinese government has implemented management processes in collaboration with many international agencies and organizations such as IUCN, UNEP, or UNESCO. Village representatives have been elected and their collaboration with the JAB has been recognized as crucial for effective NRM. But the level of influence these groups have in determining how the land they live on will be managed depends on "the endowment of property rights, distribution of income, strength of environmental movements and distribution of power" (Martinez-Alier, 1998). In the case of Jiuzhaigou, the central government retains a certain level of authority in determining those factors.

In Jiuzhaigou, we can find, at least, two examples of how ideological and political imperatives gain preeminence over more substantial issues of social equity and genuine community involvement in tourism development.

A first example is the fact that not all of Jiuzhaigou Valley's village communities have benefitted from the creation of the Nature Reserve. Indeed, as seen in Chapter 7, the income earned from tourism in Jiuzhaigou is not being equally distributed among the local communities. Some researchers have pointed to the unequal distribution of community-level tourism benefits as a major issue facing the continued protection of natural resources, especially in areas of high cultural or natural value in China (Li, 2006). As Kang (2009) points out, habitat protection areas in China can greatly improve the welfare of some while causing others to "feel that they have been left behind by the new tourist development plans." Moreover, Chinese political and cultural systems often do not favor communities when conflicts arise (Xu *et al.*, 2008) and according to Kang (2009), it is "the party-state's ultimate control over heritage sites [that] makes the distribution of tourist profits unequal, often to the advantage of local state agencies and at the expense of local communities."

---

<sup>10</sup> Social capital is a term used to describe the norms established and maintained through traditions and social cooperation, facilitating lower transaction costs. Efficient outcomes can be hindered by a lack of properly functioning social trust or lack of social capital but if cooperative social interactions take place they can lower transaction costs and "knit the social fabric of the destination". (Ostrom, 1990) As regards Jiuzhaigou's form of social capital this refers to the social institutions, cooperation, interactions, and exchanges between the JAB and the local communities.



A second example relates to the role of Tibetan minority. Tibetan, as well as other minority ethnic groups, peacefully cohabitating with the Han in Jiuzhaigou plays to the interests of marketing campaigns for the government. Indeed, the Chinese state has been using protected areas like Jiuzhaigou and the development of the tourism industry as a means of incorporating ethnic minorities into a harmonized vision of the country over the past half century.

Breidenbach and Nyiri (2005) argue that the Chinese government has wielded Jiuzhaigou as one part a vision of “modern” China, debuting its achievements and global recognition by international organizations such as UNESCO or GG21, while also revealing its “ideology of modernization through consumption and the idea that the *correctly* framed consumption of places is an instrument of strengthening national consciousness.” Thus, the government’s support of tourism may be used to “strengthen loyalties to favored ideologies and political objectives”, using it as a “promotion in an effort to exercise control and demonstrate authority and legitimacy” as well as trumpeting its success in modernizing the country (see also Yang *et al.*, 2006; Henderson 2002; Handler 1988; Leong 1997; Light 2007; Tunbridge and Ashworth 1996; Wood 1984).

### 7.3 Economic Objectives

The discourse on protected areas, such as MAB Program’s Biosphere Reserves, has focused on balancing local economies, livelihoods and natural resources. On the one hand, the ambitious vision of biosphere reserves to reconcile conservation with development and ensure active support of local people<sup>11</sup> living in and around the biosphere reserve in planning and land-use management appears promising. Yet, many biosphere reserves lack the political or financial support to effectively implement and involve communities in managing these areas. Resource scarcity or outside pressure to exploit natural resources can further fuel biodiversity conflicts, intensifying the habitat change and biodiversity losses.

There is another aspect, besides the political interests of the party-state apparatus, which might contribute to undermining the potentially positive outcomes of the Nature Reserve on local communities. The JAB and Chinese natural resource managers alike are constrained by the dominant imperative in post-reform China: economic growth. As Zhang (2005) points out, in many Chinese nature reserves developed for tourism the primary management objectives are based on the rate of return on assets or profit oriented motives. And, with the rapid growth of tourism and income, the economic imperative for the management has only become stronger – continual pressure on the JAB to increase revenues on an annual basis has followed.

An overly optimistic vision of humans’ abilities in ‘fixing’ the natural environment is prevalent in many conservation, NRM, and protected area policies and practices around the world. An *economistic*<sup>12</sup> view of sustainable development, as noted by Clark and York (2005), assumes

---

<sup>11</sup> Local people’ includes a wide variety of groups – long-term inhabitants of the land, indigenous people, and newly-arrived immigrants and so on.

<sup>12</sup> Although it is difficult to define a unified *economistic* world view, in addressing the environment, *economistic* perspectives are connected by their metric of choice: economics. Environmental economists, politicians, business leaders, and investors all rely on economics to organize the goods and services provided by the natural environment to produce commodities to be sold on the market. In general terms, the concept of ‘*economism*’ is used to describe, in critical terms, any situation in which economic criteria are granted an undue primacy over factors of any other type: concerns over ethic, moral, equity, justice etc. These are overlooked and everything is reduced to the economic aspect. Therefore, it can be

“environmental-sustainability issues can be successfully addressed by *economizing* ecology and *ecologizing* the economy.” To some extent, this has led to the promotion of protected areas like Jiuzhaigou as marketable commodities for tourist consumption presenting a world view of people and landscapes whose worth is visible only in the logic of the commodity they provide (Litzenger, 2004).

Yet, there are elements of human welfare which, because of the characteristics intrinsic to their nature, are irreducible to economic terms. Values that are not generated through any economic transaction and lie outside the market are often overlooked in valuations. Indeed, some of the workshop participants expressed disillusionment with motivating nature preservation for the sake of economy alone. Traditional Tibetan customs and spiritual beliefs for preserving the environment have long existed but are not recognized in the regulations and practices at Jiuzhaigou. Instead, as voiced by some interviewees during the field work, the policies in place seem to have been inspired by a different set of objectives or values. Cohen (2004; cited in Feng, 2006) warns that commodified cultural products can lose their “intrinsic meaning and significance in the process for the local people, who in turn lose their enthusiasm for producing them.”

Achieving sustainable development through effective biosphere reserve management may be possible. But relying solely on economic measures and valuations to guide decision making will surely fall short of determining what is or is not a desirable outcome for society in certain cases. For all the promise of a market economy that is compatible with socialist goals, Chinese NRM in practice still faces some serious challenges.

## 8 CONCLUSION

Biosphere reserves and other protected areas could hold the potential to resolving the contradiction between sustainability and development. Jiuzhaigou illustrates the complexity of balancing and managing interactions between the ecosystem, socio-economic system of a biosphere reserve. And yet, although local biodiversity conservation and economic growth are perceived benefits from the shift towards sustainable tourism based economies, for the case of Jiuzhaigou a number of shortcomings have been highlighted: the distribution of the benefits of tourism; the distribution of the environmental burdens of tourism; and participation issues in managing the biosphere reserve.

Successful management requires cooperation among the wide variety stakeholders each with their own interests at stake. Recognizing that JZG is not fulfilling its potential, an examination of the shortcomings of sustainable development practices is required. The JAB must try and resolve differences between UNESCO’s vision of conserving biological and cultural resources with the distinct implementation rules set by the Chinese political system – lasting conservation in Jiuzhaigou faces a complex system of state objectives and goals on one hand and trying to ensure benefits are distributed for the local community on the other. This task is further challenging within the context of Jiuzhaigou considering the historical land-use changes and, at times, the tense political climate facing the minority Tibetan population.

---

understood as a synonym for economic reductionism. In the context of sustainable development a similar criticism can be oriented towards those who claim that economic-based analyses are able to produce all the inputs required for decision-making on alternative policy options.

Community leaders' relationship within the wider political and social system is in continual transition and their influence in the development process continues to evolve. Chinese NRM is already moving towards more collaboration with a wider range of actors and should begin to open up spaces for collaborative action with communities. Jiuzhaigou has made great strides in working with international organizations and trying to accommodate the villagers in the park. However, JAB needs to extend this collaboration and cooperation to those in neighboring areas for whom the benefits of sustainable development have not reached. Inviting more stakeholders to participate in workshops and training seminars can help open up new spaces for interaction. Various models for community-based tourism, such as collaborative planning, may act as a substitute for more formal institutions giving villagers a stronger voice in deciding the use of their resources and currently being studied in many national parks. (see Xu *et al.*, 2008) Different approaches like these should be explored further to see if applicable in cases such as Jiuzhaigou's. The challenge in guaranteeing the rights and responsibilities of the local communities while still meeting the general goals of the state requires a more cooperative and developed mechanism than currently exists.

For all the potential opportunities afforded by the regional development related to Jiuzhaigou's tourism, the equally high consumption of the industry in terms of materials and energy as well as wastes challenges the possibility of achieving global sustainability. The benefits of Jiuzhaigou's tourism are accruing to those residing in the area while the burden of unwanted side-effects are being felt by others far away spatially and temporally. Jiuzhaigou's tourism activities would look much less sustainable if the analysis were widened to include the wastes and pollution accruing at a global ecosystem level.

On the one hand, international and national environmental policies have successfully prevented tourism from negatively impacting the local environment. But considering the recent increases in tourists arriving by air and the growing threat of climate change to hurt ecosystems, in the longer term it is not known how much longer the global biosphere will be able to assimilate these wastes. The full costs of economic growth have begun to surface and the evidence will no longer be refutable.

## 9 BIBLIOGRAPHY

1. Adger, N. (2006). Vulnerability. *Global Environmental Change*, 16, 268-281.
2. Akerlof, G. (1997). Social distance and social decisions. *Econometrica*, 65 (5), 1005-1027.
3. Amelung, B. (Ed.). (2004). *Proceedings of the NATO Advanced Research Workshop: Tourism and Climate change: Assessment and Coping Strategies*. Warsaw.
4. Batisse, M. (1997). BIOSPHERE RESERVES: A Challenge for Biodiversity Conservation & Regional Development. *Environment*, 39, 7-33.
5. Bauer, J., Sofield, T., Webb, J., Battig, M. & De Lacy, T. (2002). *Conservation, Poverty Alleviation and Community Development through Tourism in Developing Countries*. Australia: Australian Cooperative Research Centre for Sustainable Tourism.
6. Breidenbach, J. & Nyiri, P. (Ed.). (2005). *China inside out: contemporary Chinese nationalism and transnationalism*. Central European University Press.
7. Bruntland Report WECD (1987). *Our common future*. Oxford:, Oxford University Press.
8. Bryant, R., (1992). Political ecology: an emerging research agenda in Third-World studies. *Political Geography*, 11 (1), 12-36.
9. Bryman, A. (2004). *Social Research Methods* (2nd ed.). Oxford UK: Oxford University Press.
10. China National Tourism Administration (CNTA), (2000). Deng Xiaoping's Talks on Tourism, 6 January 1979. Beijing: China Communist Party, Central Literature Publishing House.
11. Christ, C., Hillel, O., Matus, S. & , Sweeting, J. (2003). "Tourism and Biodiversity: Mapping Tourism's Global Footprint". Washington D.C.: Conservation International, Washington D.C., USA.
12. Clark, B. & York, R. (2005). Dialectical Materialism and Nature: An Alternative to Economism and Deep Ecology. *Organization Environment*, 18; 318.
13. Cohen, (2004). Contemporary Tourism: Trends and Challenges. In Cohen, E. (Ed), *Contemporary Tourism: Diversity and Change*. Netherlands: Elsevier Ltd.
14. *Convention on Biological Diversity*. (1992). Retrieved April 28, 2009, from (<http://www.cbd.int/convention/convention.shtml>)
15. D. A. Posey, (1996) 'Protecting Indigenous Peoples' Rights to Biodiversity,' *Environment*, 6.
16. Daly, H. & Farley, J. (2003). *Ecological Economics: Principles and Applications*. Washington D.C.: Island Press.
17. Department of Nature Conservancy (SEPA), (1999). [Report on China's Ecological Issues]. (in Chinese) (Beijing: China Environmental Science Press, Beijing).
18. Digance, J. (2003). Pilgrimage at contested sites. *Annals of Tourism Research*., Vol. 30. No. (1).
19. Dombrowski, K. (2006). Reconciling tourism, cultural change and empowerment in a Tibetan host community. (CIGAD Working Paper Series 2/2006). Palmerston North, N.Z.: Massey University. Centre for Indigenous Governance and Development.

20. Dudwick, N., Kuehnast, K., Nyhan Jones, V. & Woolcock, M. (2006). *Analyzing Social Capital in Context: A Guide to Using Qualitative Methods and Data*. Washington D.C.: World Bank.
21. Ekins, P. (1996). Towards an economics for environmental sustainability. In R. Costanza, J. Martínez Alier, & O. Segura (Eds), *Getting Down to Earth: Practical Applications of Ecological Economics*. (pp.129-152). Washington D.C.: Island Press.
22. Fang, Y. (2002). Ecotourism in Western Sichuan, China: Replacing the Forestry-Based Economy. *Mountain Research and Development*, 22 (2), 113-115.
23. Fang, Y., Zeng, Y. & Li, S. (2005). Management Philosophy and Practices of Habitat Conservation for Jiuzhaigou Nature Reserve, Sichuan, China. *Wuhan University Journal of Natural Sciences*, 10 (4), 730-738.
24. Folke, C., Fabricius, G., Cundhill, G., Schulze, L. (2005). Communities, ecosystems and livelihoods. In Capistrano, D., Samper, C., Lee, M., and Raudsepp-Hearne, C. (eds.) *Ecosystems and human well-being: multiscale assessments. Volume 4*. Island Press, Washington DC, USA.
25. Folke, C., S. Carpenter, B. Walker, M. Scheffer, T. Elmqvist, L. Gunderson and CS Holling. (2004). Regime shifts, resilience and biodiversity in ecosystem Management. *Annual Review of Ecological Evolutionary Systems*, 35, 557–81.
26. Georgescu-Roegen, N. (1971). *The Entropy Law and the Economic Process*. Cambridge: Harvard University Press.
27. Georgescu-Roegen, N. (1993). *Thermodynamics and We the humans*. Paper Presented at the Entropy and Bioeconomics: Proceedings of the First International Conference of the E.A.B.S., Milan.
28. Gössling, S. (2002). Global environmental consequences of tourism. *Global Environmental Change*, 12 (4), 283-302.
29. Han, F. (2006). *The Chinese View of Nature: Tourism in China's Scenic and Historic Interest Areas*. Unpublished Doctoral Dissertation, Queensland University of Technology, Queensland, Australian.
30. Han, Q. (2004, March). *Recent development of Natural World Heritage in Southeast Asia: progress, impact and challenges*. Presentation at the UNESCO Training Workshop on the Management and Conservation of World Heritage Site, Hiroshima, Japan.
31. Hardin, G. (1968). The tragedy of the commons. *Science*, 162, 1243-1248.
32. Harmon, D. & Putney, A. [(eEds.)]. (2003). *The Full Value of Parks: From Economics to the Intangible*. Lanham, Maryland: Rowman and Littlefield.
33. Harris, J., Wise, T., Gallagher, K. & Goodwin, N. (Ed.). (2001). *A Survey of sustainable development: social and economic dimensions*. Washington D.C.: Island Press.
34. Henderson. (2002). Heritage Attractions and Tourism Development in Asia: A Comparative Study of Hong Kong and Singapore. *International Journal of Tourism Research* 4:337–344.
35. Hevia, J. (2001). World heritage, national culture, and the restoration of Chengdu. *Positions: East Asia cultures critique.*, Vol. 9 , No. (1),: 219–243.
36. Hicks, J. R. (1946). *Value and capital* (2nd ed.). Oxford: Clarendon Press.
37. Hoyer, K. (2000). Sustainable tourism or sustainable mobility. *Journal of Sustainable Tourism*, 8 (2), 147-160.

38. Hu. (2005). Hastening Red Tourism, and Promoting Patriotic and Revolutionary Education. China Communist Party, Central Propagandizing Department and Central Civilization Department.  
<[http://engine.cqvip.com/content/d/81160x/2004/000/010/sk42\\_d1\\_10928791.pdf](http://engine.cqvip.com/content/d/81160x/2004/000/010/sk42_d1_10928791.pdf)> (8 June 2007).
39. Jacobs, A., Wong, E. & Huang, Y. (2009, May). China Reports Student Toll for Quake'. *New York Times* [Newspaper, selected stories on-line]. Retrieved May 18, 2009, from <http://www.nytimes.com/2009/05/08/world/asia/08china.html>. Retrieved on 2009-05-21.
40. Kang, X. (2009). Two Temples, Three Religions, and a Tourist Attraction: Contesting Sacred Space on China's Ethnic Frontier. *Modern China*.
41. Kvale, S. (1996). *Interviews: An Introduction to Qualitative Research Interviewing*. California: SAGE.
42. Li, F., (2006). Tourism development, empowerment and the Tibetan minority. In Leask, A. & Fyall, A. (Ed.), *Managing world heritage sites*. Butterworth-Heinemann.
43. Lin, C. (2009). The Socialist Market Economy: Step Forward or Backward for China? *Science & Society*, Vol. 73, No. 2, April 2009, 235–241
44. Liu. (2001). *A Study of the Tourism Development in West China*. Beijing: Chinese Tourism Press.
45. Liu, J. and Diamond, J. (2005). China's environment in a globalizing world. *Nature*. 435 ((30).
46. Liu, J., Ouyang, Z., Pimm, S., Raven, P., Wang, X., Miao, H. & Han, N. (2003) Protecting China's Biodiversity. *Science* 300, 1240–1241.
47. Lofland, J., & Lofland, L. (Ed.). (1995). *Analyzing social settings: A guide to qualitative observation and analysis*. California: Wadsworth.
48. Lowenthal, D. (1998). *Heritage Crusade and the Spoils of History*. New York: Cambridge University. Press.
49. MacCannell, D. (1973). Staged Authenticity: Arrangements of Social Space in Tourism Settings. *American Journal of Society*, 79, 589-603.
50. Martinez-Alier, J. (1998). From Political Economy to Political Ecology. In R. Guha & J. Martinez-Alier (Ed.), *Varieties of Environmentalism: Essays North and South*. Delhi: Oxford University Press.
51. Meadows, D. L., Meadows, D. H., Behrens, W. W. & Randers, J. (1974). *Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*. New York: New American Library.
52. Mikkelsen, B. (2005). *Methods for Development Work and Research: A new guide for Practitioners*. London, UK: SAGE.
53. Mose, I. (Ed.) (2005) *Protected Areas and Regional Development in Europe Towards a new model for the 21<sup>st</sup> century?* Ashgate Publishing Limited, London.
54. Munda, G. (1997). Environmental Economics, Ecological Economics, and the Concept of Sustainable Development. *Environmental Values*, 6 (2), 213-233.
55. Oakes, T. (1998). *Tourism and modernity in China*. London: Routledge.
56. OECD. (2000). *Sustainable consumption: report on household tourism travel patterns. Sustainable consumption: sector case study series*. Paris: OECD.
57. Ostrom, E., (1990). *Governing the commons: the evolution of institutions for collective action*. Cambridge:, UK, Cambridge University Press.

58. Patterson, T. (2005). *The ecological economics of sustainable tourism; local versus global ecological footprints in Val di Merse, Italy*. Unpublished doctoral dissertation. University of Maryland, College Park.
59. Pearce, D. (1982). Tourists and their hosts: some social and psychological effects of inter-cultural contact. In Bochner, S. (Ed.), *Cultures in Contact: Studies in Cross-Cultural Interaction*. Oxford: Pergamon Press.
60. People's Republic of China (PRC). (1988). National Wildlife Law (*Yesheng dongwu baohu fa*). Forestry Press (*Zhongguo linye chubanshe*), Beijing (in Chinese).
61. Princen, T. (1997). The Shading and Distancing of Commerce: When Internalization is Not Enough. *Ecological Economics*, 20, 235-53.
62. Ragin, C. (1994). *Constructing Social Research: The Unity and Diversity of Method*. Pine Forge Press.
63. Repetto, R. (Ed.) (1985). *The global possible: Resources, development, and the new century*. New Haven, CT: Yale University Press.
64. SCTA. (2009). 统计报表 [Sichuan Province Travel Authority Statistics]. Retrieved April 28, 2009 from <http://www.scta.gov.cn/web/main.jsp?go=newsList&pid=7&cid=101>
65. Sen, A. (1999): *Development as freedom*. New York: Anchor Books.
66. Shen, X., Su, C. & Li, W. (2008). Jiuzhaigou Ecotourism Areal System: Temporal Evolution of Entropic Change. *Wuhan University Journal of Natural Sciences*, 13 (3), 303-308.
67. Sofield & Li. (1998). Tourism Development and Cultural Policies in China. *Annals of Tourism Research* 25:362–392.
68. Solow, R. M. (1986). On the intergenerational allocation of natural resources. *Scandinavian Journal of Economics*, 88 (1), 141-149.
69. Solow, R. M. (1991). *Sustainability: An economist's perspective*. Paper presented at the Eighteenth J. Seward Johnson Lecture, Woods Hole Oceanographic Institution. Woods Hole, MA.
70. Steffen, W., A. Sanderson, P. D. Tyson, J. Jager, P. M. Matson, B. Moore, III, F. Oldfield, K. Richardson, H. J. Schnellhuber, B. L. Turner, II, and R. J. Wasson. (2004). *Global change and the Earth system: a planet under pressure*. Springer-Verlag, New York, New York, USA.
71. Strauss A. & Corbin J.M. (1998). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. California: SAGE.
72. Sun. (2008). Societal Transition. *New Issues in the Field of the Sociology of Development*. *Modern China* 34:88–113.
73. Swain. (1990). Commoditizing ethnicity in southwest China. *Cultural Survival Quarterly*, 14(1), 26–29.
74. The World Bank, (WB). (2001). *China: Air, Land, and Water*. Washington DC: World Bank.
75. UNCED. (1992). *Report of the United Nations Conference on Environment and Development, Rio De Janeiro. Volume 1. Resolutions adopted by the Conference*. New York: United Nations.
76. UNESCO. (1996). *Biosphere Reserves: The Seville Strategy and the Statutory Framework of the World*. Paris.



77. UNESCO. (2009). *About World Heritage*. Retrieved April 21, 2009 from <http://whc.unesco.org/en/about/>
78. UNESCO. (2009). *The MAB Programme Background*. Accessed Retrieved April 21, 2009 from [http://portal.unesco.org/science/en/ev.php-URL\\_ID=6784&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/science/en/ev.php-URL_ID=6784&URL_DO=DO_TOPIC&URL_SECTION=201.html)
79. UNWTO. (2009). *Facts & Figures*. Retrieved Accessed April 28, 2009 from . <http://www.unwto.org/facts/menu.html>
80. Wang, Y. (1987). Natural conservation regions in China. *Ambio*, Vol. 16, No. 6 pp. 326-331.
81. Weber, M. (1918). Science as a Vocation. In H. H. Gerth, and C. W. Mills (Ed.), *Max Weber: Essays in Sociology*. New York: Oxford University Press.
82. Wen & Tisdell. (2001). *Tourism and China's Development: Policies. Regional Economic Growth and Ecotourism*. Singapore: World Scientific.
83. *White Paper on Conservation and Development of Jiuzhaigou* (n.d.). China: Jiuzhaigou Administration of National Nature Reserve.
84. Xie. (2003). The Bamboo-beating dance in Hainan, China: Authenticity and commodification. *Journal of Sustainable Tourism*, 11(1), 5–16.
85. Xu, Ding, & Packer. (2008). Tourism Research in China: Understanding the Unique Cultural Contexts and Complexities, *Current Issues in Tourism*, 11:6,473 — 491
86. Xu, Ma, Tashi, Fu, Lu, & Melick. (2005). Integrating sacred knowledge for conservation: cultures and landscapes in southwest China. *Ecology and Society* **10**(2).
87. Xu, & Ribot. (2004). Decentralization and accountability in forest management: case Studies from Yunnan, Southwest China. *European Journal of Development Research*. 16:153-173.
88. Yan & Bramwell. (2008). Cultural Tourism, Ceremony and the State in China. *Annals of Tourism Research*, Vol. 35, No. 4, pp. 969–989.
89. Yang & Wall. (2009). Ethnic tourism: A framework and an application. *Tourism Management* 30 (2009) 559–570.
90. Yang, L., Wall, G., & Smith, S. (2006). Ethnic Tourism Development: Chinese Government Perspectives. *Annals of Tourism Research*, Vol. 35, No. 3, pp. 751–771.
91. Yin, R. (2003). *Case Study Research: Designs and Methods* (3rd ed.). California: SAGE.
92. Ying, T.Y. and Zhou, Y.G. (2007) Community, governments and external capitals in China's rural cultural tourism: A comparative study of two adjacent villages. *Tourism Management* 28 (1), 96–107.
93. Zhang. (2003). China's tourism since 1978: policies, experiences and lessons learned. In A. Lew, L. Yu, J. Ap, & G. Zhang (Eds.), *Tourism in China: Geographic, political, and economic perspectives* (pp. 13–34). Binghamton: Haworth.
94. Zhang. (2005). An analysis of government's regulation of the tourism resources in national parks. *Journal of Shandong Normal University (Natural Science)*, 20(1),75–77.
95. Zhang, J. (2008). Measuring the ecological impact of tourist wastes: methodology and cases study of Jiuzhaigou and Huangshan National Park. *Acta Ecologica Sinica*, 28 (6), 2764-2773.



## 10 APPENDIX

### WORKSHOP OUTCOMES AND OBSERVATIONS

The following observations were made over the course of the three-day workshop:

#### *Workshop 1*

The first lecture was an introduction to climate change and energy issues. The staff seemed to be attentive and expressed interest in increasing the efficiency of the park's energy use as well as their personal consumption. They participated well, responding to open-ended questions and expressing their opinions on the topics covered. Many of the questions raised during the first session were regarding valuing nature and its preservation. The staff questioned the rationale for conservation expressing concern that efforts should not be only economically motivated. Religious or spiritual values that are held by Tibetans were raised as equally important in preserving the local environment. One of the participants directly questioned the energy efficiency discussion asking whether what was interpreted as good for the park financially should always take precedence. Some of the older participants lamented on the fact that many of the young people who were now afforded an education in the bigger cities were coming back to the park and not wanting to speak Tibetan dialect nor wanting to work in the tourism industry.

#### *Post-Workshop 1:*

Immediately following the presentation, I met with members of the science department and my interpreter to review the appropriateness of the topics and to adjust the following day's training session. During the discussion some of the basic concepts had not been understood by some of the staff. For example, the connections between coal-burning power plants, carbon dioxide and climate change were not well understood or familiar topics. It was also noted that in Chinese, the words for "coal" and "carbon" are the same when translated in Chinese possibly creating a misunderstanding regarding the linkages to climate change. There was a general acknowledgement of the concept of sustainable development, as raised during the forum discussion, but the linkages between SD and individual behavior or management policies were not clearly recognized by the staff. Although many of the science and conservation department staff were present and are university-educated, the park's efforts towards ecotourism, e.g. practices guided by the GG21, were unknown. Some conservation goals and management policies were not clearly understood and the staff was relatively unaware of the park's specific activities for minimizing environmental impacts on the surrounding areas. Thus, the following day's topics for the presentation were adjusted to focus on addressing the knowledge gaps between myself and the staff by showing practical cases where sustainability principles had been applied to operational activities in national parks around the world.

#### *Workshop 2:*

The second day presented different sustainable operations programs from national parks around the world. The discussion focused on how park management practices could integrate sustainable energy use principles and also other ways that sustainability could be increased. These included activities such as retro-fitting administrative buildings or installing renewable energy

technologies. Different tools and frameworks for sustainability assessments were covered and the staff was encouraged to express their view on the environmental vision and goals for Jiuzhaigou. This was done to generate interest in developing a program for energy efficiency, the “Green Team”, to be implemented and monitored by the staff. Another staff member had already worked on identifying energy wastes throughout the administrative office buildings and even had a plan for the Green Team approved by the park’s director. Unfortunately, the program was never implemented due to a lack of staff participation and awareness of the activity. Thus, the workshop provided an opportunity to introduce and engage the staff in developing a new plan for implementation. The general response from the staff was supportive and encouraging of the idea.

#### *Post-workshop 2:*

It was decided that the staff’s enthusiasm and interest meant the final day should be spent collaboratively developing specific Green Team goals and a plan for implementing the program. Throughout the workshop, the staff identified inefficient or wasteful use in the offices and tourist visitor buildings themselves and the motivation for participating was to be further encouraged. The main objective was to have them feel a part of the program, having gained some “ownership” over the activities by coming up with ideas themselves.

#### *Workshop 3:*

The staff members were asked to break up into groups of four to six people and to intermix with other departments. One member of the group organized and kept notes of the discussions and responses within the group. There were four main topics for the staff to brainstorm and after taking time to create their lists of ideas they were asked to share their findings with the rest of the larger audience. The topics were: 1) identifying energy use and daily consumption, 2) energy and sustainability goals, 3) Green Team activities and opportunities and 4) discussing ways to overcome the potential barriers for implementation. The groups submitted their responses, three of which were in English, and the response data was broken down by department. The staff’s enthusiasm and interactive participation in the discussion was by far the highest on this day. Many of the participants were eager to tell me how excited they were as they had never been involved in a participatory staff workshop before. They seemed pleased to have had the opportunity to give input to the management on the operations and practices of the park. The comments made during the final discussion gave the impression that people were beginning to recognize the importance of sustainable behavior and practices, at home and in the office, in order for the continued protection of the area. Some issues facing long-term conservation in the area were:

- Tourists concentrated in a few sites during the peak months. After the earthquake and turmoil from the 2008 Tibetan riots, numbers have gone down and there was a general concern over the time it will take for visitor numbers to recover.
- Public environmental education is not sufficiently provided. More training on cultural and traditional values of nature should be given to the staff. Traditional values of the local populations for nature need to be conveyed to the tourists.
- The involvement of local residents is overlooked in policies and regulations enforced by the park.
- Concerns over rapidly approaching the carrying capacity of the park and surrounding areas.

