

Towards community-driven conservation in southwest China: Reconciling state and local perceptions

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Southeast Asia



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ICRAF Working Paper Number 52



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This text is a 'working paper' reflecting research results obtained in the framework of ICRAF Southeast Asia project. Full responsibility for the contents remains with the authors

Abstract

Conserving biodiversity and ecosystems is now a priority in China. Consequently, the country has followed western conservation models by creating large numbers of public protected areas. However, this approach often disenfranchises local people, not only causing resentment and denying them access to territory and environmental services, but also failing to draw on their experience of long-term land management. The case of Yunnan illustrates how state perceptions of biodiversity and the administration of protected areas often comprise a simplified view conflicting with local customs, usages, and insights into the interaction between people and nature – interactions that may be mutually beneficial. With reference to the unique aspects of Chinese history, society, national character, and political systems, this paper analyses conservation planning in China and calls for reconciling state and local perceptions about conservation and further development of cooperative relationships between the state and communities to formulate conservation policy: community-driven conservation. Such relationships are being recognized around the world as a way of bringing about more balanced and pragmatic conservation management and harmony in society.

Keywords

Biodiversity, community conservation, reconciling, perceptions.

List of acronyms and abbreviations

ADB	Asian Development Bank
BCE	Before Christian Era
CE	Christian Era
CBD	Convention on Biological Diversity
FCCDP	Forest Conservation and Community Development Program
IUCN	International Union for the Conservation of Nature
IPP	Indigenous property rights
MA	Millennium Assessment
MMSEA	Montane Mainland Southeast Asia
M-POWER	Mekong Programme on Water, Power and Resilience
NFPP	National Forest Protection Programme
NGO	Non-governmental organization
NTFP	Non-timber forest products
PATF	Protected Area Task Force
PAs	Protected Areas
SLCP	Sloped Land Conversion Programme
SFA	State Forestry Administration
WTO	World Trade Organization
WWF	World Wildlife Fund

Acknowledgements

This paper is part of an on-going research effort supported by: a) Resource Right Initiative, a global coalition to advance forest tenure, policy, and market reforms; b) Applied Ethnoecology for Biodiversity Assessment, Monitoring, and Management in Northwest Yunnan, supported by The Critical Ecosystem Partnership Fund, a joint initiative of Conservation International; and c) M-POWER: Mekong Programme on Water, Environment, and Resilience. Nicholas Menzies, Andy White, Andreas Wilkes, Jesse C. Ribot, Deborah Barry, and John Dore provided valuable commentaries on preliminary drafts.

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Summary

Conserving biodiversity and ecosystems is now a priority in China. Consequently, the country has followed western conservation models by creating large numbers of public protected areas. However, this approach often disenfranchises local people, not only causing resentment and denying them access to territory and environmental services, but also failing to draw on their experience of long-term land management. The case of Yunnan illustrates how state perceptions of biodiversity and the administration of protected areas often comprise a simplified view conflicting with local customs, usages, and insights into the interaction between people and nature – interactions that may be mutually beneficial. With reference to the unique aspects of Chinese history, society, national character, and political systems, this paper analyses conservation planning in China and calls for reconciling state and local perceptions about conservation and further development of cooperative relationships between the state and communities to formulate conservation policy: community-driven conservation. Such relationships are being recognized around the world as a way of bringing about more balanced and pragmatic conservation management and harmony in society.

1. Introduction

China today is often seen as an environmentally destructive nation, quickly becoming the globe's most rapacious resource consumer (Diamond 2005). Notwithstanding, China is protecting natural areas and creating more nature reserves than most countries, moreover, it recently instituted the largest and biggest funded afforestation programme in the world. In this paper, we examine conservation policy in China; outline the history of conservation and how conservation policy currently operates; and, using lessons learned, possible future directions for conservation management. We explore the links between biodiversity and human cultural diversity in particular – in this most populous of countries, we find that the two are often not only mutually compatible, but also complementary.

Growing public awareness about the need to conserve biodiversity and ecosystem services has led to a dramatic increase in the establishment of public protected areas (PA) in China over several decades. China has followed the public PA model of conservation, in which rigid standards are implemented; flagship species identified; and key ecosystems, core areas, buffers, and experimental areas delimited. Once demarcated, all areas are appropriated by the state (if they are not government-owned already), formally becoming public property. This expansion may come at the expense of local community rights, however, contributing to the increasing conflict between public environmental goals and the interests of indigenous peoples who often live in the most naturally diverse areas. Indigenous people's access to natural resources, territory, and land-use practices, moreover, are regarded increasingly as an inextricable part of their cultural diversity or even human rights. It is necessary, therefore, to develop political systems that protect indigenous people's resource rights to establish harmony in Chinese society.

Given the goal of moving towards more inclusive conservation and natural resource policy, we analyze how government forest agencies and local governments in China negotiate and demarcate boundaries and administer PAs – that is, how they balance state biodiversity conservation policies with local community needs. We highlight the contradictions between official (often static and simplified) and vernacular (dynamic, fluid, and diverse) identifications of biodiversity, land use, and relations between humans and nature. In China, displacement and resettlement of indigenous people are amongst the state's oldest continuous land-use policies (Harrell 1995, Elvin 1998). The establishment of PAs is a prime example of how the state attempts to order and monitor indigenous populations in terms of their property rights and social and ecological interactions. It is essential to reconcile both state and local perceptions of conservation.

This paper focuses particularly on the Yunnan Province of Southwest China – one of the most biologically and ethnographically diverse areas on earth, part of two biodiversity hotspots, Indo-Burma and the mountains of South-Central China, among 25 hotspots in the world. Specific examples are introduced to illustrate the link between cultural and biological diversity emerging from historic ties to the landscape. In working through these examples we advocate a community-driven conservation approach, which promotes not only biological, but cultural conservation also for protecting biodiversity in situ both outside and inside protected areas.

2. Conservation in China: a Brief overview

Chinese civilization originated in the Yellow River Basin. The rich and fine loess soils, dense scrub, bushes, and forests of this plateau made it possible for agriculture to support a relatively dense population. This concentrated human settlement, however, together with extensive and intensive agriculture and growing demands for fuel wood and timber for construction have been blamed for soil erosion and environmental degradation along the upper reaches of the Yellow River. In this region, forest cover is estimated to have decreased from 53 to 8% in the last 4,000 years, with the rate of deforestation being particularly acute since the 14th century (Edmonds 1994). The earliest reference to Chinese knowledge of 'forestry' management is in the 'Book of Odes' (Shi Jing 1000 – 600 BCE) which recognized the importance of the vegetation of the Loess plateau for human society (Menziés 1996). The rise and fall of each Chinese dynasty was always accompanied by environmental change, particularly deforestation; for example, Menziés (1992a) discusses logging in the Qinling Mountains during establishment of the Tang Dynasty and makes the point that the demands that caused cycles of logging were usually triggered by episodes of urban development and rebuilding (Xi'an for example) after warfare. Early awareness of environmental issues is attributed to the Chinese philosopher Mencius (372 - 289 BCE) who stressed the importance of not overhunting animals or overcutting forests. His philosophical works warn of the dangers of opening up uncultivated land and tampering with nature.

Although China had a philosophy of harmony with nature, frequent deforestation occurred throughout various periods in Chinese history, transforming the environment significantly (Elvin 1998). Many of the seemingly somewhat natural forests are actually swidden-fallow succession or secondary vegetation, and, moreover, have even been managed as agroforestry (Xu and Melick 2007). The present denuded landscape of China is generally the outcome of millennia of deforestation caused by the establishment of agriculture and gathering of forest products: practices linked to population growth and state interest (Menziés 1992a). Since the earliest times, agriculture has been the philosophical and economic foundation of the Chinese State – non-agricultural resources like 'wildlands' or forest frontiers have been neglected and viewed primarily as uncultivated agricultural land. Unoccupied 'wildlands' also represented a threat, as hostile groups could use these areas. As a national policy of pacification, the centre encouraged agricultural settlement and economic development in strategic 'wildlands'. To these ends, the state implemented a system of self-supporting agricultural colonies ('tun tian') and administrations in the frontier regions of southwest and northwest China during the Ming and Qing dynasties (Menziés 1992). Large-scale deforestation necessitated the establishment of tree plantations to supply timber: the earliest agroforestry reports date from the 12th century and describe the cultivation of *Cunninghamia lanceolata* in combination with food crops to meet the growing demands for timber for urban industries (Menziés 1988). Large areas of tropical forest have been converted into rubber plantations to ensure the availability of rubber for national defence and economic development in face of an international embargo after the 1949 Revolution (Xu 2006).

The prototype of modern PAs can be found in imperial records dating from the Qin (221-207 BCE) and Han (206 BCE – CE 220) dynasties up until the most recent Qing (CE 1644-1911) dynasty. Historical examples include the preservation of mountain areas as imperial hunting reserves and the protection of temple grounds. This preservation of sacred sites was promoted further after the introduction of Buddhism during the reign of the Han Emperor, Ming Di (from

CE 58-75), when the monasteries acquired forests as gifts or as imperial grants. Some of the best known examples of these grants are Heng Shan and Wutai Shan, (protected as sacred mountains) and Tai Shan (protected as a cemetery site).

Modern conservation trends in China

Although China has a long history of environmental protection, the modern concept of public PAs was introduced relatively recently. In post revolution China, PAs were designated centrally in a straightforward process that was aimed at reducing logging and hunting in high-value natural areas (Jim and Xu 2004). In 1956, the People's Congress approved 'Proposal 12', in which some natural forests were designated as logging ban areas, thus creating PAs – officially called nature reserves later on. Later that same year the State Forestry Department passed a draft document on 'The Roles of the Natural Forest Logging Ban Area (Nature Reserve)' and, consequently, the Dinghu Shan Nature Reserve was established in Guangdong Province in 1956: the first official PA in China.

These new conservation policies were short-lived during the turbulent times that followed. Political ideology took a drastic shift with the 'Great Leap Forward' in 1958 and further political chaos ensued during the 'Cultural Revolution' (1965-1975). Rather, than implementing conservation areas, this period saw extensive environmental degradation resulting from the creation of enormous projects on water control, industry, and agriculture. The concurrent persecution of intellectuals, suppression of traditional and religious institutions, and breakdown in social order, moreover, exacted a heavy toll on modern Chinese society and on the environment: these effects still resonate today (Shapiro 2001).

Increasingly, over the last few decades, research and government groups have acknowledged the importance of public PAs for scientific investigation and ecological services. Foreign study tours took place as a means of learning from international experiences. Consequently, from the 1980s onwards, the rate at which new public nature reserves were established skyrocketed. By 2004, China had established 2194 nature reserves with a total area of 148 226 000 ha, accounting for 14.8% of China's total territory (see table 1) – exceeding the global average of 10%. This rising trend in nature reserve establishment looked set to continue and, on December 21, 2001, the State Forestry Administration (SFA) implemented a nationwide long-term project called 'Wildlife Conservation and Nature Reserve Construction Project'. By the end of the project in 2050, China aims to have 2500 nature reserves with a total PA of 172.8 million ha, accounting for 18% of China's land area (Xu and Melick 2007).

Table 1: Establishment of Nature Reserves in China (Source: State Environmental Protection Administration)

Year	No. of nature reserves	Protected area (1,000 ha)	Average size of reserve (1,000 ha)	% of total area of China
1956	1	1	1	
1965	19	649	34.2	0.07
1978	34	1265	37.2	0.13
1982	119	4082	34.3	0.40
1985	333	19 330	58.0	2.10
1987	481	23 700	49.3	2.47
1989	573	27 063	47.2	2.82
1990	606	40 000	66.0	4.00
1991	708	56 067	79.2	5.54
1993	763	66 184	86.7	6.80
1995	799	71 850	89.9	7.20
1997	926	76 979	83.1	7.64
1999	1146	88 152	76.9	8.80
2000	1227	98 208	80.0	9.85
2001	1551	129 830	83.7	12.90
2002	1757	132 945	75.7	13.20
2003	1999	143 980	72.0	14.40
2004	2194	148 226	67.6	14.80

Regulating and defining PAs

Over the last 50 years, the regulation and demarcation of PAs in China has altered. Prior to 1979, PAs were designated centrally—with minimum participation from lower-level governments—in a straightforward process that was aimed at reducing logging and hunting in high-value natural areas. This was followed by a period of deregulation and decentralization from 1979 to 1991 in which there was little relevant legislation, resulting in poor management (Jim and Xu 2004). In 1991, however, the central government enacted statutory procedures to encourage PA establishment at county, provincial, and national levels. Theoretically, the administrative status is tied to the degree of disturbance and ecological value (for example, a site with a lot of disturbance and no flagship species would be designated at county level, while a

relatively undisturbed site of national importance would be designated at the national level) (Jim and Xu 2004). A PA may be upgraded, moreover, if the site is nominated by the relevant tier of government. However, PA designation is also linked to funding (National Nature Reserves are funded jointly by central and provincial governments, Provincial Reserves are funded by provincial and local governments); thus PA designations can be susceptible to fiscal and political, rather than ecological, agendas (Jim and Xu 2004, PATF 2004).

The nomenclature of PAs in China is also a little confusing. Most of China's protected areas (c. 2000) are Nature Reserves that are notified and managed in accordance with the Regulations on Nature Reserves. However, PAs also include a number (c. 500) of 'Scenic Interest Areas' (often referred to as national parks), that are notified and managed by the Ministry of Construction, and 'Forest Parks' (ca. 1000) which are the responsibility of the State Forestry Administration (SFA). There is no comprehensive law in the country that applies to all types of PAs (PATF 2004). Notionally, the PA system is equivalent to IUCN standards (generally category I or II); however, as will be discussed, there is great variation in actual on-the-ground protection.

Recent influences on Chinese conservation

Reform and opening has seen China move into a more prominent position on the international stage. China has joined global trade groups (most notably the WTO) and ratified both the Convention on Biodiversity (CBD) and Wetland Convention in the early 1990s, and these have forced the country to become more accountable to other countries in a host of areas, including conservation. On a regional level, some of the most pressing environmental concerns are for Southeast Asian countries downstream along the numerous important rivers that rise in China. Consequently, China is a major player in the Greater Mekong Sub-region group which deals with trade and environmental issues of mutual concern in this region. China's rapid development is influencing global patterns of resource use and their associated environmental issues (Grumbine 2007). Similarly, the need to meet international standards is being realised increasingly as international trade and environment obligations require more ecologically sustainable production methods; and these can range from pollution monitoring to carbon neutral industries or from timber trade to food products, prompting moves to try and introduce the carbon credit scheme into Chinese-based industry (Ross 1998). Growing awareness of the need to tackle domestic environmental problems was reflected by the elevation of the Chinese State Environmental Protection Administration to ministerial level in 1998 (Harkness 1998).

Direct foreign influence and involvement in conservation are increasing. At present there are about 6,000 foreign social and environmental organizations in China (Wu 2005). Of international conservation organizations, the World Wildlife Fund (WWF) has had the longest presence, stretching back to early 1979. This initial cooperation was precipitated by the conservation of the giant panda – an emblematic species for China as well as the WWF. Over the last decade, the North American-based 'Nature Conservancy and Conservation International' have established a presence, while 'Greenpeace' is also becoming an environmental advocate in mainland China.

Besides International NGOs, Chinese NGOs (such as the 'Friends of Nature' and 'Global Village of Beijing' and 'Centre for Biodiversity and Indigenous Knowledge' in Kunming) have also emerged and are becoming more engaged in public debates and community-based conservation. Chinese NGOs cannot operate without crucial support from the state, besides being registered with the civil administration department they are also required to register with a

ministerial-level watchdog. A sign of their growing importance and independence, however, is the fact that new laws will soon be enacted to ease the local registration requirements for NGOs working on environmental conservation and sustainable development at the grass roots' level.

China's growing awareness of the importance of a stable environment is demonstrated vividly by the implementation of two massive ecological restoration projects, the 'National Forest Protection Programme' (NFPP) and the 'Sloping Land Conversion Programme' (SLCP). In August 1998, after catastrophic downstream flooding, the government introduced an immediate ban on all commercial logging of state forests in the upper reaches of the Yangtze and Yellow Rivers (NFPP). Along with the logging ban, the government also introduced a policy to reforest sloping farm lands (SLCP), together with more stringent controls on the burning of shrubs and pastures. These are huge schemes – the SLCP is budgeted at over US\$40 billion, affects more than 15 million farmers across 25 provinces, and plans to convert 14.67 million ha of cropland to forests by 2010. These programmes have been criticized, however, for their simplistic and monolithic approach, particularly in light of the diversity of landscapes and ecosystems affected (Xu et al. 2004).

After an increase of more than 4 million hectares of forest cover per year during 2000-2005 – mainly through tree plantation (FAO 2007)– China had the confidence to propose the Asia-Pacific Network for Sustainable Forest Management and Rehabilitation and committed to participate in the increase of forest cover in the region by at least 20 million hectares of all types of forests by 2020 as part of the Asia Pacific Economic Cooperation's (APEC) Sydney Declaration on Climate Change, Energy Security, and Clean Development.

Shortfalls in and limitations of contemporary Chinese conservation policies and practices

Although the rise of conservation awareness in China is heartening, on one level it seems that the government has been more concerned with the numbers and total area of reserves rather than their effectiveness. Reserves are demarcated according to hierarchical rules, often without giving much consideration to their long-term viability. Important criteria for the establishment of nature reserves include wide-ranging biodiversity, species' richness, unique ecosystems, and high rates of endemism. New PAs are proposed by researchers or government agencies, and indigenous people are rarely included in assessment, planning, demarcation, and management decisions. There have been cases in which local forest agencies have demarcated potential nature reserves on a map without going into the field to assess tenure (Harkness 1998). Also, while contiguity and size are important (to ensure viable populations), there has been a noticeable fall in the average areas of PAs in the last decade (see Table 1) – this may be symptomatic of the pressure exerted by the quota system to designate new reserves.

The current PA regulations, moreover, provide strict definitions that are unrealistic in China, so, in reality, almost no PAs conform to them. For example, Nature Reserves may have three separate management zones: 'core area' with no use, habitation or interference permitted; 'buffer zone' where some collection, measurements, management, and scientific research are permitted; and 'experimental zone' where scientific experimentation, public education, surveys, tourism, and the raising of rare and endangered species are permitted. A recent inquiry (PATF 2004), however, noted that mapped zones are rarely marked in the field and completely ignored in practice. This report went on to say that there is hardly a PA in China in which the experimental zone does not contain human settlements, farming, widespread unsustainable

harvesting of resources, or – more worryingly – mines and towns.

This gap between overarching central policy and local needs often leads to conflicts between PAs and local communities. Although limited activities are allowed in both the buffer zones and experimental areas of nature reserves, local farmers' access to resources is restricted, even if the land had previously been collectively owned. In extreme cases, local villagers or communities have been resettled outside the boundaries of the reserve. Such actions can lead to a breakdown of rules and exacerbate environmental destruction.

Insufficient government funding for the operation of nature reserves has resulted in increasing activities to raise revenue, such as tourism development, and even the use of natural resources (Harkness 1998, PATF 2004). Overexploitation of PAs by so-called eco-tourism operators is a common phenomenon, but indigenous people generally receive few benefits (Li and Han 2001, Hillman 2003). Few domestic tour operators in China comply with the international criteria for eco-tourism established by the International Ecotourism Society (TIES, 2007), which contributes to both environmental conservation and improvement in the well-being of local people. In most countries, the Tourism Bureau sets and maintains standards - including requiring that tourism operators conform to environmental protection regulations - and to coordinate publicity and advertising for tourism in the country or region in question. The crucial difference in China is that the equivalent of the Tourism Bureau is so powerful that it has the authority to grant concessions to corporations or to whoever it wants, for as long as it wants, with no regard for local concerns or property rights: for example, Shangri-La Tourism Bureau of Yunnan can give concessions to outside companies to run tourist attractions without attaching any conditions regarding the protection of the environment, employment of local people, waste treatment, and benefit sharing. Hillman's research (2003) in Shangri La shows what this means in terms of local employment in the tourism industry with up to 40% of tourism staff coming from outside and often occupying the jobs that are paid the most. This system of tourism management is perhaps the root of a lot of the pressure on protected areas. The government agency responsible for tourism is designed to increase the numbers of tourists and to generate revenue for concessionaires, not to monitor and to enforce regulations protecting the environment and local cultures.

In addition, an increasing wildlife population is leading to more conflicts between wildlife and local people in China (for example, black bears in the southwest, tigers in the northeast, and Tibetan antelopes in the west). Current regulations have not addressed adequately the issue of compensation for local people affected negatively by the nature reserves.

In summary, a number of factors combine to hamper effective conservation in Chinese PAs, and they include the following.

- The spatial overlap of people and biodiversity
- Lack of funding for (1) the resettlement of displaced people and (2) nature reserve management and planning
- Nature reserve staff often lack the incentive and the capacity to implement conservation management.
- Linking funding with levels of protection often leads to conflicting financial and environmental priorities.

In addition to the difficulties outlined above, one of the perennial problems facing conservation in China is the uncertainty about forest ownership and usufruct rights. Legally, there are two

types of forest ownership in China: state-owned and collectively-owned. There are 89.7 million ha of collective forest, accounting for 58.4% of the total. Although more than half of all forests are under collective ownership (including forest lands leased to individuals), there are no nature reserves are under collective.

Moreover, the definition of 'forest' is unclear. Strictly speaking, 'forest' in China is now defined as land having $\geq 20\%$ tree canopy cover (Miao and West 2004), but the term 'forestland' includes any land deemed to be forest, as opposed to other categories such as wetland, farmland, urban area, and so forth. According to the '5th National Forest Resource Inventory (1994-1998)', there are over 263.3 million ha of designated 'forestland', of which 158.9 million ha (16.55% of China) are actually forested. China claims to have 175 million hectares of forest area (18.21%) at present, and is aiming for 20% forest cover or a fifth of the total land area by 2010. Of the total, about one third of forest cover is in fact monocultural plantation, even monocultural rubber plantations are also counted as forest cover, and such areas often have poor environmental services in terms of water, biodiversity, and flood control (Calder 2007).

3. Changing attitudes towards conservation

Recognizing biological and cultural diversity

The current PA model – which dominates the Chinese government’s thinking about conservation – originates from European models of forest reserves and royal game preserves (Pretty 2002). The ‘Convention on Biological Diversity’ (CBD), defines a PA as “a geographically defined area, which is designated or regulated and managed to achieve specific conservation objectives.” This modern form of area conservation has been heavily influenced also by the national park system established in the United States in the late 19th century (Molnar et al. 2004). Currently, the most common form of biodiversity conservation remains through officially designated PAs. In this original model, biodiversity is protected inside natural habitats from which human activities are restricted or excluded.

Biodiversity refers to the diversity of genetics, species, and ecosystems. Internationally, biodiversity is usually recognized through rare and endangered species on the IUCN list, together with flagship species, and critical ecosystems. Myers et al (2000) defined biodiversity hotspots (high in species and endemism and low (<30%) in pristine vegetation. This definition, however, has received a lot of criticism due to the imbalance of quantitative data available for most groups of organisms and failure to address species’ conservation on a small scale and outside protected areas (Reid 1998, Brummitt and Lughadha 2003). Biodiversity conservation, however, has recently paid increasing attention not only to rare and endangered species inside biological ‘hotspots’ (areas extremely rich in species), but also to the totality of genes, species, populations, ecosystems, and landscapes in non-protected areas or ‘coldspots’ (areas that might be poor in species or attract less attention from conservation practitioners). These conservation practices suggest a need for broad conservation of dynamic, multi-scale socio-ecological patterns and processes in the coupled human-environmental system (Poiani et al. 2000).

There is a growing interest in ‘wilderness areas’ where nature is seen primarily as something to be protected from human interference (Cooper 2000). Human societies, nevertheless, are often most prevalent in the most biodiverse regions. In China in 1997 there were estimated to be 30 million poor people living in and around China’s nature reserves (Harkness 1998): given the recent expansion of PAs, this number is likely to be considerably higher now. From another perspective, the increasing mobility of the population due to economic activities and advances in infrastructural development (for example, construction of the Qinghai-Tibetan railway) has brought significantly large numbers of tourists as well as increasing human activities to the wilderness of the remote Tibetan Plateau region, and this has implications for wildlife conservation (Yin et al. 2006).

Moves to protect biodiversity from humans highlight one of the central dilemmas facing conservation planners in China (as well as in other nations): people may be part of the ecosystems that land-use managers are trying to conserve biodiversity in through a wide range of forest management practices. Human activities such as swidden-fallow cultivation and agroforestry do reduce biodiversity on a small scale, but they can also act as effective buffers to further forest clearance and conversion to other land uses that present the greatest threats to the ecosystem (Noble and Dirzo 1997). In the long term, many improved agroforestry or improved fallow management systems can enhance agricultural diversity and ecosystem services at

landscape level (Cairns 2007). Furthermore, there is growing international awareness that indigenous cultures and resource access rights warrant protection. For example, the legislation and policy developed by the IUCN, and currently in use in most countries in the world, define a PA as an area “dedicated to the protection and maintenance of biological diversity, and of natural and **associated cultural resources**, and managed through legal or other effective means” (emphasis added).

State versus local visions of biodiversity and conservation

The value of biodiversity can mean different things to different actors. Some may consider that the value of biodiversity managed for local human benefit is less than the value of ‘wilderness.’ The myth about wilderness, however, even in the history of the Americas, is not factual. The native American landscape of the early sixteenth century was a humanized landscape almost everywhere, Forest composition had been modified, grasslands had been created, and wildlife managed by American Indian society (Denevan 1992, Nash 1982, Oelschlaeger 1991). It is frequently overlooked that these ‘wild’ ecosystems are often the outcomes of long periods of human intervention and management (Redford and Padoch 1992, Toledo 1998). China, as one of the most populated countries in the world, has a long tradition of human intervention in ‘wild’ and frontier forest regions (Menziés 1992, Elvin 1998).

Rather than broader scientific concerns, local valuation of biodiversity is more focused on functional purposes such as plants for food and medicines; trees and forests for cultural services (for example, sacred groves and forests); and habitats for ecological services (see table 2). Ecosystem services include ‘provisioning services’ such as food, water, timber, and fibre; ‘regulating services’ such as the regulation of climate, floods, disease, wastes, and water quality; ‘cultural services’ such as recreational, aesthetic, and spiritual benefits; and ‘supporting services’ such as soil formation, photosynthesis, and nutrient cycling (MA 2005).

Table 2: State-driven vs. community-driven conservation

	State-driven	Community-driven
Perception of nature	Wilderness	People are part of nature or the cultural landscape
Biodiversity	All living organisms: at genetic, species, and ecosystem level	Mountains, water, plants, and animals have their own spiritual and material lives Reincarnation of life, e.g., Tibetan belief
Places and space	Natural habitat and non-habitat created by humans Biodiversity hotspots	Interrelated between people and habitat Culture in nature and nature in culture All biodiversity and habitats are equally important
Diagnosis of biodiversity loss	Overpopulation Bad land-use practices, e.g., shifting cultivation	Livelihood needs Unstable policies Extraction by outsiders
Perception of	People are the threat	Citizens of ancestor’s lands

local people	Subjects of study	Enhancing biodiversity
Human impacts on biodiversity	Always negative, root cause of deforestation and environmental degradation	Essential to create habitats for other species (crops, useful plants, and animals), people in fact sustain the diverse landscapes and biodiversity through regulated management (time and space) and mitigation measures (e.g., sanction) People nurture nature, nature nurtures people
Size of conservation	Large geographic scales, maximum species' number	Small-scale, manageable, associated habitats, and landraces at landscape level
Conservation solutions	Exclusionary protected areas Placement of species'/habitats Resettled local villagers	Sustainable use Social fencing Communication between man and nature through religious rituals
Value of biodiversity	Wild biodiversity is of high value, ecosystems disturbed by humans have less value	Value of biodiversity for ecological and cultural services, production, and livelihoods is equally important

4. Link between cultural and biological diversity: the case of Yunnan Province

So far we have traced the development of conservation policy in China, noting that while this has followed the trend of publicly protected reserves, there is growing international recognition that the protection of local people's rights, cultures, and access to resources is also important. There are further compelling pragmatic reasons, however, for China to look towards cultural conservation, because cultural diversity often goes hand in hand with the long-term preservation of biodiversity. In this section we outline some of the best documented examples of this mutually beneficial relationship in the ecologically and culturally diverse province of Yunnan – one of the poorest regions of rural China, now exposed to the competing pressures of rapid development and conservation management.

The ecological importance of Yunnan, southwest China

The area of Southwest China (Yunnan Province), situated upstream of the Greater Mekong Region, is the source of headwaters and major tributaries leading into several major rivers that reach and have impact on the lives of almost one billion people in eastern China and mainland southeast Asia (see figure 1). Elevations range from the highest peak (6740 m) in the alpine temperate zone to sub-tropical valleys as low as 76 m. The Asia-Pacific plate meets the Indo-European plate to form the Himalayan range and a number of smaller ranges that run almost parallel with each other from Northern Yunnan through the Southwestern portion of the province. The headwaters of the Yangtze, Salween, Irrawaddy, Mekong, Black-Red, and Pearl Rivers are located within this montane region. The region has been experiencing both great ecological transition and rapid economic development. New roadways, railways, waterways, and airways are being constructed for transportation, cross-border trade, tourism, and regionalization. Conceptualizing Yunnan as the 'powershed' of Guangdong on the eastern coastal region of China and Thailand downstream with great hydropower and dam construction potentials on the Lancang (upper Mekong River), Nu (upper Salween River), and Jinsha (upper Yangtze River) paves the way for increasing economic and ecological linkages between the upstream and downstream regions (Magee 2006).

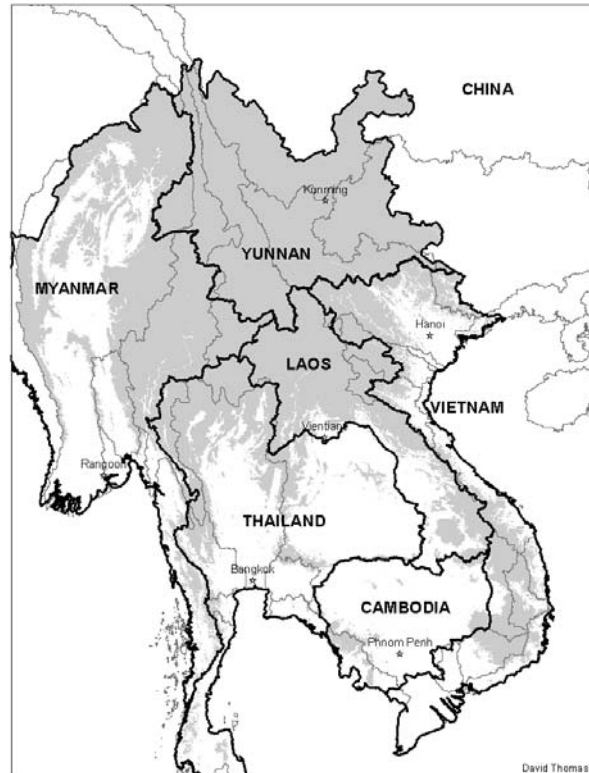


Figure 1: Location of Yunnan, China, in relation to montane mainland Southeast Asia (MMSEA)

The roof of Southeast Asia (Yunnan) provides shelter for 45 million people, one third are ethnic minorities. The vast majority of this population dwells in the upland areas, mainly indigenous ethnic groups: the Han Chinese mostly inhabit lowland valleys and urban areas. The province is also the historic home to diverse indigenous cultures: it contains 25 officially recognized ethnicities comprising of about 15 million people. Indigenous people have practised complex land-use systems, such as agropastoralism among the Tibetans, shifting cultivation among the Lisu and Jinuo, terraced paddy cultivation among the Hani, hunting and gathering among the Kucong (Lahu) and Dulong, and intensive lowland paddy cultivation among the Dai and Bai people, for centuries. Far from destroying biodiversity, these practices have maintained or even enhanced it (Xu et al. 2005). The government of China has a strong interest in political security within this mountainous region and has expressed a concern for the region's environmental impact on the economies of Yunnan and the surrounding provinces affected by the Yangtze and Pearl rivers. China has become a key regional player in development of the Mekong region, and increasing attention has been given to the Salween, Irrawaddy, Mekong, and Red rivers in terms of both environmental and economic (poverty) issues. The central government and the Government of Yunnan have launched a major environmental conservation effort in Yunnan's upper watersheds, for example, the large-scale implementation of the 'National Forest Protection Programme' (NFPP) and the 'Sloping Land Conversion Programme' (SLCP).

Covering both the hotspots of Indo-Burma and the mountains of South-Central China, Yunnan in fact serves as a biological corridor between the two. Yunnan has about 17 000 flowering plant species (62.9% of China's native species), 793 bird species (63.7%), and 300 mammal species (51.1%). About half of the endangered species in China are protected in 198 nature reserves, which cover 9% of Yunnan's land area.

The causes of forest depletion in Yunnan are complex, and they vary from one local setting to another. Forest depletion has been caused either by long-term historical exploitation of natural resources such as timber and non-timber forest products; mining operations; large-scale land reclamations; or wars during colonial periods in Southeast Asia, World War II, China's Revolution, and the 'Great Leap Forward' in the late 1950s (Xu and Ribot 2004). After the 'Rural Economic Reform' in 1978, and particularly the forestland reform in the early 1980s, Yunnan in fact has enjoyed forestry transition or forest regrowth (Xu et al. 2007). Not only the Chinese government, but also the countries downstream in the lower-Mekong region have given increasing attention to the ecological health and biodiversity of the Upper Mekong region. The Mekong River Commission was established for transboundary water government. After great investment in it as a 'corridor of commerce' by the Asian Development Bank(ADB), the ADB launched 'Technical Assistance on Biodiversity Conservation Corridors' Initiatives' in the Greater Mekong sub-region, of which Yunnan is a critical area of biodiversity corridors.

Discovery and protection of biodiversity in Yunnan

Early last century, European and American botanists, zoologists, and missionaries³, discovered Yunnan to be a place of great biodiversity. Later, Chinese scholars and scientists became acquainted with Yunnan as they fled inland during World War II. Local people often served as field guides and, consequently, scientists discovered not only new species, but also the vast knowledge of indigenous people about using those species. The botanical richness of the region is borne out by the fact that in 1951 immediately after the founding of the People's Republic of China, three botanical gardens (Kunming, Lijiang⁴, and Xishuangbanna) were established for the collection and domestication of plant resources.

Despite long-term, local conservation through resource-use practices, cultural beliefs, and resource sanctions, the Yunnan Provincial Forestry Department proposed implementing a logging ban or forest 'reserve' in six areas of the province in 1956 (in response to a national policy for resource protection). In 1958, the Kunming-based Chinese Academy of Sciences developed a proposal that called for the establishment of 24 nature reserves which described the purposes, functions, and methods of the reserves. Although the proposal itself was approved at the county, prefecture, and provincial levels of government, nothing happened. Subsequently, widespread deforestation occurred in Yunnan resulting from policies like the 'Great Leap Forward' (1958), 'Food Self-sufficiency in Upland of Yunnan' (1970s) (Xu et al. 1999), and state-driven logging operations in the 1970-80s (Xu and Ribot 2004). Previous species' losses in northwest Yunnan were due mainly to logging and establishment of monocultural forest plantations, cash crop plantations, and livestock grazing: currently the greatest threats to biodiversity are posed by national policy changes and market-driven demand for forest products (Xu and Wilkes 2004).

The establishment of nature reserves in Yunnan materialized after a national conference on nature reserves in 1980. A total of 34 nature reserves were established in late 1981 and, by 2005, Yunnan had established 198 nature reserves covering a total of more than 3.55 million ha, and accounting for 9% of the province. Fourteen of these reserves are designated at national level, 53 at provincial level, 72 at prefecture level, and 59 are county nature reserves. This figure

³ For example, George Forrest (1905-1932), Frank Kingdon Ward (1911-1921), Heinrich Handel-Mazzetti (1914-1917), Yvette Borup Andrews and Roy Chapman Andrews (1916-1917), as well as the famous explorer Joseph Rock (1922-1949) who lived in Yunnan for decades (Rock 1947; Ward et al. 2001).

⁴ Lijiang Botanical Garden was abandoned during the 1960s and is presently in the process of reconstruction.

has exceeded the targets set by the ‘Yunnan Nature Reserve Development Plan (1998-2010)’ which aimed to create a total of 179 nature reserves covering a total area of approximately 3.4 million ha by 2010.

Culture-based practices of conservation in Yunnan

Sanctioning of resources and sustainable use

In practice, state governments have never had effective management control over forests, land, and water in the peripheral areas of Yunnan: indigenous people administered these lands and resources through their own methods. Many of the customary institutions that operated in the past are still functioning in Yunnan today. In the northwest, long-term protection of the sacred Mount Kawa Karpo by Tibetan Buddhists has preserved a region that is ecologically and ethnobotanically unique (Anderson et al. 2005), while the cultivation methods of the Hani can also enhance diversity (see box 1).

Box 1: Hani swidden cultivators and their sanctioning of resources in Mengsong, Xishuangbanna

The Hani people, who traditionally practised swidden agriculture, moved into the Mengsong area in the middle of the 18th century and have been learning how best to use their natural resources since then. The forest cover is very stable, dropping only 1% from 51% in the 1960s to 50% in the mid 1990s. In Mengsong, people use the varied natural habitat for a number of activities – limited wet-rice production, homegardens, jungle tea gardens, swidden fields, and several types of forest (‘sanqpaqbalwal’ – community-protected rattan forest; ‘pucanq’ – village scenic forest for fencing the village to protect it from forest fire; ‘gaomail-sanqhav’ – watershed forest to safeguard the water supply; ‘laoqbiml’ cemetery forest for dead ancestors; ‘milsanl-sanqqu’ forest for mother earth; and different sacred spaces for ghosts and supernatural beliefs). Current government policies emphasize individual ownership of agricultural lands, better management of forests (by households, communities, and the state), and use of land for market products. Remarkably, through all of these events, some customary institutions have persisted and customary laws still govern access to forest resources in Mengsong. Spatially, the Hani designate forestland for swidden fields, pastureland, watersheds, and resource sanctuaries. One ancient customary practice is community ownership and management of rattan forest – a practice that may be a continuation of arrangements imposed by the dominant Dai ethnic group when Mengsong was founded. The Hani have a rather complex system of social governance with regard to lawbreakers. The perpetrator pays either in money or in goods (pigs, for example), according to the crime committed. Customary law, for instance, prohibits rattan collection from community-protected rattan forests (‘sanqpaqbalwal’): the illegal collection of one rattan cane would presently bring a fine of 50 Chinese yuan or in the past a payment of one pig and one bottle of wine (Xu et al. 1999).

Agroforestry mosaic landscapes

Based on China’s long recorded history, China has few, if any, ‘pristine’ forests. Forests in China are ecosystems manipulated by humans which have been cut, used, managed, and

regenerated over time again and again. Indeed, shifting agriculture has been well documented since the Song Dynasty (CE 960-1279) (Yin 2001). It was once widespread across tropical and sub-tropical southern and southwest China and practised by more than 16 ethnic groups in Yunnan alone. Several million farmers still practise sophisticated agricultural systems which include periodic rotation and fallowing, permanent farming, natural regeneration, and tree plantation. The Dai people commonly cultivate 315 species in agro-ecosystems, and local people in Xishuangbanna manage more than 100 timber species in tropical forests (Yu et al. 1985). A wide range of agroforestry systems totalling at least 220 associations or combinations of multiple species have been documented in Yunnan (Guo and Padoch 1995). Tea-based improved fallow or agroforestry systems offer great potential for the local economy and ecology (Xu 2007).

Indigenous people, furthermore, have long traditions of cultivating valuable plant species such as trees for timber and non-timber forest products (NTFP): the Jinuo and Hani peoples grow tea; the Hani grow rattan; the Miao cultivate Chinese fir (*Cunninghamia lanceolata*); the Yao, Hani, and Jinuo people cultivate *Baphicacanthus cusia* for dyes and for medicinal purposes; and species of cardamom can be found at low altitudes in Xishuangbanna (*Amomum villosum*) and at high altitudes in Honghe (*A. tsaoko*), largely in the form of *Alnus*-cardamom agroforestry. Farmers can even provide favourable micro-environments that increase biodiversity (see box 2).

Box 2: Bird diversity in the swidden agro-ecosystems of Xishuangbanna, Yunnan, China

The authors took a comparative look at the relationship between landscapes altered by humans and bird diversity in two mountainous swidden agricultural sites in Xishuangbanna. At the first site, the Hani people in Mengsong practise traditional swidden agriculture in mosaic landscapes. At the second site, the Jinuo swidden cultivators have practised a more sedentary agriculture because of the nature reserve established nearby. A survey of birds was carried out at two sites and in four different habitats: 6-year swidden-fallow fields; traditional economic forests; monsoon evergreen broadleaf forests; and montane rainforests. The forest landscape in the Jinuo ethnic region is quickly being transformed because of modern agricultural practices and, as a result, bird diversity and richness are declining. Meanwhile in the Hani ethnic region (Mengsong), the persistence of traditional swidden agriculture is maintaining the wide diversity and richness of birds. The greatest differences in bird diversity between the two sites occurred in the traditional economic forests and the 6-year fallow fields where the Hani region had much greater richness and diversity (Wang and Young 2003).

Ecological services: the case of headwater forests

Traditional practices that protect forests in headwaters can be found in almost all ethnic cultures in Yunnan. Forest ecosystems provide invaluable ecological services for downstream populations, providing water for drinking and irrigation. These headwater forests, together with sacred forests, are perhaps the ecosystems that have been least subject to human manipulation in southwest China. In fact, more than 15 nature reserves in Yunnan originated from areas protected as watersheds or headwater forests.

One example of traditional practices is the written ‘Customary Forest Laws’ for protecting headwater forests at Ana Village in Chuxiong Prefecture, Central Yunnan, established in 1714 during the Qing Dynasty (1644–1912) (Xu and Ribot 2004). In translation, it reads as follows:

“A man with a beard is respected (indicative of his seasoned age and rich experience).”

The same idea applies to mountains too:

“A person with a beard and hair is like a mountain covered with forest and grass.”

In the same vein:

“A mountain sheltered in forest and grass is like a person well clothed. A barren mountain is no different from a naked person, exposing its flesh and bone. An unsheltered mountain with poor soil painfully bears great resemblance to a penniless and rugged man. Even a pine tree or single bamboo grows thousands of leaves and branches, how can a mountain tolerate a treeless state? Yes, indeed, no one does not enjoy being amongst clean streams and green mountains. Everyone understands that only healthy green forest and fertile soil can nurture ever-flowing springs. None doubts the significance of those fundamental elements of nature such as soil, water, and fire. Yet, do we know it is the root of trees and forest that bring us water? It is for our benefit and fortune. Meanwhile, upon the order of the officials, our village has established a tradition of electing a village forest guard since the time of Ch’ien-lung emperor [Qing Dynasty]. Alas, there have been so many generations of the old who have conscientiously protected our village’s forest till today. Let us dare not to discontinue this tradition....”

Not only do the indigenous peoples of Yunnan possess profound ecological knowledge, they also already have an established system for local watershed governance and forest resource management.

Over hundreds of years, the upland and lowland communities have developed complicated social networks and relationships for both ecological and economic reasons. The uplands supplied dependable and good quality water, timber, and NTFP. In addition, upland populations provided a source of labour for either cash or labour exchange. In return, lowlands provided food, salts, agricultural tools, market information, and technology for those living in the uplands (Coward 2000).

Impacts of the public protected area approach in Yunnan

Many PAs were poorly planned with little or no consultation with local people. For many communities, establishment of PAs has restricted traditional access to forests and other natural resources and, in some cases, even resulted in their resettlement or displacement. In fact, many reserves were established after the forest allocation policy implemented in 1982, therefore some collective forestlands have been demarcated into PAs without proper compensation.

In some cases, people are charged to continue traditional practices. In Xishuangbanna, approximately 220 ha of cardamom (*Amomum villosum*) are located inside PAs, and they contribute an income of 420 US\$ per household for 882 families in the Mengyang section of Xishuangbanna Reserve alone (Jiang and Ou 1998). A similar practice for planting cardamom (*Amomum tsaoko*) can be found in Jinping Fenshuiling Reserve in Honghe Prefecture. In order to restrict understorey planting in both reserves, staff started levying local 20 US\$ per ha from local villagers to cultivate cardamom.

Due to the large expansion of PAs and limited financial resources, governments have often

underestimated the costs and impacts that nature reserves have on local people. More demands are being made for fair compensation, not only for existing assets and the cost of resettlement, but also for rights foregone and negative livelihood impacts (see box 3).

Box 3: Nuozadu Provincial Nature Reserve

Nuozadu Nature Reserve, situated along the Lancang-Mekong River in Simao Prefecture, was proposed in the early 1980s and formally established in 1996 with a total area of 21 679 ha. The aims of the reserve are to conserve tropical monsoon rainforest ecosystems, tree ferns, wild water buffalo (*Bos gaurus*), and elephants (*Elephas maximus*). The establishment of the nature reserve impacted 36 hamlets of 8 administrative villages with a population of 8981 (1828 households). Eight of the villages are located completely within the borders of the nature reserve, 11 villages are partially inside the nature reserve, and the other 17 villages traditionally used resources within the nature reserve. According to a field survey, local villagers had traditionally collected 782 metric tonnes of bamboo shoots, tapped 133.7 tonnes of pine turpentine, 7.1 tonnes of mushrooms, and 8.6 tonnes of medicinal plants. Collective forests compose two thirds of the total protected area. A total of 4565 ha of collectively owned land, including 3308 ha of collective forests and 822 ha of farmland to which the villagers were supposed to have full access, was included in the nature reserve. With new dam construction along the Mekong River, the 'Resettlement Bureau' funded their resettlement at 60\$ per capita, 37\$ per m² per house, and \$5490 per ha for farmland. However villagers complained that the compensation was insufficient for reestablishment of residence and livelihoods in the new environment. With encouragement from the dam resettlement programme, the managers of the nature reserve want to relocate the villagers outside the protected area, but they do not have sufficient funds (FCCDP 1998).

Uncertainty also exists for those local people who live inside a PA, pending a resettlement decision that is predicated upon available government finance. These people, moreover, have limited access to rural development investments such as road construction, telecommunications, and electricity, and they often depend on government relief programmes (see box 4). The data on the repercussions for settlements that become the unwilling hosts of displaced populations are limited.

Box 4: Displacement of five villages in Gaoligongshan National Nature Reserve

A total population of 6337 reside in the natural villages (1562 households) in and around the protected area in Lushui County of Nujiang Prefecture. Of this population, there are 5 natural villages, 52 households, and a population of 252 that live inside the nature reserve. Due to restrictions on land use, villagers had an annual income of less than 40 US\$ per capita. About 60% of households suffered food shortages for 2-3 months of the year. In order to resettle these households, the government invested 28,000 US\$ (about 110 US\$ per capita) and allocated 67.2 hectares of farmland (0.27 ha per capita) (FCCDP 2000).

Insufficient financial support for conservation, particularly at local and provincial levels, can create a management vacuum that ultimately degrades ecosystems. For instance, by 1996 the Nuoazadu Nature Reserve, proposed in the early 1980s, had lost almost half its forest cover due to poor management, open access farming, and illegal extraction of timber and non-timber forest products (NTFP) (FCCDP 1998). Similar examples of counterproductive conservation outcomes exist in Sichuan where high-quality panda habitats were destroyed at a more rapid rate after the establishment of reserves than before (Liu et al. 2001) and Yunnan, where villagers rushed to exploit or destroy resources before access was denied (Harkness 1998). Indeed, the biggest threats to biodiversity conservation and PA in China are now considered to be agriculture, collection of NTFP and wood, and hunting (Ervin 2003b, Xu and Wilkes 2004).

5. Community-driven conservation alternatives

Appreciating the links between cultural and biological diversity

Rather than simply being ancient natural landscapes that need protection, China's ecosystems also represent a cultural heritage. The remaining natural ecosystems in China are in fact the result of many generations of human domestication, cultivation, and manipulation on historical, spatial, and temporal scales: this challenges conservation practitioners to integrate technical solutions with the indigenous ways of perceiving reality and relationships between humans and nature.

Community-driven conservation is a useful approach for conserving biological and cultural diversity, and therefore can play a critical role in strengthening local sustainable livelihoods. Indigenous people have shown that local livelihood practices can be advantageous for the long-term maintenance of conservation goals because a) conservation is sustainable due to the active participation of resident peoples; b) the costs of conservation are reduced; c) their culture and local livelihoods are linked; d) they use indigenous knowledge, practices, and innovations; and, e) local institutions and governance are strengthened.

The development of an integrated, comprehensive management strategy is essential to ensure that ecological, socioeconomic, and cultural objectives are compatible and sustainable. In the context of the multicultural environment of Yunnan where traditional cultures have evolved in intimate association with nature and biodiversity, PAs should be a) sensitive and respectful of cultural values; b) respectful of local people's rights and needs related to lands, waters, and natural resources; c) inclusive of local strategies and systems for protecting biodiversity and natural resources; d) accountable to development objectives at the national, regional, and local levels; and e) part of a larger national and international strategy for the protection of cultural and biological diversity.

Inclusive conservation planning: theory and practice

The international conservation community recognizes the linkage of culture, biodiversity, and livelihoods, and moves have been taken to address the issues of access and benefit sharing, particularly for indigenous people (for example, CBD, Article 8(j): Traditional Knowledge, Innovations, and Practices). Unfortunately, however, any negotiated development benefits rarely trickle down to local communities or to conservation: scientific organizations tend to benefit most (Kate 2002). This gap between the inclusive conservation ideals and the realities for the people affected is at the crux of this whole issue of balanced conservation. Literature on conservation planning is full of politically correct statements; for example, in an analysis of the nature reserve system in China to the IUCN, Zhu (2002) says:

“In addition, many minority nationality areas coincide with areas of high biodiversity, therefore attitudes stemming from traditional religious beliefs, cultures, ethics, and habits also play a very important role in establishing Nature Reserves and protecting the environment.”

In order to bridge the scale of biodiversity hotspots and local cultural habitats as well as epistemologies of state and local perceptions of conservation, we need to reconsider the exclusive PA approach to conservation. The ‘Nature Conservancy Programme’ of China has

developed a model for a new Chinese national park system in Yunnan. The Pudacuo National Park demonstrates to local governments how a well-managed park can be ecologically and economically valuable by helping the local communities and economy through providing neighbouring residents jobs in the park management and eco-tourism operations.

Although the author later acknowledges limitations of current planning policies, such bromides typify many overviews of Chinese conservation. To delve deeper, we need to outline the mechanisms of conservation and resource planning in China and identify aspects that may be constructive for improved conservation outcomes.

Securing access rights and benefits

It is instructive to illustrate the changing dynamics of benefit sharing from resources in China by applying the access theory (Ribot and Peluso 2003). This draws a distinction between ‘access rights’ (which tend to be based on the notion of property) and ‘access powers’ – that is, the theoretical right, as opposed to the actual ability to derive benefits from things. Ribot and Peluso (2003) make the point that through access rights, states often maintain ambiguity over who really holds the power over local resources, since delegating laws are made by executive decree. This ambiguity is evident in many of the recent policies introduced in China where moves to improve community rights (for example, the introduction of locally elected village councils) have been accompanied by a simultaneous imposition of central policies that have a profound effect on local resource use and access (for example, PAs, national reforestation, and land conversion programmes that ban logging, pasture burning, and farming on hillsides). In effect, although local communities may have been granted new access rights, they are usurped by national policy, thus they are deprived of access benefits.

Access theory requires that benefits flow and mechanisms are identified and mapped to analyze how and where benefits are derived: key structural elements include access to technology, capital, markets, knowledge, and authority (Ribot and Peluso 2003). These concepts are certainly applicable to the situation in China. For example, access to technology may vary from something as simple as fencing (which excludes some people from a resource and changes customary sharing arrangements) to access to electricity, water pumps, roads, and transport. With the expansion of infrastructure in rural China, resource exploitation now favours those – often outsiders – with access to technology. Similarly, access to capital can be used to enhance extraction and production directly (often via technology), mobilize labour, purchase rights, or buy influence over people who control resources. Capital is usually very limited or non-existent in rural communities and, therefore, must be imported.

Even if communities retain a legal right to use resources and have some ability to extract them, however, market access often determines who may commercially benefit. Access to markets can be controlled through the processes outlined above (that is, access to capital, technology, and transport), but also through exclusionary practices or supported by state policies controlling professional licenses and access fees. In southwest China, the burgeoning industry of high-value NTFP (for example, matsutake and *Cordyceps*) is a good example of this: local communities have limited market access as this is dominated by well-financed and well-connected outsiders who act as middle men and distributors (Winkler 2005). Similarly, in the rapidly expanding tourism sector, small local enterprises have little or no access to marketing and are at the mercy of outside operators and alliances backed by the government (Li and Han 2001, Hillman 2003).

Recently, the concept of access to knowledge is something that has altered radically in rural

communities in China. Knowledge was central to historical beliefs, ideological controls, and resource access within communities. This indigenous knowledge still holds currency within some communities – for example, knowledge of mushroom harvesting sites and techniques are kept within families or clans – but, in China today, it is more important to have access to knowledge that enables input into the new mechanisms by means of which conservation practices and land management decisions are made. This may be knowledge of legal rights and administrative processes or knowledge of scientific research. Scientific findings are often used to justify state control over resources. For example, the state used studies on erosion to support the transition from swidden farming (Xu et al. 1999) and economic studies helped justify the relocation of rural communities in dam-building programmes (Dore and Yu 2004). The people most directly affected by these decisions had virtually no opportunity to comment or contribute to such studies.

All forms of access are in many ways overridden by having access to authority that invariably decides who may benefit from resources. Authority may be accessed through knowledge or by having social or professional relationships with those in power (facilitating applications for permits or lobbying through official channels) or through having the social, economic, or market clout to control or influence access. Decision-making power now generally resides outside local communities.

An interdisciplinary and intercultural approach to conservation in China

In terms of access benefits, recent conservation and development policies in China have generally resulted in a shift of power from local communities to outsiders. Given this fact, the question is how to develop more balanced and representative policy-making mechanisms. To this end the early work of Henning (1970) is interesting. Henning examined the factors that govern conservation management in the USA. Firstly, he points out that the majority of resource managers are administrators: they are generally concerned with management of people's behaviour towards natural resources rather than natural management per se. As discussed above, an acknowledgement that the mechanisms of decision making about resource allocation are invariably sociological is the key to any attempt to design a more inclusive conservation policy. The importance of human behaviour becomes even more apparent when this same study elucidates the central concepts of decision making about resources: these range from empirical disciplines, such as geography and economics, through to cognitive sciences such as political science, sociology, and individual psychology. Henning suggested that social science was generally underrepresented in decision making about resources and he advocated a multidisciplinary approach in which all these interests were clearly recognized and/or represented in public conservation planning. Despite being based on the American situation, these concepts have universal applicability, but it is particularly pertinent to examine them with a view to the unique politics and cultural mores that influence Chinese policy making (table 3).

Table 3: Analysis of interdisciplinary groups recognized by Henning (1970) as key elements in conservation and resource management and their relevance to contemporary China

Concept	General relevance to resource management	Particular relevance for China today
Anthropology (Culture)	People perceived in terms of the values they place on the environment.	Modern Han values dominate and affect a large number of minority cultures in mountain regions.
Economics (Scarcity)	Demand and supply of natural resources Money limits conservation values, that is, stream and land restoration.	Fastest growing resource consumer in the world with relatively poor natural resources. Huge demand for new fuel, hydroelectricity, and domestic water. Nature reserves poorly managed due to financial constraints and incompetent staff.
Geography (Place)	Extremely important for a host of reasons: relative proximity and accessibility of resources (to human populations) Crossing of political boundaries	Many biodiversity resources are in the poorest regions, minority areas, and rugged mountain areas. China controls the headwaters of river systems critical for the region. Natural resources often occur in ecologically sensitive wilderness areas.
History (Time)	Identifies past patterns of use as well as past myths or values associated with these patterns. Impacts of changing technology	The last half century has seen rapid and large-scale swings in political ideology and policy direction. Rapid technological advancement Perception of minority livelihoods as 'primitive'
Political science (includes public administration) (Power)	Essentially, all decisions about natural resources are of a political nature – a power struggle between competing interests and values.	Centralized government has the power to make rapid and sweeping changes (for example, NFPP; SLCP).
Psychology (Individual)	Strong personalities and values of key players may have disproportionate influence on resource situations.	Chinese leaders and decision makers have enormous personal power. Old-fashioned education and ideological influences (Soviet)
Sociology (Group)	Resource agencies and pressure groups are basically groups in a pluralistic society composed of formal and informal interests.	Society is not yet pluralistic, but dynamic and interconnected. There is a growing sense of national pride and prestige. There is a growing role of science in public debates and policy-making processes. Growing middle class and Chinese NGOs

		Increasing awareness about local culture and ethnic identity
Animal behaviour (Territory)	The concept of territorial compulsion (individually and within groups) which may or may not be compatible with conservation.	Many government agencies are newly established and/or competing for presence and identity. Decentralization of government administrations and increase of democratic voices in the villages Maintaining nationally strategic peripheral areas is important.
Ecology (Interrelations)	Humans are in a highly dynamic and manipulative role in relation to the environment. A total environmental orientation approach is seldom attained, except through 'lip service.'	Anthropocentric views of Confucianism: that conservation should benefit human society. Concept of harmony and balance with nature (Confucianism and Daoism): largely lost during post-revolutionary expansion. Growing environmental awareness

Analyzing these decision-making concepts in the Chinese context reinforces several of the key drivers for conservation management that we have already noted. A combination of economics and geography has resulted in massive hydropower projects that have literally submerged local cultures and communities in western regions. There is a saying in western China: 'western power goes east' ('xidiandongshu'). This is not just a literal reference to the 'West to East' power schemes, but encapsulates a deep resentment that local resources and decision making are invariably siphoned off to meet the demand of the powerful political economy centres along the east coast.

In China, there are numerous battles for territory (that is, 'animal behaviour') over resource management. Nine different ministries or administrations now manage PAs and, during the turbulent recent decades, the roles and responsibilities of government departments have been constantly defined and redefined. In the last decade, forestry – a crucial element for conservation in China – has transformed from resource acquisition to environmental protection, overlapping with newly developing agencies for environmental protection and reserve management. These departments struggle with a sense of identity and responsibility for mandatory and discretionary powers, and this has been complicated by the recent creation of elected village councils (Xu and Ribot 2004). All these groups are competing for territory and authority. Overarching this is the long-standing Chinese desire to develop and control peripheral territories for national security. In peripheral regions, the importance of PAs ranks well below the need to control fuel pipelines, power grids, mining operations, and transport networks. Existing regulations, moreover, allow for Nature Reserves to be de-gazetted or downgraded. Partly because of this, more powerful agencies can override or negatively impact PAs with impunity (PATF 2004)

China has a unique set of conditions that makes conservation planning different from anywhere else. With reform and opening, China's economy is the fastest growing in history, but this is set against a centralized authoritarian government that has the power to instigate enormous changes without the numerous committees and enquiries (that is, 'political science' and 'sociology') that paralyze democratic nations: the rapid implementation of conservation policies of such

magnitude as NFPP and SCLP could not occur in the western world. This form of political power, however, is very susceptible to individual influences ('psychology'): Chinese leaders have enormous power. Post-revolutionary leaders were largely educated in eastern European and Soviet styles of thinking, which is manifested in the Chinese perspective (mega-projects, landscape engineering, and separation of humans and nature) (Shapiro 2001). China, of course, has a history of large-scale projects and attempts to conquer nature: for example, the Grand Canal and Great Wall in the past (Elvin 1998) and on-going south-to-north water diversion and cascade dam construction after completing the 'Three Gorges Dam' along the Yangtze River at present, but any remnant Daoist perspective of balance and harmony with nature was shelved during post-revolutionary times (Shapiro 2001). It is only now that new influences are becoming apparent with a predominance of Chinese leaders with exposure to western education and modern economic backgrounds, as well as rediscovery of the value of traditional Chinese culture.

This is what makes the recent decision to hold a moratorium on the Nujiang dam project so interesting – it is a rare public withdrawal. In 2004, Chinese Premier Wen Jiabao announced that, following concerns from environmental and local community groups (that is, 'sociology'), the dam project would be suspended pending an inquiry (there is considerable political speculation concerning who supplied the information to environmental groups – some claim that it was the central government itself (Anonymous 2005). Regardless of the eventual outcome of this project, it is very significant that modern Chinese policy is acknowledging potential problems or shortfalls. By comparison, the difficulties that authorities are experiencing in applying new environmental impact assessments, including social impact requirements (often retrospectively) on developments that are closely connected with powerful figures, demonstrate the difficulties in overcoming 'guanxi' (although political 'friendship' and influence clearly occur in all cultures, the sense of relationship and obligation can be exceptionally strong in Chinese society).

Using Chinese character traits constructively

There are aspects of the modern Chinese character ('sociology') that can be harnessed to enhance conservation outcomes. 'Emerging' China has a strong sense of national pride. After a recent history of occupation and humiliation, Chinese society is keen to show a unified front and impress the world. This is demonstrated by the massive expenditure on a programme to put humans in space and the Beijing Olympics despite ongoing internal poverty differentials. In working towards more inclusive conservation planning in China, however, this sense of national pride is not likely to respond well to overt criticism, exposure, or bullying – as often happens with lobby groups in the western world. It would be preferable, rather, to work towards the desired outcomes by cultivating the Chinese character traits that can build a harmonious society that represents minority diversity and respects a balance with nature (a mixture of 'psychology', 'sociology', and 'ecology'). This positive trait is seen in the constructive role China has promised to take within the organization for the Greater Mekong sub-region and also by China's willingness to sign the Kyoto Protocol on climate change. In order to address the world's concern about the 'China factor' in global sustainability, China put forward a proposal recently on a forest recovery and management network which was adopted by the recent APEC Sydney declaration. China as responsible stakeholder attempts to demonstrate that large-scale forest conservation and plantation in China have global implications.

Another relevant social factor in China is the emergence of a rapidly growing middle class:

people with education, access to international forums, and a growing voice in national responsibilities and obligations. The middle class (with increasing amounts of disposable income) is also more aware of environmental and health concerns associated with issues such as pollutants and toxins, leading to greater demand for organic or less harmful alternatives. A sure sign of a developing middle class is the expanding number of Chinese conservation groups and internal campaigns to preserve endangered species (the aforementioned Nujiang dam protest was largely driven by home-grown Chinese conservation groups). In fact, as of 2005 there were 290 000 registered NGOs in China, among which 153 000 were social organizations. If unregistered organizations are included, this figure could be as high as 3 million (Wu 2005). Although still in the seminal stages, the growth of social advocacy is evidence of an increase in free thinking and questioning; however, this public participation still demonstrates uniquely Chinese characteristics in which Confucian respect for hierarchy and authority is deeply entrenched. For example, unlike foreign NGOs which strive for independence, Chinese NGOs do not see close ties with the government as a problem, but rather as an asset that enhances popular support (Anonymous 2005). Compromise and complementarity rather than a confrontational approach are still tactics for a Chinese NGO's survival.

Chinese government, on the other hand, in compliance with international practices and increasing global responsibilities and obligations, would like to listen to more critical opinions not only from NGOs but also from local farmers or communities and their concerns for building a harmonized society. The Nujiang dam controversy might not halt the building of the dam — the government intends to go ahead and build dams — but the original proposals might be modified in terms of number of cascades and heights of dams in response to criticism from the public and from environmentalists.

In turn, international conservation agencies and NGOs are adapting to Chinese ways: working quietly from within and using fewer foreign personnel but rather employing Chinese nationals (often with western education) who can understand Chinese ways. To outsiders, Chinese decision making can seem glacial and incredibly circuitous — even official literature may be full of flowery poetic analogies and classical historical references — but when decisions are made, changes can be rapid and far reaching.

Developing community-driven conservation in China

In examining conservation issues and resource allocation in southwest China we have identified a need for more inclusive policies that recognize the unique conditions of the Chinese character, geography, and history. In terms of conservation planning, there are specific priorities that can be addressed using the examples studied: these are discussed below.

Securing ecosystem goods and services locally

Protected areas are meant to provide a variety of goods and services to society at large such as watershed protection; biological (including genetic) resources; and opportunities for education, research, and recreation. Payment for environmental services can reward good management (water regulation fees to maintain catchment forests are already levied in some provinces [Harkness 1998]). The primary beneficiaries of revenue from PAs, however, should be the people living in or near these areas. Market access, whether for NTFP or tourism, needs to be provided or created for local communities. Mechanisms to help implement such changes could be the enforced disclosure of interest groups in tourism ventures (so tourists know where their

money is going); giving local communities first refusal on developments; and making local administration more transparent.

It is possible to add value to local NTFP by creating local brands, introducing international standard certification, encouraging local processing, and developing cooperatives to enhance bargaining and buying power. There are also areas of international trade which, despite appearing to be somewhat esoteric, can have profound impacts on smallholder farmers' 'niche' products for premium markets. For example, the European honey market is restricted to honey from one European bee species (*Apis mellifera*). This directive bars honey derived from indigenous Himalayan bees, depriving poor beekeepers of market access and discouraging the conservation of local, wild honeybees and their natural habitats (Ahmad and Joshi 2005).

The protection of intellectual property rights generally concentrates on China's international infringements, but this is also an internal concern with ramifications for community conservation through ethno-tourism. Local cultures, art forms, and products need clear legal protection to ensure that ethnic groups have access to the benefits derived. Once again, enforced disclosure of interest groups and provenance of items or performances may be one way of addressing this.

Indigenous management practices as 'disturbance' ecology

Conservation policy needs to look beyond initial preconceptions of destructive practices: the biodiversity of shifting agricultural systems is higher than that of many PAs (Harkness 1998) and, while there is no doubt that forest fires are a serious concern, burning restrictions are degrading rangelands and increasing weed species in southwest China. The concurrent restrictions on burning and promotion of afforestation, moreover, may be counterproductive, because the loss of grazing lands places more pressure on young forest plantation areas. So, rather than proscription, perhaps governments would be better advised to develop more consultative fire management and monitoring practices with local people: the current situation gives farmers little incentive to cooperate with government policy. Similarly, by limiting forest access, the intensity of use of designated fuelwood forest can become unsustainable. Again, the outcomes envisaged of these conservation policies are often compromised by other simultaneous changes – such as improved road access and creation of new markets for firewood (stimulated by the logging ban) – which can combine to result in unsustainable practices in fuel forests.

Secured access and collective institutions

Ownership of land and resources is also important as it strengthens a community's long-term, cultural attachment to such areas. As outlined earlier, in extreme cases, unclear land tenure and the fear of loss of secured access have promoted poor management practices or wanton destruction. In southwest China, many shifting cultivators and pastoralists are still maintaining collective ownership as a basis for maintaining territorial integrity and avoiding ecological fragmentation.

Any talk of conservation management in China invariably comes back to the thorny question of collective forests — they are a fundamentally important part of the ecosystem and serve to illustrate the ongoing uncertainty over land tenure and resource access. It bears repeating that collective forests are central to any meaningful conservation planning in China — they account for 58.4% of the nation's total forested lands. However, collective ownership in China is still

poorly defined ; and this has been a battlefield for decades and it is not clear who represents local communities and how decisions are made. Higher-level government still intervenes in community decisions and forest resource management (timber collection for personal use requires a quota permit from the township and final approval from the County Forestry Bureau) (Xu and Ribot 2004). The introduction of direct elections for village heads according to the Village Organic Law introduced in 1998 might be an opportunity to enhance accountability in local communities, but transferring power without accountability is dangerous for forest resource management, and establishing accountability without power is useless.

The confusion surrounding collective forest rights has been compounded by the commercialization of NTFP. New institutions are emerging that are redefining access to NTFP within and across villages, leading to potential confusion and conflicts. In northwest Yunnan, the commodification of matsutake mushrooms has led to a differentiation between tree tenure and NTFP tenure on the same land (Yeh 2000).

How should local knowledge of forestry, resource use, and management practices be integrated into decision making? What channels of representation can guarantee that, or at least help, local views influence the design of forest management policy? First, forestry should be regarded as a social rather than a technical issue, involving interdisciplinary research and the collaboration of local communities in decision making. Second, scientists should interpret indigenous knowledge, communicating with local people, and providing relevant information for decision makers. Third, local people should have real representation through locally elected officials at the administrative village level. Fourth, it is essential to develop a legal framework for collective and even private ownership of PAs. The challenge for the SFA is to design a system that changes the role of forestry agencies from daily managers to monitors. In terms of tangible policy outcomes, this may involve giving local communities greater access to high-value forest, and monitoring this to ensure sustainable practices.

Community-based education

Community-driven conservation is built upon the notion that, rather than being strictly technical, conservation science should be redefined as a civic or community-based science (Bäckstrand 2004). Given this argument, improved management strategies for PAs in China require better education and communication between and among policy planners, affected communities, and the general public. Conservation advocates need to articulate the link between human cultural diversity and biodiversity in China. Part of the function of a PA should be to promote an appropriate understanding of, and respect for, local people's cultural values among visitors and the public at large. The initial impression about shifting agriculture, for example, may be of deforestation, but, if this system was couched in terms of overall agro-biodiversity and sustainability, outsiders may take away different opinions.

The expansion of market economies and the commercialization of culture, however, are having an impact on local communities. Younger generations are being educated in formal schools and engaging in off-farm jobs in the cities. If and when they return to their local communities, they may have new and competing interests and social values that will likely cause internal conflicts not experienced previously. Therefore PAs should support traditional, local education systems by providing them with opportunities and tools for communicating nature-related cultural values to younger generations. Other relevant issues are an improved understanding of their roles and integration of women into conservation planning (as women are often the most closely involved

in using local resources) and, when it occurs, conflict resolution within communities.

Younger generations offer the opportunity to bring important new knowledge into traditional systems. As identified earlier, the access to knowledge about legal rights and responsibilities and access to science are critical for contemporary conservation planning (even a rudimentary knowledge of these issues might have prevented much of the exploitation by outsiders of local communities for resources rights, tourism benefits, and indigenous property rights [IPR]). This sort of information can be introduced via the return of those educated externally and bolstered by community-based education. Rather than excluding people, conservation advocates and policy makers should be providing resources to support the technical training of communities (Salas et al. 2003).

Conservation concessions and partnership

Contractual partnerships between government and non-government actors to manage state-owned lands for conservation are being adopted increasingly around the world (Bray et al. 2003). The state can hand over small PAs to local communities in a pilot phase while management plans and monitoring indicators are developed and facilitated by third parties such as local NGOs. It will also be important to involve urban-based businesses, the wealthy middle class, and individuals in improved conservation efforts. With the growing awareness of the private sector about social responsibility, there is a potential to establish government-business-community conservation partnerships through collaborative projects. The government can provide tax reduction incentives for those who invest either in state or collectively owned land, in restoration of degraded ecosystems, or conservation of existing protected areas, and this could definitely reduce the state's burden for conservation. Through this approach, the government would no longer be the sole provider of conservation services: it would become the responsibility of the whole community both public and private. Policies need to be developed for a) establishment of private trusts to raise funds for conservation; b) tax incentives for donations to conservation trusts; and c) private conservation reserves for which management costs are tax exempt. The benefits of this approach include an improvement in knowledge enabling informed conservation decisions, support for long-term research and monitoring, a network of committed people, the development of partnerships dedicated to conservation between companies and non-government organizations, and wider public awareness of the issues. At present, some of these concepts are being discussed at policy-making levels in China.

6. Conclusions

It is time to evaluate the effectiveness of establishing public PAs focused on biodiversity 'hotspots'. This approach might gain public attention but often fails to meet conservation objectives in practice (Ervin 2003a). In China, local communities have received little financial and technical support for conservation. In addition, the uncertainty of collective forest ownership and access has put local institutions and livelihoods at risk. The officially imposed dichotomy of nature and culture has not only eroded indigenous knowledge about the sustainable use of resources, but also has affected biodiversity by reducing agro-biodiversity and forest quality and eroding cultural diversity and identity.

In China today, the key is to design policies that enable local people to optimize their use of resources while at the same time meeting broader conservation objectives; for example, allowing local people to engage in forestry and, therefore, work with rather than against the national conservation goals. Beginning with reconciling state and local perceptions of conservation, a community-driven conservation approach can be achieved with the growing economic and environmental awareness in China.

China is showing the will and ability to spend huge amounts on the environment, open up to limited international (and internal) scrutiny, and establish nature reserves. China also has the unique ability to implement massive and broad-reaching changes overnight: it must now temper this power with a willingness to work towards more consultation and reconciliation among different perceptions and site-specific outcomes of conservation. Far from being an idealistic option, community-driven conservation may well be the only viable way of achieving the Chinese notion of a harmonious society that maintains cultural and biological diversity.

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Who we are

The World Agroforestry Centre is the international leader in the science and practice of integrating 'working trees' on small farms and in rural landscapes. We have invigorated the ancient practice of growing trees on farms, using innovative science for development to transform lives and landscapes.

Our vision

Our Vision is an 'Agroforestry Transformation' in the developing world resulting in a massive increase in the use of working trees on working landscapes by smallholder rural households that helps ensure security in food, nutrition, income, health, shelter and energy and a regenerated environment.

Our mission

Our mission is to advance the science and practice of agroforestry to help realize an 'Agroforestry Transformation' throughout the developing world.



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