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Governance of Biodiversity Conservation in China and Taiwan

Gerald A. McBeath and Tse-Kang Leng

ENVIRONMENTAL GOVERNANCE IN ASIA

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1. Introduction

Few issues display more clearly the competition between China's drive to become economically developed and to conserve biodiversity than hydropower development. This is the subject of China's most recent environmental controversy. In August 2003, the National Development and Reform Commission, a powerful economics super-ministry, authorized construction of a 13-station dam along the Nu[1] River (*Nujiang*) in Yunnan Province. After at least a decade of construction, the dam would become the world's largest. It would produce more electricity than the Three Gorges Dam, helping China address energy shortages while bringing jobs to poor residents of southwestern China and revenues to the provincial and local governments.

However, the Nujiang is one of only two large Chinese rivers that has not yet been dammed. Originating in the Qinghai-Tibetan plateau, it flows through Yunnan into Myanmar, where it is named the Salween River. The river passes through spectacular gorges, and its waters wash habitats of many endemic plant and animal species. Indeed, it is one of China's remaining 'hotspot' areas of rich biological diversity, and justifiably is called an 'oriental treasure garden'. It is part of a UNESCO world heritage site.[2]

Reaction to plans for dam construction was swift and far-reaching. Local residents feared displacement (potentially affecting more than 50 000 farmers), loss of water for cultivation of crops, and depletion of fish and other species upon which residents depend. Although most local officials and scientists supported the project, national-level scientists and environmental non-governmental organizatons (ENGOs) questioned the need for yet another expansive hydropower development that would put so many environmental values at risk. International forces became engaged in the Nujiang controversy as well, including downstream neighbors of China, the International Rivers Network and other international NGOs, even the World Bank.

No organized umbrella movement formed to challenge government plans to dam the Nujiang. Instead a loose collection of individuals and groups – including scientists, journalists, university students and NGO representatives – worked through a series of poorly coordinated, consciousness-raising activities: they conducted study tours of the region, held workshop sessions, spread flyers describing the risks of development, sponsored exhibits of photos from the area, sent petitions to government officials, established websites and communicated via the Internet. They did not attack the government;

instead they appealed to China's acceptance of sustainable development goals and adoption of environmental impact assessment legislation, asking that these goals and procedures be observed. They also worked with the State Environmental Protection Administration, which entertained criticism of the project and questioned its environmental implications. One commentator called the Nujiang protests emblematic of 'a new social movement' in China that has avoided 'confrontational methods' and instead adopted a moderate strategy of advocacy.[3]

In April 2004, Premier Wen Jiabao surprised observers when he halted the project, asking that further studies be conducted. He acknowledged opposition and called for careful consideration of major hydroelectric projects 'that have aroused a high level of concern in society, and with which the environmental protection side disagrees.'[4] This was the first recorded instance of delaying a major state project; it was the first acknowledgment by high state officials of the new power of ENGOs in Chinese society. Opponents of the Nujiang project criticized the environmental assessment as lacking 'public support' and unlikely to pass 'public scrutiny', because it was not fully transparent.[5] Indeed, some 61 NGOs (including Friends of Nature, China's oldest) and 99 individuals memorialized the premier, asking that the environmental assessment be published. While it seems likely that some parts of the Nujiang project will proceed, and unlikely that the authoritarian state will disclose fully all decisional documents, just the public venting of the controversy is a breakthrough. We explore the ramifications of the Nujiang controversy in a more detailed consideration of the case in Chapter 8.

In the remote hills of Hsinchu county, Taiwan, in a place called Smangus, lives a small community of aborigines, of the Atayal tribe. Immigrants from China forced ancestors of these aborigines to the hills in the nineteenth century; then Japanese colonists pushed them further inland to harvest the acres of hardwood crowning Taiwan's mountain peaks. The Atayal, however, refused to cut down the oldest cypress trees, believing that they possessed spirits that would haunt whoever felled the trees.[6]

Until 1991, the two dozen families of Smangus lived by collecting mushrooms, which they carried for six hours, over mountain trails, to the nearest market. However, in 1991, they discovered a stand of some 1000 rare Formosan cypress trees dating from 2500 years ago, which revolutionized village life. The state and county collaborated in the construction of a road that reached the village in 1996, ending its isolation. However, the road opened the village to floods of tourists. In the Chinese New Year celebration of 1997 alone, 1200 tourists in 500 vehicles entered Smangus. They carved initials on the cypress trees, invaded village plots and homes, and left piles of garbage.[7]

This prompted villagers to organize in order to protect their environment. They established a tribal foundation and deeded the cypress and all existing

tourist facilities to it. Operating as a commune, this Christian aboriginal community established rules to protect its environment and culture. The Presbyterian Church played an important role in educating the Atayal and helping them establish the collaborative management system of the tribe. Each community family assumed responsibilities for farming, serving tourists, and maintaining community facilities such as roads and the local culture center. A sign at the village entrance expresses the village spirit: 'Smangus is God's Tribe'.[8]

Most eco-tourism in Taiwan (and China) has brought economic benefits at the expense of biodiversity values. In Smangus, however, the community has taken advantage of the regime's liberal provisions for self-government. Its comprehensive conservation plan excludes penetration by large tourist enterprises. The community limits tourist numbers and assigns visitors to community-owned guesthouses. Regulated tourism now benefits the community as a whole, which has a new school, restaurants, even an Internet connection, without threatening the ecosystem.[9]

These two cases introduce the ongoing conflict between economic development, typically pursued by business firms and governments, and communities seeking to preserve and protect local human and ecosystem values. We cannot generalize from the examples to all other instances of environmental conflict in China and Taiwan today, yet they express important differences of governance. As the story in this book unfolds, we also note similarities in approach and method to environmental protection, irrespective of differences in political system and economic development. First, though, we define our subject and outline the approach.

DEFINITIONS

Biological diversity (biodiversity) refers to the variety of living organisms on earth, the range of species, the genetic variability within each species, and the varied characteristics of ecosystems. Biodiversity sustains life on earth. Today, loss of species and their habitats is a problem of global dimensions; it potentially undermines the equilibrium supporting ecological security.

In this study we introduce the problems and prospects of biodiversity loss and conservation in mainland China and Taiwan, from the perspective of governance. In addition to the work that political institutions and administrative agencies do to conserve species and ecosystems, we are also concerned with individuals, groups and communities as they influence and are influenced by the state. We discuss and examine informal processes as well as formal institutions and practices. China and Taiwan are thought to hold between 10–13 percent of the world's known species. For this reason, and given the large number of endemic species there, government policies and practices, as

well as informal processes that attempt to conserve biodiversity, are not only in the interest of China and Taiwan, and the East Asian region, but also the planet as a whole.

We introduce the topic of the governance of biodiversity conservation through a brief examination of the nature of the problem and then a discussion of the significance of China and Taiwan in the global biodiversity challenges. Following that, we consider the root and primary causes of biodiversity loss. We turn then to a discussion of the contribution that comparative analysis – in this case, a comparison of mainland China and Taiwan – makes to an understanding of biodiversity conservation. The chapter concludes with an outline of the topics to be covered in this book.

THE PROBLEM OF SPECIES AND HABITAT LOSS

It is difficult to understand precisely the nature of the problem of biodiversity loss, because the total number of species in the world is unknown. However, a recent United Nations study estimates the total number of existing species as about 13 million, of which less than 2 million have been described.[10] Of the described species, estimates of biodiversity loss vary widely, but well over 1000 species per year may be disappearing from the Earth, compared to only 1–4 species per year from the fossil record.[11] The most intensely studied species are plants and chordates (including fish, birds and mammals). Studies estimate that the impact of human activities on other species has threatened the continued existence of 18 percent of mammals, 11 percent of birds, 8 percent of plants, and 5 percent of fish.[12] Biodiversity loss has enormous consequences for humans. In economic terms alone, global threats to species and ecosystems may cost at least US$33 trillion.[13] The increasing loss of species threatens purification of air and water, food security, complex compounds used in medicines, and myriad other links in the life chain.

These are global figures. When we turn to the risks to biological diversity in China, in view of the enormous pressures of population and economic activities, it is difficult to be optimistic. These pressures have led to a greater threat to biodiversity in China (and also in Taiwan) than elsewhere. Compared to the global rate in species loss of 10 percent, the estimate for China is larger, about 15–20 percent.[14] The recent *China Species Red List* indicates that 40 percent of mammals, 7 percent of birds, 28 percent of reptiles, 40 percent of amphibians, and 3 percent of fish are at risk, and a greater percentage of endemic than non-endemic species appear in the threatened column.[15] A recent Chinese Academy of Sciences report notes:

> 'As a developing agricultural country with a huge population, China depends more on biodiversity than others do. However, China's biodiversity is most severely

> threatened because of enormous pressures of population and rapid growth of the economy, which exerts heavy impacts on biological resources. It is estimated that 40 percent of ecosystems in terms of area are degraded severely, 15–20 percent of species being highly threatened, and genetic diversity suffers greatly from heavy erosion.'[16]

The issue of the loss of biological diversity – in species and their habitats – is thus of manifest importance. Few other environmental issues are so immediately pressing, with such broad ramifications for long-term human survival on the planet.

SIGNIFICANCE OF SPECIES AND ECOSYSTEMS IN CHINA

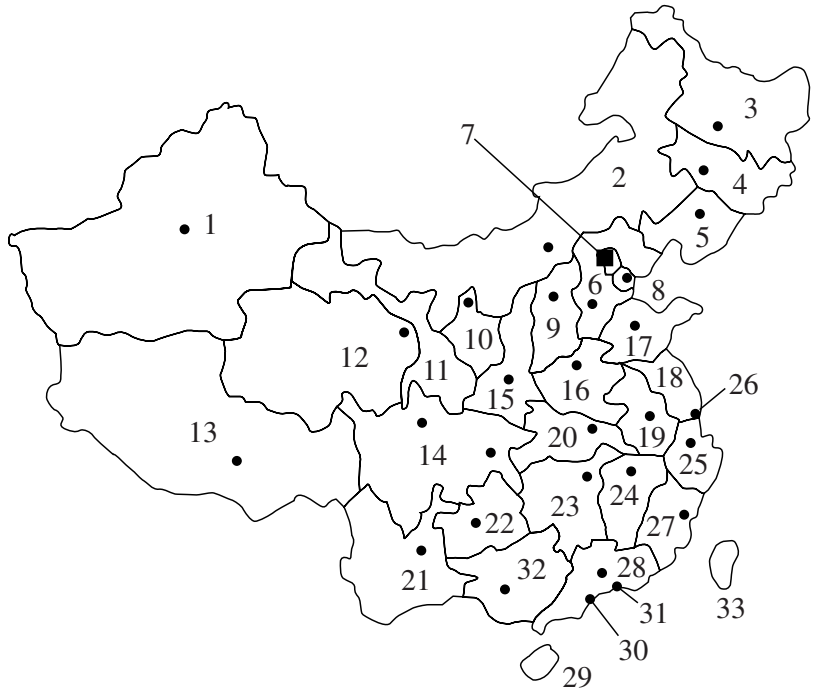
China is considered one of a handful of 'mega-diversity' countries.[17] An early study of China's biodiversity had this to say about China's significance:

> 'China is one of the world's richest countries in terms of biodiversity. It owes its great natural richness to its large size, great physical range of conditions and the fact that it contains ancient centers of evolution and dispersion together with the fact that many areas served as Pleistocene refugia during the temperate species decimations of the Ice Ages.'[18]

China is the largest country in Asia, and almost as large as all of Europe. It covers 9.6 million square kilometers, which is 6.5 percent of the area of the planet. At its greatest extent, China stretches for almost 4000 kilometers from the Pacific Ocean in the east to the Sino-Kazakhstan border in the west, and some 3200 kilometers from its southern frontier with Vietnam to the northern border at the Heilongjiang River.

Eastern China generally is low-lying; it consists of the basins of the Yellow (Huang He), Yangtze (Chang Jiang), and Pearl (Zhu Jiang) rivers. A series of mountain ranges, deserts, and plateaus occupy western China. The Tibetan plateau, the average elevation of which exceeds 4000 meters, is the most extensive upland area. It is bounded on the south by the Himalayas and on the north by the Kunlun range. Other major mountain ranges in western China include the Tian Shan, Pamir, and Altai. The main desert areas are the Takla Makan, Tarim Basin and Dzungarian (Zuangker) Basin. Semi-deserts and steppes cover almost the entire northern border area of China through Ningxia and Inner Mongolia. Extensive mountainous areas are also found in Gansu, Sichuan, and Yunnan, and south to the borders with Myanmar, Laos, and Vietnam.[19]

China's varied land ecosystems include forest, shrub, grassland, meadows, desert, mountain tundra, and agricultural ecosystems. Each ecosystem also varies by climatic conditions and categories of species. For example, forests



Notes:

1. Xinjiang
2. Inner Mongolia
3. Heilongjiang
4. Jilin
5. Lianing
6. Hebei
7. Beijing
8. Tianjin
9. Shanxi
10. Ningxia
11. Gansu
12. Qinghai
13. Tibet
14. Sichuan
15. Shaanxi
16. Henan
17. Shandong
18. Jiangsu
19. Anhui
20. Hubei
21. Yunnan
22. Guizhou
23. Hunan
24. Jiangxi
25. Zhejiang
26. Shanghai
27. Fujian
28. Guangdong
29. Hainan
30. Macau
31. Hong Kong
32. Guangxi
33. Taiwan

Source: Adapted from www.theodora.com/maps.

Figure 1.1 Map of China

include coniferous, mixed, and broad-leaf types; deserts include dwarf-tree, shrub, semi-shrub, and mat semi-shrub deserts.[20] Marine ecosystems include estuaries, inter-tidal belts, saline marshes, mangrove forests, coastal ports, seaweed beds, coral reefs, continental shelf, and open oceans and islands.[21]

Table 1.1 below presents information on the number of species in China as compared to the world totals. The extremely varied ecosystems of China, as

Table 1.1 Comparison of China's species to world total

Category	Species in China	World total	Percentage (%)
Mammals	581	4 170	13.93
Birds	1 244	9 198	13.52
Reptiles	376	6 300	5.97
Amphibians	284	4 148	6.79
Fish	3 864	19 056	20.28
Freshwater Algae	9 000	26 900	33.46
Lichens	2 000	20 000	10.00
Moss	2 200	23 000	9.57
Pteridophyta	2 600	12 000	21.67
Gymnosperm	250	850	29.41
Angiosperm	30 000	260 000	11.54

Source: National Environmental Protection Agency of China (1998), *China's National Report on Implementation of the Convention on Biological Diversity*, Beijing: China Environmental Science Press, 1998, p. 9.

well as the large number of endemic species, present large challenges to those who seek to preserve biodiversity. Table 1.1 confirms that efforts to preserve China's species and ecosystem diversity are very much in the interests of the planet.

TAIWAN'S BIODIVERSITY CHALLENGES

Taiwan is an island located off the southeastern coast of mainland China. Taiwan's coastline stretches up to 1600 kilometers, embracing a variegated topography including coral reefs, lagoons, wetlands, barriers, plains, basins, and hills. Mountains and valleys form the central core of the island, differing in height by nearly 4000 meters above sea level, and temperatures change with elevation. Heavy precipitation and a humid environment in Taiwan foster diverse plant communities across tropical, subtropical, temperate and alpine zones. The island has a rich and unique animal kingdom.

Taiwan has abundant biological resources and is home to about 150 000 species or 1.5 percent of the world's species.[22] Taiwan is famous too for the richness and diversity of its plant life, with over 4000 vascular plant species classified to date.[23] Table 1.2 below shows the number of Taiwan's recorded species.

Portuguese explorers of the sixteenth century called Taiwan 'beautiful island' (*Ilha Formosa*) for its unique geobiological environment. However,

Table 1.2 Taiwan's species compared to world total

Category	Species in Taiwan (endemic)	World total	Percentage (%)
Mammals	69 (17)	4 170	1.7
Birds	500 (15)	9 198	5.4
Reptiles	109 (28)	6 300	1.73
Amphibians	42 (10)	4 148	1.01
Insects	180 000	1 000 000	18.0
Fish	2 775	19 056	14.6
Pteridophyta	685 (72)	12 000	5.7
Gymnosperm	28 (18)	850	3.3
Angiosperm	3 600 (1 000)	260 000	1.4

Source: Nature Resources and Ecology Government Information System Database in Taiwan, see http://ngis.zo.ntu.edu.tw/mammal/.

Taiwan's long-term emphasis on economic development and its rapid industrialization have created significant adverse impacts and endangered a large number of species on the island. It currently faces serious crises over environmental pollution, destruction of habitat, depletion of natural resources, and disappearance of species.[24]

CAUSES OF BIODIVERSITY LOSS

The root cause of loss in species and their habitats is the growing number and encroaching behavior of human beings and their institutions.[25] China has the world's largest population, now in excess of 1.3 billion (about 22 percent of the global total). Taiwan's population increased rapidly from 6 million, at the time of colonization by Japan (1895–1945), to 23 million in 2000. The spread of human settlement crowds other species. The agricultural, extractive and industrial activities undertaken to support growing human populations directly and indirectly imperil other species and their habitats.

Conventional explanations of biodiversity loss point to a series of direct causes: deforestation, desertification, air/land/water pollution, transboundary air pollution, overfishing, invasive plants and animals, climate change, and certain economic development activities. Each of these is a global environmental problem, yet each begins in specific districts and regions of individual nation-states. China and Taiwan are contributors to species loss that has global ramifications; activities of Chinese and Chinese institutions also contribute to biodiversity loss in other nations. The relationship of these

environmental issues and problems to biodiversity loss will be clearer after discussing them with examples.[26]

Deforestation is an elemental cause of biodiversity loss globally and in China and Taiwan, as forests are home to more than one-half of all species. Population growth and the timber industry are the major factors causing a substantial reduction in forests.[27] About half of China's forests have been destroyed since 1949. Today, forests cover 134 million hectares, 14 percent of the land area, but few virgin forests remain. In recent years, they have decreased at an annual rate of 5000 square kilometers. In Taiwan, the amount of forested land fell from 2.3 million hectares in 1945 to 1.87 million hectares in 1993, a decline rate of 19 percent.[28] Mining and logging have deforested mountains, which causes erosion, reduced water storage capabilities, severe sandstorms in northern China, and species and habitat loss. About 600 000 hectares of Taiwan's 1.3 million hectares of hilly areas are eroded (and 300 000 hectares are severely eroded).[29]

Agricultural development and housing settlements have also reduced forest and vegetative cover. For example, to increase production, farmers in Taiwan have planted crops like areca on marginal lands and forest reserves. This has caused a heavy loss of topsoil and severe damage to water and soil conservation. According to a survey by the Soil and Water Conservation Bureau of Taiwan province, 9.2 percent of the hillsides on Taiwan were over-used in 1997.[30] As will be noted below, in China government policies of afforestation, reforestation, and converting cropland to grassland and forests have ameliorated some of the deleterious effects of deforestation, but because they replace natural forests, they have 'altered the variety, quality, and the pattern of delivery of plant and wildlife habitats that had been provided previously'.[31] The massive reforestation and afforestation programs have not yet curbed soil erosion, which threatens more than one-third of China's territory.[32]

Sand and desert cover about 27 percent of China's land area. The expanse of deserts has increased dramatically in the contemporary period (desertification annually claims an additional 3400 square kilometers)[33] and is correlated with the increase of sandstorm activity in north China.[34] Desertification in parts of China is attributable to deforestation as well as to poor protection and overutilization of water resources in arid and semi-arid regions of the north and west. Increased desertification in some parts of China also is attributable to agriculture, commercial, and residential development.

Pollution of air, land, and water is a third direct cause of species and habitat loss. As a number of observers have noted, China has eight of the world's ten most polluted cities, and air pollution is found in rural as well as urban areas. China uses coal to supply nearly 70 percent of its energy needs, and coal is a heavy environmental polluter. Coal burned in factories emits sulfur dioxide, carbon monoxide, and heavier particulates that until recently have not been

monitored by government agencies. Coal is also used for home cooking and heating.

Chemical and other industrial facilities pollute land and waters with toxic contaminants, diminishing plants and a host of invertebrate organisms. An extreme example is the rapid growth of Taiwan's semiconductor industry. For the past 20 years it has caused severe damage to the environment.[35] Huge loads of chemicals and toxic materials are flushed into the air, water and land, constituting a danger for humans and other species. Illegal dumping of toxics and waste discharges by the high-tech industry in Hsinchu, Taipei, and Kaohsiung contaminate streams and creeks and burden waste incinerators, wastewater treatment plants, and sludge farms.

Air and water pollution caused by improper production and use of pesticides has become increasingly serious recently.[36] As Taiwan's agricultural development progressed, fertilizer use tripled between 1952 and 1998, leading to infertile, acidified soils and gross drinking water contamination. Waste water polluted agricultural lands to the point that 30 percent of Taiwan's rice is contaminated with toxic heavy metals.[37] Food in Taiwan is also contaminated with pesticides, and farmers increasingly do not eat what they sell at the market.[38] A large number of the rivers, streams, and lakes in China and Taiwan have been choked of all life by sewage, agricultural field, and industrial plant runoff.[39] In China, '[M]ore than two-thirds of lakes are eutrophic to some extent and in 10 percent of lakes eutrophication has reached an alarming level'.[40]

Air pollution from neighbors affects China, and China's atmospheric pollution (including airborne sand particles) affects other nations in East Asia, North America and even Europe. Acid rain falls on forests, grasslands, and croplands; it also increases the toxicity of rivers and lakes. Altogether, these forms of pollution endanger habitat that is critical for the continued survival of some animals, a large number of plants, and thousands of micro-organisms.

Marine and freshwater fish are a major protein source for the Chinese, but increased fishing (a global environmental problem) has rapidly depleted supplies. Intensive fish harvesting also has threatened species that lack much economic value, such as sea grasses, sea anemones, mollusks, and other forms of marine life. Illegal fishing practices – poisoning, dynamiting, electrocuting fish – causes shrinkage of fish stocks and long-term damage to marine coastal and fresh water areas. Sewage dumping off coastal cities has also contaminated ocean habitats.

Foreign animals and plants have invaded many ecosystems in China and Taiwan, with adverse consequences for species and habitats. For example, in south China invasive algae have bloomed in aquatic ecosystems, causing eutrophication and the demise of endemic aquatic species. Invasive plants have challenged endemic species in many regions of China.[41]

Climate change is a cause of species and habitat loss on a global basis, and is particularly evident in China. Today China is the world's second largest emitter of greenhouse gases (after the United States). Moreover, it is the chief global contributor to ozone depletion. The increase of average temperatures has led to greater evaporation of water and water insufficiency in many parts of northern China, calling for rationing and politically unpopular price hikes. Several of China's northern and western wetlands, habitat to swamp grasses, and migratory bird species, among others, have dried out.

We mentioned economic development as a generic root cause of biodiversity loss. In China, some large-scale economic development projects have directly disrupted ecosystems and affected species' survival. Most notable have been the large hydro-electric power developments, such as the Three Gorges Dam, and more recently the dam construction on the upper reaches of the Yangtze River and proposed construction of dams on the Nu River in Yunnan Province. Construction of large dams usually necessitates the resettlement of population. It may flood cultural heritage sites. Rising water levels also flood animal and plant habitats. Increased turgidity of waters imperils fish and the phytoplankton and other micro-organisms critical to aquatic life.

Smaller-scale examples of direct impacts of economic development on biodiversity loss include gathering of plants and herbs for use in traditional Chinese medicine. Although banned internationally and nationally, illegal trafficking continues in rhinoceros horns, tiger bones and bear bile. Poachers make huge profits from sales in trade of these exotic Chinese medicine ingredients. Other rare and endangered mammals such as Tibetan antelope, pandas and golden monkeys are poached also.

This brief survey pictures the abundant threats to species and habitats in China and Taiwan. The threats are created by human behaviors and are not naturally occurring. They affect diverse bioregions in China and Taiwan, and they present unique challenges to the governance of biodiversity conservation. Natural disasters – typhoons, earthquakes, floods – also cause environmental destruction. Until recent years, damage from these episodic natural events could be meliorated over time. However, accelerated human settlement, rapid economic growth and particularly deforestation have exacerbated the effects of natural disasters. Since 1996, Taiwan has experienced 'debris floods' and highly destructive mudslides; in 1998, the Yangtze River floods in China were among the worst of that century.

COMPARATIVE ANALYSIS AND BIODIVERSITY CONSERVATION

Comparative politics is a sub-field of political science, which investigates the national (and sub-national) structures and institutions of countries, their

political processes and values. Scholars in this sub-field may compare one country to a model or pattern; they may compare a small number of countries, either with mostly different or similar attributes;[42] or they may compare a large number of nations, perhaps all, which implies the use of quantitative analysis.

Whatever set of countries is examined, the objective of comparative politics is to understand and explain the outputs and outcomes of state behavior – for example, the biodiversity conservation policies of nations and the extent to which they have been effective in protecting endangered species and ecosystems. The comparison process tells us whether the same policy outcomes are the product of similar or different structural and behavioral arrangements within nation-states, and whether the same kinds of power arrangements produce similar or different results.

This book compares the biodiversity conservation policies and practices of China and Taiwan, treating them for research reasons both as sovereign nation-states.[43] There are important similarities between China and Taiwan. Most people in both countries are Han Chinese; most can read Chinese and speak Mandarin (*Putonghua*) – the official language of both China and Taiwan to this day. They share a Confucian heritage, memories of the world's oldest continuous civilization, the social codes of the Chinese family system, and customs such as the Chinese New Year. During the nineteenth century, when Taiwan clearly was under the control of the Qing Dynasty (during which period it became a province of China), both jurisdictions experienced the humiliations of foreign imperialism and colonialism.

There are also large disparities between the economic situation of China and Taiwan. When the Nationalist (*Kuomintang*) leaders of the Republic of China lost the civil war to the Chinese communists in 1949, they removed their government and military to Taiwan. From 1949 to the early 1990s, the two regimes had little contact. By the late 1960s Taiwan's entrepreneurs had developed a robust capitalist economy, and by the twenty-first century Taiwan had a per capita income greater than US$13 000, qualifying it as a rich nation. China's leaders, on the other hand, operated a socialist economy until 1978 when Deng Xiaoping began market reforms. Although China's economy grew quite rapidly in the 1980s and 1990s, it remains in 2005 a developing nation with a middle class considerably smaller than Taiwan's proportionally and a per capita income one-tenth that of Taiwan.

The political differences between China and Taiwan are equally large. Since the establishment of the People's Republic in 1949, the Communist Party has directed the state; it brooks no opposition to party rule. In contrast, by the late 1980s, Taiwan's authoritarian leaders had acquiesced to the establishment of opposition parties and movements; in the 2000 elections, the leader of the opposition party, Chen Shui-bian, won the presidency, a sign of democratic

consolidation. In 2005, Taiwan is a democratic state and China remains an authoritarian polity.

The purpose of comparative analysis is to explain important political outcomes, such as degree and extent of environmental protection. It does so by testing hypotheses or generalizations in a relatively controlled setting. In this comparison, we can control many dimensions of culture and society that would confound analysis were we to compare China and Taiwan to western nations. Throughout this book, we will be testing whether differences between China and Taiwan in economic and political development have any significant bearing on the differences in policies and practice of biodiversity conservation.

PLAN OF THE BOOK

The argument of this book unfolds in seven substantive chapters. Chapter 2, 'Historical Patterns', begins with a description of traditional orientations to nature and conservation in China, and reviews elite orientations, such as Confucianism and Taoism, popular religious orientations, ancestor worship, and animism of minority groups. It considers the long history of dynastic rule and perceptions of national development informing behavior of elites. Then, it turns to the growth of capitalism in the new Republic of China, including economic development pressures on the environment. The next section of the chapter focuses on Mao's China, radical political change through revolution, which resulted in what some observers have called 'attacks on nature',[44] followed by a discussion of economic reforms under Deng Hsiaoping and his successors. Taiwan's political change since 1988 is discussed briefly. This chapter concludes with analysis of changes in public opinion on environmental issues in both China and Taiwan.

Chapter 3 describes the current status of species and ecosystems in China and Taiwan. First, the chapter examines the process that has been developed in both states to identify species at risk of extinction and their critical habitats. It then presents information about the most endangered and threatened species in mainland China and Taiwan, and discusses, with examples of internationally recognized endangered species, the pressures leading to adverse modification of their critical habitats. The chapter then reflects on the role that natural scientists and scientific institutions have played in the identification and preservation of biodiversity.

Chapter 4 introduces both the legal and institutional frameworks for biodiversity conservation. The first sections ask: How comprehensive and rigorous are the laws and regulations in China and Taiwan providing for wildlife conservation and environmental protection generally, and what is the nature of the revision process? The chapter treats China's participation in

international biodiversity treaties and conventions such as the Convention on the International Trade in Endangered Species (CITES) and the Convention on Biodiversity, and evaluates their impact on Taiwan (which is not a member but has observed their provisions). The second half of the chapter explores the degree of integration and centralization in each country's institutional framework: central ministries with portfolios on biodiversity conservation, devolution to sub-national governments, and important linkage mechanisms (such as task forces). The chapter concludes with an analysis of the effects of legal and institutional differences on policy making.

Chapter 5 treats the units established to protect threatened and endangered species. We call them protected areas (PAs) but they may include national forests, nature reserves, and cultural heritage sites. The chapter describes the evolution of the protective systems in China and Taiwan, and then reviews the distribution of protected areas. The focus of the chapter, however, is on policy implementation: challenges to effective conservation management, because of problems of finance, staffing, authority, and the conflict of national policy with the needs of local populations. The chapter concludes with examples of protected areas in China and Taiwan.

The final three substantive chapters examine different aspects of the politics of biodiversity conservation in China and Taiwan. Chapter 6 addresses business firms and the pressures they put on the living environment. It begins with a comparison of the domestic organization of businesses in China and Taiwan (including discussion of state-owned enterprises (SOEs), town and village enterprises, and small and middle-sized enterprises (SMEs)) and then examines state-business relations (including the role of business associations and lobbying governments). The chapter features the special role that multinational corporations play in China and Taiwan, for example, their application of international standards to Chinese conditions and other forms of diffusion in environmental norms. It presents case studies of both adverse and positive impacts of multinationals in China and Taiwan. This chapter concludes with discussion of cross-strait trade; it asks whether the 'race-to-the-bottom' hypothesis applies to the situation of Taiwanese firms in mainland China.

Chapter 7 turns to the development of environmental non-governmental organizations (ENGOs) and examines the extent in operation of 'civil society' in China and Taiwan. The chapter introduces several types of environmental NGOs: those organized by governments to serve their missions and interests (called GONGOs or government-organized non-profit organizations), relatively autonomous national-level ENGOs with foreign linkages (such as The Nature Conservancy, the World Wildlife Fund (WWF), Conservation International, and Greenpeace), and grassroots NGOs, both at the national level and in local areas. This chapter also briefly discusses biodiversity conservation projects of NGOs, global banks and other lending institutions,

and the role played by media in publicizing environmental news and opening a forum for NGOs.

Chapter 8 contrasts the traditional, intra-elite (and bureaucratic politics) means of resolving environmental issues typical in modern China and pre-democratic Taiwan with decision making under conditions of democratization in Taiwan. It reviews the significance of interest group conflict, for example between business corporations and ENGOs, the extent to which environmental issues have entered political party debate, and the bearing of concerns such as biodiversity conservation in elections and on election outcomes. Then the chapter turns to two large case studies: 1) discussion of the proposed south coast (Binnan) development project on the Qigu wetlands in Taiwan and 2) the impact of hydro-electric power development on the Nu River region of Southwest China, for what they reveal about the political nature of environmental decision making.

The book concludes, in Chapter 9, with a summary of the argument and conclusions regarding the comparative politics questions we have asked concerning the relationships between economic development, democratization, and other important variables (such as horizontal diffusion) and conservation of biodiversity in China and Taiwan. The chapter also asks whether there are particular 'Chinese characteristics' in the global attempt to create a sustainable future.

ENDNOTES

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4. Jim Yardley, 'China's premier orders halt to a dam project threatening a "Lost Eden"', *New York Times*, 2 April 2004.
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42. See Dogan, Mattei and Dominique Pelassy (1990), *How to Compare Nations: Strategies in Comparative Politics*, 2nd edn, Chatham, NJ: Chatham House Publishers.
43. To the People's Republic of China, Taiwan (or the Republic of China, the country's formal name) is a renegade province of China and not an independent nation-state. However, Taiwan does meet formal definitions of nation-states in comparative politics and international relations. It has all the appurtenances of a state: people residing in a territory, under the control of a government that has sufficient force (a free-standing army, police) to compel obedience to the law. It is recognized internationally by about two dozen other states, and under the name 'Chinese-Taipei' or 'Taiwan' participates in a few international bodies, such as the International Olympics Association, the Asia Pacific Economic Conference (APEC), and the Asian Development Bank. Taiwan has trading relationships with most of the world's nations. It also comports to definitions of a nation in that most of its residents share an identity with the current status and condition of Taiwan as a sovereign entity, though they may disagree about its future course (independence or unification with China).
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2. Historical patterns

The way nation-states address problems of biodiversity loss is likely to be strongly influenced by the political, economic, and social challenges they have encountered historically. These challenges may create opportunities to improve national security, stability, and development, but they may also cause environmental crises. In this chapter we focus on some of the patterns characterizing major eras of human-environmental interactions in China and Taiwan.

The chapter begins with a presentation of traditional orientations to nature and conservation, exploring elite, popular religious, and cultural minority perspectives. Then the chapter briefly considers the style and approach toward the environment of the imperial, dynastic system, beginning in 221 BC with the unification of China under the Qin Dynasty. The core of the chapter is a brief introduction to the environmental history of China and Taiwan in the twentieth and early twenty-first centuries. The periodization is conventional: first, a discussion of Republican and increasingly capitalist China from the end of the Qing Dynasty to the establishment of communist power on mainland China in 1949; second, socialist and autarkic China under Mao Zedong, from 1949 to 1976; third, the economic, marketizing reforms initiated by Deng Hsiaoping in China beginning in 1978 and continuing to the present; and finally, change in Taiwan as it underwent rapid economic development, political liberalization, and then democratization. The chapter concludes with an examination of public opinion about environmental conservation in China and Taiwan.

TRADITIONAL ORIENTATIONS TOWARD NATURE AND CONSERVATION

Elite Orientations

Over several millennia, Chinese intellectuals developed and revised an extraordinarily rich skein of theories and ethics of state and human behavior. Typically, scholars classify the major philosophical schools as Confucian, Taoist, and Legalist, and indeed plentiful evidence of each – and their interconnections – can be found in dynastic history.[1] The persistence of

Confucianism and Legalism is explained by the authoritarian state system of imperial China, in which rulers determined orthodoxy. Taoism, always heterodox, nonetheless complemented both Confucianism and Legalism.

Our main question is how each philosophy imagines relationships of humans toward nature and conservation of other species and ecosystems. Writers on environmental ethics suggest three types of orientations: anthropocentric, sentientist, and ecocentric. An *anthropocentric*, or human-centered orientation, conceives of humans as holding the center of the universe; only humans have intrinsic worth, and the value of other species and entire ecosystems is instrumental to human purposes. A *sentientist* view endows value on non-humans able to feel, to experience pleasure and pain. Typically this means higher-order vertebrates (other mammals such as dogs, horses, rats, etc.) but sometimes is extended to reptiles, amphibians, birds, and fish. While these species may be used instrumentally by humans, they must be accorded moral relevance. Finally, an *ecocentric* view pictures humans as interconnected with other species, as well as inorganic matter, in a complex web of life. Rights are trumped by duties to preserve the ecosystem as a whole.[2] It should come as no surprise that until the mid-to-late twentieth century, most philosophical and ethical systems saw nature through an anthropocentric lens.

Confucianism is both a philosophical system and a social ethic. It envisions humans at the center of a universal system of values, and it most prizes relationships humans have with other humans and institutions created by them. The good Confucian is someone who strives for perfection of self and benevolence toward others. Two passages from the *Analects* reveal attitudes toward non-human species:

> 'The Master used a fishing line but not a cable (attached to a net); he used a corded arrow but not to shoot at roosting birds.' (Book VII, p. 27)[3]

> 'The stables caught fire. The Master, on returning from court, asked, "Was anyone hurt?" He did not ask about the horses.' (Book X, p. 17)[4]

The first statement implies that people should not take unfair advantage of other creatures, yet can use them for sustenance. It is consistent with the western proscription of cruelty to animals. The second statement implies a clear ordering of the animal kingdom, with humans at the top of the hierarchy. Both fit within the anthropocentric world view.

China's most eminent political philosopher, Mencius, also discussed the necessity of nature preservation in the context of political security and stability:

> 'If you do not interfere with the busy seasons in the fields, then there will be more grain than the people can eat; if you do not allow nets with too fine a mesh to be

> used in large ponds, then there will be more fish and turtles than they can eat; if hatchets and axes are permitted in the forests on the hills only in the proper seasons, then there will be more timber than they can use. When the people have more grain, more fish and turtles than they can eat, and more timber than they can use, then in the support of their parents when alive and in the mourning of them when dead, they will be able to have no regrets over anything left undone. For the people not to have any regrets over anything left undone, whether in the support of their parents when alive or in the mourning of them when dead is the first step along the Kingly way.'[5]

Customarily Taoism is regarded as complementary to Confucianism. As de Bary et al. note, they 'run … side by side like two powerful streams through all later Chinese thought and literature, appealing simultaneously to two sides of the Chinese character'.[6] Instead of Confucianism's emphasis on the burden of social responsibility, Taoism fancies the flight of the human spirit and the transcendent beauty of nature. Two selections from Lao Tzu's classic *Tao Te Ching* capture this orientation to the environment:

> 'The highest good is like water. Water gives life to the ten thousand things and does not strive. It flows in places men reject and so is like the Tao. In dwelling, be close to the land. In meditation, go deep in the heart. In dealing with others, be gentle and kind.[7] Do you think you can take over the universe and improve it? I do not believe it can be done. The universe is sacred. You cannot improve it. If you try to change it, you will ruin it. If you try to hold it, you will lose it.'[8]

Both statements imply a natural order, to which humans should submit. Instead of dominating nature, humans need to passively accept it and be guided by its mysteries. Taoism, then, appears to carry few of the connotations of anthropocentric thought.

Legalism was more explicitly political than either Confucianism or Taoism. It became the authoritarian, governing theory of the dynastic Chinese state. As such, it emphasized the development of capacity in the state through military power and agricultural wealth. Han Fei Tzu, a leading Legalist theorist, said:

> 'When one's strength is great, others come to pay court; when one's strength is weak, one must pay court to others. Therefore the enlightened ruler devotes his efforts toward acquiring strength.'[9]

Lord Shang is reported to have remarked: 'Indeed, having a large territory and not cultivating it is like having no territory; having a numerous population but not employing it is like having no population'.[10] In Legalism then, humans were to dominate nature to make themselves secure in a powerful state.

In sum, elite orientations toward nature in the traditional Chinese order were mostly anthropocentric. With the exception of Taoism, other species and the ecosystem existed for the purpose of human exploitation.

Popular Religious Orientations

Historians note that in the Shang Dynasty (approximately 1700 BC) the practice of ancestor worship had formed, perhaps initially as an outgrowth of sacrifices of animals or liquor to the collective 'first ancestors'.[11] By the start of the dynastic period in the early Han era, 'various popular cults, such as the worship of ancestors and sacrifices to nature deities, still survived among the masses. The nature cults became more and more identified with Taoism'.[12] Ancestor worship continues into the modern period, but without sacrifices. Again, with the exception of Taoist cults, these practices also reflect anthropocentric views toward other species.

It was the introduction of Buddhism to China in the first to third centuries AD that provided an alternative environmental paradigm. The variant of Buddhism introduced into China, Mahayana (Greater Vehicle), emphasized the transitory nature of life (that individuals dwelled in emptiness) and the possibility of escaping suffering (or salvation) through the compassionate intervention of Bodhisattvas. All schools and sects of Buddhism, however, believed in the fundamental equality of all forms of life. Every living being was a 'compound of ever-changing components, to which accrue merits and demerits as a result of the actions of the being'.[13] When, for example, the species died, its components reorganized, but on a higher or lower level, dependent on how its life had been lived.

Buddhism was adopted first by elites in the early centuries, and it soon became as popular as Taoism and Confucianism. To many Chinese, the three codes of behavior were recognized as a syncretic blend of philosophical, religious and ethical thoughts. As elites became disenchanted with Buddhism (by the eighth to ninth centuries), it penetrated into the lower classes. There it changed perspectives of the people concerning other species, making them more inclined to 'respect all life'.

Minority Orientations

Although China today claims 56 official minorities, in fact there are more than 100. Most non-Han[14] Chinese live in peripheral areas of the Chinese state; they are less likely to have been influenced by elite Chinese orientations.

Tibetans are perhaps the politically most sensitive Chinese minority; their traditional orientations toward nature and conservation are strongly influenced by Tibetan Buddhism. Their leader-in-exile, the Dalai Lama, expresses his view of the changes in the Tibetan landscape in the last generation, and the extent to which it conflicts with the environmental beliefs of Buddhism:

> 'We always considered our wild animals a symbol of freedom. Nothing held them back; they ran free. Without them something is missing from even the most

> beautiful landscape. The land becomes empty, and only with the presence of wild animals can it gain its full beauty. Nature and wild animals are complementary. People who live among wildlife without harming it are in harmony with the environment. Sadly, the profusion of wildlife that once thrived in the region is no longer to be found. Partly due to hunting, but primarily due to loss of habitat, what remains is only a fraction of what there was.'[15]

Many minorities employ animistic practices as part of their traditional culture. For example, both in Mongolia and Inner Mongolia in China:

> 'The older generation and the herdsmen believe that there is a non-material spiritual world, and that every mountain, rock, forest and water body has a god or spirit or local deity, which owns and protects it. Therefore, there are thousands of places and mountains manifested as sacred.'[16]

Both of these minority perspectives on nature conservation more closely resemble ecocentricism than the anthropocentric logic. Thus they conflict with traditional Chinese perspectives. We note these conflicts particularly when we discuss protected areas in Chapter 5.

Little scholarly attention has focused on traditional environmental attitudes in China, but the most prevalent and powerful among the leadership emphasized use of other species and ecosystems to meet human needs. Harris notes that the orientations are:

> 'Predominantly "utilitarian" and secondarily "dominionistic" and "aesthetic". Simply put, most Chinese traditionally view wildlife in terms of its impact on human life and livelihood, and secondarily as objects of beauty, but only when under the control of man.'[17]

We turn to the history of modern China and Taiwan, for insights into the policies leaders pursued respecting conservation of nature.

THE IMPERIAL SYSTEM

Traditional Chinese thought did place special emphasis on the relationship between nature and human beings. The omnipotent emperor had to follow the rule of nature to govern the earth effectively. Yet the two millennia of the Chinese imperial system were characterized by absolute power of the emperor and the subordination of civil society.

A paragraph in the *Records of the Historian* (*Shiji*) indicates the ruler's duty:

> 'It is the duty of the prime minister to be an aid to the Son of Heaven above, to adjust the forces of the yin and yang, and to see that all proceeds in accordance with

> the four seasons. At the same time he must strive to nourish the best in all creatures, bring order to the feudal lords and barbarian tribes surrounding the country, and within the state to win over the common people and see to it that each of the other ministers and officials performs his proper duties.'[18]

This advice urged a non-intrusive style of management and emphasized harmony. The emperor was to follow the trend of nature to attain the goal of balancing yin and yang sides of the cosmos. In the early imperial system of China, this balancing policy helped consolidate the political legitimacy of the emperor. Because the emperor was the Son of Heaven, his mandate to rule depended on maintaining order between nature and humans as well as among the people. One sign of loss of the mandate was the inability of dynasties to avert floods, famine and drought. The 'king's way' (or *wang dao*) required that attention be paid to conservation, but within the framework of human-centered values.

Preserving nature and consolidating power were regarded as twin objectives in the Chinese imperial tradition at the early stages. The record of early dynasties was mixed with respect to environmental preservation. A significant ecological achievement of the Qin Dynasty (221–209 BC) was the huge water diversion project engineered by Li Bing and his son at Dujiangyan. For more than two millennia it has controlled the flow of water from the Min River into the Chengdu Plain of Sichuan. Construction, renovation, and expansion of China's Great Wall and Grand Canal, however, denuded adjacent lands of forests and altered ecosystems.[19] We present the Dujiangyan case in greater detail.

The Dujiangyan irrigation system lies on the Min River (Minjiang) to the northwest of Dujiangyan City in Sichuan. It was built over 2200 years ago under the direction of Li Bing, governor of the Shu Prefecture in the Qin State. The major purpose of construction was to manage water flow of the Minjiang to facilitate irrigation of the Chengdu Plain and to enhance water conservation.

After a careful survey of the area, a channel was cut through Mount Yulei in the west of Sichuan, creating a man-made river. A dike divided the river into two parts: the inner river and the outer river. In order to control floods and discharge silt, two spillways were built at the end of the dike. Following geographic characteristics of this region, the dike distributed 60 percent of the water to the inner river, and 40 percent into the outer river during the dry season. During the flood season, 40 percent of the water entered the inner river, and the rest the outer river. The curved shape of the dike matched the shape of the river. The bottom waters of the Minjiang, rich in sand, flowed into the outer river (helping to prevent flooding) while surface clear waters flowed to the inner river and were used for agricultural irrigation and water conservation.

The dike consisted of bamboo cages filled with egg-sized stones; spaces

among the stones decreased the pace of the river. The linkages and accumulation of bamboo stone barrels made the dike a solid and intact construction of civil engineering for more than 2000 years. Since the Tang Dynasty (AD 618–907), villagers in the Dujiangyan region maintained the system.

Scholars argue that the success of Dujiangyan reflected traditional wisdom of 'learning from nature'. Li Bing, the major architect of Dujiangyan, lacked knowledge of modern civil engineering. What inspired him was the Taoist principle of coexistence between human beings and the environment. The ultimate goal of dike construction was to preserve natural resources, instead of destroying the environment for the purpose of human survival. The system's particular function of flow regulation has realized the goal of 'management of drought and flood' (*Shuihan congren*) in the Minjiang.[20] It also has enhanced biodiversity in the region.[21]

For more than 2000 years, the Dujiangyan irrigation system has brought large benefits to agricultural production and people's lives in the Sichuan plain. The irrigated area has expanded gradually from 126 000 hectares to nearly 660 000 hectares of land, covering 36 counties. Dujiangyan was listed as a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Cultural Heritage site in 2000.

The natural environment in late imperial China worsened due to the growth of population and decrease of arable land. Toward the end of the Sung dynasty (AD 979–1279), filling lakes to create agricultural land became commonplace in the Yangtze River delta area. The outcome was an increase of agriculture production, but frequent flooding was a serous side-effect. The Sung elite began to acknowledge that the destruction of ecological balance in the lake shore areas eventually would cause long-term damage to human populations. Rapid deforestation also became an ecological problem. In the Sung dynasty, deforestation in the Zhejiang Province caused serious problems of erosion, mudslides, and floods.[22] In the Ming (AD 1368–1662) and Qing (AD 1662–1908) dynasties, population pressure forced peasants to cultivate hill sides and cut more trees. Loss of green cover and a decreased capacity to retain water led to the erosion of the soil and the destruction of irrigation systems. In Zhejiang, Anhui and Fujian provinces, for example, over-cultivation caused salinization of the soil, erosion, and eventual degradation of whole ecosystems.[23]

THE REPUBLICAN YEARS

Republican China (1911–49) was an era of political instability, accelerated economic pressures and rampant wars. In the warlord period from the death of

Yuan Shikai (1914) to the victory of the Chinese Nationalists' (Kuomintang or KMT) northern expedition (1928), a vacuum of power at the central government level, foreign penetration, and continuous infightings in the provinces and local levels created extreme political confusion. After the victory of the northern expedition, the Nanjing government, led by Chiang Kai-shek, began the 'golden decade' of national development in China (1929–38). The KMT government used industrial construction as the major instrument to boost national development while preparing for war against the upcoming invasion from Japan.

In the Republican period as a whole, the economy grew by an average rate of 5.5 percent annually.[24] Foreign capital in Manchuria (under colonization by Japan), north China, Shanghai and other treaty ports stimulated consumer goods industries, with an especially rapid growth of the textile industry. Transportation and communication arteries bourgeoned, along with a domestic steel industry. Although China remained an agricultural country, the percentage contribution of agriculture to gross domestic product (GDP) declined from 60 to 50 percent by the end of the Civil War.[25]

These developments took their toll on the environment, but KMT leaders also gave some attention to controlling floods and renovating and improving irrigation systems.[26] The KMT government faced multiple challenges to effective governance. These challenges included the communist rebellion, Japanese invasion, and the extreme need to alleviate poverty. The outbreak of the war of resistance against Japan in 1938 and the subsequent Chinese civil war from 1946 to 1949 destroyed the economy as well as further weakened the ecology of mainland China.

MAO'S CHINA

In the first three decades of the People's Republic of China, party chair Mao Zedong wrote most of the script. Mao's style of governance in China emphasized four components; mass line and mass movements, class struggle and continuous revolution, superiority of 'red' (ideologically correct) over 'expert' and the cult of personality.

1. Mass line and mass movement Mao developed the strategy of the mass line as the major instrument to struggle with the KMT during the civil war. The mass line continued in post-1949 China as reflected in large-scale movements such as the Great Leap Forward, the Anti-Rightist campaign, and the Cultural Revolution. From Mao's perspective, the mass line was essential to mobilize support from the general population and to keep communist ideology pure.

Mass movements and a collectivized economy conferred some legitimacy on the communist regime.

2. Class struggle and continuous revolution From Mao's perspective, class struggle and class conflict would continue for a long period after the establishment of the People's Republic. Communist leadership needed to pay attention to the transformation from 'contradictions within the people' to 'contradiction with the enemies'. Party leadership was responsible for identifying objects of struggle and launching investigation and struggle campaigns. Continuous class struggle was perceived to be the best way to maintain dynamism within the communist party and among the masses.

3. Superiority of 'red' (ideologically correct) over 'expert' Politics commanded all economic decision-making processes during the Maoist period. Ideology set the directions and the methods for policy implementation. The centralized socialist command economy neglected local differences and reduced economic incentives, resulting in declining productivity. Those who deviated from the party line, such as intellectuals, were subject to thought reform and imprisonment.

4. The cult of personality The first two and a half decades of the communist regime also can be described as a period when Mao's personality – his values, hopes, wants, and fears – dominated decision making. Mao's ideas such as egalitarianism, self-reliance, and anti-professionalism were all reflected in the policy-making process and policy outcomes. The zenith of radicalization was the Cultural Revolution from 1966–76, which took China to the edge of political, social, and economic collapse by the late 1970s.[27]

Some scholars suggest that the primary cause of China's environmental problems is economic reforms and industrial growth beginning in 1978, 2 years after Mao's death. Most, however, believe that the Maoist era accelerated environmental degradation, yet followed tendencies of Confucianism evident in imperial China. The most incisive study of this era is Judith Shapiro's *Mao's War Against Nature: Politics and the Environment in Revolutionary China*. She argues that the abuse of people in Maoist China was linked to abuse of nature: 'The environmental dynamics of the period suggest a congruence between violence among human beings and violence by humans toward the nonhuman world'.[28]

Shapiro uses four themes to focus her argument: (1) political repression; (2) utopian urgency; (3) dogmatic uniformity; and (4) state-ordered relocations. Discussing political repression, she tells of two scientists who attempted to avert crises but were suppressed by the Maoist regime. In 1957, demographer and Beijing University president Ma Yinchu warned, based on

the 1953 census, that China's rapid population growth would jeopardize development if not checked. For his forthright views, which contradicted state policy and Mao's belief that China's strength lay in her huge and growing population, Ma Yinchu was silenced, forced to resign from the university, and stripped of his academic and government posts. Hydraulic engineer Huang Wanli opposed construction of the Sanmenxia dam on the main channel of the Yellow River, predicting correctly that siltation would clog the dam, damage the ecosystem, and harm the local population. Huang too was subject to unrelenting criticism as a rightist; losing his position, he was forced to do hard labor. Both cases illustrate the linkage between political repression and environmental degradation.

The induced sense of 'utopian urgency' explains the impact of the Great Leap Forward (1958–60) on China's environment. The mass mobilization campaign to overtake Britain in steel production within 15 years, among other goals, led peasants to cut down trees to fuel steel furnaces; deforestation resulted in erosion, sedimentation, desertification, and changes of microclimates. The campaign to eradicate the four pests nearly eliminated sparrows, with deadly consequences for the ecological balance in the countryside. Although it was inattention to sound agricultural practice and production values that brought on China's greatest famine, Shapiro contends that Mao's utopian visions as well as the elite's urgency to modernize (continuing to the present) have had devastating environmental consequences.

The Cultural Revolution enforced dogmatic uniformity across China. For example, the national campaign to 'Learn from Dazhai', applied uncritically throughout China in the Cultural Revolution, led to environmental ruin. The Dazhai model was artificially constructed to be an example of Mao's favorite parable of 'The Foolish Old Man Who Removed the Mountains', in order to demonstrate that humans could conquer nature and bend it to their will. Among the most egregious applications of the Dazhai model were attempts to plant wheat on Mongolian grasslands, despoilation of wetlands, and encroaching on lakes and rivers to expand cultivation. To purge the lakes, Shapiro notes, was to purge and rebuild the mind: 'The battlefield of the lake was an arena for urgent struggle: against nature, against political enemies, and against the limits of human will'.[29]

Two large state-ordered relocations affected the environment in China's frontier regions. The first, occurring from 1964–71 and prompted by the Vietnam War, established a 'Third Front' in the western and southwest China hinterland. The irrational distribution of strategic industrial plants and facilities caused severe air, water, and soil pollution and deforestation. A second movement to forcibly relocate 'educated youth' had equally horrendous environmental results. Their reclamation work damaged wetlands and forests, destroyed the ecology of steppes, and led to desertification.

Transformation of the rainforest in Yunnan province into rubber plantations denuded the soil, encouraged overhunting and deforestation. Not only were these examples of the disastrous consequences of large, poorly planned, and hurried development projects; they also represent the adverse impacts on the environment of those (such as the lost generation of rusticated youth) who had lost their sense of place.

China's imperial tradition, Shapiro's study concludes, was not environmentally benign, and the Soviet Union influenced China's post-revolutionary leaders to construct huge projects without attention to environmental costs. However, Mao and the Chinese communist system accelerated environmental degradation: 'Maoism constructed a world that pitted humans against nature, and inculcated this world view among the people through repression, indoctrination, utopian promises, and censorship'.[30]

Shapiro finds the Maoist era to be both unique and 'an extreme and revealing example of a general pattern … the transparency of the link between human political repression and the effort to conquer nature by portraying and treating it as an enemy'.[31] China's current leaders inherit this legacy with all its eco-destructive ramifications.

ECONOMIC REFORM IN DENG'S CHINA

The rehabilitation of Deng Xiaoping to power at the third meeting of the Eleventh Congress of the Chinese Communist Party (CCP) in 1979 was a pivotal event in China's economic reform. In contrast to the Maoist practice of political dominance, Deng gave first priority to economic development, which would require rapid restoration of the country's political and economic institutions and abolition of the commune system in agriculture. Deng also retreated from class struggle and mass movements as methods of policy implementation. The ultimate goals of Deng's reforms were: (1) to correct dislocations among supply, production, and marketing by downward transfer of authority to enterprise units; (2) to curb egalitarian tendencies by linking rewards to performance and using material incentives; (3) to give local authorities greater powers in the areas of economic planning, capital construction, materials management and foreign trade; and (4) to introduce private ownership and market mechanisms in the socialist system to stimulate greater productivity and efficiency.[32] (Chapters 4 and 6 discuss the reforms in greater detail.)

Reforms also addressed China's population problems. In 1979, China introduced the one-child family policy, which is the single most important reduction of environmental stress to have occurred globally in the past generation. The policy was designed primarily for urban areas, where there

were incentives for residents to have small families. In rural areas, the army of enforcement officials (at least one million) tolerated families with two, even three children. The policy was also not applied to minority households at all. The onus of policy implementation fell on women and led to abuses such as forced abortions and sterilizations.[33] Preference for male offspring resulted in cases of female infanticide and under-reporting of births, as well as skewed sex rates and the likely future problems as millions of men lack marriage partners.

Notwithstanding these serious defects, the policy has sharply reduced the rate of growth in China's population as compared to relatively unconstrained population growth in other large developing countries such as India and Indonesia.

The second decade of Deng's reform deepened the socialist market economy of China. By rebuilding Shanghai as the 'dragon's head' for China's development, the coastal areas from Shenzhen to Dalian became world factory centers. State-owned enterprise reform and a 'soft landing' to avoid economic overheating became major tasks of national development for Deng's successors Jiang Zemin and Hu Jintao. China's World Trade Organization (WTO) accession in 2002 further integrated China into the global economy.

Decentralization and liberalization in the economic realm also led to the rise of new social forces in China. In the political sphere, the CCP recognized the need to establish a system of rule of law, but retained authoritarian controls over civil society. In the 1990s the regime initiated local elections at the grass roots levels. New social associations began to emerge in the 1990s, but as we note in Chapter 7, these remained largely under state control. The state also emphasized a collaborative relationship with the entrepreneurial forces in the society. The 1999 constitutional amendments indicated that 'individual, private and other non-public economies that exist within the limits of prescribed law are major components of the socialist market economy', a change matched by the embrace of entrepreneurs into party ranks. A collaborative style of governance, under the leadership of the CCP, was realized in Jiang Zemin's theory of the 'three represents': the CCP must always represent China's advanced productive forces, her advanced culture, and the fundamental interests of the overwhelming majority of the people in China.[34]

POLITICAL CHANGE IN TAIWAN

Modern Taiwan's economic base formed during the Japanese colonial era from 1895 to 1945. Japan established monopolies in major industries and improved the infrastructure, and Taiwan quickly became a favorite site for Japanese investors. Western capitalists lost access to Taiwan, and economic links

between Taiwan and mainland China were severed. Activities of Japanese capitalists in Taiwan were part of the strong state-business complex of the Japanese empire, which placed Taiwan in the general framework of Japan's economic development in the first half of the twentieth century.[35]

The primary focus of the Taiwan economy was the export of agricultural commodities such as rice and sugar to the mother country. At the same time, the improvement of Taiwan's infrastructure, for example modernization of its sewage and sanitation systems, laid the foundation of economic growth for the next few decades.

When the Japanese empire launched the Sino–Japanese and Pacific war in the 1930s, the policy of developing Taiwan's agriculture changed . Taiwan was first utilized as a logistics center to support Japanese warfare in mainland China and Southeast Asia. The wartime effort emphasized these sectors:

1. power supplies, including development of water resources and coal mines;
2. new industrial centers and ports in Taipei, Hsinchu, Kaohsiung and Keelung;
3. development of machinery, ship-building, cement and chemical industries to achieve self-reliance and support Japanese military needs; and
4. mobilization and recruitment of Taiwan's laborers to support activity in major Japanese battlefields.[36]

After 1944, Taiwan Island itself was under severe air attacks and became a battlefield.

Taiwan's economic development after the end of World War II is commonly characterized as state-led growth coupled with a fairly equal distribution of wealth. In the early years, the state supported infant industries and established state-owned enterprises to reach its economic goal of import substitution. In the take-off period of the 1960s and 1970s, the state promoted export-led growth. The state led and controlled the market by providing tax breaks, subsidizing strategic industries, and regulating business activities. The ultimate goal of the state was to achieve high economic growth through export-oriented small and medium-sized enterprises (SMEs) concentrated in labor-intensive industries.

During Taiwan's take-off era, the state and the general public perceived economic development as the first priority and neglected the worsening of environmental conditions. Taiwan's SMEs exploited cheap land and labor in the countryside and set up thousands of factories, hiring female laborers to work in assembly lines. These factories directly contaminated water resources, rice fields and the air.[37]

Taiwan's economic miracle based on SME development not only ignored

environmental protection but also neglected other issues such as labor welfare and women's rights. Pent-up pressures for reform stimulated the regime to allow gradual political liberalization in the 1980s. Taiwan's resulting democratization is neither a top-down nor a bottom-up revolution. No single force determined the outcomes, and the result reflects cooperation and interaction between state and society.[38]

Taiwan's style of democratization created new actors, such as business groups and indigenous elites who were absorbed into policy-making roles. While a strong middle class pushed the state to expand political liberalization, a new 'Taiwanese culture' also developed within the general public. By the 1990s, identity politics increasingly de-emphasized Chinese origins, which was exacerbated by Taiwan's diplomatic isolation.[39] The growing importance of a Taiwanese identity further localized the domestic regime in Taiwan, and facilitated the consolidation of democracy.[40]

Prior to the 1996 presidential election, the KMT regime, still dominated by mainlanders, remained alien to many Taiwan residents. Lee Tenghui's election, the first democratic presidential election in any Chinese state, indigenized the regime and significantly enhanced its legitimacy. The 2000 election, which brought minority Democratic Progressive Party (DPP) candidate Chen Shui-bian to power, revealed the fault line of twenty-first-century politics in Taiwan, which was sharpened in the 2004 election. The DPP (head of the pan-green alliance) controlled the powerful executive, but the opposition pan-blue alliance, including the KMT, People's First Party, and the New Party, still enjoyed a slight majority in the Legislative Yuan. The lack of trust between the ruling alliance and the opposition alliance led to a stalemate, political sabotage and political conflicts among political institutions and political elites. Heated ethnic conflicts roiled society and the polity was increasingly divided into the two extremes of pro-independence and pro-unification camps. Since 2000, people's satisfaction with the actual performance of Taiwan's democracy, their trust in the major institutions of democracy, and their faith in the superiority of such a regime have all declined.[41]

CHANGES OF ENVIRONMENTAL OPINION IN TODAY'S CHINA AND TAIWAN

This discussion of political and economic change in the last generation, and in particular its deleterious impacts on threatened and endangered species and ecosystems, prompts these questions: How aware are the public of adverse environmental change? How important are environmental problems as compared to other social, political, and economic issues? Does public opinion

appear to influence policy making, or is it more likely to follow government officials' plans?

China

It is difficult to compare responses to these questions of publics in China and Taiwan, because of the differences in what is known about public opinion in the two jurisdictions. In China, survey research on the environment is relatively recent, dating only from 1990. One sees a variety of survey research products: some are commissioned by government agencies, such as the State Environmental Protection Administration (SEPA), some by universities or NGOs; many use samples of convenience. Ultimately, the data are non-comparable. Finally, we lack longitudinal data that would indicate change in public opinion over time. Nevertheless, several dozen reports provide sufficient information to make a few preliminary observations.[42]

First, there is a growing awareness of environmental problems. Among the list of problems for which respondents have been asked to make assessments, items affecting species and ecosystem degradation (for example, desertification, chemical pollution, reduction in biodiversity) are regarded as equal or greater in seriousness to the pollution of air, water and land.[43] The greatest concern in 2005, though, is sufficiency of clean drinking water, which follows reports of water shortages and pollution throughout China.[44] The various reports, however, indicate that the consciousness of environmental degradation may be superficial, given the lack of uniform treatment of environmental issues in schools. Awareness also varies by region (rural versus urban) and expresses the not-in-my-backyard (NIMBY) phenomenon: people are more likely to be aware if they have direct experience of an environmental problem.

Second, most respondents assign a lower priority to environmental problems than to other issues such as unemployment, overcrowding, and educational quality – with the exception of young people who give environmental protection a greater value than the middle-aged or old.[45] Moreover, survey research indicates an unwillingness of respondents to make the trade-offs necessary to improve environmental conditions, by, for example, slowing economic growth. Reasons for this lack of commitment have not been specified through intensive field research, but one plausible explanation is 'lack of trust in government officials' commitment on matters pertaining to the environment'.[46]

The research to date fails to document a strong influence of public opinion on governmental performance. One commentator notes: 'Instead of policies being informed or influenced by public opinion, it is the public's own environmental perceptions of the environment that are being shaped by state policies propagated by the media'.[47] We take a slightly different view of the

impact of public opinion on policy-making when we examine the Nujiang Dam case in Chapters 7 and 8.

Finally, to answer a general question asked at the outset of the chapter: survey research in China indicates that most respondents continue to hold anthropocentric views concerning nature. A recent survey in Guangzhou found that a quarter or fewer respondents agreed to tenets[48] of the New Environmental Paradigm (NEP), a lower percentage than found in Europe, North America, and Japan.[49] Although this study did not identify the characteristics of those adopting NEP, we suspect they are young, well-educated, and hold professional occupations. Yet a recent study of Beijing-area university students notes: 'If it had been at all possible they would have supported strengthened environmental protection, but reality convinced them that economic growth was necessary to raise the standard of living of Chinese citizens'.[50]

Taiwan

In Taiwan, survey research on environmental perceptions has a 20-year history. In a 1999 public opinion survey conducted by the Institute of Sociology of Academia Sinica, researchers noticed a significant growth of environmental consciousness in Taiwan during the 1990s. The report indicated that the Taiwanese populace is sensitive to environmental issues and aware of the cost, risks, and trade-offs on which decisions must be based in planning for the future. Table 2.1 compares the responses of population samples at three points in time: 1983, 1986, and 1999.

The first item of note in Table 2.1 is that air pollution is consistently mentioned as Taiwan's greatest environmental problem. Noise and water pollution, as well as solid waste disposal, change positions somewhat over the years, but remain of great concern. Soil erosion ranked higher in 1999 than previously, which reflects the worsening problems concerning land loss and degradation, as seen in flooding disasters of the past decade. Another noteworthy change is the reduction in over-population from a high rank in the 1980s to a lower position in 1999, consistent with demographic changes (the lower birthrate in Taiwan). Most of these high-ranked factors influence Taiwan's biodiversity.

As compared to other social problems, the environment has declined somewhat as an issue of concern. In 1983 it ranked fourth (after juvenile delinquency, public safety, and overpopulation). In 1986 it ranked second (after juvenile delinquency). However, in the 1999 survey, environmental pollution had dropped to fifth place (after juvenile delinquency, bribery in elections, public safety, and unemployment).[51] Nature conservation, a new topic on the survey in 1999, ranked seventh as a public concern. As in China,

Table 2.1 Environmental problems in Taiwan

1999 rank	Social problem	% answering serious or very serious	1986 rank	1983 rank
1	Air pollution	86.2	1	2
2	Soil erosion	80.4	8	8
3	Water pollution	79.3	4	5
4	Solid waste disposal	76.8	6	4
5	Noise	76.1	2	3
6	Depletion of natural resources	74.8	7	7
7	Industrial waste	73.6	n/a*	n/a*
8	Pesticides	73.5	5	6
9	Nuclear waste	57.4	9	11
10	Natural disasters	57.0	11	9
11	Overpopulation	49.1	3	1
12	Energy shortages	48.9	10	10

Note: * Industrial waste not included in 1983 and 1986 surveys.

Source: Hsin-Huang Michael Hsiao, Russell A. Stone and Chun-Chien Chi (2001), 'Taiwan's Environmental Consciousness: Indicators of Collective Attitudes Toward Sustainable Development', paper presented at the workshop on *Sustainable Development Indicators*, National Central University, Chung-Li, Taiwan, for the Program for Southeast Asian Area Studies (PROSEA), 17–19 November, p. 5, available at www.sarcs.org/wwwroot/documents/chi%20paper.pdf.

a larger number view other social problems as more important. Contrasting with China, economic development does not trump environmental protection at each occasion when opinion is measured.

CONCLUSIONS

China has the world's oldest continuous civilization, and in this chapter we have investigated the impact of that history on the environment. We began by describing orientations in thought toward nature and conservation. The main philosophical systems of traditional China – Confucianism and Legalism – took an anthropocentric stance, assigning value to humans over non-human animals and other species. Taoism, never a reigning system, adopted a more ecocentric view, as did popular religions, such as Buddhism and minority cultures with animistic beliefs. However, the prevailing elite mindset, which influenced policy, advocated utilitarian ends.

During the long dynastic histories, population growth surpassed the

environmental carrying capacity in many parts of China. Large public projects – such as the Great Wall and Grand Canal – ruined ecosystems, yet the overall record of early dynasties was mixed. After all, China heralds the world's earliest water diversion project at Dujiangyan, and dike construction not only controlled flooding for two millennia but also enhanced biodiversity in the region. From late in the Sung Dynasty to the fall of Imperial China in 1911, population pressures stimulated over-cultivation and deforestation, which further tipped the ecological balance.

Republican China was an interregnum environmentally as well as politically. Leaders paid some attention to flood control and irrigation systems, but were overwhelmed with domestic instability and invasion by Japan. After Japan's defeat in 1945, communists again fought with nationalists for the control of China. When the KMT lost the civil war in 1949 it retreated to Taiwan, furthering the isolation of that island (which had been under Japanese control from 1895 to 1945) from China.

In China, Mao's domination over the polity allowed him to launch war against the environment. Both the Great Leap Forward and Cultural Revolution had devastating environmental effects; increasing deforestation and overcultivation and destroying habitats of many threatened and rare species. The failed political and economic policies of Maoism brought mainland China close to collapse. Then Mao died and Deng Hsiaoping took the reins of power and reformed China's economic system. The economic reform focus, accompanied by some political liberalization, continues to the present. Exuberant economic growth rates are now the challenge to China's environment, yet the successful curbing of population growth occurred in this era too. Finally, the environment has entered consciousness of leaders since the late 1980s.

Meanwhile, Taiwan under KMT rule took off economically and by the twenty-first century has entered the small club of economically developed nations. This occurred at the expense of Taiwan's environment, and protests of environmental activists – joined by the chorus of those opposing authoritarian controls on labor and social groups – prompted political reforms, liberalization and eventually democratization. The success of both economic and political development (including indigenization) gave leaders confidence that Taiwan could remain outside the orbit of China's power, which increased friction between China and Taiwan.

The public in both China and Taiwan are increasingly aware of degradation to the environment. Survey research suggests that mainland Chinese still agree with the regime's emphasis of economic development before environmental preservation. Notwithstanding its rapid economic growth of the 1980s and 1990s, China does remain a developing country with a huge rural poverty problem. Attitudes of Taiwan's residents reflect a greater willingness to

engage in the trade-offs that perhaps are essential to improve environmental conditions, but this depends on when the question is asked and the economic situation (and perceived political capability) at that moment. In the following chapter, we consider the extent of biodiversity problems in both jurisdictions.

ENDNOTES

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42. See, for example, Guojia huanjing baohu zongju [State Environmental Protection Administration], 'Quanguo gongzhong huanjing yishi diaocha baogao (Zhaiyao)' [A Survey of the Nation's Public Environmental Consciousness (Summary)], Huanjing jiaoyu [Environmental Education], no. 4 (1999) 25–27; Yuan Fang (1999), 'Zhongguo shimin de huanjing yishi diaocha: Beijing he Shanghai' ['A survey of Chinese residents' environmental consciousness in Beijing and Shanghai'], in Xi Xiaolin and Xu Qinghua (eds), *Zhongguo gongzhong huanjing yishi diaocha* [*A Survey of China's Public Environmental Consciousness*], Beijing: Zhongguo huanjing kexue chubanshe [China Environmental Science Press], pp. 109–30; Stockholm Environmental Institute (2002), *Making Green Development a Choice: China Human Development Report*, Oxford: Oxford University Press. For a review of the literature in Chinese from 1990 to 2004, see Yok-shiu F. Lee (2005), 'Public Environmental Consciousness in China: Early Empirical Evidence', in Kristen A. Day (ed.), *China's Environment and the Challenge of Sustainable Development*, Armonk, NY: M.E. Sharpe, pp. 60–65.
43. Lee (2005), ibid, pp. 42, 50 and 55.

44. This survey was done by the All-China Environmental Federation and supervised by State Environmental Protection Administration (SEPA) in April–May 2005. The huge sample included 4 million people from 31 provinces, regions, and municipalities, but the methodology was not systematic. Other problems listed included air quality, garbage, destruction of vegetation and desertification and air/noise pollution. See Sun Xiaohua, *China Daily*, 28 July 2005, p. 2.
45. Ibid, p. 44.
46. Op cit, n. 44, p. 52.
47. Op cit, n. 44, p. 56.
48. The questions with percentage disagreeing were: 'Plants and animals exist primarily to be used by humans (25.8); mankind was created to rule over the rest of nature (23.1); and humans have the right to modify the natural environment to suit their needs (19.3). Carlos Wing Hung Lo and Sai Wing Leung (2000), 'Environmental Agency and Public Opinion in Guangzhou: The Limits of a Popular Approach to Environmental Governance', *China Quarterly*, **163** (September), 686.
49. Ronald Inglehart has done path-breaking research on post-materialist values, the root of the NEP. For a summary of Inglehart's findings on post-materialism, see his 1997 book *Modernization and Postmodernization: Cultural, Economic, and Political Change in 43 Societies*, Princeton, NJ: Princeton University Press. See also R.E. Dunlap and K.D. van Liere (1978), 'The "New Environmental Paradigm"', *Journal of Environmental Education*, **9**, 10, and J.C. Pierce, N.P. Lovrich, T. Tsurutani, and T. Abe (1987), 'Culture, Politics, and Mass Publics: Traditional and Modern Supporters of the New Environmental Paradigm in Japan and the United States', *Journal of Politics*, **49** (1), 54–79.
50. Wong, Koon-Kwau (2003), 'The Environmental Awareness of University Students in Beijing, China', *Journal of Contemporary China*, **12** (36), 536.
51. Hsiao, Hsin-Huang Michael, Russell A. Stone, and Chun-Chien Chi (2001), 'Taiwan's Environmental Consciousness: Indicators of Collective Attitudes toward Sustainable Development', paper presented at the Workshop on Sustainable Development Indicators, National Central University, Chung-Li, Taiwan, 17–19 November, 2001, p. 6, see www.sarcs.org/wwwroot/documents/chi%20paper.pdf.

3. Current status of species and ecosystems in China and Taiwan

Accelerated economic development in the last 50 years has had the greatest impact on threatened species and ecosystems in China and Taiwan, notwithstanding the accumulation of pressures over millennia. The measurement of biodiversity loss is an even more recent phenomenon. Only since the mid-1980s have scientists begun to form frameworks and baselines that can be used to compare threats to species and ecosystems in China with those of other nations.

In this chapter we examine the status of China and Taiwan's threatened and endangered species and ecosystems in the early twenty-first century (2005). We begin with a review of the process used in both jurisdictions to identify endangered species. Then we present information on actual species, with a special focus on those recognized internationally as endangered. Next we discuss the critical habitat of species in the context of the three main ecosystem types: forests, wetlands and oceans. The chapter concludes with a focus on scientists and scientific institutions, and the important role they play in the identification and preservation of species.

THE IDENTIFICATION PROCESS

Special Conditions of Data Collection in China

Three factors or conditions influence the ability of scientists to develop accurate information about species and ecosystems: the size and diversity of China, the small number of highly trained specialists in the biological sciences and ecology, and a bureaucratic culture that discourages information sharing.

Mackinnon et al.'s *A Biodiversity Review of China*[1] divides the Chinese landmass into seven biogeographical regions. A review of these regions informs us of the great variety of land forms in China:

1. Northeast China: forested hills and the Changbai and Da Xiangan Mountains.

2. North China: plains and low hills (with deciduous forests) of the heavily populated regions north of the Yangtze River.
3. Inner Mongolia-Xinjiang: the northern third of China, including steppes and deserts north of the Tibetan Plateau and also the Tianshan and Altai mountain systems.
4. The Tibetan Plateau and Himalayan highlands.
5. Southwest China: transitional mountains from the eastern Himalayas to the Sichuan and Yunnan plateaus, including deep river gorges that impede movement of species.
6. Central China: divided into the Guizhou plateau, the Sichuan basin, and southeastern provinces.
7. Tropical South China: including the South China rain forest, Hainan Island, and Taiwan.

Mackinnon et al. remark that China's size (the world's third largest country) and diversity make it difficult to collect accurate information:

> '[T]he sheer size of the country ensures that no single person has a complete first hand view of conditions. Data from different regions is very variable in terms of reliability, completeness and contemporaneity, and such data is scattered between many regional or organizational bodies rather than brought together in any single repository.'[2]

A second factor impeding data gathering is insufficient education and training of the collectors. At the national level, knowledge of individual species and ecosystems is limited. The biological sciences are at an early stage of evolution in China, and taxonomy is particularly underdeveloped. This adversely affects the development of comprehensive data bases on biodiversity.[3] Ecology as a discipline is barely two decades old. Although China has benefited from foreign expertise, this tends to be localized to specific regions and species.

Commentators often speak of the 'ten lost years' of higher education due to the Cultural Revolution, which had an extremely deleterious effect on the natural sciences. Even after the onset of reforms in the late 1970s, professors, curricula, and textbooks remained out-of-date. One of our respondents, reflecting on his undergraduate education in the early 1980s, recalled that a highly respected professor assigned works published in 1951 as the most current texts; his graduate school professors in the mid-1980s lacked doctorates and had not studied abroad.[4] He thought that the first Chinese PhD in zoology had not been awarded until the mid-1990s.

Insufficient education and training of scientific personnel is a problem in most developing nations. The third condition, bureaucratic insularity, is an obstacle to the collection of accurate environmental data in most countries, both developing and developed. Mackinnon et al. remark:

> '[T]he concept of freely shared information is not widely accepted in China. Many individuals or organizations are unwilling to reveal data either to foreigners or other Chinese agencies. Though (this) is slowly changing information collection remains difficult.'[5]

Notwithstanding these obstacles, Chinese scientists have, within the last two decades, collected an impressive amount of data on species and ecosystems. We can observe this in the formation of national lists of endangered and threatened species.

National Key Species Lists

About 1300 species are listed as protected under the 1988 Wild Animal Conservation Act (WACA, discussed in detail in Chapter 4). Two categories of protection are established; I and II. Species in both categories are considered key (*zhongdian*), but the type I species are in greatest need of conservation and require national authorization for any removal. With the exception of several orchid species, the great majority of listed species are mammals. The process of listing species as belonging to type I or II is determined by the State Forestry Administration (SFA) and is not flexible. The list has been revised just once in the last decade, to upgrade musk deer from class II to class I.

Scientists and protection officers operate in the realm of uncertainty as to the total number of species in China, and more importantly, the exact number which are endangered (close to extinction) or threatened. The approach taken by the SFA has been to invite scientific experts to advise it on species to be listed; the agency makes the final determination as to which are listed, and in what classification.

An ornithologist with the Chinese Academy of Sciences (CAS) made these observations about the identification process:

> '(Do scientists in your institute participate in the listing process?) Yes, we have experts who participate. The process is under the jurisdiction of the SFA, which is the major agency for protection of birds in China. It has established the classification system. Scientists can propose species for listing. (To the SFA administrator?) Well, he and his deputies are probably busy with less mundane affairs. We make the recommendations to lower-level officials. (Any controversy about this?) This is not a very controversial process. In the past, it has not been a scientific process either. Our interest is in the species we study. It is not easy to make changes.'[6]

A SFA middle-level manager with experience of the listing process in China as well as in other countries made several comments about the nature of the identification process:

> '(Criteria used in listing?) There are some criteria, such as economic significance of the species and the like, but the definitions do not resemble those of the US Endangered Species Act (ESA).
>
> (Role of experts in making decisions?) SFA is in charge of terrestrial species and the Ministry of Agriculture (MOA) in charge of aquatic species; both call in experts to help. Based on my experience in SFA, I'd say the experts are simply those known best by division directors and not the "best available scientific expertise" (language used in the ESA), but I am not sure that this is any different from the practices in other countries. Moreover, the problems in classification and listing reflect the lagging development of biological science in China. The "experts" know only one or two species well, and there lacks general knowledge of the comparative status of all mammal species or other kingdoms with respect to survivability. … As a result, the basis for species and habitat identification is quite uneven. Calling in a different group of "experts" probably would produce a different set of priorities.'[7]

Finally, an economist made general comments about decision-making in the area of biodiversity conservation, which applies to the particular case of listing species as 'key': 'The decision-making system here is not pluralistic, yet it is not a single entity. The mechanics are not inviting of groups, but the state does compromise'.[8] For the national list of threatened species, the listing process is indeed relatively closed, notwithstanding the invitation to scientific experts to participate in meetings and task forces. Moreover, individual citizens (including scientific experts) do not have the authority to petition the government to place a species on the national list. As we shall see, the process used to develop China's most recent list of threatened and endangered species is considerably more inclusive.

The 'Red' List

In 2000–03, under the aegis of the Biodiversity Working Group of the China Council for International Cooperation on Environment and Development (CCICED),[9] China adopted the most recent (2001) Red List of Endangered Species based on the International Union for the Conservation of Nature (IUCN) Red List criteria.[10]

A large group including more than 100 scientists and conservation experts, representing all of the biological sciences and some non-Chinese authorities, worked for three and a half years on this project. They applied the Red List criteria, the categories for threatened and endangered species, to over 10 000 species in the animal and plant kingdoms. The listings present the most recent findings concerning virtually all species of mammals, birds, amphibians, reptiles, fish, and a select group of insects, mollusks and vascular plants.[11] This investigation considered the impact on species if their critical habitat were reduced by certain percentages.[12]

The *China Species Red List*, which, when complete, will extend to six

volumes, is the most comprehensive evaluation of the status of wild fauna and flora in China. One of the directors of the project commented on the process:

> 'The inventory process has been so haphazard and in the past there was no movement. Government officials didn't think it was important. The Red List is the first baseline that we have. Yet there is no broad-based effort to do comprehensive inventory work. It can't be done by individual scientists working alone.'[13]

Notably, the process used to develop the *China Red List* was participatory (at least among recognized scientific experts) and transparent.

Identification Process in Taiwan

Taiwan did not start its classification work on endangered species until the early 1980s. Based on Article 49 of the Cultural Heritage Preservation Act of 1981 and Article 69 of the Enforcement Rules of the Cultural Heritage Preservation Act, 2001, 34 valuable and rare animals or plants that are unique to Taiwan or whose species members are few in number or in danger of extinction were listed from 1984–88.

Since the promulgation of the Wildlife Conservation Law in 1989, the Council of Agriculture (COA) has added at least 465 species to the list of endangered species. This list includes species of mammals, birds, amphibians, reptiles, insects, and other invertebrates.[14] The COA designated the Wildlife Conservatory Advisory Committee (WCAC) as the responsible authority for identifying and determining the classification of protected species. The Wildlife Conservation Law (1989) requires that academic experts, private conservation organization members, aborigines, and other non-governmental representatives comprise not less than two-thirds of the 31 members of the advisory group.

The classification of endangered species and ecology Geographic Information System (GIS) databases in Taiwan generally is based on the 1994 standards of evaluation of the World Conservation Union (IUCN). The endemic species research institute of COA also uses schema from the United States, New Zealand and Australia; it submits an evaluation system proposal to the COA for classification of species. The Center for Wildlife Conservation and Management of National Pingtung University of Science and Technology provides an Information Network for Species and Products Identification; it is funded by COA to assist in implementation of wildlife conservation.[15]

As we note in Chapter 4, protective categories for animal species are more comprehensive than those for plants, and the total number covered, around 2000, is greater than found on China's national list. The Wildlife Conservation Law (1989) arranges protected species into three categories: 1) endangered

Table 3.1 Distribution of species across China's provinces

Province	Area (sq. km)	Forest (sq. km)	Mammals' E value*	Birds' E value	Plants' E value	Protected Areas	Priority**
Anhui	139 000	17 916	198	184	160	8	C
Fujian	121 000	44 964	106	487	197	1	C
Gansu	381 000	17 690	276	319	156	19	B
Guangdong	184 100	56 366	285	504	271	13	B
Guizhou	176 000	23 093	113	294	279	9	C
Guangxi	236 000	52 272	283	517	666	49	B
Hainan	33 900	2 420	203	434	359	31	B
Hebei	188 000	16 768	118	319	51	2	C
Heilongjiang	469 000	152 944	175	366	93	16	B
Henan	167 000	14 199	194	146	119	16	C
Hubei	186 000	37 790	197	231	177	6	B
Hunan	210 000	68 723	158	154	239	29	C
Jiangsu	169 000	3 247	140	378	79	8	C
Jilin	187 000	60 789	153	216	163	7	A
Jiangxi	169000	54 623	106	378	167	17	C
Liaoning	146 000	36 527	202	309	96	21	B
Inner Mongolia	1 183 000	137 401	197	209	122	0	C
Ningxia	66 000	951	102	84	42	6	C
Qinghai	721 000	1 945	190	156	37	4	B
Shandong	153 000	9 047	106	264	25	35	C
Shaanxi	206 000	44 714	224	190	145	7	B

Shanxi	156 000	8 100	88	159	59	4	C
Sichuan	567 000	68 108	384	432	464	63	A
Taiwan	35 760	19 695	111	560	148	18	B
Xinjiang	1 600 000	11 209	345	328	167	21	A
Xizang	1 228 000	63 203	438	410	163	7	B
Yunnan	394 000	91 965	741	1 360	1 040	30	A
Zhejiang	102 000	34 289	106	310	258	9	C

Notes:
* The 'E' score is the value of endemism of species within the taxa in the particular province. In the words of Mackinnon et al., it is 'the best index of overall biodiversity value' (p. 19).
** 'Priority' is based on two factors: 1) the importance of the particular province to China's overall biodiversity, and 2) whether creating additional protected areas in the province would more than marginally improve conservation of endangered species.

Source: Adapted by the authors from John Mackinnon et al. (1996), *A Biodiversity Review of China*, pp. 41–45.

species whose population is at or below replacement levels; 2) rare and valuable species, endemic to Taiwan; and 3) species requiring conservation measures but not in immediate danger of extinction.[16]

STATUS OF SPECIES

We take three different approaches in understanding the status of endangered and threatened species in China and Taiwan. First, we review the distribution of different species across Chinese provinces. Second, we consider the degree in endangerment of taxa, based on the most recent comprehensive investigations. Third, we present brief case studies of endangered species which are of international significance, such as the Giant Panda.

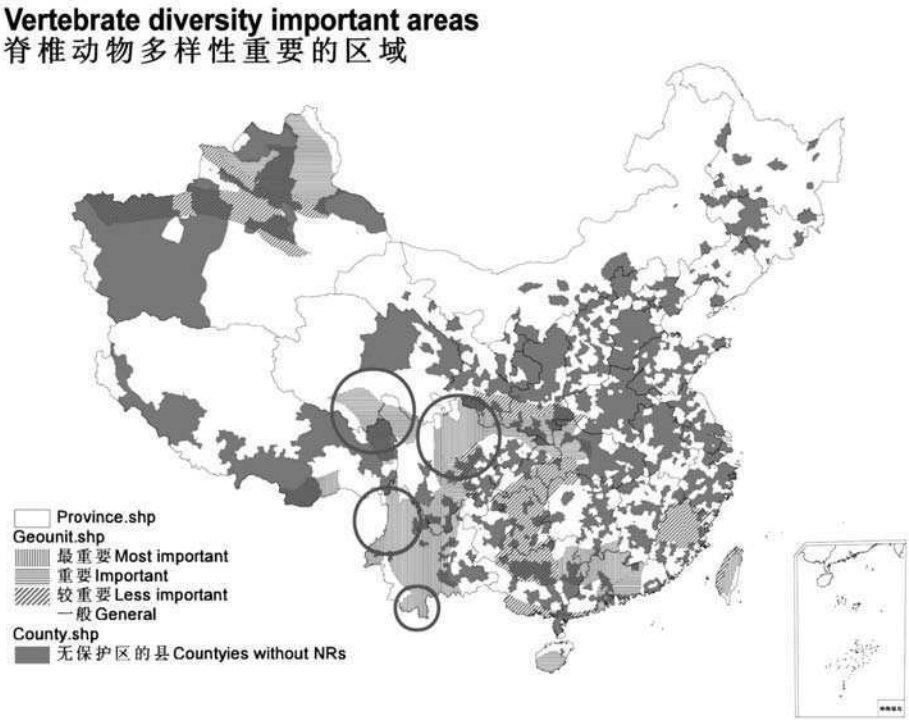
Distribution of Species

China's rare and threatened species are distributed unevenly. The economically developed and long-settled provinces of the East Coast have just a handful of endemic species and few that are rare. China's northern, western, and southern peripheral regions, however, have higher degrees of richness and endemism of species. Table 3.1 presents these contrasts.

Table 3.1 shows a high degree of variety across the provinces, with some having low rates of endemism, others at the middle ranges, and still others with quite high numbers of indigenous species. Table 3.1 displays a relationship between the amount of forested land in the province and the degree in endemism of its species, although this correlation is not extremely high. Yunnan Province, with the third highest amount of land under forest cover has the largest number of endemic species in mammalian, plant, and avian taxa. Provinces or autonomous regions such as Ningxia and Shanxi, with little forested land, also have lower levels of endemism.

The column on protected areas is one to which we shall return when discussing nature reserves in Chapter 5. Data were drawn from the early 1990s; in 2005, however, there are more than 2000 protected areas, and thus the column is out-of-date. Nevertheless, it indicates an association, as one would expect, between the number of protected areas and the degree in endemism of species.

The 'priority' of the province for biodiversity conservation is an important consideration. Only four of China's 27 provinces are designated as an 'A' or top priority status: Jilin, Sichuan, Xinjiang and Yunnan. All except Sichuan are on China's periphery, Jilin in the northeast, Xinjiang in the west, and Yunnan in the southwest. On the other hand, of the 13 provinces classified as 'C', most are along China's eastern coast. This observation will be repeated



Source: Xie Yan (2005), Biodiversity Working Group, Chinese Academy of Sciences.

Note: Circled areas represent areas with reasonable coverage through nature reserves.

Figure 3.1 Important areas of vertebrate diversity in China

throughout this volume: the areas of China in greatest need of species and habitat protection are in the most remote and poorest sections of the country.

Figure 3.1 presents this information in the form of a map of vertebrate biodiversity.

Species Endangerment in China

In 1998, the State Environmental Protection Administration (SEPA) published the *Country Report of China Biodiversity*, which listed the rate in endangerment of these taxa: mammals, 22.06 percent; amphibians, 2.46 percent; reptiles, 4.52 percent; birds, 14.63 percent; gymnosperm, about 28 percent; and angiosperm, about 13 percent.[17]

The *China Species Red List* presents evidence that the threatened status of China's species in 2004 is 'much more severe than expected before'.[18] Table 3.2 presents information on wild taxa, comparing the percentage of threatened categories (critically endangered, endangered and vulnerable) and the percentage that is 'near threatened'.

Table 3.2 Threatened status of Chinese species

Taxonomic group	Percentage threatened (%)	Percentage near threatened (%)
Mammals	39.8	10.7
Birds	7.4	7.4
Reptiles	27.52	15.2
Amphibians	39.9	19.6
Gymnosperm	69.91	21.23
Angiosperm	86.63	7.22
Orchids	78.26	21.24

Source: Adapted by authors from Wang and Xie (2004), *China Species Red List*, pp. 12–15.

Note: Plant species have not been completely inventoried; the report indicates that 'The percentage of endangered plant species much exceeds that from past evaluations' (p. 12).

In all taxonomic groups with the exception of birds, the percentage of endangerment has increased astronomically. Nearly 40 percent of mammal species appear threatened on the 2004 list, as compared to a rate of 22 percent in the 1998 publication. The rate of change in reptiles is greater, from 4.5 to 27.5 percent; and the rate for amphibians is higher still, from 2.5 to 40 percent. Part of the change may be accounted for by measurement error, and the lack

of comprehensiveness of earlier surveys. Still, the change in degree of endangerment is startling.

Species Endangerment in Taiwan

Taiwan has a smaller number of species than China, just about 1.5 percent of the world's known total. These include: 70 species of mammals; 550 species of birds (40 percent of which reside in Taiwan all year round); 100 species of reptiles; 34 species of amphibians; 2000 species of fish; 18000 species of insects (including 400 butterfly species); 610 species of ferns; 28 species of gymnosperms; and 3600 species of angiosperms.[19]

Of these species, approximately 2000 have been identified as endangered, threatened, or rare. Among the endangered species designated under the Cultural Heritage Preservation Act of 1981 are the Formosan land-locked salmon, Formosan black bear, Formosan clouded leopard, and birdwing butterfly. Most attention, however, has focused on Taiwan's bird species.

The wetland areas in the west coast of Taiwan are important stop-over and wintering areas for thousands of north-south migrant waterbirds, and the numerous scattered uninhabited offshore islets attract pelagic species that roost and nest. Also, the long isolation of Taiwan since the Ice Ages has resulted in 15 endemic species and around 70 endemic subspecies within the 550 bird species so far recorded. In recent years, Birdlife International has listed Taiwan as an 'important bird area'.[20]

According to an island-wide survey conducted by the Wild Bird Federation of Taiwan (WBFT) in 2001, Taiwan has 53 global Important Bird Area (IBA) habitats for migratory and non-migratory birds and 2 endemic bird areas (EBA), with 19 threatened species on record.[21] The total areas of these IBA habitats include approximately 652000 hectares, equivalent to 18 percent of the territory of Taiwan.

Based on the IUCN Red List categories; Taiwan has one critical bird species, the Chinese crested tern, and nine species are endangered – the black-footed albatross, Japanese night-heron, oriental stork, crested ibis, black-faced spoonbill, swan goose, scaly-sided merganser, spotted greenshank, and spoon-billed sandpiper.

Examples of Endangered Species in China

Few in China or outside it are familiar with many of the species discovered to be threatened or endangered. The most well-known endangered species are those that appeal to humans, and are often called 'mega-charismatic fauna (or flora)'. For instance, a 50-year retrospective account of wildlife conservation

in China published by the SFA lists these 15 species as the main part of the bureau's 'rescuing wildlife project'[22]:

1.	giant panda	6.	Chinese alligator	11.	deer
2.	crested ibis	7.	Asiatic elephant	12.	pheasants
3.	tiger	8.	gibbon	13.	cranes
4.	golden-haired monkey	9.	musk deer	14.	orchidaceous plants
5.	Tibetan antelope	10.	P-Gazelle	15.	cycas

We will introduce briefly the first seven species on the SFA list, and discuss their habitats, primary threats to survival, and governmental responses.

The giant panda is one of the poster mammals for the global biodiversity conservation movement, as well as the logo for conservation organizations (such as the World Wide Fund for Nature (WWF)). The panda is a species endemic to China with an ancient lineage stretching millions of years into the past. Giant pandas have been hovering at the brink of extinction for the last 50 years. They are distributed in six areas (Qinling, Minshan, Qionglai, Big Xiangling, Small Xiangling and the Liangshan Mountains) of three provinces: Sichuan, Shaanxi and Gansu. According to the most recent inventory done by the SFA (2005), China has 1590 giant pandas in the wild, living in habitats covering more than 23 000 square kilometers.[23] An increasing number (163 in 2005) have been raised in captivity[24] or live in zoos worldwide.

Some pandas have been poached because of the value of their pelts, but the main threat to their survival is encroachment on their habitat by the growth of human population, settlement, and deforestation. Their natural habitat shrunk progressively in the twentieth century, to the extent that by the early 1990s it was estimated to be 12 000 square kilometers, only one-fifth of the range 40 years previously.[25] Recent additions to panda-protected areas have nearly doubled this amount, but whether it is sufficient is uncertain.

The response to the decline in the panda population has been two-fold. First, the state established 24 nature reserves to protect pandas and their habitat. Second, in one of the earliest protected areas for pandas, the Wolong reserve (established in 1959), scientists initiated a panda breeding and research program that has been somewhat successful in reversing species decline. A number of environmental NGOs have also focused on panda conservation, for example the WWF.[26] Yet recent reports point to the continuing decline in critical habitat available to giant pandas, as a consequence of growing human populations and encroaching commercial activities within nature reserves. Jianguo Liu et al. reviewed habitat extent over the 30 years of the establishment of the 'flagship' protected area for the panda in Sichuan Province and found an increase in habitat loss and fragmentation.[27] A panda specialist, critical of the focus of the Wolong reserve on the breeding center instead of the

intrinsic value of the wild animal itself, remarked: 'Now people are looking up to Wolong. It has millions of RMB in its budget from the national government. We need to use more appropriate methods'.[28]

The crested ibis is one of the world's most endangered birds. This red-faced, white-feathered species lives in rice fields and feeds on aquatic insects. Its range once extended throughout East Asia – including sections of Russia, China, the Korean Peninsula, and Japan. Thought to be extinct in the region, it was rediscovered in the Zinling Mountains of southern Shaanxi Province of China in 1981.[29] The numbers have remained quite low however, hovering around 200. (A *China Daily* report in 2005 mentioned a population total of 750.)[30]

The threat to the crested ibis is largely to its habitat. Contamination of breeding and resting areas by chemical fertilizer and pesticide run-off has endangered its survival. In response, authorities have established several staging and breeding habitats, and monitored the species during the breeding season. Since 2004, a few crested ibis have been returned to their natural habitat.[31] A few natural wetlands have been restored to provide hunting areas for the ibis too.

Tigers are the largest carnivores in China but the population, just 100 in the wild, has become nearly extinct. China has four subspecies of tigers. The Bengal and Amur (or Siberian) tigers have peripheral habitats in China, with the primary habitats in the Indian subcontinent and the Russian Far East respectively. The South China and Indo-Chinese (usually called 'Indian') tigers are found in southern Tibet.[32]

Tigers are an economically valuable species, both for their pelts[33] and for their use in traditional Chinese medicines;[34] they continue to figure in the illegal wildlife hunting and trade of China, India, and Southeast Asia. Habitat for tigers includes coniferous forests, broad-leaved forests, mangrove swamps, and tropical forests. Again, encroachments of human settlements, agriculture and deforestation all contribute to this species' endangerment.

A number of zoos have bred tigers in captivity, and two breeding centers in the northeast – the Hengdaohezi Tiger Breeding Center in Heilongjiang and the Northeast China Tiger Park at Harbin – have had some success in captive breeding, to the extent that the artificially bred tiger population today exceeds the wild population.[35] In addition, the state has established more than two dozen nature reserves for the purpose of protecting the species.

The golden-haired monkey is endemic to China and is found in Yunnan, Guizhou, and Sichuan provinces. There are 13 populations of the species and about 2000 individuals. In the judgment of one specialist: 'In one place of its range, the population has increased; in several, the population has been extirpated; in most places, it has stabilized'.[36]

The species is valuable for its fur, and like the panda and tigers has been

poached and traded in China and Southeast Asia. As the monkey's habitat is subtropical forests, it is particularly endangered by illegal logging, clearing of land for agricultural plots and human settlement.

A dozen nature reserves have been established to protect the habitat of the golden-haired monkeys, and there is pressure from NGOs to increase the number of protection areas. The Nature Conservancy (TNC) has developed a partnership with SEPA, SFA and the local community to establish a nature reserve in Laojunshan. Scientists have conducted an analysis of the forest ecosystem, and worked to create a coordinated management system. Said one specialist: 'We want to show the government how to design, manage, and staff a nature reserve'.[37]

The Tibetan antelope is another species endemic to China and found only on the relatively arid steppes of the Tibetan plateau; in the Chang Tang of Tibet and adjoining parts of Qinghai and Xinjiang.[38] Although the species resembles an antelope, it is actually an early branch of a sub-family including sheep and goats. Once a flourishing species of 1 million at the start of the twentieth century, hunting has reduced numbers to around 75 000 on the Tibetan plateau.

Schaller describes the economic value of the Tibetan antelope:

> 'The antelope has the finest wool known. Marketed internationally under the name of *shahtoosh*, the wool is woven into luxury scarves and shawls that sell for several thousand dollars each in Europe, America, Japan, and elsewhere … demand by the fashion industry has in the past two decades led to the illegal slaughter … both by nomads and motorized gangs of poachers from towns. The wool is smuggled out of Tibet, much of it through Nepal, to Kashmir in India and to Italy for weaving.'[39]

Increased and more effective enforcement has reduced poaching somewhat, but market demand is still high for the species, with shawls selling for as much as US$18 000 in Europe and north America.[40] The habitat of the antelope is also under pressure of increasing human populations and commercial pressure from livestock raising.

The government established four nature reserves for the protection of the Tibetan antelope, and plans to increase the area of coverage for them. In addition, an artificial breeding program has begun. Survival of this species may be aided by increases in public awareness. In 2004, some theaters in Beijing and other Chinese cities showed *Hoh Xil* (*kekexili*, or Tibetan antelope), a film picturing the conflict between Tibetan antelope poachers and a volunteer patrol team attempting to protect the animals, set in 1996.[41]

The Chinese alligator is an endemic species in China. Once it was widely distributed throughout China, but now it is restricted to the Yangtze River and some of its tributaries, in the provinces of Jiangsu, Zhejiang, and Anhui. An estimated 300 remain in the wild.[42]

The alligator has an economic value, as its organs are used in traditional Chinese medicine. The construction of dams, farming, commercial enterprises and deforestation have all encroached on its habitat. Altogether, only half a dozen nature reserves now protect the species. Scientists have developed artificial breeding programs. Finally, the highly concentrated population of alligators has been dispersed, to increase prospects for genetic diversity.

The Asian elephant is distributed primarily in the tropical rain forests of south and southwestern Yunnan Province. Its numbers are estimated to be from 200 to 250. The main threat to Asian elephants is the decrease in size of their natural habitat. Encroachment of agriculture and deforestation (including illegal logging) has fragmented their habitat, and increased conflicts between wild elephants and local farmers. The governmental response has been to construct two nature reserves, build protection stations, and develop some field monitoring programs.

Many NGOs have been active in the preservation of Asian elephants, as has been the case with other endangered species too. In 2000, the International Fund for Animal Welfare (IFAW) inaugurated an Asian Elephant Protection Project with the Yunnan Forestry Bureau and the local government (Simao Prefecture). The rural community capacity-building part of the project has provided micro-credit loan assistance to the local communities, to encourage farmers to seek alternative crops nearer villages, thereby reducing conflict with elephants in the forest. The scientific research element of the project led to creating man-made niter ponds in the forest, so that elephants would not venture into villages for salt. Finally, the environmental education component emphasized harmonious coexistence between humans and elephants. The local government issued a ban on hunting elephants as a result of the cooperative agreement.[43] This organization was successful in another area where logging threatened elephant habitat. The NGO representative recounted the case:

> 'We learned that a local logging company was working in the range area of Asian elephants … they were not operating in the protected area. It was legal to cut trees there, but nevertheless, it was important critical habitat. We asked the company for its logging plan. Also, we gave them data on how many elephants there were there. I wrote a letter to them as a specialist, and said if the natural habitat were destroyed, it would cause more problems to the local community. I gave them copies of my scientific papers and also copied the SFA. They stopped logging after four to five months. (Because they'd reached their quota?) No, it was earlier than they had planned.'[44]

These seven species are treasured not only in China but elsewhere in the world. The efforts to increase their numbers and preserve, even restore, their habitats is one sign of the importance of biological diversity conservation in China. Activities of the national government, provincial and local

governments, have been matched by scientists and NGOs. We cannot, however, generalize from these cases of charismatic animals to the treatment of all endangered and threatened species in China.

Examples of Endangered Species in Taiwan

We examine just three endangered species in Taiwan, considering a fourth, the black-faced spoonbill, in Chapter 8.

The Formosan black bear is a species of the *Ursidae* family, and is Taiwan's largest land mammal. They are covered with a thick coat of black fur in wintertime, thus their name, but in summer their hair turns brown. With a maximum weight of 200 kilograms, the black bears would be considered small in the North American context.

The Formosan black bears are an endemic subspecies in Taiwan. They are few in number, approximately 250. Their habitat is forested terrain in the mountains at elevations of from 1000 to 3500 meters. Black bears are valuable economically because of their pelts; and their organs (and bile) are used in traditional Chinese medicine. For these reasons, they are subject to illegal hunting, but perhaps the greatest threat to their long-term survival is habitat loss and degradation.[45]

Another mega-charismatic fauna endangered in Taiwan is the Formosan clouded leopard. This long-bodied, long-tailed carnivore prefers densely leaved forests, where it preys on deer as well as smaller animals such as monkeys, birds and squirrels. The species is endemic to Taiwan and typically is found at elevations above 1000 meters throughout the island.

Leopards, like tigers, are valuable for their pelts and their use in traditional Chinese medicine. Thus, they are threatened by poaching and illegal trafficking, notwithstanding attempts to protect them. Like the Formosan black bear, their habitat is increasingly subject to degradation and loss because of residential, commercial and agricultural development in Taiwan.[46]

The Formosan landlocked salmon is a cold-water species and requires clear, unpolluted waters with a temperature below 18°C to survive. This species is migratory and inhabits slow-flowing streams with gently sloping beds at elevations above 1500 meters.[47] The biological importance of the salmon was first recognized during the Japanese colonial era (in 1938).[48] Increasing human activities, for example the construction of dams and dikes, caused pollution and blocked their migration route. Public outcry led to the salmon's inclusion on the protected species list in 1985, when restoration of the species commenced. In 1989, the COA elevated its status to endangered, and its habitat was incorporated in the Shei-Pa National Park (later designated as a wildlife refuge).[49] However, frequent typhoons and the rise of temperatures due to climate change remain a constant threat to the survival of the species.

Disaster brought by heavy rains of Typhoon Haitang and Matsa in the summer of 2005 ruined its habitat and washed out many fry.[50]

CRITICAL HABITAT

The habitat of a species is the place it resides; critical habitat refers to space essential to survival of the species. The threats to China's biodiversity introduced in Chapter 1 directly pressure species, such as the overexploitation and utilization of animal, plant, and fish resources. Yet most threats to biodiversity are those that have an adverse impact on habitats, for example uncontrolled deforestation, overgrazing of range lands, pollution of the land, air, and water, and human activities such as mining and wetland reclamation.

In this section we briefly survey the changes to habitats in China's three major ecosystems: forest, wetlands and oceans. The discussion refers primarily to China, but much of it applies to Taiwan as well. In each ecosystem area, we ask about the nature of the change, and the response of governments and other organizations.

Forests

Harkness notes in his review of changes to China's forests: 'Forests are the most important ecosystems in China, in terms of the sheer diversity of species they harbor and the essential goods and ecosystem services they supply'.[51] Notwithstanding this importance, China's forests have been severely challenged by modernization and political change. As noted in Chapter 2, during the Great Leap Forward (1958–60) forests were cut to fuel the mass iron and steel smelting campaign. In the Cultural Revolution, following the Dazhai model, peasants cut forests to establish more farms and increase grain production. Following the onset of economic reform, forests were cut to meet economic development needs. As a result, in less than five decades, almost half of China's forests were destroyed. China's forests now cover 134 million hectares, just under 14 percent of the nation's land area. However, few old growth (or virgin) forests remain, and those are at risk.

The state has responded to massive deforestation with equally large-scale reforestation and afforestation programs. Table 3.3 below presents an overview of seven afforestation programs.

Four of these programs warrant further mention:[52]

1. Natural Forest Protection Program (or National Greening Campaign) – this program includes a complete logging ban in the upper reaches of the Yangtze River and the upper and middle reaches of the Yellow River;

Table 3.3 China's afforestation programs since the 1970s

Name of Program	Duration	Coverage	Intended Target	1999 Results
National Greening Campaign	1987–present	Varied over time	Varied over time	27.9 billion trees planted
'Three Norths' Shelterbelt Program	1978–2050	551 counties in 13 provinces	Afforestation of 35 million ha by 2050	25.67 million ha planned
Protective Afforestation, upper/middle reaches of Yangtze	1989–2000	271 counties in 12 provinces	Planting and restoration of 6.8 million ha	4.8 million ha planted
Coastal Shelterbelt Program	1991–2000	195 counties in 11 provinces	Planting of 3.6 million ha	1.1 million ha planted
Cropland Protection and Agro-Forestry in the Plains	1988–2000	918 counties in 26 provinces	Set standard	850 counties reached standard
Taihang Mountain Afforestation	1990–2010	110 counties in 4 provinces	Planting of 4 million ha	3.3 million ha planted
Combating Desertification Campaign	1991–2000	598 counties in 17 provinces	Control desertification in over 7.2 million ha	Desertification controlled in 8 million ha

Notes: hectare = ha.

Source: Adapted from Runsheng Yin, Jintao Xu, Zhou Li, and Can Liu (2005), 'China's Ecological Rehabilitation: The Unprecedented Efforts and Dramatic Impacts of Reforestation and Slope Protection in Western China', Woodrow Wilson Center, *China Environment Series*, Issue 7, p. 19.

reduction or adjustment of timber output in state-owned forest farms of the northeast and Inner Mongolia; and rehabilitation and development of natural forests in other regions.

2. Shelterbelt Development Programs – this involves establishing plantations in two large regions: the three Norths (North, Northeast and

Northwest China) and the Middle and the Lower Reaches of the Yangtze River.

3. Conversion of Cropland to Forest and Grassland Program – this nation-wide ecological program is designed to control soil and water erosion; its goal is to convert 22.7 million hectares of land by 2010.[53]
4. Sandification Control Program – this ecology program focuses on the problem of sandstorms in the vicinity of Beijing, and involves planting forests and grass cover in the five jurisdictions of Beijing, Tianjin, Hebei, Inner Mongolia, and Shanxi.

A final program is the Forest Industrial Base Development Program. The focus of this program is on the establishment of fast-growing and high-yield timber plantations, to ease pressure on forest resources.

The *China Daily* announced proudly in 1998, 'China now ranks first in the world in both the speed and scale of afforestation'.[54] A 2005 report proclaimed that one-quarter of China would be forested by 2020.[55] Nevertheless, Harkness comments that '[I]ncreases in forest cover have coincided with decreases in the actual amount of wood available for harvesting',[56] and these declines in production were exacerbated by the 1998 ban on logging[57] in old growth forests after the Yangtze River floods of that year. The reduction in availability of timber domestically led to an influx of imports from Southeast Asia and West Africa (regions with high rates of biodiversity too). Ironically, the increased concern with preservation of habitats for endangered and threatened species in China's forests has come at the cost of forests and their threatened species abroad.[58]

Several problems have been identified in the afforestation programs, particularly the development of monocultural plantations, which limits species diversification. A forestry management official said that this needed to be kept in perspective:

> 'We are now looking at species diversity. We are emphasizing hardwood species, and this is a positive sign. Yes, there are problems, but the scale is unparalleled. We are converting sloping farmlands into forests, and enlarging wetlands. Even though we have "paper parks", there has been extraordinary change. There is massive afforestation, which is good for carbon sequestration.
>
> (Continuing problems of monocultural plantations, for example, onset of respiratory problems associated with poplar cultivation in the Beijing area?) Yes, but the biomass accumulation of poplar is larger than hardwood forests; also, poplar are fast-growing.'[59]

Yin et al. (2005) point out additional difficulties. They object to the top-down nature of campaigns, and insufficient attention paid to local interests and conditions. Often those who have lost access to forests and logging have been

inadequately compensated. Finally, the lack of long-range planning and development of good practices may increase other problems, such as erosion and introduction of invasive species.[60]

It is difficult to draw a single generalization concerning the changes in China's forests since the onset of economic reforms. Clearly, they provide better refuge for species than during the Maoist era. Long-term prospects for species diversity within China's mostly new forests, however, would appear to be uncertain. As a recent report indicates, protection of forest biodiversity continues to be inhibited by 'the population issue, excessive catching and over-hunting, and (natural) forest area reductions'.[61]

Wetlands

China has approximately 65 million hectares of wetlands, which is 10 percent of the world's wetland areas (the largest in Asia and fourth largest globally). The wetlands include marshes, bogs, peat-based wetlands, coastal wetlands, lakes, rivers, coastal shallows and mudflats, and what are called 'artificial wetlands' (paddy fields). Wetlands are a large store of biodiversity, hosting hundreds of plant species, animals, freshwater fish, and birds (including important migratory species). They are like kidneys, purifying water for human consumption. Seven of China's wetlands meet the criteria of the Ramsar convention and are Wetlands of International Importance. These include wetlands in Zhalong in Heilongjiang, Xianghai in Jilin, Donzhaigang in Hainan, Niaodao in Qinghai, East Dongting Lake in Hunan, Poyang Lake in Jiangxi, and Mai Po Marsh and the inner deep bay northwest of Hong Kong.[62]

The largest threat to China's wetlands is urbanization and conversion of wetlands to farmland. About half of China's coastal wetlands have been lost through reclamation, which has reduced marine plankton and fish species, as well as blocked estuaries and caused flooding.[63] Illegal fishing is common in both commercial marine fisheries and rivers and lakes. Areas of mangrove forest have declined; in Guangdong, the reported rate of recent reduction is 86 percent.[64] The digging of drainage canals for agricultural purposes has changed wetland hydrology, as has the construction of large hydropower projects. Air and water pollution have had an adverse effect on wetlands. One estimate is that more than two-thirds of China's lakes are eutrophic to some extent.[65] Siltification has increased as a result of overlogging. Estimates suggest that flooding disasters in the middle and downstream sections of the Yangtze River basin and in Northeast China are a direct result of altered wetland hydrology and decreased capacity of wetlands to store floodwater.[66] Climate change too is also a factor in the decline of wetlands.[67]

Wetlands conservation is a relatively recent priority of the Chinese

government. China signed the Ramsar Convention for the Protection of Wetlands in 1992, but to date has not yet enacted national wetlands protection legislation.[68] Several wetlands are part of the national protected area system, but few enforcement personnel monitor the degradation of wetlands. In 2004, the SFA announced that by 2020 it would have almost 600 wetlands reserves, covering more than 70 percent of China's total wetlands.[69]

Oceans

China's coastline extends 18 400 kilometers and abuts four seas: the Bo Hai (considered an 'inland' sea), the Yellow Sea, the East China Sea, and the South China Sea. Coastal wetlands are important spawning and nursery grounds for fish and crustaceans and feeding sites for water birds.

Threats to China's oceans include overfishing, destructive fishing methods, pollution, and the reclamation of coastal lands. Marine fisheries are nearly 75 percent of China's total fisheries, and overfishing has resulted in a serious decline of take in recent years. The mariculture industry has caused degradation of water quality as well as put pressure on fish fry, small crustacea and shellfish.[70] Moreover, the use of dynamite and poison fishing has damaged coral reefs and mangrove forests. At least 50 percent of the coral reefs off China's coasts have disappeared in the past 20 years. Loss of coral reefs in turn increases the risk of typhoon damage to China's coasts.

Pollution from industries, agriculture, domestic sewage, oil and gas exploration, and fish farming has degraded China's ocean environment, as has extensive run-off of silt from rivers and seabed dredging. As one NGO representative remarked: 'All the coastal cities of China dump their wastes in the sea'.[71] A State Oceans Administration official stated: 'The coastal marine ecosystem is worsening, the quality of ocean water is deteriorating, and large amounts of pollutants are infiltrating from land to the sea'.[72] The loss of coastal wetlands to agriculture, aquaculture, and reclamation projects has devastated both wildlife and marine resources.[73] Sea cows have become extinct in China's seas, as have several species of kelp.[74] Mining of beach sand and minerals destroys habitat of sea turtles. Both sea turtles[75] and coral are products of illegal trading. Construction of dams and irrigation projects on coastal plains affects the hydrological conditions of the coast too.

The primary response of the government to adverse changes of the marine environment has been to establish marine reserves and marine parks, about 100 in total. Enforcement of existing regulations and laws on pollution remains problematical. Yet in 2005, the state launched an eight-year biodiversity maintenance project for coastal areas of the South China Sea, with the United Nations Development Programme (UNDP) and the Global Environmental Facility.[76]

SCIENTISTS AND SCIENTIFIC INSTITUTIONS

In China

Most of the data on China's species and ecosystems have been collected by biological scientists, working in research institutes, universities, and increasingly, private corporations. Natural science disciplines are organized into research institutes under the umbrella of the Chinese Academy of Sciences (CAS). The institutes have played a large role in policy recommendations, as noted by the development of the China Red List and the report on protected areas, issued by the Biodiversity Working Group in late 2004.

China's scientists have created a new information system, called the China Biodiversity Information System. More than 90 subcommittees worked on this large project, which has produced one million records.[77] The Institute of Botany of CAS alone has published more than 20 volumes on biodiversity protection and it sponsors a biennial conference on this subject, which attracts participation of scientists and government officials. As already mentioned, biological scientists propose the addition of species to the national list. Also, SEPA and the CAS have established the China EcoRegional Assessment with foreign NGOs (particularly TNC) and other Chinese government agencies and NGOs. This five-year action plan intends to create baseline data to ground future conservation actions and investments.[78]

Several of the biological science disciplines have professional associations. One of the oldest is the Chinese Ornithological Society, formed in the 1960s. Its members are researchers and professors who meet every four or five years to report on research.[79] This association has limited contacts with foreign ornithological associations; it does not take political positions. A veteran scientist explained the limits on media reporting of environmental issues and on scientific institutions:

> '(Press reporting on environmental issues?) This is just an escape valve, and the government still does not allow any highly critical reports on environmental issues, which would negatively connect the direction of the regime with any current problem. You can read any number of reports on environmental issues, but none is very deep. The regime tries to keep everything in balance and not disturb social order. So the large environmental issues such as the Three Gorges Dam and species loss are not treated exhaustively. Also, there is little specialized expertise among journalists to cover these issues.
>
> (Pressure of scientific organizations?) There are just a few of these scientific associations, but none is truly independent. Scientists work through the different institutes of the Chinese Academy of Sciences, and this is a government organization. It is not like scientific academies in the US or other western countries. It is government science.'[80]

Scientists have objected to large-scale construction projects, such as the Three Gorges Dam, dams on the upper reaches of the Yangtze River, and the West-East Gas Pipeline Project. All these projects proceeded, notwithstanding the objections of scientists. In the latter two projects, however, modifications did meet some of the scientists' environmental objections. A veteran policy analyst pointed out the contextual factors that condition the influence of science on policy:

1) 'If higher officials have reached consensus on an issue, it is not possible to influence them; if, however, there is dissent among policy-makers, they are susceptible to influence.
2) If scientists have a strong and unified position on a new issue about which higher officials are poorly informed, then scientists will be able to influence government policy;
3) Finally, timing is critically important. During the SARS crisis, scientists influenced policy because people knew about the issue and trusted scientific expertise. There was an opportunity then for influence.'[81]

In Chapter 8 we consider the impact of scientists on the construction of the Nu River dam in Yunnan Province.

Role of Research Institutions and Scientists in Taiwan

Article 17 of the Convention on Biological Diversity (CBD) asks each country's government to establish a biodiversity information exchange center for the compilation of a national biodiversity database. A national node is also to be established to serve as a window for information exchange partnerships and sharing with other countries. The Global Biodiversity Information Facility (GBIF) was established in 2000 under the terms of the CBD to promote and integrate biodiversity information and to establish exchange mechanisms. Taiwan became an official affiliate member of GBIF in March 2003. In the same year Taiwan established the Taiwan Biodiversity National Information Network (TaiBNET), which compiles databases of biological species and biodiversity specialists in Taiwan.

The Academia Sinica is Taiwan's umbrella science institution, and in 2001 the National Science Council (NSC) commissioned it to design the TaiBNET website (see http://taibnet.sinica.edu.tw), which lists taxonomic information and the names of biodiversity specialists in Taiwan. Some 500 specialists are included on the list, which is an acknowledgment of the degree of scientific expertise and the number of natural scientists in Taiwan. The database also contains taxonomic data on 45 000 species. The TaiBNET coordinates with the international system through the Taiwan GBIF National Node (TaiBIF – see http://www.taibif.org.tw), established in 2002 at GBIF's request. The TaiBIF catalogs biologists in Taiwan, native species, government agencies, research

organizations, NGOs, large-scale plans or group-research plans, related websites, biology databases, documents and publications.

Biological diversity is one of Taiwan's most important natural resources. Many government departments have launched projects to gather information related to biodiversity, including the COA's Natural Resources and Ecology Geographic Information System (GIS) Database, the Environmental Protection Administration's Environmental Resources Database, the NSC's Specialists and Species Database (TaiBNET), as well as the National Digital Archives Program, which has information on collections of plant and animal specimens. There are also many other important databases established by educational institutions, research organizations and NGOs.

However, these databases have not been substantially integrated. Perhaps the establishment of the National Biodiversity Database will comprehensively digitize various types of information into one database on the Internet, linking a species' name to all related information about that species within each database, or allow use of GIS to search each database for species and extent of biodiversity at a specified location. Such a platform could be used both internally and internationally to provide essential information for academic exchange and practical applications, and bring the results of basic academic research into full play.[82]

In addition to the TaiBNET, the Research Center for Biodiversity (RCB) of Academia Sinica is in charge of integrating scientific research on biodiversity in Taiwan. For instance, under the sponsorship of the NSC and the COA, the RCB investigates, classifies, and strengthens research into the monitoring system of biological resources. The RCB also cooperates with the COA to reinforce the investigation and management of invasive species. Under the sponsorship of the NSC, COA and the Ministry of Foreign Affairs (MOFA), the RCB represents the Taiwanese government in participating in the activities of international organizations such as the GBIF and BioNet-International.[83]

CONCLUSIONS

The process of identifying endangered, threatened and rare species and ecosystems is relatively recent in China and Taiwan. Until the formation of the China Red List, the system in China has been relatively closed, incorporating agency scientists and selectively invited natural scientists. Reflecting its democratic approach, the process in Taiwan admits academicians, unaffiliated natural scientists, and representatives of NGOs.

The preservation status of endangered species and ecosystems is quite different, primarily because of China's vast size, limited scientific expertise, and limited resources available to dedicate toward mitigating adverse

modification to the habitats of endangered and threatened species. Thus, China – with a much larger number of endemic species than Taiwan – also has a far greater number in the endangered and threatened columns. Four provinces out of 27 in China (Jilin, Yunnan, Xinjiang, and Sichuan) are top priority with respect to species preservation concerns, while Taiwan itself has fewer such issues.

We also have examined briefly the ecosystems providing critical habitat to endangered and threatened species, focusing on China. There is a direct relationship between forest areas and biodiversity, and in China the forest environment has been seriously challenged. Yet the forest ecosystem has received great attention in the last decade, particularly since flooding of the Yangtze in 1998 indicated the dangers of deforestation. China's afforestation programs represent a massive investment of resources and personnel into biodiversity conservation. Wetlands and oceans have received much less attention; only in the twenty-first century has the Chinese government begun to develop policies to address degradation of these ecosystems.

Because natural scientists play critical roles in the identification of endangered and threatened species and ecosystems, as well as in the mitigation of risks, we considered briefly the national scientific establishments in China and Taiwan. In the former, the CAS is developing expertise in the biological sciences, and applying this expertise to biodiversity issues. While we cannot say that science determines biodiversity policy in China, given the uncertainties of species and ecosystem knowledge, it is clear that it informs policy making. In Taiwan, we find a proportionately larger and better trained scientific establishment, both in government and universities. However, as we shall see later (in Chapter 8 especially), this does not mean that scientists have greater influence than their peers in China on biodiversity policy.

In Chapter 4 we turn to the architecture of political institutions and administrative agencies empowered to address the problems of species and habitat endangerment identified here.

ENDNOTES

1. Mackinnon, John, Mang Sha, Catherine Cheung, Geoff Carey, Zhu Xiang and David Melville (1996), *A Biodiversity Review of China*, Hong Kong: World Wide Fund for Nature (WWF) International, p. 39. The discussion follows their outline.
2. Ibid, p. 21. See also Li Fei (2000), 'Evaluating species resources in China and their sustained usage' (in Chinese), *Research and Evaluation in Traditional Chinese Medicine*, **2** (12), 15–21, and Xu Haigen (1999), 'Study and development of the China biodiversity meta-database' (in Chinese), *Journal of Lanzhou University*, **35** (4) (December), 103–08.
3. See Schei, Peter, Wang Sung, Xie Yan (compilers for CCICED) (2001), *Conserving China's Biodiversity (II), 1997–2001*, Beijing: China Environmental Science Press (2001), 10–11, and Lu Yihe, Liding Chen, and Bojie Fu (2001), 'Biodiversity resources: utilization, conservation and management' (in Chinese), *Biodiversity Science*, **9** (4), 422–29.

4. Personal interview with State Forestry Administration manager, Beijing, 5 July, 2004.
5. Mackinnon et al., op cit, n. 1, p. 21.
6. Personal interview with an ornithologist in the Institute of Zoology, CAS, Beijing, 25 June, 2004.
7. Personal interview with an SFA official, Beijing, 6 July, 2004.
8. Personal interview with a member of the CAS, Beijing, 30 June, 2004.
9. A brochure of CCICED explains its origin and purpose in China: 'Established in 1992, the China Council for International Cooperation on Environment and Development (CCICED) is a high-level non-governmental advisory body of the State Council of China. Every year, each working group (WG) under CCICED submits its report to the Council based on its studies and investigation which experts from (the) international community and China worked together in the past year. CCICED members and co-chairs of the working groups hold an annual Council Meeting where formal recommendations from WGs are approved and submitted directly to the Chinese Government. Among the six working groups in various disciplines at the beginning of CCICED, expanded to eight, the Biodiversity Working Group (BWG) is the only one dealing with living resources, that is biodiversity including species, ecosystems and genetic diversity. The purpose of the BWG is to strengthen cooperation and exchange experiences between China and the international community in the field of biodiversity conservation. It is aiming at evaluating the current status and key problems of biodiversity conservation in China, and formulating key recommendations for conserving China's biodiversity through the Council to the national or provincial governments accordingly'. See BWG/CCICED, 'Introduction to Biodiversity Working Group, China Council for International Cooperation on Environment and Development' (no publication date available).
10. The structure of endangered species at the regional level ranges from extinct, extinct in the wild, regionally extinct, critically endangered, endangered, vulnerable, and near threatened to those of least concern. The English version of the IUCN Red List Categories and Criteria is at: http:www.iucn.org/themes/ssc/redlists/rlcategories2000.html. The guidelines for application of the IUCN Red List Criteria at regional levels is found at: http://www.iucn.org/themes/ssc/redlists/regionalguidelines.htm.
11. See the preface by John MacKinnon in Wang Sung and Xie Yan (eds) (2004), BWG of China Council for International Cooperation on Environment and Development, *China Species Red List*, vol. I, Beijing: Higher Education Press, p. ii.
12. Interviews with officials of the CAS, Beijing, 25 June, 2004 and 30 December, 2004. See also Wang Sung and Xie Yan, ibid, p. 9.
13. Interview with a scientist in the CAS, Beijing, 25 June, 2004.
14. Guodong, Peng (1996), 'IUCN and the application to species conservation'. See http://www.goecities.com/~smewmao/indepth/IUCNlevl.html.
15. See http://ngis.zo.ntu.edu.tw/new/rareplant/index.htm.
16. Legislative Yuan (1989, 1994), *The Wildlife Conservation Law and Its Implementing Regulations*, Taipei: Legislative Yuan.
17. Guojia Huanjing Baohu Chu (1998), *Zhongguo Shengwu Duoyangshing Guoching Yanchiu Baogao*, Beijing: Zhongguo Huanjing Kexue Chuban She (in Chinese); SEPA (1998), *Country Report of China Biodiversity*, Beijing: China Environmental Science Publishing.
18. Wang and Xie, ibid, p. 12.
19. Republic of China (2001), *Yearbook, Taiwan 2000*, Taipei: Government Information Office, pp. 203–04.
20. 'Birds in Taiwan', see: http://www.birdingintaiwan.com/birds/intwn.htm.
21. 'Taiwan blessed with 53 major wild bird habitats', *Central News Agency*, 4 September, 2001. Also see: http://th.gio.gov.tw/show.cfm?news_id=829; 'IBAs in Taiwan', *BirdLife International*, at http://www.birdlife.org/datazone/sites/index.html?action=SitHTMFindResults.asp&INam=&Cty=205&z=1.
22. State Forestry Administration (2001), *Retrospect & Prospect*, Beijing: Department of Wildlife Conservation, SFA.
23. *China Daily* (2005), 'Old age cause of death for 4 wild giant pandas', 23 July.

24. See Jiang, Zhigang (2004), 'Wildlife conservation in China: policy, practice and prospects', in Jiang Zhigang (ed.), *Key Topics in Biodiversity and its Conservation*, Beijing: China Academy of Sciences, 14-page loose-leaf folder.
25. Ibid. See also J. Peng, Z. Jiang and J. Hu (2001), 'Status and conservation of giant panda (*Ailuropoda melanoleuca*), *Folia Zoologica*, (in press).
26. The WWF has supported monitoring in 15 panda reserves and two forest farms in Sichuan, Shaanxi, and Gansu. See WWF (2003), *2001–03 WWF China Programme Report*, Beijing: WWF, p. 15.
27. Liu, Jianguo et al. (2001), 'Ecological degradation in protected areas: the case of Wolong Nature Reserve for giant pandas', *Science*, **292** (5514), 6 April, p. 98. See also Colby Loucks et al. (2001), 'Giant pandas in a changing landscape', *Science*, **294** (5546), 16 November, p. 1465, and Environment News Service (2001), 'Endangered pandas not safe in Chinese nature reserve', 6 April; accessed at http://forests.org/archive/asia/ enpannot.htm.
28. Personal interview with zoologist, Beijing University, 12 January, 2005.
29. Jiang, Zhigang (2001), and X. Li, M. Li and J. Lu (1996), 'Population viability analyses of crested ibis', *Chinese Biodiversity*, **2**, 69–77 (in Chinese with English summary).
30. Ma, Lao (2005), 'Rare species freed in wilderness', *China Daily*, which cited Zhu Julong, deputy director of the Shaanxi Provincial Forestry Bureau, 6 September, p. 2.
31. Ibid.
32. Jiang, op cit, n. 24, and J. Seidensticker, S. Christie and P. Jackson (1999), *Riding the Tiger*, Cambridge: Cambridge University Press.
33. A China representative of Trade Record Analysis of Flora and Fauna in Commerce (TRAFFIC) explained the demand for pelts:

    > 'There is a problem with big cats. Few are left in China, and they are a problem mainly in Lhasa, Tibet. A minority group there, the cangze want to use big cat skins to make clothes. About 38 big cats were killed for their skins. Now that the people have money, they want to make their traditional clothes. Their custom is to use animal fur for trimming clothing.' (Personal interview, Beijing, 1 July, 2004.)

34. Personal interview with zoologist and member of the Endangered Species Scientific Commission, Beijing, 5 July, 2004.
35. Jiang, op cit, n. 24.
36. Personal interview with golden-haired monkey specialist (by phone), Yunnan Province, 28 March, 2004.
37. Ibid.
38. See Schaller, George B. (1998), 'Wildlife conservation in the Chang Tang Reserve, Tibet', in Wu Ning, Daniel Miller, Lu Zhi and Jenny Springer (eds), *Tibet's Biodiversity: Conservation and Management*, Lhasa, Tibet: China Forestry Publishing House, pp. 22–23.
39. Ibid, p. 23.
40. The International Fund for Animal Welfare (IFAW) in China has supported local nature reserves and forestry police on the Tibetan plateau in their anti-poaching efforts. It conducted a global investigation of illegal trade and markets for *shahtoosh*, produced public education materials, and conducted training workshops for the SFA, SEPA and forestry police. The IFAW conducted an undercover investigation of illegal antelope pelts in the international market and its report, 'Wrap Up That Trade' called on the fashion industry and consumers to eliminate market demand for *shahtoosh*. See IFAW (2004), *International Fund for Animal Welfare in China*, Beijing: IFAW, p. 5, and Wang Ying (2004), 'Poachers threatening antelopes' survival', *China Daily*, 30 October, p. 4. CITES officials in China, however, claim that there is little demand in China for the apparel (personal interview, Beijing, 5 April, 2004.)
41. Wang Ying, ibid, p. 4.
42. See http://www.angelfire.com/mo2/animals1/crocodile/chinall.html, last accessed 29 July, 2005.
43. Personal interview, representative of IFAW, Beijing, 27 June, 2004. See also, IFAW, op cit, n. 40, p. 7.

44. Personal interview, representative of IFAW, Beijing, 30 June, 2004.
45. See http://www.gio.gov.tw/info/ecology/English/animals_e/HighAnimals_e/, accessed 25 September, 2005.
46. See http://www.gio.gov.tw/info/ecology/English/bow_e/milk_e.htm, accessed 25 September, 2005.
47. See http://www.gio.gov.tw/info/ecology/English/bow_e/fish_e/fish_01_e.htm.
48. Kano, T. (1940), *Zoogeographical Studies of the Tsugitaka Mountains of Formosa*, Tokyo: Institution of Ethnographic Research.
49. See Patel, A.D. and Y.S. Lin (1989), *History of Wildlife Conservation in Taiwan*, Forestry Series Report No. 20, Taipei: COA.
50. See ETToday.com (http://www.ettoday.com/2005/08/26/327-1836122.htm).
51. Harkness, James (1998), 'Recent trends in forestry and conservation of biodiversity in China', *China Quarterly*, **156** (December), 911.
52. Program descriptions are drawn from the SFA (2001), *Forestry in China*, Beijing: SFA, pp. 14–15, and SFA (2003), *China Forestry Development Reports 2003*, Beijing: SFA, pp. 1–15.
53. Reports of declining grain harvest after the initiation of this program have led to more cautious implementation. See Zhao Huang (2004), 'Cautious land-forest conversion continues in West Region', *China Daily*, 15 October, p. 1.
54. *China Daily*, 'Afforestation tops priority list among former loggers', 10 June, 1998, p. 3.
55. Chao Liang (2005), 'China 2020: a greener and leaner landscape', *China Daily*, 1 August, p. 2.
56. Harkness, op cit, n. 51, p. 924.
57. Some logging, now illegal, continued to occur in old growth forests after the ban. One of our respondents, with specialized expertise in forestry economics, mentioned that the State Forestry Administrator had said that one-third of industrial wood in China was harvested illegally. Most of this timber was harvested above the official quota level. This is his interpretation of how illegal logging continues:

    > 'On the recommendation of the SFA, the State Council fixes and approves a five-year quota, which is adjusted annually. Even if you log your own timber without adhering to a quota, it's illegal. The SFA administers this law. You would expect there to be tens of thousands of people in jail, but that's not the case. Most of the people imprisoned for this offense are peasants who get caught moonlighting. Maybe they wanted to cut some trees for a daughter's dowry, or to pay a debt, or just to have some more to eat. But the state-owned firms, the forestry farms, systematically over-log. It is not easy to check nationally on the number of logs that are cut. It is impossible to control the values of over 10,000 national logging sites.
    >
    > (How is this checked?) There is an extensive network of checking (examination) stations. At these stations, permits to log are checked. But the system is corrupted. Loggers give money to local officials to register a lower amount than that actually logged. Thus, they avoid the quota limit and also avoid paying heavy taxes. Even if you log 100 cubic meters and are within the permitted quota, you still need to pay something to pass the examination station. If not, the officials can create obstacles. For example, they might ask you to take the timber off the truck to measure it, which would take a great deal of time and effort. So people pay the bribes.
    >
    > (Does this happen regularly?) It happens all the time. The end result is that five years later, at the end of that quota period, a national inventory will be taken. SFA will do surveys; they'll use remote sensing. Then they discover that the inventory doesn't match the quota.' (Personal interview, Beijing, 13 March, 2004.)

58. Ibid, p. 931.
59. Personal interview with forestry manager, SFA, Beijing, 18 May, 2004.
60. Runsheng, Yin, Jintao Xu, Zhou Li, and Can Liu (2005), 'China's ecological rehabilitation: the unprecedented efforts and dramatic impacts of reforestation and slope protection in Western China', *China Environment Series*, issue 7, pp. 28–30.

61. Ying, Zhang (2001), *Evaluation on Forest Biodiversity in China* (in Chinese), Beijing: China Forestry Publishers, p. 4.
62. State Forestry Administration (2000), *China National Wetland Conservation Action Plan*, Beijing: China Forestry Publishing House, pp. 6–8.
63. Ying, Wang (2005), 'Coastal regions "expand" into sea', *China Daily*, 26 May, p. 1.
64. Weifeng Liu (2004), 'Mangrove protection emphasized,' *China Daily*, 13 August, p. 3.
65. Ibid, p. 19.
66. Op cit, n. 64, p. 20.
67. Personal interview with representative of Wetlands International, Beijing, June 22, 2004.
68. For a survey of legislative needs, see: Wang Xiaoyang (2004), 'Integrated legislation on wetlands' (in Chinese), WuHan University, MS thesis; and Qin Yufeng (2001), 'Legislative necessity for wetland protection in our country' (in Chinese), *Academic Exchange* (7), (July), 29–32.
69. Chao, Liang (2004), 'Wetlands key to national development', *China Daily*, 29 June, p. 2.
70. Mackinnon et al., op cit, n. 1, p. 495.
71. Personal interview with NGO representative, Beijing, 11 January, 2005.
72. Jize, Qin (2005), 'Pollution worsens in country's sea water', *China Daily*, 10 January, p. 5.
73. Ibid, p. 496.
74. Personal interview with official, State Oceanic Administration, Beijing, 1 January, 2005.
75. A respondent who had worked with an international NGO on oceans issues made these comments about marine species trade:

    > '(How do you collect information on illegal trade in marine species?) For investigation of sea turtles, we go to different souvenir stores, and discover where the wholesale factories are. We go to the secret places to talk with the dealers. We see where they have imported from. This is organized smuggling with strong government connections, with the species coming from Southeast Asia. The companies that do the importing are registered in China and are government enterprises (state-owned enterprises), so they don't have to go through customs. For example, coral is shipped by containers, and is smuggled in. We have talked to the dealers; they tell us how they get it. Also, we look at the wrapping papers used in shipping the coral reef. It's wrapped in newspapers from the Philippines. Our focus is on the demand side, and not the supply side. We want to hold the dealers responsible. Government officials are not willing to capture and prosecute the law-breakers, the poachers.'

76. Ying, Wang (2005), 'Coastal zones key to ecosystem defense', *China Daily*, 3 February, p. 2.
77. Personal interview with botanist, CAS, Beijing, 2 July, 2004.
78. SEPA, 'China EcoRegional Assessment' (no publication date available). Also, personal interview with representative of TNC, Beijing, 18 May, 2005.
79. Personal interview with ornithologist, CAS, Beijing, 25 June, 2004.
80. Personal interview with member of CAS, Beijing, 30 December, 2004.
81. Personal interview with policy analyst, Chinese Academy of the Social Sciences, Beijing, 26 May, 2005.
82. Executive Yuan, Taiwan ROC (2004), *Annual Report on National Sustainable Development*, National Council for Sustainable Development, pp. 20–23, see http://ivy2.epa.gov.tw/nsdn/en/PRINT/93Annual.pdf.
83. Shao, Kuang-Chao (2004), *Establishment and Prospects of the Research Center for Biodiversity*, Taipei: Academia Sinica, pp. 5–8.

4. Legal and institutional framework for biodiversity conservation

In this chapter we consider the biodiversity protection regimes of China and Taiwan. By regime we mean the complex of laws, regulations, and policy statements (as well as the implementing agencies of government) designed for the purpose of protecting endangered and threatened species and their critical habitats.

In the first section of the chapter we examine the legal framework, including constitutional statements, national laws, and regulations. In the case of China, we review the conventions and international treaties that China has agreed to. In the case of Taiwan we examine the impact of international conventions when they can have no binding effect (as Taiwan is not a signatory nation). The overall question is the extent to which the legal framework provides comprehensive and systematic protection of species and ecosystems.

The second section reviews the institutional framework responsible for the implementation of law and regulations. This includes central ministries and a host of sub-national governments (in the case of China, provinces and special administrative regions) as well as local governments. Our overall questions in this section concern the degree of centralization in the implementation of law and policy, and the amount of policy integration, for example, as provided for by linkage agencies and behaviors.

THE LEGAL FRAMEWORK IN CHINA

National Law

It was only in the reform era, beginning with the leadership of Deng Hsiaoping in 1978, that environmental issues including biodiversity conservation began to be addressed. An early acknowledgment was revision to the constitution in 1982. Article 26 reads:

> 'The state protects and improves the environment in which people live and the ecological environment. It prevents and controls pollution and other public hazards. The state organizes and encourages afforestation and the protection of forests.' [1]

From this period to the present (2005), 15 laws[2] have addressed different aspects of biodiversity conservation. Laws offer the strongest degree of protection; they are enacted by the National People's Congress, China's supreme legislative body. Although quite broad and often more in the nature of policy statement than statute, the laws are transparent and enforceable. They can be broadly classified into four types: general environmental protection, pollution prevention, ecosystem protection, and species protection.

China's basic environmental law is the Environmental Protection Law, adopted in 1979 and amended in 1989. This legislation stipulates that governments at all levels should establish nature reserves to protect important natural ecosystems, habitats for rare and endangered wild animals and plants, watershed and relic sites. One of the chief areas of emphasis in this law is the environmental impact assessment methodology, prevalent in most western nations by the late 1970s, which became a mandatory policy for all large and medium projects in 1979. However, as Palmer notes, this is a requirement that has not always been imposed on industries owned by governments, whether central or local.[3]

This and other gaps in the legislation (for example, omission of zoning and other planning activities of governments from environmental examinations) led to the passage of a new Environmental Impact Assessment (EIA) Law, which took effect in September 2003. The new EIA requires mandatory environmental assessment studies by construction companies for all construction projects. What has most interested observers is the new law's requirement that the construction company conduct a public hearing if a project may have a major environmental impact, or otherwise collect comments from the public, relevant parties and experts before seeking government approval. However, the law makes exemptions in the cases of national security and omits standards and tests for determining what are 'substantial' environmental impacts.[4] In Chapter 8, we review the impact of the new law on the Nu River dam project in 2004.

Pollution is a growing threat to biodiversity in China, and three laws provide some protection: the Water Pollution Prevention Law of 1984 (revised in 1996), the Solid Waste Pollution Prevention Law of 1995, and the Air Pollution Prevention Law of 1987 (revised in 1995). In addition, Art. 6 of the Environmental Protection Law of 1989 as revised in 1996 allows individuals or units to bring class actions against polluters.[5]

In the 1980s, a series of laws focused on different ecosystem types, with most pertaining to the protection of China's forests. The first forest legislation was enacted by the National People's Congress in 1985.[6] This Forest Law formalized the division of forests between the state and collectives (*jiti*). It enunciated principles for forest management, set up a timber harvest quota system, and required permits for shipping timber. Article 20 specifies that

forest administrative sectors at national and provincial levels should set up nature reserves to protect typical forests, habitats of rare and endangered animals and plants, and other forests with special conservation values. However, the Forest Law (1985) did little to protect natural (old-growth) forests in the process of rapid deforestation.[7] (In 1998 the Forest Law was revised, paying attention to market use of forest resources and clarifying ownership, leaseholds, and management. The revisions did not provide further protection for natural forests.[8]) In 1985, the Grassland Law was enacted.[9] Additional legislation on the marine environment, fisheries, water and soil conservation, and land management extended the reach of the state further into the protection of degraded ecosystems and species.

It was not until 1988, however, that species protection legislation – the Wild Animal Conservation Act (WACA) – was enacted by the National People's Congress, and it was promulgated the following year. This legislation charges the state to ensure the protection of wild animals and their habitats, organize regular field surveys of wildlife resources, and to improve ecological impact assessment for construction projects. As already mentioned in Chapter 3, the law establishes categories of protection for endangered or valuable species. Moreover, the law imposed penalties for killing or trading in banned species. The maximum penalties were quite harsh, including long prison terms and even execution. Sayer and Sun note that 'more than 30 people have been executed for killing or trading in parts of elephants and giant pandas.'[10]

Altogether, this is a large body of law related to biodiversity protection, but it lacks comprehensiveness.[11] Although the forest and marine environments are protected legally, wetlands are not, and there is rising interest in their protection.[12] Critical habitat for endangered species lacks explicit protection. Coral reefs in China's exclusive economic zone are not protected from coastal industrial development and overfishing.[13] Plant species are devalued in the sense that there is no plant protection law (but plants are protected via regulations). Species without apparent economic value, such as insects, are devalued as well. Finally, there is still no legislation to lay an authoritative foundation for the system of protected areas. Parenthetically, in the absence of national legislation, some provinces and municipalities have crafted local laws, for example, for the protection of mangrove forests.[14]

There is a problem, too, with the practicality of law, the connection between legal purpose and feasibility of enforcement. One critic with experience of forest ecosystems in China observed:

> '(Systemic problems?) China has an entrenched system, which is very hard to change. There have been decades of complaints about the environment, since the late 1970s. We have major legislation on conservation and environmental protection. Once we have legislation, really, enforcement is the problem. The

> government believes that is enough. If it is not enough, officials make more laws and punish people more severely.
>
> (Source of the problem?) The laws are an important source of the problem. There is a fundamental flaw. In the United States and Canada, for example, first there is a case, a legal case, which establishes a precedent. Then there's legislation to address the problem and similar ones in the future. In the process of developing laws, legislators establish a sense of what the problem really is. There's a process, managed by interest groups, which have a say, and finally there's a compromise. In China, a problem gets to the crisis point; then high officials say write legislation on it. They call in the law experts. If it is a severe problem, then there will be severe punishments. Work of the ministries goes to the State Council, to the National People's Congress, and the law is promulgated. But who enforces the law? No one knows if it is feasible to implement it, even though everyone is well-intentioned.
>
> (How does this apply to biodiversity protection law?) Read the Forestry Law. It has severe punishments. Go to the SFA and ask them for their *anjian* (cases of punishment). If you cut trees illegally, start fires in forests, convert forest land to crop land: they can send you to jail. They actually do that. Yet there is still illegal logging in China.'[15]

Thus, part of the problem in the legal framework reflects the transitional nature of law in Chinese society. As Ma and Ortolano comment, 'environmental laws are general and often intentionally ambiguous, (and) they allow the State Council, national agencies, and local governments to add details that influence implementation'.[16]

National Regulations

Regulations (*fagui*) are a less authoritative basis for action than legislation. They do not undergo a public review process, as occurs increasingly for proposed legislation through the National People's Congress. They may not be publicly available, raising the question of what the limits to action are. They do reflect negotiations among affected bureaucratic interests, and are issued by China's paramount administrative body, the State Council.

Three sets of regulations implement the WACA. Regulations on 'Terrestrial Wild Animal Conservation', issued in 1992, include specific stipulations on the protection of wild animals, management of wild animal hunting, and domestication, reproduction, and other utilization of wild animals. Regulations on 'Aquatic Wild Animal Conservation' were issued in 1993; they prohibit fishing, killing, the sale and purchase of key national protected aquatic wild animals and institute a permit system for their domestication. Regulations on 'Wild Plant Conservation', issued in 1996, prohibit the collection, sale, or purchase of key wild plant species; they also outline rescue measures for endangered plants and recovery of their habitats.

The most concrete actions taken by the state to address biodiversity conservation have been the establishment of nature reserves, forest reserves, parks, and other protected areas (PAs), the subject of Chapter 5. The first nature reserve was established in 1956, but until the end of the Maoist era, few areas received this type of protection. Then, in the 1980s and 1990s, the number of protected areas increased dramatically. By 2005, over 2000 protected areas had been formed in China; some are quite small, but a few comprise large areas of the lands in a province or autonomous region.[17] In total, they comprise about 15 percent of China's land area, larger than in the United States (US). However, critics allege that from one-third to half of the PAs are 'paper parks'.

The first mention of PAs in planning documents was in 1979. Regulations were promulgated for them in 1985. Revisions to these rules were endorsed by the State Council in 1994. The legal basis, management and financing of protected areas are controversial and the issues are presented comprehensively in a recent report, *China's Protected Areas*.[18] By regulation, the protected areas include three separate management zones:

> '[*Core*] *area* with no use, habitation or interference permitted, apart from limited scientific research; *buffer zone* where some collection, measurements, management and scientific research is permitted (but which is not really a buffer zone in the usual international meaning of that term); and *experimental zone* where scientific investigation, public education, tourism and raising of rare and endangered wild species are permitted.'[19]

The regulation establishes two levels, national and local, for protected areas, based on the importance of their biodiversity. It provides a management system, including specification of national and local responsible agencies and the requirement that each nature reserve have a specialized management body. It also lists prohibited activities in nature reserves, such as deforestation, grazing, fishing, herb collecting, land clearing, and mining.

Regulations address some topics on which the law is silent, such as wetlands and protected areas. No regulations, however, constrain behavior toward species without economic value and many critical habitat areas.

Participation in International Conferences and Conventions

China's first involvement in international environmental conferences occurred in the 1972 United Nations Stockholm Conference on the Human Environment (UNCHE). Few steps had been taken at that time to establish an environmental protection organizational network. As Jahiel notes, until that time, only an 'office' handled environmental protection activity.[20]

China's role at the conference was minor, and it followed that of developing

countries in charging the advanced industrialized countries with the responsibility for pollution control while defending its right to exploit resources without external influence. Ross observes:

> 'China was a "laggard" participant in this international regime, avoiding international obligations by shunning treaty commitments or exhibiting a disdainful attitude toward compliance obligations.'[21]

However, following the conference, Premier Li Peng 'made a commitment to conscientiously implement resolutions adopted at the conference'.[22]

After the Stockholm conference, China held the First National Environmental Protection Conference in Beijing in August 1973. The primary achievement of this conference was the recognition that environmental problems existed in China and that environmental considerations should be incorporated into planning for economic development. This conference led the State Council to form 'regulations on protecting and improving the environment', which included the best-known policy, *San Tong Shi* (Three Simultaneous Points): 'For any new projects, improvements or expansions, environmental protection devices should be designed, installed and operated simultaneously with the main body of the project'.[23]

By the 1980s, China had become a willing participant in international conventions, and several pertain directly to endangered and threatened species and their critical habitats. In 1981, China joined the Convention on the International Trade in Endangered Species (CITES), which pledged it to ban the import and export of endangered species listed in the CITES annexes.[24] This trade became especially problematical as economic development and rising affluence increased the demand for wild plants and animals. International criticism of China's trade in internationally threatened species, such as the use of tiger and rhino parts in traditional Chinese medicine, caused the state to ban sales in 1993, but the problem of illegal trade remains.[25]

China joined the International Convention for the Regulation of Whaling in 1980, the Convention Concerning the Protection of the World Cultural and Natural Heritage in 1985, and acceded to the International Tropical Timber Agreement in 1986. China agreed to the Montreal Protocol on Substances that Deplete the Ozone Layer under liberal terms. It had until 2010 to phase out the production and consumption of ozone depleting substances (ODS), and it received US$740 million from the Multilateral Fund to develop ODS substitutes.[26] In 1992, China joined the Ramsar Convention, the Convention on Wetlands of International Importance Especially as Waterfowl Habitat. China also participates in the Convention to Combat Desertification and the United Nations Convention on the Law of the Seas (UNCLOS), which are also relevant for conservation and the sustainable use of biological diversity.

Up through the mid-1990s, China consistently opposed environmental

diplomatic initiatives that threatened to constrain its development potential and interfered with its domestic affairs. The government expressed this position in advance of the 1992 United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro. China chaired a session of 41 developing countries, acknowledging the need for international cooperation to promote environmental protection and sustainable development but demanding financial assistance, the right to development, and to oppose interference in internal affairs of developing countries.[27] The expression of this attitude in policy had been the principle of 'coordinated development', under which environmental protection was given the same importance as development of the national economy, which implied a short-term view of environmental degradation.

However, China's participation in the 1992 Rio Earth Summit led to the State Council's adoption of Agenda 21 for China, which embodies the concept of sustainable development, emphasizing the rights of future generations. This was integrated into China's ninth Five-Year Plan of National and Social Development and the Outline of Long-Term Targets for the Year 2010.[28]

Two international conventions figured prominently in global deliberations at the time of the Rio conference – the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biodiversity (CBD). China moved cautiously on the UNFCCC (signing it and later the Kyoto Protocol in 1997), but appeared to energetically subscribe to the CBD. It was one of the first developing nations to ratify this convention. This difference in approach might be explained by the perceived impact on economic development. The CBD did not impose broad constraints on development in the economy as a whole.[29]

The CBD acknowledges sovereign equality of nations and their rights to biological resources within their territories, while urging nations to conserve biodiversity.[30] An important component of the convention is the recognition of aboriginal and community use of biological resources, and the emphasis on traditional, as well as modern, forms of ecosystem knowledge (Articles 8[j], 10[c], 17[2] and 18[4]). Article 6 of the CBD calls for planning and the development of measures in each country to reduce threats to biodiversity. Under this requirement of the CBD, China files a 'biodiversity action plan'.[31] Recently, China has signed the Stockholm Convention on Persistent Organic Pollutants (SCPOPs), but implementation will be difficult, given that four out of nine chemical products on the SCPOPs list are still produced in China.[32] The most recent convention ratified by China (in 2005) is the Cartageña Protocol on Biosafety. This subsidiary convention to the CBD affects China as it is one of the largest importers of genetically modified organisms (GMOs).[33]

Since joining the United Nations, China has ratified more than 30 multilateral environmental agreements. Observers note that China generally

has become more willing to participate in such agreements and to do so at an earlier date.[34] China's adherence to international obligations has increased as international environmental diplomacy has accelerated and as China's capacity to participate has increased.

Some commentators attribute an anti-democratic impulse to China's participation in international conventions and environmental conference diplomacy. Palmer argues:

> 'This embrace of Western and international standards stems in part from a reluctance to draw on either China's indigenous traditions of environmental protection or on the ideas of non-governmental environmental activists … [It is] an attempt to limit the political role of environmental activists and to avoid a genuine degree of public participation in environmental decision-making.'[35]

Like other nations, China examines the costs and benefits to its global participation and acts in its national interest. The significant fact, however, is that these international conferences, conventions, and agreements have enhanced China's capacity to develop and implement biodiversity conservation policy. They are a clear indication of the vertical diffusion of ideas, rules, and policy. In Chapters 6 and 7 we will examine other forms of environmental learning in a discussion of transnational corporations and environmental non-governmental organizations (NGOs).

Revision to Laws and Regulations

China's participation in international environmental conferences and conventions on biodiversity preservation followed upon her opening up to global forces after the Maoist era, and expressed the increased value she placed in the UN and international law. The rise of interest by political leaders in environmental issues, including biodiversity conservation, also corresponded with China's growing wealth and ability to commit resources to environmental protection.

In tandem with participation in international conventions on biodiversity, leaders have developed a series of action plans to implement the CBD. These represent policy statements of the regime, indicating strategic goals, measures, and blueprints. We list the action plans, as well as a few projects embodying goals, during the period 1992–2000:

- Action plan of marine biodiversity conservation (1992);
- Action plan for agriculture biodiversity conservation (1993);
- Forestry action plan for China's Agenda 21 (1995);
- Action plan of the conservation and management of mangrove ecosystems (1995–6);

- China Ocean Agenda 21 (1996);
- National planning for forest ecological construction (1996–2050);
- Trans-century Green Projects plan (1996–2000);
- Plan for the centralized conservation of urban rare flora species (1996);
- Conservation plan for South China Tiger (1996);
- Biodiversity protection and sustainable use of wetlands (2000–04);
- Action plan for implementing the UN Convention to combat desertification (1998).[36]

This represents a large amount of planning activity, at least in part stimulated by the adoption of international rules and standards. For example, *China's Second National Report* discusses identification and monitoring activities done to implement CBD provisions.[37] A leader of the State Environmental Protection Administration (SEPA) commented on the impact that the CBD has had on China's policies and practices:

> 'There has been a change in concept. Before we had much less knowledge about biodiversity, but now there is far greater familiarity. … The CBD has influenced national policy, and many methods have changed as a result. For example, the SFA and MOA have conducted more surveys and investigations … and regulations and policies have changed too. For example, recently the Minister of Construction told cities and towns to develop biodiversity plans. … In planting trees, he advised that they should use different varieties instead of single species. Also, they should submit plans on how to stop invasive pests.'[38]

While international stimuli have intensified the focus on biodiversity conservation, the existing body of legislation and regulations is under revision, and this reflects a maturing in the attitude of the state toward species and habitat preservation. The premier legislation on rare and endangered species, the Wild Animal Conservation Act (1989) underwent revision in 2002–03. The State Forestry Administration (SFA) wrote a draft and submitted it to the State Council, but the severe acute respiratory syndrome (SARS) epidemic (reputedly initiated by the eating of wild civet cats in Guangzhou) intervened and delayed the process. Differences between the proposed revisions and existing law show important changes in thinking about biodiversity conservation in China.[39] We illustrate five of these differences below.

1. Ownership and use of wildlife From the establishment of the People's Republic of China, all wildlife belonged to the state. Then, with marketizing reforms beginning in the late 1970s, people wanted to domesticate certain species, and be able to sell those they had raised. This conflicted with prohibitions on the sale of rare and endangered species. The proposed solution is to assign the power to use and manage wild species, based on a permitting system. Similarly, the WACA prohibited people from using (and in particular,

eating) wild animals while presently, wild deer, pigs, small birds, cats are raised for the purpose of eating. The revision would allow this, using a permit system.[40]

2. Management fees in wildlife areas At the implementation of the WACA in 1989, and the establishment of many nature reserves and scenic areas, the government charged relatively high fees to defray the expenses of management. The fees are a disincentive to use of the areas and are particularly onerous for those living in protected areas (almost all of which are populated). The central government has cut taxes for farmers, and an accompanying change would reduce or eliminate fees for using protected areas.

3. Wildlife classification system The WACA established two classes, I and II, and both were for 'key' species, without differentiation as to their degree of endangerment. Proposed revisions would put all endangered species such as tigers and pandas into the first class, and then for the other valued species create a general statement, allowing different ministries and jurisdictions to permit use based on scientific investigations. This would increase the flexibility of the classification system.

4. Critical habitat provisions The WACA's critical habitat provisions are weak, and the proposed revisions would extend them in several directions. One amendment would protect the full range of migratory species, such as the crested ibis. For example, the crested ibis needs elevated locations for its nests; if the trees are outside nature reserves they would be protected under the revisions.

5. Compensation for wildlife damage If wild animals damage livestock or crops, farmers may be compensated by local people's congresses, but in remote and poor areas, local governments lack financial resources. Thus, there is an incentive for farmers to kill wild animals, such as tigers, elephants, bears, alligators, which threaten their livelihood. The proposed revision would compensate those who suffer losses from wild animals.[41]

The overall impact of revisions would be to increase the comprehensiveness of species protection while enhancing flexibility. Some market-based instruments would be employed to provide incentives for people to appreciate wildlife diversity (for example by reducing or eliminating fees to observe wildlife and by compensating those damaged by wild animals). Also, revisions acknowledge that species bred in captivity require a more flexible treatment in law.

The biodiversity protection regime we have described is not perfect.

Nevertheless, compared to the Maoist era in China and the experience of most other developing nations today, the present legal, regulatory and policy regime indicates a strong commitment of the state to biodiversity conservation.

THE LEGAL FRAMEWORK IN TAIWAN

There are three parts to Taiwan's biodiversity regulatory regime: the Cultural Heritage Preservation Law of 1981, the Wildlife Conservation Law of 1989 (amended in 1994), and legislation establishing national parks (the National Park Law of 1972 and the Forest Law of 1932). We will discuss the first two, which are the core of the regulatory regime, and emphasize the Wildlife Conservation Law, because it is the most comprehensive.

Cultural Heritage Preservation Law

This legislation was enacted quite early in the progress of Taiwan's environmental movement (but rather late, compared to the legislation of endangered species and habitats in other industrialized countries). In general, it pursues two objectives: the creation of a system of nature reserves and designation of a small number of plant and animal species for protection.

Under the terms of the legislation, 19 nature reserves have been established in Taiwan. These include small tracts, such as the five-hectare plot protecting volcanic land forms in Kaohsiung, as well as large forest reserves (for example the 47 000-hectare forest reserve circumscribing Mount Tawu).[42] The Taiwan Forestry Bureau under the Council of Agriculture (COA) manages most of the reserves, but city and county governments manage seven while under general COA supervision.

The Cultural Heritage Preservation Law protects 11 species of rare and valuable plants, including the Taiwan beech tree and the Taiwan keteleeria (*Keteleeria davidiana*), a hermaphroditic tree of the pinaceae family which is an Ice Age survivor found in the Pinglin Taiwan Keteleeria Nature Reserve. Some 23 species of rare and valuable animals also are protected under this law, including the clouded leopard, Formosan black bear, bird-wing butterfly, and the Formosan land-locked salmon. Significantly, to the present day, no other legislation protects the large number of threatened plant species and their habitats.

Wildlife Conservation Law

The limited range of species covered by the Cultural Heritage Preservation Law, and the small number of reserves established, prompted protests from

foreign observers as well as domestic environmental groups in the 1980s. Most active in the coalition of groups petitioning the Legislative Yuan for greater biodiversity conservation protection were the Wild Bird Society of Taipei, Society for Wildlife and Nature (SWAN), and affiliated scholars and endangered species experts. They held several demonstrations outside the Legislative Yuan during the first readings of the bill, and it was adopted, with little opposition, in June 1989.

The original legislation was drawn from several foreign laws on wildlife conservation, including those of the US and European countries. The law classified nearly 2000 animal species into three categories. The first, the endangered category, includes species whose population is at or below the critical level. The second is the rare and valuable category for species that are native to Taiwan or with few members of the population. Species in neither of these protected categories could be disturbed, abused, hunted, captured, traded, exchanged, owned, killed, or processed.[43] The third category includes species which require conservation measures but could be utilized when, as determined by the COA, population levels have become sustainable.

Under the terms of this legislation, the government also established 13 wildlife refuges which encompassed more than 23 000 hectares of land. For example, the Cat Islets Seabird Refuge was established in the Pescadores and the Tatu Rivermouth Wildlife Refuge adjacent to Taichung County. Also, 28 major wildlife habitats were created.

Although the legislation entrusted enforcement of the conservation law to the COA, penalties were slight (under NT$1000 [US$30] in many cases) and no incarceration was prescribed. Domestic ENGOs complained that rare and endangered species were still being traded illegally in Taiwan, and those with foreign connections, such as TRAFFIC and SWAN, shared this information with colleagues there. The UK protested Taiwan's trade in endangered species and threatened trade action. It was US pressure, however, that led to the amendment of the legislation. In 1994, the US applied the Pelly Amendment, administering trade sanctions on Taiwan. It banned imports of wildlife and wildlife products from Taiwan, with a particular focus on trade in tiger parts and rhino horns (both used in traditional Chinese medicines).

In response to this strong international pressure, the Legislative Yuan revised the Wildlife Conservation Law within three months. It instituted large fines, between NT$100 000 and NT$750 000 (US$3030–US$22 727), and/or incarceration from six months to five years for the trade or display for commercial purposes of protected, endangered, or rare and valuable wildlife products (as well as unauthorized import or export of live protected wildlife or products made from protected wildlife). There were heavy penalties for false labeling of merchandise that contained protected wildlife or wildlife products. Finally, punishments for habitual offenders were even more strictly enforced.

The government formed an inter-agency task force to investigate and stop the smuggling of wildlife products. Also, the media in Taiwan focused on infractions of the law and enforcement busts. In response to the legislative and administrative actions, the US lifted sanctions on Taiwan in 1995. In the following year, it further removed Taiwan from the Pelly's watch list. To the Taiwan government, the revised Wildlife Conservation Law is 'among the most severe in Asia'.[44] This may be the case, but the legislation does not quite establish the precautionary principle in the conservation of Taiwan's threatened and endangered species.

Protection of critical habitats against industrial development remains vague and gives government officials large areas of discretion. For example, Art. 8 of the law provides:

> 'Any construction and land use in major wildlife habitats *should be* carried out in a way and areas which least affects the habitat, and the original ecological functions of the habitat *should not be* harmed. *If necessary*, the Authorities shall ask the owners, users or occupants of a land use project to conduct an Environmental Impact Assessment … Concerning existing facilities, land utilization or development activities which have a significant impact on the wildlife in the area, the NPA (COA) *may require* the relevant person or target business authority to put forth a plan for improvements within a certain time limit.'[45] (emphasis added)

The COA retains the discretion to permit or disallow industrial or housing development based on investigating officials' judgment about the impact on the habitat, without being required to prevent adverse modification. Moreover, the COA retains the discretion to determine which habitat is critical and for how long. These matters are not yet codified in regulations.

Low penalties have reduced the efficiency of laws and regulations. The Cultural Heritage Preservation Act of 1981 (CHPA), and Arts 1, 8, 9, 10, 11, 13 and 14 of the Wildlife Conservation Law provide specific instructions for the definition and mechanisms for conservation of Taiwan's nature heritage. However, these regulations provide few incentives to halt people from violation, due to the low penalties imposed.

Furthermore, laws are not balanced with the livelihood needs of the residents. When the National Parks Law was enacted in 1972, it focused solely on the provision of recreational service to the public. It did not take into consideration the suitability of facilities for use of residents or the livelihood needs of park in-holders.

The Forestry Law, the Fishery Law and other conservation laws were designed with economic development in mind. Moreover, the number of different authorities involved in administering the law creates opportunities for confusion through lack of coordination. For example, the supervising authority for the CHPA is the Ministry of Economic Affairs; for the Wildlife

Conservation Act it is the COA; and the administration office for the National Parks is under the Construction and Planning Agency of the Ministry of the Interior (CPAMI).[46]

Impact of International Conventions

Since its withdrawal from the UN in 1971, Taiwan has had limited representation in international government organizations. In 2005, it had diplomatic relationships with only 25 nations. One might suspect that diplomatic isolation would limit the impact of international environmental conventions on Taiwan's domestic policy and behavior, but this is a hypothesis with little confirming evidence. As we shall see, Taiwan has been strongly influenced by CITES, by the Convention on Biodiversity, and by the Rio Summit's popularization of sustainable development.

CITES

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was established in 1973 in order to protect wildlife species from overexploitation due to international trade. Some 160 nations are parties to the convention, including most nations in the industrialized West (and most of Taiwan's trading partners).

The CITES Convention operates by requiring signatory parties to regulate international trade in species listed in its three appendices. Appendix I includes species threatened with extinction by international trade. These species are strictly regulated and are not allowed to be commercially traded internationally. Appendix II includes all species which may become extinct if their trade is not regulated. To engage in trade for an Appendix II species, a CITES permit is required. Species may be added or deleted from these two restrictive appendices only by a two-third's majority vote at a Conference of Parties (COP) of CITES.

Taiwan did not participate in the original CITES, and is not formally bound by its provisions. However, Taiwan is dependent on international trade, and particularly vulnerable to adverse actions of major trading partners such as the US and European Union Member States. For this reason, Taiwan tends to observe most CITES regulations and restrictions. The foreign trade office (Kuo-mao Chu) in the Ministry of Economics Affairs issues CITES permits for Appendix II species.

Convention on biological diversity

The Convention on Biological Diversity (CBD) was the product of the UN Conference on Environment and Development at Rio de Janeiro in 1992. Over 180 nations signed the accord, which sought the conservation of biodiversity,

sustainable use of biodiversity components, and fair and equitable sharing of benefits from the use of genetic resources.

Although not a party to the CBD, Taiwan has developed a national strategy for the conservation of biological diversity meeting objectives of the convention. In April 1999, the COA began compiling a national report on Taiwan's biodiversity, and the Executive Yuan has agreed to the implementation of a biodiversity action plan.[47] Furthermore, Taiwan's executive named 2000 as the Year of Taiwan's Biodiversity Conservation.

Sustainable development

The United Nations' Brundtland Commission report of 1987, *Our Common Future*, made sustainable development a criterion of the effectiveness of environmental measures for all countries. The report defined sustainable development as 'development that meets the needs of the present without compromising the development of future generations'. The Rio Summit of 1992 formally adopted sustainable development as an objective for all nations, and enacted Agenda 21, a large and complex blueprint for global social development and environmental conservation. These actions were reinforced in the Rio +5 meeting and in the 2002 Johannesburg Sustainable Development World Summit, which specifically called for national action plans.

Taiwan's Executive Yuan established a National Council for Sustainable Development (NCSD) in 1997. Initially the NCSD was chaired by a Minister-Without-Portfolio, but the chair passed to the Vice Premier in 1999 and to the Premier in 2002. The de facto chair at the time of writing, Yeh Jiun-rong, also held the position of vice premier. Members of the NCSD include government officials and also scholars, experts, and representatives of ENGOs. Divided into eight working groups, the NCSD had developed, by late 2002, broad action plans.

The fourth working group of NCSD focuses on biodiversity issues. Its three broad objectives are to:

1. strengthen study, management, conservation, utilization and fair sharing of biodiversity;
2. strengthen management on biodiversity; and
3. encourage cooperation partnerships to facilitate biodiversity work.

However, the action details are vague. For example, an action recommendation under the first objective calls for carrying out 'monitoring and assessment for land, wetland and ocean biodiversity every three to five years in order to detect and predict the possible changes'.[48] The COA is the leading government agency for the biodiversity working group, and its

implementation of the plan largely focused on completing an inventory of endangered and threatened species.[49]

In short, Taiwan's actions on biodiversity issues have indeed taken into account international conventions. Motivations for addressing international standards of biodiversity include the fear of adverse economic repercussions from trading partners and the desire to improve the state's international environmental image.

THE INSTITUTIONAL FRAMEWORK IN CHINA

Although China has announced – in law, regulation and policy – a commitment to biodiversity conservation, the question is whether it has allocated sufficient organizational, human, and financial resources and created adequate incentives in practice to put the regime into effect. To answer this question requires a focus on administrative organization centrally and sub-nationally as well as the linkage mechanisms, drawing different agencies together.

Central Ministries

Like the situation in most countries, the organization of China's national bureaucracy is not conducive to the effective implementation of biodiversity conservation laws and policies. China only developed an environmental agency, the National Environmental Protection Administration, in 1988. The name of the agency was changed to the State Environmental Protection Administration (SEPA) in 1998, and it was then elevated to ministerial status; but it remains a relatively small agency, with only one-twentieth the personnel of the US EPA,[50] yet with a far more expansive mandate. The SEPA has broad responsibility for each of China's major environmental problems, and thus its attention is diffused to issues of air, water, and land pollution, acid rain, and climate change. In the area of biodiversity conservation, it has a department of nature conservation and division of nature reserves and species management; it also has general responsibility for developing and maintaining the biodiversity data management and information system.

As most of China's endangered and threatened species are located in forested areas, the SFA has large administrative responsibilities for their preservation. The SFA also is a relatively small agency, with around 250 Beijing office employees only. Since the reorganization of central government agencies in 1998, its status has declined to the sub-ministerial level. The SFA is the primary agency for implementation of the WACA and the Forestry Law, and it is responsible for the management of about 75 percent of China's

protected areas. The SFA has compliance powers and a network of permit and security (or police) officers to enforce laws and regulations pertaining to endangered species and ecosystems.

A third agency involved in biodiversity conservation is the Ministry of Agriculture (MOA). This department was once housed together with forestry, but they have been independent since the mid-1980s. The MOA has an office for endangered and threatened species and administers a small number of protected areas, about 3 percent of the total. The MOA has primary responsibility for plant species and fisheries; the national protection list assigns aquatic species to MOA and all other terrestrial species to SFA. This framework in the WACA does not account well for amphibians and reptiles, which sometimes leads to disputes between MOA and SFA as to which agency regulates what species.

A fourth agency is the Ministry of Construction (MOC), which is in charge of China's public construction, including national highways, dams (such as the Three Gorges Dam) and ports and harbors. The MOC supervises national parks registered with the UNESCO natural heritage sites, which are included in the small number of protected areas it administers, about 3 percent of the total. The MOC also regulates the Chinese zoo system, and all city zoos belong to the MOC.[51]

The fifth agency is the State Oceans Administration (SOA), which is a specialized agency in the Ministry of Land and Natural Resources. Its responsibility extends offshore China's coasts to the 200-mile limit. The SOA has responsibility for marine reserves and all endangered and threatened marine species, but identification of such species is least well-advanced among the categories of protected species.[52] The SOA administers a small number of marine protected areas, but lacks compliance powers.

As mentioned in Chapter 3, the Chinese Academy of Sciences (CAS) is one of the earliest institutions to promote biodiversity research and protection in China. The CAS has founded new institutes to expand biodiversity research, and organized large field studies of biological resources. The State Commission of Science and Technology has funded part of this work.[53]

A number of other agencies are involved in biodiversity conservation less directly. For example, the Ministry of Foreign Affairs (MOFA) is responsible for international conventions in which China participates, and heads delegations at international environmental conferences. Similarly, the Ministry of Foreign Trade and Economic Cooperation has duties with respect to certain environmental treaties, such as CITES. The Ministry of Education has training functions with respect to environmental education, the Ministry of Finance has responsibilities regarding environmental assessments, and the list goes on. Altogether, at least one dozen central government ministries and agencies have some duties in biodiversity conservation; none has a clear lead-agency

role in all areas of conservation. This lack of administrative integration is common cross-nationally in the management of complex environmental issues. Nevertheless, some coordination is achieved through linkage mechanisms discussed below.

Devolution to Sub-national Governments

A much noted tendency of Chinese government since the onset of economic reform is devolution (transfer) of administrative power to the provinces and autonomous regions (and indeed to municipalities), and this practice vastly complicates biodiversity conservation efforts. For example, each of the provinces has a forestry bureau and an environmental protection bureau (EPB), and forestry and environmental protection offices are found at the local government level too. The sub-national offices operate in a problematic administrative context as they serve two masters: the SFA or SEPA in Beijing, and the provincial governor (or local mayor). Because administrative control tends to follow the source of funding, and the central government allocates less to environmental conservation than provinces and municipalities, there is no clear line of authority from the center to the site where problems of endangered and threatened species conservation must be resolved. Campbell uses devolution to explain the failure of local environmental authorities to repair damage to the Yun Dang Lake in Xiamen:

> 'In Chinese bureaucratic parlance, local EPBs have a so-called "professional" or advising relationship with the provincial EPB, and by extension, the NEPA. In contrast the municipal government enjoys a more commanding "leadership" relationship with municipal EPBs. In short, municipal political authorities have more clout over local environmental bureaus than do national-level environmental officials, and mayors therefore occupy a critical position as the political masters of the municipal EPBs.'[54]

Moreover, as noted, national laws are vague and leave much discretion to local administrators. Clearly, given the weak bureaucratic position of EPBs, there is little incentive for officials to rigorously enforce the law, and they adopt pragmatic orientations. The deputy director of SEPA disclosed that heads of local environmental protection agencies sometimes had to write to higher authorities incognito to report violations in their own areas.[55] Whether they are most strongly motivated by cultural factors of respect for authority, *guanxi* (relationships) and face (as Ma and Ortolano contend)[56] or economic pressures, may make little difference in the decision-making context.

Provincial and local environmental offices are relatively well-supplied with personnel – from 60 000 to 120 000 in the early twenty-first century.[57] However, most encounter pressures that put them at odds with national environmental goals.[58] In Chapter 5 we discuss the problems they encounter

with respect to lack of resources, incentives, and training in the administration of protected areas.

Devolution implies impediments to the central direction of policy. In an enormously diverse nation such as China, there are good arguments for the devolution of administrative power. A SEPA administrator expressed positive views toward devolution of environmental protection powers:

> 'Although the personnel and basic instructions on work come from the provinces in most cases, still they must observe national laws. There are many differences across the country, the areas are very diverse. Local officials know best how to administer the law. There are some regions, such as in the West, where they lack financial resources and face development pressures. In these cases, leadership makes a difference.'[59]

When there are strong pressures to develop an industry that may impinge on a critical habitat or fragile ecosystem, the contradiction between central and local control becomes most clear. Many of the recent stories of habitat degradation in China feature a provincial or local government, seeking to develop the local economy, in conflict with a national law and environmental office.[60] A SFA manager commented on the plans of Asian Pulp and Paper (APP), an Indonesian multinational forest products corporation, to plant fast-growing trees (eucalyptus) for paper production on many thousands of hectares of leased land in the Yunnan province:

> 'Greenpeace protested, saying that growing this type of tree was harmful to the forest ecology. SFA sent inspectors. Yet the Yunnan provincial government supported the firm's plans (and in fact had leased the land to APP). SFA personnel objected to cutting any old-forest, but in this case the area in question was less than 1000 hectares – (old-growth forest of a total project area of 1.8 million hectares). There is a serious contradiction between the national and local governments. SFA has responsibilities for forests; the area is poor with no industry, and the local government wants economic development. The provincial government leased the land at only 0.8 yuan an hectare (about 9 cents) per year, a very low rate, to attract foreign investment and business. Finally, to resolve the contradiction, the National Development and Reform Commission became involved, and agreed to allow the project to continue.'[61]

In this case as in many others, biodiversity values were sacrificed to permit the economic development activity to proceed.

Even scientists well-known for their efforts to preserve biodiversity acknowledge the priority of economic development concerns. Asked why national policy on biodiversity conservation was often not effective at local levels, a biologist commented:

> 'China is a very large country. It is like the transmission of electricity: there's leakage and what is ultimately delivered at long distances is much less than what

> was sent. Although China has a strong government, it cannot control everything. It is not like the US or other western countries. Distant places can get away with a lot. Second, places which have many threatened species and ecosystems are also very poor. Economic development is more important to them. Local governments look to people's needs. Thus the central government always emphasizes "scientific" sustainable development. We always supply ideas, we want biodiversity. The developed areas should support the less developed ones. Now, however, there is no way to do this.'[62]

The apparently irreconcilable nature of this contradiction is readily accepted by policy elites, and conditions the meaning of sustainable development. By 'scientific', this researcher seemed to imply feasible, what could be accomplished at existing resource levels without compromising economic growth.

Linkage Mechanisms

The gap between national policy and local implementation in China is partially bridged by several linkage mechanisms, and we discuss four: central government coordination, national fiscal policy, mobilization campaigns and transmission channels, particularly the media and NGOs.

First, the State Council of China is capable of reaching from national into local affairs. Although in theory the State Council is subordinate to the National People's Congress and its Standing Committee, as Saich notes: 'it is, in effect, the government of China'.[63] It was the State Council which consented to the establishment, in 1992, of the China Council for International Cooperation on Environment and Development (CCICED).[64] The State Council acknowledges what information is important by accepting reports, such as information presented annually by the Biodiversity Working Group of CCICED, and its recent (2004) *China Red List* and report on protected areas. In response to the requirements of the Convention on Biodiversity Conservation, the State Council established a Coordinating Group for Implementation of CBD, with a membership of 20 departments and a technical support system.[65]

The State Council also monitors law enforcement, and in 1993 promulgated a 'Notice on Strengthening Investigation on Enforcement of Environmental Laws and Punishing Illegal Activities'. Within one year (1993–94), it increased by 50 percent the areas of investigation, which turned up 100 000 cases of violations concerning wild animals, forests, grasslands, and mining development. By 1996, investigations reached 29 provinces/regions.[66]

Sustainable development planning, pursued under State Council aegis, also assists integration. The Chinese regime appeared to pay less attention to sustainability policies than rich states because of their apparent cost. Leadership warmed to the concept for several reasons: the rhetoric attracted

some international support; it mollified domestic environmental critics (who questioned why China ranked 133rd among 142 countries in the Environmental Sustainability Report); it provided a way to address the overheating of the economy; and gave a cachet of legitimacy to the new regime of Hu Jintao and Wen Jiabao. In 2004, sustainable development entered economic planning as SEPA and the National Bureau of Statistics worked jointly to create a 'green GDP' measure, which would subtract resource depletion and other environmental externalities from the GDP in order to illustrate the relationships between the environment and the economy.[67]

A related concept, the 'circular economy', focused on low energy consumption (as China surged into the international oil markets), low pollution and high efficiency.[68] These are more applied iterations of the idea of sustainable development, and they integrate the planning of powerful agencies with environmental institutions.

Second, notwithstanding the decline of revenues to the central government following marketizing reforms and devolution, it has the largest budget in China, approximately 6.2 percent of GDP.[69] As we shall see in Chapter 5, the central government can leverage its fiscal power to improve the management and protective capabilities of nature reserves. Furthermore, as we shall discuss in Chapters 6 and 7, the central government effectively manages all foreign financial assistance China receives to protect its endangered species and ecosystems. As foreign financial assistance is such a large component of China's overall spending on biodiversity conservation, the center influences directions taken by provinces and local areas.

Third, some integration of policy is attained through the use of national campaigns. Although mobilization campaigns have been explicitly repudiated as a method of rule,[70] a compulsory national tree-planting campaign, which started in 1981, has been a main factor in the success of China's afforestation program.[71]

A fourth linkage mechanism is education about biodiversity issues through schools, the media, the Internet and NGOs. China's compulsory elementary education system does teach students biology (called 'nature') and in the context of this course, some information on biodiversity conservation may be transmitted. Environmental science courses are popular at China's colleges and universities. The Ministry of Education has asked several universities to teach environmental education, but this field is in its infancy in China.

The first environmental newspaper was the *China Environmental News*, sponsored by SEPA and initiated in 1984. During the 1980s it was the primary voice on environmental issues in China.[72] By 2000, China's 2000 newspapers carried 47 000 articles on environment-related issues,[73] and the central television station CCTV has produced several programs on the environment. In a 2001 opinion survey, some 79 percent of respondents indicated that

television and radio were the primary source of news on environmental issues; publicity produced by the government (regime socialization) was a second source, 42 percent of respondents.[74] Nevertheless, these media are still censored and do not report on all dissidence concerning the environment, such as protests about the Three Gorges Dam.[75]

Some 103 million Chinese are connected to the internet, the world's second largest number after the US,[76] and the usage rate has tripled since 2001. The internet accommodates a number of blogs on biodiversity conservation issues, yet this usage is supervised. Finally, since the 1990s, China has allowed a large number of environmental non-governmental organizations (ENGOs) to form. As we shall see in a review of ENGOs in Chapter 7, they lack a fully autonomous ability to influence government policy. Yet most of the ENGOs take as their mission environmental education. Most ENGOs have websites, and some have been quite successful at communicating their concerns through the media. As the founder of one of China's earliest ENGOs said: 'Sometimes we go to the press. But we have such good relations with them, that more frequently they come to us'.[77]

Notwithstanding these varied linkage mechanisms, it cannot be said that China has a high degree of public concern for the conservation of biodiversity. (See our discussion in Chapter 2.) A scientist pointed out the large gap between elite and mass views:

> 'Now biodiversity conservation is a government objective, but not a popular objective. Ordinary people should want it. To protect a painting is simple, you put it in a room and guard it. To protect an ecosystem is hard. You can't put it in a room. It shouldn't only be government. There is a generational problem too, especially with farmers and workers, and for remote areas and forests. That is the greatest challenge to environmental conservation, not money.'[78]

THE INSTITUTIONAL FRAMEWORK IN TAIWAN

Central Coordination

The institution promoting bureaucratic coordination and consensus building at the central government level is the National Council of Sustainable Development (NCSD). In June 1989 and August 1991, the Ministry of Economic Affairs (MOEA) and the Environmental Protection Administration (EPA) respectively formed committees to respond to the Montreal Protocol. In May 1992, the Executive Yuan formed the Global Change Working Group (GCWG), chaired by the EPA's Deputy Administrator, in order to coordinate global environment related activities in all government branches. In December of 1996, the Executive Yuan elevated the position of the GCWC under the

Executive Yuan, and reorganized its mission under the name of National Council of Sustainable Development.[79]

Within the NCSD framework, a biodiversity working group organizes research, monitoring, and management. For example, it has already finalized planning of biodiversity monitoring systems for Taiwan's lands, wetlands, and marine environments. Maps have been drawn up showing the distribution of plant species and important wetlands in the Taiwan area.

The Biodiversity Working Group has prepared the Taiwan Indigenous Edible Mushroom Germplasm Bank and completed 251 tribal surveys and maps of indigenous traditional lands. Targeting existing property rights laws that fail to provide legal protection of indigenous ecological knowledge, the Working Group drafted legislation for the Legislative Yuan.[80]

Taiwan's Biodiversity National Action Plan, meeting CBD terms, was approved in 2001. The plan mentioned goals and implementation strategies to use biological resources sustainably; to strengthen research, education, and training; and to promote partnerships in biodiversity conservation. The task force to implement the national plan includes 1) the Biodiversity Working Group of the NCSD; 2) the Biodiversity Committee of the COA; 3) the consulting group for ecological engineering technology in the Public Construction Commission; 4) units planning teaching improvements in biodiversity in the Ministry of Education; and 5) National Security Council experts in biodiversity, and research and planning staff.[81]

Government Agencies

Table 4.1 shows the bureaucratic division of labor in implementing Taiwan's biodiversity policies.

The institutional framework for Taiwan's biodiversity conservation policies has serious weaknesses. First, the bureaucratic network is fragmented and lacks integration. Also, the COA and EPA are relatively weak sectors within the bureaucracy, compared to the development agencies such as the MOEA. Second, several ministries conduct their own surveys and investigations on biodiversity. The central government in Taipei lacks a system to incorporate all the biodiversity information from ministries and develop systematic policies. Third, government agencies have failed to reach a balance with respect to the rights of minorities and aboriginals in the process of preserving biodiversity. Agencies tend to plan and implement biodiversity policies from purely scientific and engineering perspectives. Fourth, although the general public has a strong consciousness toward the need for environmental protection, it lacks knowledge on essential steps to implement good environmental practices. As a result, the public cannot exercise a check on the government's environmental performance.

Table 4.1 Government agencies and their functions in biodiversity conservation

National government conservation agencies	Function and authority
COA, Executive Yuan	Responsible for the Cultural Heritage Preservation Act (1982), the Wildlife Conservation Law (1989), the Forestry Law (1932) and the Fishery Act (1929)
Council for Cultural Affairs, Executive Yuan	Shared responsibility for the Cultural Heritage Preservation Act
Environmental Protection Administration	Responsible for the planning, promotion and coordination of Taiwan's biodiversity conservation policies
Ministry of Interior	In charge of ecological conservation for Taiwan's national parks and coastline areas
Ministry of Economic Affairs	In charge of the import/export of rare animals and plants, and the development and conservation of water resources
Ministry of Transportation and Communications	In charge of the conservation of Taiwan scenic areas
Local government conservation agencies	**Function and authority**
County (city) governments	Agriculture Bureau or Economic Affairs Bureau for every county/city government in Taiwan province, Construction Section, Kinmen country government
Yuan-controlled municipalities	Department of Economic Development, Taipei city government, Department of Economic Development, Kaohsiung city government
Forestry and Natural Conservation Police	Compliance responsibilities

Source: The conservation website for wildlife protection, Council of Agriculture: http://wagner.zo.ntu.edu.tw/preserve/system/index.htm.

Critics call for personnel changes and ethical accountability. Members of working groups and task forces play multiple roles in Taiwan's society, which may influence their integrity and professionalism. Furthermore, environmental laws, regulations, and executive orders may be 'as numerous as the hairs of the cow'. For instance, since the approval of the Environmental Impact Assessment (EIA) Law in 1995, there have been at least 69 supplementary regulations and executive orders. The continuous process of revision and amendment confuses bureaucrats as well as enterprises. Most members of the EIA review committees are engineers who focus only on the scientific treatment of environmental problems. Review committees lack members with broad, society-wide perspectives.[82]

Our interviews indicated that the fragmentation of the bureaucratic framework causes major problems of policy implementation. The NCSD is mainly an advisory body, with the EPA serving as its agent for policy coordination and integration. However, since the EPA is a weak and small institution in Taiwan's bureaucracy, it has no power to 'order' other institutions to implement policy. Moreover, many issues of biodiversity conservation are under the jurisdiction of other governmental agencies. The COA is responsible for biodiversity preservation, and the Ministry of Interior is in charge of national parks and land planning. Furthermore, the EPA fails to manage the 'sources' of environmental deterioration. Its focus is at the 'end-of-the-pipe', that is, it initiates solutions or treatment when the pollution event has already caused severe environmental damages.[83] These tasks of remediation and mitigation are very detailed and time consuming. However, the budget of the EPA is among the lowest of the central ministries. In reality, the administrative level of EPA is lower than a normal ministry.

Devolution to Sub-national Governments

There is a large gap between central planning agencies and local implementation bodies in Taiwan. For instance, EIA review at the central level is conducted in a relatively disinterested fashion. Local governments, beset by frequent elections and economic crises, are in general pro-development. The Self-Governance Law for counties and cities stresses autonomy of the local government; it constrains supervision capacities of the central EPA toward local EPAs. The central EPA may refuse to provide financial assistance to the local EPA if the latter fails to implement environmental regulations. However, without financial support, the local EPA has a good excuse to remain idle. This creates a downward cycle of environmental deterioration.[84]

Another explanation for a weak local capacity in implementing biodiversity conservation is the worsening fiscal situation of local governments in Taiwan. Some local governments have debts, equivalent to millions of US dollars. In

some cases, local governments are unable to pay the monthly salaries of their employees.[85] Worsening financial conditions limit capacities of local governments to invest in environmental protection and sustainable development. Financial difficulties also force local leaders to seek more development projects to improve the local economic situation. Pro-enterprise policies are natural choices under the current budget constraints of the local governments, and this pits local interests for growth against national policies for species and habitat conservation.

CONCLUSIONS

Both China and Taiwan have reasonably complete laws, regulations and policy statements regarding biodiversity conservation. Coverage of law and regulation is best for vertebrate species; it is worst for plants and other invertebrates, particularly those without economic value. In Chapter 3 we highlighted the role that scientists have played in identifying endangered and threatened species and ecosystems. Legislative bodies (the National People's Congress in China and the Legislative Yuan in Taiwan) have essentially ratified the results of the State Council and Executive Yuan. However, democratization in Taiwan has made legislative ratification a political process, with demonstrations of ENGOs and pressure applied to individual legislators. This is a significant difference in the process of drafting legislation on environmental issues.

Throughout this book we have noted that the rule of law is not yet established in China; even in Taiwan, both forming and implementing the law is subject to personal linkages (*guanxi*) as well as to rent-seeking behavior of individuals and groups. Moreover, laws on biodiversity conservation, like laws in general, tend to be ambiguous and quite general, placing greater emphasis on regulations and interpretations of agency administrators.

A relatively large number of international conventions and treaties apply to the biodiversity conservation area in environmental politics. The approach of China toward these conventions and international regimes has been different from that of Taiwan. First, China entered the UN, and participated in international conventions, later than Taiwan. Second, China very early on adopted the stance of leader of developing nations, and insisted on 'coordinated development'. It sought, and generally received, favorable financial terms as the price of its adherence, and also postponed effective dates for as much as a decade. China benefits from participation in international conventions by financial assistance, which has paid for a good part of its environmental remediation and mitigation work. It also benefits through development of a positive international image. Finally, China benefits through

the modernization and rationalization of its procedures in light of international norms.

Since the Republic of China – Taiwan – departed from the UN in 1971, it has had few options to sign international accords which also include the People's Republic of China. Nevertheless, Taiwan has attempted to participate in important international environmental conferences, often doing so through ENGOs, such as SWAN. Also, Taiwan's behavior with respect to international conventions on biodiversity (such as CITES, CBD) and the broader Agenda 21 goals of sustainable development resembles that of fully accredited nation-states.

To answer our first question (What is the extent to which the legal framework provides comprehensive and systematic protection of species and ecosystems?), it appears that both China and Taiwan have reasonably comprehensive legal and regulatory systems for the protection of species and ecosystems, and that both States benefit from complex international conventions in this area.

In both China and Taiwan, a large number of central and sub-national institutions of government are responsible for the implementation of law and regulations. State environmental protection agencies play leading roles, sometimes together with national forestry and agriculture offices (and in a few instances working at cross-purposes with them). However, other ministries are involved, such as those in economic affairs, finance, education, foreign affairs, construction and water resources. Given this degree of fragmentation, coordination of policy is difficult. To the extent policy is integrated, it is through task forces, special commissions, and through the State Council (in China), but in the latter case only on exceptionally divisive issues, such as major project construction. In general, agencies implementing biodiversity conservation policies are small, ill-funded, and less powerful than agencies closer to the core of the State, such as economic and defense institutions.

Once both jurisdictions were highly centralized in their administration of policy, explained by their common origin as Leninist-style party-states. Since democratization in Taiwan, the centralization of power through the Executive Yuan has declined, and environmental policies are increasingly decentralized. In China, since the onset of economic reforms in the late 1970s, the regime has decentralized power to provinces, regions and municipalities. Since sub-national agencies have most of the personnel engaged in biodiversity conservation work and most of the financial resources, they are in the driver's seat, and their interests tend to advance economic development objectives over and above sustainability. Because of the vast size of China, this devolution of policy has greater effects and more adverse consequences than in Taiwan. Thus, to answer our second question, 'What is the degree of centralization in the implementation of law and policy?', law and policy tend to be

administered in a decentralized fashion, which compounds the problems of policy fragmentation. It is unclear, however, whether these conditions clearly differentiate China and Taiwan from most other states.

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    > '(L)ocal governments in China are confronted with difficulties in self-regulation. When a local government owns and sponsors many polluting industries or projects, it is difficult for it to monitor itself. When an environmental bureau is part of the local government, it is often difficult for the bureau to enforce environmental regulations on other government units that sponsor polluting factories and are of equal, and often higher, hierarchical ranking than the enforcing bureau itself.'

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5. Protected areas and biodiversity conservation

Globally, countries establish protected areas – nature reserves, parks, historical sites, monuments – to preserve rare and endangered species and their ecosystems. Soule and Torbough contend: 'As an effective strategy of conserving biodiversity, the setting aside of protected areas is the *sine qua non* of effective management'.[1] The United States (US) was the first nation to create a protected area, Yellowstone National Park, in 1872; in 2005, at least 100 000 protected areas are found in more than 100 countries. China and Taiwan are latecomers to this form of biodiversity conservation, with histories of less than 50 years.

In this chapter, we explain the evolution of protected areas and the functions they perform. For China, we examine the distribution of conservation units, geographically and administratively. Then we consider five large obstacles to effective management: architecture of the system, administrative organization and enforcement, limited financial support, human resource problems, and conflicts between local populations and protected areas. We also give an example of a relatively well-managed protected area, the Mount Gaoligong Nature Reserve in the Yunnan Province. For Taiwan, we also treat the distribution of protected areas. Then we turn to coordination, management, and fiscal problems. The example for Taiwan is a proposed park to be co-managed with aboriginal peoples. The chapter concludes with a comparison of the protected area systems in China and Taiwan.

EVOLUTION OF THE PROTECTED AREA SYSTEM

The World Conservation Union (IUCN) defines a protected area as 'an area of land and/or sea specially dedicated to the protection and maintenance of biological diversity, natural and associated cultural resources, and managed through legal or other effective means'.[2] Protected areas perform a host of functions; they:

- maintain valuable ecosystem services through the protection of soil and watersheds;

- conserve populations of animal and plant species in natural environments that allow for their continued natural selection and evolution;
- protect important staging areas for migratory species;
- protect local cultural links with nature;
- provide sites for the development of eco-tourism and other economic opportunities;
- provide sites for people to experience the aesthetic and therapeutic values of wilderness;
- protect sources of potentially valuable genetic resources; and
- provide opportunities for public education and awareness, and living laboratories for continued biological exploration and study.[3]

China's system of protected areas evolved in four stages. In the earliest stage (from 1956–66), the State established a small number of reserves, with the first, Dinghushan Nature Reserve, founded in Guangdong Province in 1956. Five scientists proposed this means of conserving biological diversity during the third plenary session of the First People's Congress. Their motion read:

> 'It is an urgent need to establish a number of nature reserves in each of the provinces and autonomous regions to preserve natural landscapes for the country. The nature reserves will not only function as basic sites for scientific researches, but also create favorable conditions for the conservation, propagation and extended use of the very abundant animal and plant species. In the meanwhile, they play an active role in the awareness activities of patriotism.'[4]

Although the State Council did not issue regulations for the management of protected areas, the Ministry of Forestry proposed targets, methods, and areas for delimitation of reserves. By 1965, 19 protected areas had been organized.[5]

In the second stage of evolution (1966–78), political conditions delayed the expansion of protected areas. The Cultural Revolution was especially destructive, as the decline of effective governmental control led to the hunting of wild animals, felling of timber, and other appropriation of the resources in existing nature reserves. One hopeful occurrence during this period, yet without an immediate effect, was the formation of provisional regulations on nature reserves. These were discussed at China's first national environmental conference in 1973.[6] By the end of 1978, only 34 nature reserves had been formed.

The third stage (1979 to about 1995) was a period of rapid expansion in number of protected areas. At the onset of China's economic reform policies and opening up to the world, the State Council and National People's Congress laid the legislative foundation for biodiversity protection (discussed earlier in Chapter 4), including the passing of the Forest Law in 1985 and the Wild

Animal Conservation Act in 1988. Both laws called for the establishment of nature reserves. During this period, China also joined international conventions related to biodiversity conservation such as the Convention on the International Trade in Endangered Species (CITES), the Ramsar Convention on Wetlands (Ramsar), and the Convention on Biodiversity (CBD); and it participated in the International Man and Biosphere network. At the start of this period, several ministries jointly released the 'Notice of Strengthening Management, Planning and Scientific Investigations in Nature Reserves', followed in 1992 by the Environmental Ministry's formation of an evaluation committee for national nature reserves. In 1994, the State Council issued regulations on protected areas.[7] By the close of the period, China had approximately 1000 protected areas (PAs).

The fourth stage (1995–96 to 2005), is a period of continued expansion in number of PAs, with attempts at rationalization of the overall system. Protected areas were included within China's Biodiversity Action Plan, and in 1995 the Global Environmental Facility (GEF) pledged US$18 million to improve management of nature reserves. Two other factors led to an exponential increase in protected areas: natural disasters and regional economic development projects. Large-scale droughts and floods in 1997 and 1998 alerted elites to the significant rate of ecological deterioration, which prompted Premier Zhu Rongji's ban on logging in the upper reaches of the Yangtze River in 1998. An ecology professor described the effect of these disasters: 'This aroused the interest of the people. Environmental problems are the most important of factors affecting decision-making, especially crises'.[8] Second, the 'Great Opening of the West' campaign in 1999 stimulated the establishment or expansion of protected areas, such as the Lop Nur Wild Camel Nature Reserve in Xinjiang, Sanjiangyuan in Qinghai, Genhe Cold-water Fish Reserve in Inner Mongolia, and Zadatulin in Tibet. Professor Xie Yan reports that nature reserves increased at an average of 160 sub-national and 16 national-level reserves every year after 1997, with a peak of 320 in 2000 and another peak in 2003.[9]

By mid-2005, China had more than 2000 nature reserves covering approximately 15 percent of its total land area.[10] In addition, there are about 1400 forest parks, 800 scenic landscape and historical sites, 50 geological parks, 50 water conservation scenic areas, and at least 1000 small conservation and agricultural reserves.[11] Although the term 'protected area' is sufficiently broad to cover all of these conservation units, we use it throughout this chapter as interchangeable with nature reserve.

The explosion in numbers of protected areas, as well as problems of law, finance, staffing, management, and reconciliation of biodiversity conservation and local economic development objectives in the vicinity of protected areas, spurred focused study. In 2003, the China Council for International

Cooperation on Environment and Development (CCICED) formed the Protected Area Task Force (PATF), to continue earlier work done by the Biodiversity Working Group; its 2004 report to the State Council, *China's Protected Areas*, makes comprehensive recommendations for reform of the PA system and informs this book. Simultaneously, legislators and administrators initiated planning for new legislation on nature reserves, which would both rationalize and modernize the system.

DISTRIBUTION OF PROTECTED AREAS IN CHINA

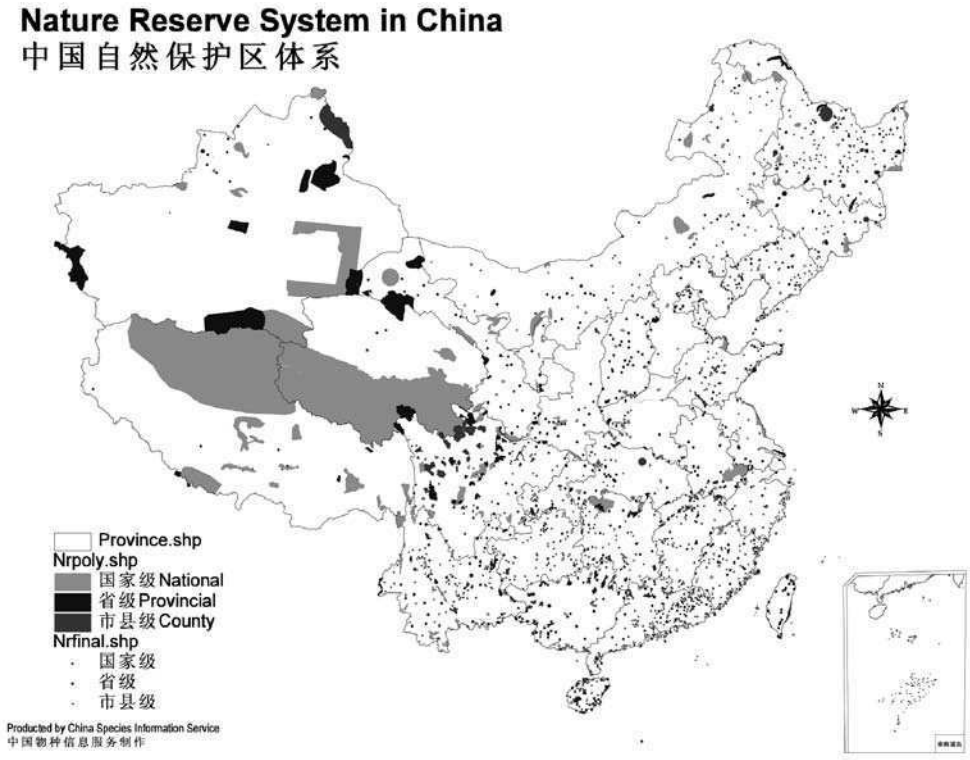
Figure 5.1 displays the geographic distribution of protected areas in China, which is quite uneven.

Each province or autonomous region has nature reserves, but the greatest expanse lies within the western provinces, which have relatively low human population density. Nineteen nature reserves are larger than 10 000 square kilometers (most are in the West); collectively, they comprise about 66 percent of the total nature reserve area.[12] The largest nature reserve in China is the Sanjiangyuan (Three Rivers' Source) in Qinghai Province.[13] In eight provinces – Tibet, Xinjiang, Qinghai, Inner Mongolia, Sichuan, Gansu, Yunnan and Heilongjiang – nature reserves cover approximately 20 percent of the area, and the population density is 32 people per square kilometer. In the other provinces, nature reserves extend to only about 5 percent of the land area, while the population density is 293 people per square kilometer.[14]

The western and southwestern provinces of China have the highest levels of biodiversity, explaining the large spaces allocated to nature reserves. Low-altitude regions with high population density and concentrated biodiversity are not adequately covered.[15] The exclusion of economic activities except tourism would make it quite difficult to add populated, low-altitude regions to the system of protected areas. Table 5.1 reviews the types of nature reserves in China.

Nature reserves in China are organized into three types: natural ecosystem, wildlife, and natural monuments. Of the areas included in natural ecosystems, Table 5.1 indicates that ocean and coastal ecosystems are poorly covered (even though the number of protected areas had doubled to 80 by 2005). As mentioned previously, in the wildlife ecosystems, there are few PAs for plants as compared to animals.

The political and administrative distribution of protected areas is also uneven. Just 226 of the 2000 plus PAs (about 11 percent of the total) are national nature reserves. The remainder fall under the jurisdiction of provinces or autonomous areas, but are effectively controlled by one of three sub-national jurisdictions: provinces (or autonomous areas), municipalities, or



Source: China Species Information Service, 2005, and Xie Yan, Chinese Academy of Sciences.

Figure 5.1 China's protected area system

Table 5.1 Type of nature reserves

Type	Number by the end of 2001	Area by the end of 2001 (in 1000 hectares)
Natural Ecosystems		
Forest	769	224.5
Prairie and meadow	33	35.1
Desert	10	362.4
Inland wetland and watershed	137	216.1
Ocean and coast	40	10.1
Wildlife		
Wild animals	325	415.0
Wild plants	111	21.3
Natural Monuments		
Geological formations	90	11.0
Paleontological	26	3.6
Total	1551	1299.1

Source: Department of Natural and Ecological Conservation, State Environmental Protection Administration, 2002; reprinted in Xie et al. (2004), p. 282.

counties. Since 1979, four criteria have been used to evaluate applications from regions for the formation of nature reserves:

- Typical natural ecosystems representing different natural zones;
- important survival and breeding area is for national first grade protected animals, rare plant species or other wildlife with special protective value;
- areas where natural ecosystems or species have been damaged, but are of high value and should be restored or replaced; and
- natural and historic relics and important water catchments such as geological sections, glacier relics, lava, hot springs, and fossil locations with special protective value.[16]

Proponents seeking provincial, municipal, or county-level reserve status apply to the relevant local government for approval, and the report is submitted to the supervising national ministry or agency for recording purposes. Advocates seeking the status of a national-level reserve for a region undergo special review by the Evaluation Committee of the National Nature Reserves chaired by the State Environmental Protection Administration (SEPA). Additional

criteria for this designation include national and international representative characteristics of the area, scientific importance, or specific research value.[17] The State Council is the approving agency for all national PAs.

The largest number of nature reserves is found at the sub-national level, yet they occupy just one-third of the total protected land area: about 22 percent for PAs at the provincial level, and 11 percent for municipal and county-level nature reserves. The national nature reserves occupy more land than the others, some two-thirds of the total. Moreover, they have more 'valuable' biodiversity resources, and as we shall see are much better funded. This explains the great pressure to upgrade PAs from sub-national to national status. Table 5.2 below indicates the distribution of protected areas among different government agencies.

Table 5.2 Agencies managing nature reserves

Agency	% of PAs
State Forestry Administration	76
State Environmental Protection Administration	11
Ministry of Agriculture	3
Ministry of Water Conservation	2
Ministry of Land Resources	2
State Oceanic Administration	2
Ministry of Construction	1
Ministry of Geology and Mineral Resources	1
Other*	2

Note: * Chinese medicine, scientific research and education and tourism agencies have established some nature reserves.

Source: Adapted by authors from Xie et al. (2004), p. 282.

Clearly, the majority of PAs falls under SFA and SEPA control. The State Forestry Administration (SFA) has responsibility for China's forests, wetlands, and terrestrial wild animals, whose ecosystems comprise the largest number (and area) of protected areas.

CHALLENGES TO GOVERNANCE OF PROTECTED AREAS

Protected areas are the main element in China's strategy to conserve biodiversity. The SFA estimates that PAs cover 80–85 percent of China's

endangered and rare wildlife species.[18] As recent high-level reviews indicate, however, the overall system of nature reserves is unlikely to attain the objectives sought by the State without reform. Drawing from the *Task Force Report*, the critical literature, and our interviews, we examine five specific challenges: 1) the architecture of nature reserves, 2) horizontal and vertical administration, 3) financial resources and incentives, 4) human resources and training, and 5) community-level conflicts. These challenges encompass national and local politics as well as issues of administration.

The Architecture of Protected Areas

The structural framework of the protected area system has three deficiencies. It is based on regulations, not law, and is not integrated with other legislation concerning land use. Second, there are gaps of coverage in the system. Third, the system is inflexible and does not accommodate multiple uses. We discuss each in turn.

First, although national leaders have adopted a relatively large number of regulations concerning nature reserves, legislation is only now in the process of being developed. The PATF recommends a 'comprehensive legal framework for an advanced system of protected areas based on the full range of protected area objectives'.[19] The justification for this recommendation is the fact that PAs throughout China have been superimposed upon 'a mosaic of land uses that are often in severe conflict' with PA regulations.[20] This suggests a need to integrate law and planning:

> 'The PA system is not directly connected with the government plans for overall land use and development programs at national, provincial and county levels. So large development projects often take precedence over the interests of PAs. However, China's new "Scientific Development Perspective" calls for a higher level of recognition for PAs.'[21]

This leads to situations where laws and regulations concerning biodiversity conservation cannot be enforced, particularly when they conflict with priority development projects:

> 'The oil fields of Shengli, for example, are fed by large amounts of water pumped out from the Yellow River Delta NNR at the expense of NR objectives. Many NR managers have no control over development activities within the reserve boundaries, even if they are forbidden under the 1994 Nature Reserve Regulations.'[22]

In other cases, the boundaries of the nature reserve overlap areas of traditional community use, which is often the case in poor ethnic minority areas:

> 'Many farmers have extended the lands that they cultivate beyond their certified limits, but have enjoyed such tenure unhindered for many years. For example, a large part of the Menglun Nature Reserve (part of the well-known Xishuangbanna National Nature Reserve in Yunnan) has been abandoned by the Nature Reserve Management in the face of armed demonstrations by villagers.'[23]

The unsettled ownership status of many rural lands compounds this problem. Although all land in China is owned by the state, only 60 percent or so of the nature and forest reserves are on land over which state agencies have clear control. The remainder are controlled by collectives (*jiti*), operating under the 'responsibility system', initiated at the onset of economic reforms. For example, Harkness notes:

> 'When the collective forest lands of Yuhu village were incorporated into the Yulongxueshan Nature Reserve in northwest Yunnan … farmers responded by cutting down trees they had previously managed on a sustainable basis.'[24]

These cases express problems resulting from the lack of an integrated law for the PAs, which is nested within an overall land-use and development framework.[25]

Second, there are problems of gaps in the coverage of endangered and rare species and ecosystems, some of which have already been mentioned. The PATF used a Geographic Information System (GIS) based analysis to identify gaps in PA coverage. It plotted boundaries of all nature reserves and then overlaid this matrix with a classification of the 124 recognized biogeographical units and the distribution of all known vertebrate species. This revealed the following problems in coverage:

- Low nature reserve coverage in high human density regions;
- under coverage of some areas, for example lowland stream areas;
- about 48 species are not covered by any nature reserve;
- inadequate coverage of some of the most important biogeographic units; lack of coverage of others;
- marine wildlife has not been well covered by nature reserves.[26]

Thus, the current PA system does not fully incorporate China's endangered and rare species and its ecosystem functions.

Third, the existing system of management zones – core, buffer, and experimental – is rigid and inflexible. In the core area, no individuals, groups, or institutions are permitted entry except upon approval. Indigenous inhabitants in core areas are supposed to be relocated. Only scientific research is permitted in the buffer zone. In the experimental area, a range of uses is permitted: scientific experimentation, educational activities, survey work, tourism, and domestication and reproduction of rare and endangered wildlife.[27]

By regulation, each nature reserve, irrespective of ecosystem and wildlife type, must be divided into these three zones. The zonal system is impractical or unworkable in several nature reserves (such as large wetland or grassland areas, or in deserts where mining is the only possible economic activity), and it creates conflict with community groups.

The PATF has recommended that China adopt the international standards of the World Conservation Union, which would introduce greater flexibility into the zonation system. The IUCN management categories are:

- Category Ia: strict nature reserve/wilderness PA, managed mainly for science or wilderness protection;
- Category Ib: wilderness area – PA, managed mainly for wilderness protection;
- Category II: national park – PA managed mainly for ecosystem protection and recreation;
- Category III: natural monument – PA managed mainly for conservation of specific natural features;
- Category IV: habitat/species management area: PA managed mainly for conservation through management intervention;
- Category V: protected landscape/seascape – PA managed mainly for landscape/seascape conservation or recreation; and
- Category VI: managed resource PA, managed mainly for the sustainable use of natural resources.[28]

A large number of PAs in China would fit much better within the national park classification (category II) or as protected landscape/seascape. Overall, the current system, in the opinion of the PATF:

> 'Faces a lack of flexibility to adjust to local conditions and solve conflicts between conservation and development objectives. This is the biggest reason for the poor management of China's NRs. China needs to develop a PA system suited to Chinese conditions and the six-category scheme of IUCN will be the most important reference.'[29]

Our interviews with managers and scholars of biodiversity conservation confirmed this observation. Flaws in system design were responsible for much of protected areas' failure to achieve their conservation mission.

Administrative Organization and Enforcement

Both horizontal and vertical administrative problems adversely affect management. At the central government level, protective functions are divided among a large number of agencies, each with different missions. A forestry administrator discussed this type of conflict:

> 'The Yangtze alligator – endemic to China – is a terrestrial species under the Wild Animal Conservation Act and managed by SFA, but there's conflict between MOA and SFA concerning administrative rights over alligators and crocodiles that are non-endemic to China but listed in the appendix of CITES. The issue should be resolved through a revision to the Wild Animal Conservation Law. This process began several years ago but is stalled because of struggles between MOA and SFA on certain species and provisions.
>
> (Why isn't the conflict resolved, perhaps by the State Council?) The State Council is absorbed with political problems and issues of economic development. It doesn't have the time to resolve a matter such as which agency should be in charge of what species. Moreover, the State Council doesn't involve itself as a judge without a mutual understanding reached by the relevant ministries. Neither the SFA Administrator nor the MOA Minister has insisted on this yet.'[30]

A more general problem concerning these two ministries is that fish in rivers of a nature reserve under SFA jurisdiction are governed by the Fishery Bureau of the Ministry of Agriculture. No laws or regulations provide for effective coordination of such potential (and in many cases, actual) conflicts. The PATF report calls for greater data sharing and collaboration among agencies. Its most compelling recommendation in this area is the formation of 'an above-ministry-level and cross-sectoral alliance to ensure the integration of protected areas and overall land use and development planning, coordination among line ministries, and supervision of protected area effectiveness'.[31] It remains to be seen whether the State Council would endorse the creation of yet another inter-ministerial committee.

The problem of vertical integration is much more intractable, and mirrors the difficulty China has faced in coordinating economic development activities from the center to provinces and local governments. The problem here extends beyond the system of divided loyalties, with provincial and municipal environmental bureaus responding to both national and sub-national masters. It also reflects the difficulty of having different systems of incentives and values. One NGO representative who had visited 60 PAs explained the conflict between national conservation objectives and local practices as follows:

> 'There are many different local situations, and especially in the remote areas (where most of the large nature reserves are). The biggest factor is the drive for rapid economic development. Local governments want to develop the economy. And they want to measure the efficiency of their officials by economic development and not their conservation efforts. So they look at economic development needs first. Each local government administration has only 4–5 years to get promotions, and they focus on economic development. It is short-term, non-sustainable economic development, and that's the main stress to the environment in local areas. Local governments and companies want to build big dams. They earn money from the construction of dams. Such projects bring money to the local people, yet they are often harmful to the environment.'[32]

The PATF report emphasizes the deleterious, often indirect, effect of 'insensitive' infrastructure development:

> 'Unlike most direct exploitation, this is legal and occurs with the backing of local authorities. Funding is readily available to construct roads, power supplies and tourist facilities, and consequences we have seen include forest clearance for tourist-related activity (for example a deer farm and tourist bungalows), and the building of a power line through a moderately small primary forest, effectively cutting it in two for the endangered primates living there. Of particular concern is river regulation, including both impoundment (dam building) and channelization (direct modification of a river course). These can change the chemical, physical and biological characteristics of rivers, and cause the loss of both habitat complexity and natural mechanisms for flood regulation and waste-assimilation.'[33]

Although there have been some exceptions,[34] the general pattern has been for infrastructure projects to proceed irrespective of the boundaries of protected areas or zones within them.[35]

One analyst responding to our question on dam construction near habitat of endangered species commented: 'The boundary of the core area in this nature reserve was changed to accommodate dam construction.'[36]

Financial Resources and Incentives

Groups and institutions from three levels direct funding to China's nature reserves – international, national, and provincial/local – and there are problems at each level. First, China has become highly reliant on foreign funding for management and training, which is unsustainable in the long-term. Previously we mentioned GEF's US$18 million investment in the management of nature reserves. It has also invested in wetlands biodiversity conservation and in the Lop Nur Nature reserve. As Xie notes: 'By June of 2003, GEF has provided or approved about US$400 millions to China projects … in which about 13 percent are used for biodiversity conservation'.[37] The governments of Britain and the Netherlands, among others, have invested in nature reserve projects, as have a number of international environmental non-governmental organizations (ENGOs) such as the World Wide Fund for Nature (WWF), Conservation International (CI) and The Nature Conservancy (TNC). However, much of this funding is one-time-only. It tends to emphasize capacity building, resource investigation, and environmental education efforts, yet monies are used for infrastructure construction too. There is no guarantee that international donor agencies will make long-term commitments to nature reserve management.

The central government's primary contribution to funding nature reserves has been to pay for infrastructure – construction of buildings such as offices, rescue centers, tourist facilities, roads, and sometimes zoos or botanical

gardens. A recent estimate is that the central government allocates $30 million RMB (about US$3.7 million) annually to national-level nature reserves, which it divides, in a competitive process, among 25–30 of the 226 national-level areas.[38] This funding can be used for facility construction and improvement of 'fundamental capacity'.[39] When PAs developed rapidly in the 1980s and 1990s, there were incentives for their establishment as the central government allocated one-time-only funding for this purpose, chiefly for construction of facilities and roads. Central government fiscal support of PAs has increased, and in 2002 it established a National Endangered Plant and Wildlife Construction Program, with a total budget of RMB$16.5 billion (about US$2 billion). Program objectives include the improvement of existing PAs, establishment of new reserves (increasing reserves in hotspot areas of Yunnan and Sichuan from 60 to 260 in 2010), and protection and restoration of 15 species of endangered plants and animals nationwide.[40] However, the fund is earmarked for infrastructure construction and not for improved management; there is no separate account in the state budgeting system for PAs.[41]

Infrastructure funds are probably the majority of funds spent on PAs but are just one of three funding categories. The second category is operational funds, paying for staff salaries, travel, daily office costs and the like. The third category is special program funds used for purposes such as surveys of biological resources. The central government reimburses some personnel costs; on occasion, ministries will authorize special project funding, but usually for national-level nature reserves. In short, the central government has not shouldered the principal burden for operation and maintenance of PAs.[42]

Most domestic funding of nature reserves comes from provincial and county sources. Xie points out that:

> 'By 1999, facility construction for national and provincial NRs in Yunnan added up to about RMB$58 million (US$7.15 million). Personnel costs of provincial NRs are usually included in the provincial government financial budget. Lower level NRs usually only get very small fund support from local governments.'[43]

Information on total costs of nature reserve operations in China are not available, but it is clear that support from governments is insufficient. Resources to fund operating costs (including paying salaries of nature reserve personnel) are grossly inadequate for the maintenance of a PA system crossing 15 percent of China's land area. A 2004 study reports:

> 'Questionnaires returned from PAs across China indicated major funding shortages for staff salaries and benefits, maintenance and running costs of equipment and infrastructure, travel, compensation for animal damage to surrounding farmlands, legal prosecutions, communications, publicity and meetings with local stakeholders. In short, allocation of state funds for conservation is inadequate, poorly targeted and not well-utilized or transparent.'[44]

Cash-starved managers of provincial and municipal-level PAs then become entrepreneurial. Managers of areas with charismatic fauna, or other aesthetic values, emphasize eco-tourism. Staff in reserves with exploitable natural resources began to develop them. This increases revenues for administration of the reserves but obviously has deleterious effects on the ecosystem and species being protected. Glacy describes the village Zhongdian in the northwest Yunnan Province, adjacent to a wetlands reserve with a population of endangered birds including black-necked cranes. The village's natural attractions (mountain scenery, hot springs, Tibetan culture) recommended establishment of a tourism business:

> 'To facilitate Zhongdian's development, an airport capable of international flights was built. It was built adjacent to the wetlands habitat supporting the wildlife, with aircraft taking off and landing directly over the black-necked crane habitat. Concurrent with construction of the airport, an EIA was completed by the local environmental protection bureau. The construction process itself caused impacts of noise, increased human population, aircraft-bird collisions, and many other negative effects that were essentially ignored. As of 2002, interviews with local residents reported that the population of black-necked cranes decreased.'[45]

Harkness argues that 'Conservation remains a largely unfunded mandate even inside the nature reserve system, with fiscal pressures leading some reserve managers to cannibalize the very resources they are supposed to protect'.[46] Further examples of such revenue-raising activities include:

> '[T]ourism that relies on construction of damaging infrastructure, hotels, zoos, and specimen collections, cultivation of food crops, forest, reed and bamboo plantations and fish farming and other types of aquaculture, even though these activities are forbidden within NRs.'[47]

This perverse set of incentives; the perceived need to exploit a nature reserve's biological diversity in order to fund its operation – as well as infrastructure development and 'knock-on effects of disturbance in the food web'[48] – may cause loss of biodiversity on a substantial scale.[49] In sum, financial problems challenge the most basic function of PAs, the preservation of species and ecosystems.[50]

Human Resources and Training

The PATF report criticizes management standards in nature reserves in these terms:

> 'Nature Reserves in China have initiated many questionable practices, such as captive breeding, unnecessary or damaging habitat manipulation, artificial feeding,

> burning without a fire management plan, predator control, introduction of alien species, and forced relocation of local people.[51]

The report goes on to suggest that human resource deficiencies account for this condition: drawing directors from the local civil service without qualifications to manage nature reserves; the absence of a formal career structure that would enhance morale; and staff ignorance of ecological approaches to management.[52]

With respect to provincial, municipality, and county-level PAs, it would seem that the preparation of staff for conservation of endangered species and ecosystems has been abysmal. Until recently, appointments to positions were often made on patronage grounds. Protected area staff were ill-educated; they lacked knowledge of the life sciences, could not easily distinguish the species they were employed to protect, and had no incentive to increase their knowledge or capability. Also, as one national official noted, in the remote, rural, isolated PAs, 'The conditions for staff are difficult. To stay there, essentially, they have to sacrifice their children's future and sometimes their marriages'.[53]

Based on statistics from late 2001, some 62 percent of China's 2000-odd nature reserves have installed management agencies, and thus 38 percent have not. About 73 percent of the nature reserves have special management staff. In total, management staff number about 30 000 for the country as a whole. The larger, national-level PAs may have around 100 staff; smaller, sub-national-level PAs may have as few as two or one; the average is around six staff members per reserve.[54] Clearly, there are too few personnel to manage PAs covering 15 percent of China's territory.

The most recent survey of the human resource situation in China's nature reserves was done in mid-2004 and facilitated by CI. Researchers distributed questionnaires in 56 nature reserves with a total of 1088 staff members. The survey results discussed below reflect the sample, which may not be representative of most PAs in China.[55] Nevertheless, this is the largest sample survey on this topic done to date in China. Survey results indicate these staffing conditions:

- Regular (as opposed to part-time and temporary) staff members comprised 46 percent of the total number of workers;
- nearly all the nature reserves surveyed lacked specialized staff in ecosystem, habitat and species management, field patrol and monitoring, public environmental education, and law enforcement;
- about 80 percent of staff have less than 10 years experience; nearly half began their work less than five years previously;
- just over 10 percent of staff have bachelor's degrees; an additional 45

> percent had specialized secondary work or some college work (through adult education).[56]

In summary observations, the authors suggest that staff capacity was greatest in areas of financial and human resource management. Staff capacity was least satisfactory in areas such as ecosystem, habitat and species management, project development and management, and technology and information management, areas related to the prime function of nature reserves.[57]

Much attention has focused on the development of management capacity in China's nature reserves of late, involving foreign funding agencies and international ENGOs such as CI, WWF, and TNC. In addition, at least five colleges/universities in China have developed specialized degree programs in the management of nature reserves, such as at Beijing Forestry University and Northeast Forestry University. Were funding increased to make the jobs attractive and were capacity-building efforts to continue, one could be less pessimistic about the prospects for enhancing the ability of those working in nature reserves.

Community Conflicts

Pressures of local communities – for access to land and resources of nature reserves, for participation in decisions of PA authorities directly affecting their lives, and for recognition of the value of their local culture – contribute most of the tension to the development and management of conservation units.

First and uppermost is the contradiction between seeking to alleviate poverty and improving the environment for endangered species and ecosystems. In general, China's richer areas (primarily those along the east coast) have allocated more resources to species conservation with greater success. In China's poorer regions, where most of the threatened endemic species are located, preservation efforts conflict with provincial and local attempts to foster development, and with attempts of poor people to survive.[58] A study by investigators for the SFA reported on a typical village in the Jianfengling nature reserve of Hainan Province:

> '[T]he administrative village including Miao and Li nationality natural villages, has 69 households with the population sum of 362, who are all poor. In this area, the average income per capita only is RMB $300 (US$37), more than 60 percent of which comes from collection of forestry and sideline products, hunting, grazing, 40 percent of which comes from rice, peanuts, planting cassava and raising pigs, cattle, and sheep. In this village roads have been paved but electricity isn't current, and using water is very difficult. There only are teaching stations for first and second grade primary school pupils in this village.'[59]

In the competition between hungry humans and threatened non-human species, the former have won out consistently. As one official opined: 'If people don't have enough to eat, you can't expect them to protect the environment'.[60] A case study of threats to Guizhou's nature reserves expresses this conflict starkly:

> 'The majority of reserves are situated in remote and poor regions whose economic development is fairly backward. On the one hand, local governments and residents have a strong desire to develop the economy and alleviate poverty. On the other hand, because of poor living conditions, backward transportation and lack of access to information, the development of the local economy depends largely on natural resources. As the life of the local people is tightly connected with natural resources, Guizhou's situation is more serious than in other places.'[61]

Since the late 1990s, this facet of conflict has received increased attention. The PATF report recommends ways that can both alleviate poverty and promote the conservation of biological resources, for example by direct payments to individuals or communities which engage in conservation activities instead of logging or converting habitats to agriculture.[62] A number of pilot projects in nature reserves, many assisted by international ENGOs, have demonstrated the efficacy of this approach.[63]

A second conflict is between the authoritarian direction of biodiversity conservation policy (including the management philosophies of most nature reserves) and local initiatives and participation. Biodiversity conservation efforts in China have emphasized national top-down strategies, and have not involved local communities. Said one knowledgeable SEPA official: 'Generally what happens is that the central or provincial government establishes a protected area without local participation, and then expects the local people to deal with it'.[64] Large numbers of people have been displaced from their homes and communities to serve conservation values; those remaining constantly face threats to their livelihoods. There is little consensus in local areas of China that biological diversity should take precedence over a variety of other uses of natural resources. The PATF report emphasizes the contradiction between this condition and principles of the Convention on Biodiversity (CBD), which ask for involvement of communities and fair sharing of benefits from the use of biodiversity:

> '[L]ocal people are largely excluded in practice and even regarded as a problem rather than an opportunity for collaboration. Local people are rarely involved during the establishment and in management of PAs, and are not encouraged (are sometimes deliberately excluded, indeed) from participation in eco-tourism opportunities.'[65]

A final area of conflict reveals the difference in culture and lifestyle of Han

Chinese and non-Han minority populations who may approach conservation in unorthodox ways, and who populate many PAs, especially those on China's periphery. One dimension of this conflict is a disrespect for traditional ecological knowledge of minority peoples, which makes national management measures difficult to enforce.[66] Yet, as Harris suggests, 'Wildlife communities and habitats are generally healthier and more intact in areas of predominantly ethnic minority occupance than in ethnic Han areas'.[67]

A second dimension of this conflict extends beyond acknowledgment of the value of indigenous ecological knowledge to its integration into species and ecological protection strategies and management decisions. In several case studies, researchers have discovered that acceptance and use of local ecological knowledge benefits not only the preservation of species and ecosystems, but also the survival of minority cultures.[68] These explorations into greater acceptance and use of traditional ecological knowledge have prompted experimentation with community co-management of nature reserves.[69]

THE MOUNT GAOLIGONG NATURE RESERVE

This critical analysis of China's nature reserves would be incomplete without consideration of an example of success. We present the well-managed Mt Gaoligong Nature Reserve of Yunnan Province. The Mt Gaoligong Nature Reserve is located in the western reaches of Yunnan Province, bordering Myanmar. Its pivot is Mt Gaoligong, in the largest mountain range on the western side of Mt Hengduan, rising from 2378 meters to a peak of 4649 meters. Historically, the Gaoligong mountain range has been a barrier to travel along China's southwest border. Local people describe it as 'having four seasons within the same mountain'.[70] The nature reserve stretches south to the Nu River (Nujiang), a semi-tropical area.

Distinctive geologic land forms include volcanoes, lava rock, and geothermal springs. The region is rich in biodiversity, especially of plants; orchids, China roses, rhododendras, camellias, azaleas, Chinese yew, king gingko, and ceibas. The mountain is the home of the rhododendra tree. Animal species are also diverse and include the takin, black muntjac, Bengal tiger, clouded leopard, white-brow gibbon, red pheasant and other vertebrates comprising 82 of the key species on the national protected list. Also, 15 ethnic minority groups live within and in the vicinity of the nature reserve.

In 1981, pleas from local middle-school teachers and Yunnan University professors, who believed that economic development was adversely affecting the rich biodiversity of Gaoligong, led to the formation of a forestry project area and subsequently a forest park. In 1986, the State Council declared Mt

Gaoligong a national-level nature reserve.[71] It was the second area in Yunnan province to become a national PA, after Xishuangbanna.

In its nearly 20 years of operation, the Mt Gaoligong Nature Reserve has confronted all the predicaments of law, policy, and administration affecting China's PAs. Initially, conflict between local minority cultures and the PA administration threatened biodiversity conservation. The Director attributes the success of Mt Gaoligong (as a nationally recognized PA and the best managed one in Yunnan) to these factors: 'We have a traditional perspective. We apply the laws and regulations with a traditional perspective in mind. We want people, especially the local people, to recognize the importance of biodiversity'.[72] Nevertheless, the lack of a landscape approach to the design of nature reserves means that the PA faces pressures from increases in population outside the reserve in the Nu River area. Also, external economic growth endangers some species, particularly fish, within the nature reserve.

The Mt Gaoligong Nature Reserve has a collection of buildings, situated within the experimental zone of the reserve: dormitories for workers, a rescue center for injured species, an environmental education center (focusing on bird watching), and rudimentary eco-tourism facilities. A well on the reserve supplies water for reserve staff needs and is shared with residents in the experimental zone. The administrative center of the reserve is an hour's drive away in Baoshan city, the headquarters of Baoshan county, and physically across the courtyard from a city office building.

Reserve managers navigate complex relationships with a host of superior and parallel government bodies. The SFA claims supervising authority over this national-level reserve. The Yunnan Provincial Forestry Bureau exercises authority too. (It is a program office with just ten officials.) The SFA is in touch with nature reserve managers once or twice a year only; provincial forestry officials have more frequent contact, about seven or eight times yearly. The provincial office examines construction and work plans and facilitates budgeting for the reserve.

It is the local government that has the most frequent communication with the reserve staff. The Director commented:

> 'In general the municipal government does not have much authority. Yet we are part of the municipal government in many respects. They examine all the laws and regulations; they supervise construction plans. The Baoshan municipal forestry administration also has responsibilities with respect to the protected area. However, its mission is larger. Several thousand people work for it; its responsibilities extend to putting out forest fires. Overall it is a confusing relationship.'

When asked about his relationship with the head of the forestry department of Baoshan, the Director said 'He's my "older brother" in terms of authority'.

Although the nature reserve is not rich in terms of fiscal resources, it is

probably better financed than most PAs in China. The Macarthur Foundation supported the reserve by sending experts and establishing experimental stations (beginning in 1993–94). In 1998, the Netherlands government struck an agreement with China to provide assistance to several PAs in Yunnan Province, including Mt Gaoligong, principally to train personnel. Most of the reserve's funding is from governments. The central government paid for construction of facilities and roads as well as for planning expenses associated with the reserve's development. To establish testing and collection centers for the reserve's work in the inventory of species and critical habitats, the central government has spent RMB$700 000, the province RMB$200 000 and the municipality RMB$400 000 (US$86 313, US$24 661 and US$49 322 respectively). Salary support comes partly from the central government, but mainly in the form of supplements from Baoshan county and Yunnan Province. Only the province and county have budget line-items for the Mt Gaoligong Nature Reserve; at the national level, funding is available in program categories only. Finally, and discussed more fully below, the reserve benefits financially from an eco-tourism enterprise. The budget for the reserve in 2005 is RMB$2–3 million (US$246 000 to 370 000).

Budget figures vary from year to year as do numbers of staff. In 2005, Mt Gaoligong PA had 140 employees; a few years earlier there were 161 employees. Approximately 20 percent of the staff are college-educated, including the Director who took a BSc in zoology at Yunnan University. About 40 percent have 'equivalent training', which means that they may have finished middle or high school and have taken adult education courses on a self-study basis, through a technical institute at the provincial capital in Kunming. The Director commented: 'It is very difficult to do this and requires a high degree of motivation'. The remaining 40 percent of staff (drivers, custodians and the like) have little formal education. The reserve lacks the staff expertise and facilities to conduct scientific work; instead, staff collect samples which are sent to Kunming institutes for analysis.

Given the hostility of villagers to the establishment of the nature reserve, its managers have devoted considerable attention to economic, political, and cultural development projects. During the early phases of reserve evolution, managers allowed a doubling of residents in the experimental zone of the PA. It assisted in the construction of homes. In a combination of protective and economic development work, it helped residents in reforestation and urged them to combine planting crops with planting trees. It encouraged the use of coal and other fuels instead of firewood for cooking fires. Also, the management developed a small methane gas industry and founded an eco-tourism enterprise, the basis of which is birdwatching. Still in the early stage of development, this enterprise has targeted tourists from the US, Europe, and Japan. Its objectives:

1. 'We want tourists to buy local goods in order to improve the local economy, and
2. We want the local producers to improve the quality of the goods they sell, so that they can charge higher prices and make more money. The administration office coordinates the tours.' (Annually the reserve experiences 10 000 tourist days.)

The administration of the reserve has taken a cautious approach to the implementation of species protection laws and rules. Initially, local residents felled trees for building materials and firewood. After a few were arrested for illegal timber cutting, the incidence declined, but there is still resistance. The taking of protected species is a continuing, but somewhat reduced problem:

> 'We still have legal responsibilities to enforce the laws. Now, only a minority of people violate the rules. There are still hunters, and those who despoil the environment. We take hunted products as specimens, when we catch those who are hunting illegally. We show the local people what happened to the culprits. The local people turn the poachers in. This is especially the case for birds; the local people don't kill them anymore.
>
> (Number of violations in recent years?) The record over the last 20 years shows that there are fewer violations now. For hunting violations, the sentence is seven years, but for trading illegal products (poaching) there's a life sentence. We've never had any death sentences for poaching. We do have tigers in the reserve. Some species of tigers are used in traditional Chinese medicine. We regulate this very strictly.
>
> (How is regulation done?) We have our own monitors, and there are forestry police. About 50 cases a year, more or less, are sent to the local court. The cases go from the forestry police to the procurate at the court. In our office we have 10 forestry police. They do work on the violations while we manage things. We collect information on the violations, but we don't capture or prosecute the offenders. That's the job of the forestry police.'

In addition to regulation, the reserve management has an active environmental education program for local residents. A recent campaign objective is to reduce littering inside the reserve boundaries and to keep the protected area clean.

The orientation of the reserve management has become more encouraging of local participation; managers strive to curb adverse reactions of ethnic minorities to the Han Chinese. The 15 minority nationalities share a traditional orientation to the use of the resources in the protected area, which the management acknowledges and hopes to revise through increased environmental education, such as teaching methods of species preservation to collectives, and by encouraging local residents to grow their own plants for eating and use in medicines instead of picking and gathering endangered plant species. The director suggested that management had changed its philosophy: 'We are

changing the old style of being fighters and combative, and instead are emphasizing "love of nature and people"'.

Overall, this approach corresponds with the concept of integrated conservation and development – a form of reconciling the management of PAs to the economic and social needs of local people, while attempting to reduce pressures on species and critical habitats. In the process, the reserve management has worked with local non-governmental organizations (NGOs), such as village biodiversity conservation associations and co-management committees.[73]

The Mt Gaoligong nature reserve is less than 20 years old, and we lack baseline data from the 1980s to determine what its overall impact has been on rare and endangered species and ecosystems. Compared to other PAs reported on here, however, its pragmatic management, attention to the needs of local communities, and traditional philosophy appear to have produced progressive results.

DISTRIBUTION OF PROTECTED AREAS IN TAIWAN

To conserve ecological diversity, the government has set aside 19.6 percent of Taiwan's total land area in a multi-tiered conservation system that includes six national parks, 19 nature reserves, nine forest reserves, 17 wildlife refuges, and 30 major wildlife habitats. Figure 5.2 below displays these protected areas and Table 5.3 sorts them by the protected categories of the IUCN.

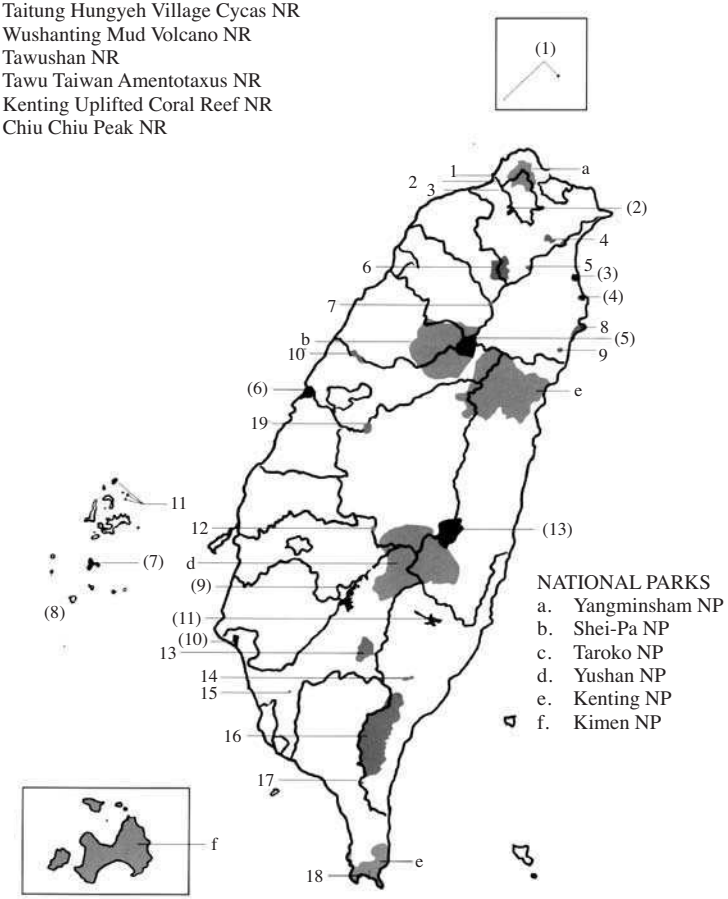
Table 5.3 Categories of protected areas in Taiwan

Name	IUCN categories (I–VI)	Numbers	Size (hectares)	Area (%)
Nature Reserves	I	19	64 777	1.8
National Parks	II	6	322 845	9.0
921 National Earthquake Mountains	III	17	Currently only designated areas	
Wildlife Refuges	IV	13	23 200	0.6
Major Wildlife Habitats	IV	28	296 572	8.3
National Scenic Areas	V	10	469 980	13.06
Forest Reserves	VI	9	21 739	0.6
Total		102	1 199 113	33.36

Source: Shin Wang, 'The Development and Management of Taiwan's Protected Areas', Proceedings of IUCN/WCPA-EA-4 Taipei Conference, March 18–23, 2002, Taipei, Taiwan, see http://www.cnps.org.tw/park-03/WPC-EA4-2002/0%20Plenary%20Session/P13.pdf.

NATURE RESERVE
1. Watzuwei NR
2. Tamsui River Mangrove NR
3. Kuantu NR
4. Pinglin Taiwan Keteleeria NR
5. Hapen NR
6. Chatienshan NR
7. Yuanyang Lake NR
8. Wushihpi Coastal NR
9. Nanao Broadleaved Forest NR
10. Miaoli Sanyi Huoyenshan NR
11. Penghu Columnar Basalt NR
12. Taiwan Pleione NR
13. Chuyunshan NR
14. Taitung Hungyeh Village Cycas NR
15. Wushanting Mud Volcano NR
16. Tawushan NR
17. Tawu Taiwan Amentotaxus NR
18. Kenting Uplifted Coral Reef NR
19. Chiu Chiu Peak NR

WILDLIFE REFUGES
(1) Mien Hua and Hua Ping Islets WR
(2) Taipei City Waterbird R
(3) Lanyang Rivermouth Waterbird R
(4) Ilan County Wuwei Harber Waterbird R
(5) Formosan Landlocked Salmon R
(6) Tatu Rivermouth WR
(7) Penghu Wangan Island Green Turtle WR
(8) Penghu County Cat Islet Seabird R
(9) Kaohsiung Nantzuhsien WR
(10) Tainan City Ssutsao WR
(11) Hsinwulu River Fish R
(12) Matzu Islands Tern R (not shown)
(13) Hualien County Yuli WR



Note: R = Reserve, NP = National Park, NR = Nature Reserve, WR = Wildlife Reserve.

Source: SWAN, Taiwan, 2004.

Figure 5.2 Taiwan's protected areas

Nature Reserves

Following the Cultural Heritage Preservation Act of 1982, the Council of Agriculture (COA) has overseen the establishment of 19 nature reserves in Taiwan. They range from a 5-hectare plot to protect volcanic land forms in Kaohsiung to the 47 000-hectare forest reserve surrounding Mt Tawu. Altogether, about 65 000 hectares fall within nature reserves. Twelve nature reserves are managed directly by the Taiwan Forestry Bureau of the Taiwan Provincial Government. The other nature reserves are managed by such agencies as the Taipei City Government's Bureau of Reconstruction, the Penghu County Government, and the Taiwan Forestry Research Institute. Each managing body is responsible to the COA, which ensures that reserve management follows the law.[74]

National Parks

Taiwan has a comprehensive national park system that balances conservation, recreation, and research goals. The system was inaugurated in 1984 after the passing of the National Park Law, with the establishment of Kenting National Park at the southern tip of Taiwan Island. In 1985 and 1986, Yushan (Jade Mountain), Yangmingshan, and Taroko National Parks were created, in central, northern, and eastern Taiwan respectively. In 1992, Shei-pa National Park was established in north-central Taiwan, and in October 1995, the sixth and most recent national park, Kinmen National Park (occupying 26 percent of the Kinmen Islands) was opened to the public.[75] National parks cover 294 466 hectares, about 8 percent of the total area of Taiwan. In the concluding case study for this section, we discuss plans to add another park to the national system – the Magao Chinese Cypress National Park in northern Taiwan's Chilan Mountain.

National Forest Reserves

Forestlands recognized as possessing unique natural characteristics are classified as forest reserves in Taiwan. These reserves follow multiple-use policies, but preservation is emphasized over development. The COA's Forestry Bureau manages national forests; and since 1965, it has also developed forest recreation areas. In 2005, Taiwan has 16 forest recreation areas based on the Forest Law.[76] The total area of forest reserves is about 22 000 hectares or 0.6 percent of the total area of Taiwan.[77]

Coastal Areas

Taiwan's coastline extends 1566 kilometers, and coastal areas are also

protected within a conservation unit.[78] Along the west coast are numerous estuaries and shallow sea bays with many intertidal mud flats and offshore islands. The north and south coasts have unique geographic features and diverse ecosystems; they support a large number of soft coral reefs. Pacific Ocean waters near the east coast are a habitat for whales and dolphins.

The Executive Yuan promulgated a Taiwan Coastal Area Natural Environment Protection Plan in 1982, and it designated seven coastal protection areas.[79] Another five coastal protection areas joined the list in 1985. Activities detrimental to the environmental quality of these coastal areas are prohibited, and environmental impact assessments are required for any proposed developments within them.

COORDINATION, MANAGEMENT AND FISCAL ISSUES

The most serious problem in the management of Taiwan's PAs is lack of coordination and the inappropriate division of labor among governmental agencies. Coordination problems are rooted in conflict among laws. Article 11 of the National Park Law assigned authority for parks to the Ministry of the Interior (MOI). However, Article 16 of the Forestry Act (1985) states: 'Should a national park be designated in a forest area, the forest area within the demarcated boundaries shall be managed by the agency that is in conjunction with the relevant national park'.[80] For example, when Kenting National Park became Taiwan's first national park in 1984, the park administration had to contend with the Forestry Bureau, two other government bureaus and thousands of residents who farmed, lived, and ran businesses inside the land of Kenting National Park[81] All claimed authority under Article 16 of the Forestry Act.

Policy goals of economic development prevail over the long-term agenda of nature conservation and environmental protection. The Deputy Director of Taiwan's EPA maintained:

> 'There are four major tasks of the management of protected areas: conservation, protection, development and resource utilization. At the current stage, all these four tasks belong to the jurisdiction of one single administration unit. For instance, the conservation, protection, development and resource utilization tasks of the forest belong to the jurisdiction of the Forest Bureau of the COA. In order to improve its records of performance, the natural tendency of the Bureau is to promote development and profitable utilization of forest resources. Tasks for conservation and protection are put aside and neglected.'[82]

Yet the territories of national parks and national forests overlap by as much as 90 percent in some cases. The supervising agency for national parks is the

MOI, while national forests are under the jurisdiction of the COA. Overlaps of administrative functions, as well as contradictions in conservation and development goals, lead to serious problems of management. Major issues in protected areas such as environmental protection, species conservation, eco-tourism, and disaster alleviation fall under different governmental branches, including the Bureau of Forestry in COA, the Bureau of Soil and Water Conservation in COA, the Department of National Parks in the Construction Administration of the MOI, the National Parks Department of the Tourism Bureau of the Ministry of Communication, and the Forestry Department of the Vocational Assistance Commission for Retired Servicemen (VACRS).

A proposed resolution of these conflicts would be the establishment of a new Ministry of Environment and Resources (MER). A new Administration of Forestry and Natural Conservation within MER would be the protector of conservation units, leaving COA as a development agency. Also, current plans are to integrate forestry, national parks, eco-tourism, biodiversity conservation, disaster management, and academic research into one single governmental branch.[83]

In Taiwan, which funds its PAs handsomely in comparison to China, the recent budgets for natural conservation and protection have shrunk. Economic development and tourism have become the major policy goals. For instance, in the budget year 2001, research and planning expenditures for natural conservation comprised just 0.02 percent of the total budget. In contrast, expenditures for construction and engineering comprised 55 percent. When compared to the year 2000 budget for parks, expenditures on conservation (including personnel salaries) were 58 percent lower, but the construction budget declined by only 7 percent.[84] Staff members responsible for conservation and interpretation were among the first to be made redundant.

The purpose of establishing national parks is to preserve Taiwan's unique natural scenery, wild fauna, flora, and historic sites, and provide public recreation and areas for scientific research.[85] Yet park officials, facing central and local budget shortfalls, have had to become entrepreneurial. They have developed new attractions to bring visitors to the parks (and this boost in tourism would seem contradictory to the intent of policy). From 1995–2004, visitors have more than doubled.[86] New construction in the parks for the accommodation of tourists has made them look nearly urban and resulted in degradation of the protected areas. Also, new man-made structures have disturbed the lives of animals and plants residing within the parks.[87]

The Proposed Magao National Park in Taiwan

Taiwan's protected areas operate in a newly democratized culture, which is especially apparent in the proposal to establish a new park in northern Taiwan.

The proposal is noteworthy because it would encompass aboriginal villages. To the present day, national parks in Taiwan have used Yellowstone National Park as their model and prohibited local indigenous residents from living within them.[88] They also disallow customary aboriginal activities and cultural practices, such as hunting and gathering. The result has been to separate aboriginal culture from the aboriginal lands located in national parks. (About 90 percent of the land area of Taiwan's six national parks was originally the territory of aborigines.)

The proposed site is also the original location of stands of cypress trees. During the colonial era, firms began to cut the cypress trees to meet increasing demand in Japan for building materials. Logging cypress trees increased in the post-war era. In the late 1980s, conservationists launched a forest protection movement to curb deforestation of mountainous areas, and in 1989 a moratorium took effect, by which time many aborigines had been forced to relocate.[89] By the late 1990s, conservationists and aboriginal people demanded the establishment of a national park to save ancient forests in the cloud zone of Chilan Mountain area (about 1200–2000 meters in elevation) of northern Taiwan.[90]

The COA responded by designating a 'Yuanyanghu Natural Reserve' within the Chilan Mountain area as a protective area for the cypress forest, and in 2000 it was upgraded to the Chilan Important Wildlife Habitat. However, the administrative agency responsible for the Chilan area was the Forest Protection Department of VACRS[91], and it continued to take cypress trees from the forest. The VACRS officials contended that workers cut down only dead trees and cleared logs on the forest floor of the old-growth forest for the health and regeneration of the forest. Scientific researchers and forestry experts in universities and the Taiwan Forestry Research Institute verified these claims, yet environmental activists and ecologists disagreed. They insisted that the cypress forest did not require human intervention and that logging activity would damage the old-growth forest. They also argued that VACRS logged dead trees for its own profit (drawn by the high market price of Taiwan cypress), and that no forest agency monitored VACRS logging activities. Moreover, activists (including ecologists) emphasized the importance of brush and logs in a healthy forest ecosystem, for the role they play in nutrition cycling and as a habitat for diverse animals and plants.[92]

Environmentalists were suspicious of the three government agencies administering policy in the Chilan region. They argued that the Forest Bureau, the Taiwan Forestry Research Institute, and VACRS, had a pro-development bias and were not protecting the area. For this reason, they sought to have the area classified as a national park, because under the National Park Law of 1972, land-use provisions are somewhat more strict and none of the three suspected agencies had regulatory authority. In early 2000, it was the national

park authority that began conducting evaluation research. The proposed park would cover 53 000 hectares, including four aboriginal villages in the northern Taiwan counties of Taipei, Ilan, Taoyuan, and Hsinchu.[93] Initially, the plan was to call it the Chilan National Park, until aborigines objected. 'Chilan' means orchid habitat in Chinese as there are many orchids on Chilan Mountain. However, the Tayal name for Chilan Mountain is Magao, which means 'spicebush'.[94] An aboriginal villager explained objections to the name Chilan at a meeting sponsored by the national park authority:

> 'The Tayal name of the Chilan area is "Magao," in memory of a battle against the Japanese invasion in the early 20th century. Now the cypress trees in Chilan Mountain are almost all cut out, and they have been replaced with cedar, not cypress. The national park is supposed to protect the cypress forests, but they are now preserved well in Yuanyian Lake and the Shuie-bai mountain area, so the name falls short of reality. Therefore, it is best to name it Magao National Park.'[95]

President Chen Shui-bian supported the aboriginal position.[96] Within six months of his government taking office, DPP legislators moved to amend articles of the National Park Law to permit traditional aboriginal practices such as hunting and gathering.[97] The national park authority set up an Advisory Committee for the establishment of the park as a participatory regime including local residents, particularly the Tayal people.

Furthermore, the DPP government promised that the Magao National Park would be co-managed with aborigines, and protection of their interests and conservation of their culture would be the principal aims.[98] Despite opposition from the Forest Protection Department of VACRS, in mid-2003 the DPP cabinet officially delineated the proposed area. The new park's 53 600 hectares would include 900 hectares of primeval cypress forest and be inhabited by some 30 000 persons, most of whom are Atayal. Revision of the National Park Law made the MOI responsible for holding dialogs with the Atayal indigenous people to develop a model for park management. The park administration promised to provide employment opportunities and training for indigenous people, to serve as forest guides and conservation inspectors, and said it would cooperate with indigenous people in developing ancillary services.[99]

However, Taiwan's partisan politics intruded on these plans. Opposition parties sought out grassroots government and some aboriginal leaders.[100] Aboriginal legislators objected to the government's planning, by insisting that the National Park Law be amended to include a provision providing for the welfare of the aborigines before work on the park began.[101] They also called on the Legislative Yuan to pass the Indigenous People's Autonomous Area Law to protect the basic rights for aboriginal people. These controversies led the Legislative Yuan to freeze the budget of Magao National Park. The MOI began to establish collaborative efforts with the aboriginals. At the preliminary stage,

the government will help preserve aboriginal culture through restoration of relics and original buildings. To foster economic development within the national park, the government is prepared to support aboriginal handicrafts, hire aboriginals to organize forest and wildlife restoration and make up inspection teams, and rebuild the infrastructure according to the needs of the aboriginal tribes. The government's mid and long-term goals are to strengthen the aboriginal production system and promote eco-tourism.[102] The ultimate goal is to establish a co-management system for sustainable development in this minority area.

CONCLUSIONS

In this chapter we have considered two different systems of protecting biodiversity through the establishment of PAs. China's system is enormous, including a total area greater than several large European countries. Yet China and Taiwan have approximately the same percentage of land (15–19 percent) in categories designed to protect species and ecosystems.

The system in China evolved differently than that in Taiwan. China was slow to establish reserves; then, in the late 1980s, PAs grew rapidly, and in recent years over 200 reserves have been established. This rapid rate in expansion must account for the several difficulties discussed in financing and managing the PAs. In contrast, the expansion of protected areas in Taiwan was more gradual.

The Chinese system is far simpler than that in Taiwan. Most PAs have identical structures: core areas, buffer zones, and experimental zones, with invariant restrictions for each zone, irrespective of differences in ecosystem type, species protected, or socio-economic conditions of the area. China's is a one-size-fits-all approach. Taiwan, on the other hand, uses the IUCN categories, which permit a range of uses such as nature reserves, national parks, wildlife refugees, and national scenic areas, each with different purposes and accompanying restrictions. Our interviews in China revealed great interest in adopting the IUCN categories. Clearly, it would be to China's advantage to transform many of its nature reserves into national parks. This would increase the flexibility of China's system.

Our examination of challenges to the system revealed differences and similarities in management and operations. Protected areas in both jurisdictions have large problems of administrative organization and coordination, because several agencies have missions with respect to biodiversity conservation and land-use management. However, these conflicts and inefficiencies are not unique to China and Taiwan. Also, administrative and coordination problems are especially prevalent regarding environmental issues.

Problems of financing PAs are far greater in China than in Taiwan. This reflects primarily the difference in economic development rates of the two states. Only in the twenty-first century, after nearly two decades of very rapid economic growth, is China able to allocate more resources to biodiversity conservation, as seen in recent budget increases. Taiwan is not without fiscal problems, and these do affect the incentives of reserve managers. When state contributions shrink, they search for other revenues to support operations, which may impair conservation objectives.

China has far greater problems of human resources and training of PA personnel than Taiwan. This too reflects differences in economic development. Fewer resources allocated to conservation units, especially by provinces and municipalities, means fewer staff. It also expresses the more limited spread of secondary and post-secondary education in China. Only within the last decade have colleges and universities developed degree programs for this type of environmental management.

Finally, the two systems differ in their treatment of local populations. In China, most PAs are in rural areas where residents of experimental zones or adjacent villages may be quite poor. This imposes serious obstacles on managers who, by rigidly protecting plant and animal species, appear to diminish livelihoods of residents. In these circumstances conflicts are unavoidable. Taiwan is a comparatively rich state, and its managers encounter fewer problems of this nature.

The interactions of minority populations with the PA system differ also. A part of this difference is economic, as China's minorities are poorer than Taiwan's aborigines. Yet the most glaring contrast is attributable to political system differences. China's approach to minority cultures has been authoritarian and 'top-down'. No system of co-management has been applied systematically. Several pilot programs have developed to involve minorities in PA planning, but most of these are sponsored by foreign NGOs such as TNC, CI and WWF. This is not to suggest that Taiwan has found a solution to the need for PA systems to partner effectively with cultural minorities. In fact, most PAs in Taiwan are on lands once occupied by aborigines, now displaced. Yet the democratic political process has made even small populations, such as the aboriginal one, of political value. Parties compete for aboriginal votes, which requires them to champion aboriginal interests.

ENDNOTES

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4. Quoted in the Division of Wildlife Protection, SFA (2003), *Study on China's Nature Reserves Policies* (in Chinese and English), Beijing: China Forestry Publishing Co., p. 236.
5. Ibid, p. 237.
6. Ibid.
7. See Xie Yan, 'Review on the management system of China's nature reserves', in Xie et al. (2004), p. 317.
8. Personal interview with Professor of Ecology, Beijing, 10 January, 2005.
9. Ibid, pp. 317–18.
10. The number 'nearly 2,000 nature reserves' is reported in the 2004 publication edited by Xie, Wang, and Schlei (2004), op cit, n. 2, p. 281. Government sources list several numbers, with the variance explained by time of publication and whether the source includes the most recent figures from provinces and special administrative regions. Respondents to interviews in May 2005 all mentioned 'more than 2,000' protected areas. One, an upper-level manager in SEPA, said that 'by the end of 2004, China had 2,195 PAs, covering 148 million hectares'. Personal interview, Beijing, 19 May, 2005.
11. Xie et al. (2004), op cit, n. 3, p. 281.
12. Xie Yan and Li Lishu (2004), 'Gap analysis on nature reserve system in China', in Xie et al. (2004), op cit, n. 3, p. 518.
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15. Ibid, p. 519.
16. Xie Yan, in Xie et al. (2004), op cit, n. 3, p. 322.
17. Ibid.
18. Personal interview with official in SFA, 21 May, 2005.
19. Xie et al. (2004), op cit, n. 3, p. 274.
20. Ibid, p. 283.
21. Xie et al. (2004), op cit, n. 3, p. 284.
22. Ibid, p. 286.
23. Xie et al. (2004), op cit, n. 3, p. 286.
24. Harkness, James (1998), 'Recent trends in gorestry and conservation of biodiversity in China', *China Quarterly*, (156) (December), 921.
24. See Wang Xiaomi (2004), 'The Perfection of the legal system of nature reserves in China' (in Chinese), WuHan University, MS thesis.
26. Xie et al. (2004), op cit, n. 3, pp. 518–23.
27. Xie et al. (2004), op cit, n. 3, p. 325.
28. From IUCN, 1994.
29. Xie et al. (2004), op cit, n. 3, p. 338.
30. Personal interview with SFA official, Beijing, May 27, 2004; and personal communication, March 30, 2005. See also Wang Xiaoyang (2003), 'Legal issues of wetland nature reserve managed by multi-departments', *Forestry Inventory and Planning*, **4** (December), 14–17.
31. Xie et al. (2004), op cit, n. 3, p. 275.
32. Personal interview with ENGO representative, Beijing, 11 June, 2004.
33. Xie et al. (2004), op cit, n. 3, p. 345.
34. Examples of mitigation measures proposed by nature reserve managers include:
    'The West to East Pipeline bisected several NRs and provided compensation, and the major highway that will cut through Mengyang NR in Xishuangbanna will be raised off the ground for some sections to allow elephants to pass underneath, the Golmud-Lhasa railroad was designed to allow Tibetan Antelope to continue their migration between two

PAs, and a railway scheduled to be built inside the Cao Hai NR was resited elsewhere.' (Xie et al. (2004), op cit, n., p. 287.)

35. Personal interview with a government-organized NGO representative, 2 January, 2005.
36. Personal interview with planning institute researcher, Chinese Academy of Social Sciences, Beijing, 18 January, 2005.
37. Xie et al. (2004), op cit, n. 3, p. 329.
38. Ibid, p. 285.
39. Xie et al. (2004), op cit, n. 3, p. 329.
40. Critical Ecosystem Partnership Fund (2002), 'Mountains of Southwest China hotspot', 12 June, 17.
41. Ibid, p. 288.
42. One knowledgeable observer, a forestry professor who consults with the SFA, believes this will change. In his estimate, within 5 years all operating expenses of national-level PAs will be defrayed by the central government (personal interview, Beijing, January 10, 2005). Yet China's spending on all areas of environmental protection is less than 1.5 per cent of GDP. See Qin Chuan (2005), 'Billions more needed for environmental protection', *China Daily*, 30 March, p. 1. Fully funding all PAs at adequate levels would likely take twice this amount.
43. Xie et al. (2004), op cit, n. 3, p. 328.
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46. Harkness (1998), op cit, n. 24, p. 929.
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52. Ibid, p. 290.
53. Personal interview with SFA official, Beijing, 5 July, 2004.
54. These statistics are drawn from Xie et al. (2004), op cit, n. 3, pp. 327–28. The total number of staff is a rough estimate and may be greater or smaller by several thousand. For a more comprehensive analysis, based on an evaluation index system, see Li Xiaobo (2000), *The Evaluation Index System and Sustainable Development Model of Chinese Forest, Wetland, and Wildlife Nature Reserve by Social Forestry Engineering*, Beijing, Chinese Academy of Forestry, PhD thesis.
55. Deng Weijie and Li Shengzhi, 'Report on capacity building of nature reserves in China', in Xie et al. (2004), op cit, n. 3, pp. 554–83. The sample contained more national-level nature reserves than found in the universe. It heavily over represented Sichuan Province (48 of the 56 nature reserves were in Sichuan), which is a hotspot under observation by CI since 2002.
56. Ibid, pp. 561–69. These data on educational background of reserve staff represent an improvement in qualifications. An earlier survey of 217 nature reserves indicated:

    'Of the 9,112 present staff, those with 4-year undergraduate education and above are 288, making 3.16 percent of the total; those with 2-year or 3-year specialized education are 1,753, making up 19.25 percent of the total; 4,646 persons are with junior or senior middle school education, making 51.0 percent; and others 2,423 persons comprise 26.6 percent.'

See Division of Wildlife Protection, SFA (2004), *Study on China's Nature Reserve Policies*, Beijing: China Forestry Publishing, pp. 246–47.

57. Ibid, p. 573.
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6. Business organizations and biodiversity conservation

Previous chapters have treated population growth, enlarged agricultural and housing footprints on the land, and actions of governments – in particular the development of infrastructure – as major causes of ecological degradation in China and Taiwan. In this chapter we consider the role that economic organizations have played as drivers of environmental change. Due to the rapid industrialization of both Taiwan and China in the post-World War II era, our focus will largely be on business enterprises.

The chapter begins by describing the domestic organization of factories and businesses in China and Taiwan. Then we turn to the relationships between enterprises (and business groups) and the state, asking both about the degree of autonomy in business organizations and the degree of penetration by the state into the decision making of business firms. At first glance the question may seem irrelevant to the protection of rare and endangered species and ecosystems. Yet if the state includes important business interests in developmental decision-making (a state-society relationship called corporatism) and if environmental conservation values are among the core interests of the State,[1] then actions of enterprises are more likely to preserve species and ecosystems. This at least has been the experience of a number of countries which are leaders in environmental policy globally, leading to an important hypothesis in the literature of comparative environmental politics: corporatism is more conducive to benign environmental outcomes than pluralism (or other forms of state-society relationships). This discussion prefigures the examination of environmental non-governmental organizations (ENGOs) and civil society in Chapter 7.

A special focus of this chapter is the role that foreign multinational corporations play in China and Taiwan. Multinationals are potential agents of diffusion to host countries, not only of technology and capital but also of environmental practices. We ask whether they have been progressive or regressive forces through their operations in China and Taiwan, and consider four cases briefly – the Lin Yuan petrochemical complex and Bayer in Taiwan, then Shell and EDAW in China. The final section of this chapter is a test of another hypothesis in comparative environmental politics: the 'race to the bottom'. We ask whether the exponential increase in the asymmetric trade

between Taiwan and mainland China has worsened or improved environmental outcomes.

DOMESTIC ORGANIZATION OF BUSINESS IN CHINA

Until the late 1970s, the Chinese economy was fully socialist. The state controlled the production and distribution of goods and services through state-owned enterprises (SOEs). The SOEs fell under one of four levels of government: central, provincial, municipal, or county. Enterprise directors attained their posts through the elaborate nomenklatura system dominated by the Communist Party, not because of their qualifications as entrepreneurs; and they held control irrespective of the performance of the factories or firms. No SOE went bankrupt. Because the state controlled all significant enterprises, it could influence their actions. However, in its first three decades the Chinese state lacked any core interest concerning the preservation of biodiversity, and enterprises wasted nature.

By 2005, goods and services in virtually all economic sectors were allocated by the market, and most prices now reflect forces of supply and demand. Economic reforms under the leadership of Deng Hsiaoping changed fundamentally China's economic structure, but did not eliminate the SOEs. By the end of 1993, China had about 130 000 SOEs. Then they accounted for approximately half of industrial output (but received 90 percent of government subsidies).[2] By the twenty-first century, the economic share of SOEs had fallen to around 35 percent, but they remained important in core heavy industrial areas such as oil production, coal mining, machine building, and utilities.[3] As we note throughout, oil/gas exploration, development and transportation, as well as hydropower development, pose great risks to threatened species and ecosystems. The SOEs' relative lack of productivity and profitability[4] remains one of China's largest economic difficulties, addressed haltingly by the regime, because they provide income and job security to millions of workers.[5] For example large-scale layoffs in the state sector reduced SOE employment to 78 million by 2002, and caused unrest because the non-state sector was unable to absorb the large number of unemployed workers.[6]

After the reform era began in 1978, a few pilot programs delegated decision-making authority to managers and instituted rewards for performance. Since 1984, factory directors have become responsible for decisions, which greatly increased the autonomy of SOEs. Reforms in the late 1990s emphasized 'ownership restructuring' in SOEs, but in the estimation of observers, the somewhat diversified ownership structure has not motivated officials to 'refrain from opportunism and act like true owners'.[7] Thus, while SOE directors and managers have greater autonomy, the nature of their

authority is still unclear. Supervising bureaucratic agencies have less control over them than was the case before reforms began. With respect to our questions on the implementation of biodiversity conservation policy, they would seem to be an unpredictable agent, with their willingness to curb environmentally damaging but economically profitable proposals dependent on the nexus of bureaucratic politics in which they operate. In this context, the salience of biodiversity conservation interests is a critical determinant. Several cases discussed in this volume concern SOEs. For example, in the West-East Pipeline Project, Sinopec initially sought to override environmental objections to its proposed pipeline routing, but in negotiations changed its position. Also, the Nujiang hydropower development controversy (discussed in Chapter 8) is thought to have been brought to a head because of the breakup of the national monopoly controlling electrical generation, and the resulting competition for market share of regional state-owned energy giants.[8]

The most dynamic parts of the economy, however, are the Township and Village Enterprises (TVEs; *xiangjen qiye*) and private enterprises. In the initial stages of economic reform, TVEs had an ambiguous legal status, as they were owned collectively by all rural residents of the township or village in which the enterprise was located (but increasingly managers of TVEs operated them as if they, the managers, were the actual owners). In 1993, there were approximately 1.3 million TVEs, and they then produced about 30 percent of national industrial output (rising to 40 percent by 1996),[9] yet received less than 10 percent of state subsidies. Town and Village Enterpises, which are small and generally productive, are considered part of China's non-state economic sector.

When the number of firms and employment in TVEs declined somewhat in the 1990s, these local government-owned enterprises began to privatize. By 2000, more than a million such firms in rural China had privatized, a huge number on both the Chinese and global scale. However, the pattern of privatization differed from that in most other countries, as the firms were sold to insiders, usually their managers, and not to outsiders. Upon privatization, the firms increased their profitability.[10] Through this process, managers-turned-owners attained autonomous decision-making powers and had a strong incentive to increase profitability,[11] which would influence their treatment of environmental issues. That is, they were inclined to emphasize the short-term bottom line at the expense of preserving local ecosystem values. For example, an environmental activist reported on the TVE he had observed in 2002, while conducting environmental education activities in Inner Mongolia:

> 'At one site, we saw a paper mill which was discharging waste water into nearby fields, and this poisoned cattle. On our return to Beijing, I informed SEPA. The agency sent out an inspector who verified what we had seen. But the result was not what we had hoped for. SEPA said it had found sufficient evidence to close the

> plant, but the local government had invested in it; essentially, it was owned by the local government … Only the government of the autonomous region could close it, but obviously it didn't want to do so as it would lose revenue.'[12]

Yet other observers suggest that, in general, privatization of TVEs may lead to shrinkage of enterprises that 'are inefficient, waste resources, and cause excessive environmental damage relative to their economic contribution'.[13] However, while competition may reduce the number of inefficient TVEs, it will not necessarily cause them to adopt conservationist interests in the near-term, meaning that they, like SOEs, increase the challenge to environmental sustainability.

A second part of the non-state sector is composed of Chinese joint ventures of foreign firms, usually multinationals. At the outset of economic reforms, these were few in number, but with China's drive for foreign direct investment (FDI) in the 1980s, they mushroomed. We discuss western multinationals below.

The third part of the non-state sector is composed of individual and family proprietorships, which are equivalent to Taiwan's small and medium-sized enterprises (SMEs). Most of these businesses are concentrated in the service sector (for example, restaurants, hair salons, convenience stores), and their output value has been increasing faster than that of agriculture or industry. Their number has increased greatly too, but they comprise a relatively small part of the Chinese gross domestic product (GDP) and pose less of a threat to biodiversity conservation.

Overall, the non-state sector has been the most dynamic part of the Chinese economy since the 1980s and accounts for over half of Chinese GDP. Within the non-state sector, TVEs present the greatest challenge to local ecosystems. Those SOEs involved in energy production, as we shall see, are a threat on the regional scale.

STATE-BUSINESS RELATIONS

The relationship between states and economic organizations, such as factories and business firms and their representatives, varies cross-nationally. In broad terms, groups may organize freely and stand in opposition to the state, a bottom-up system called 'pluralism' (which depends on a civil society), or the state may organize groups and direct their energies, in a top-down system called 'corporatism'. Our discussion focuses on businesses (and to a lesser extent with labor organizations) in China and Taiwan, and whether they compete freely or are directed by the state largely is explained by the period when industrialization occurred in the nation and the strength of the state at that time.

Most pluralist systems saw the state developing strength after industrialization had occurred, and both labor and business interests had organized collectively. This was the pattern in both the United Kingdom and the United States. Most corporatist systems saw the development of a strong state first, whereupon industrialization occurred and business and labor interests organized, but under the influence of the state. In both China and Taiwan, the state developed strength before the full onset of industrialization, predisposing them to state influence on business growth and activity.

The Concept and Utility of Corporatism

Corporatism has meaning in contradistinction to *pluralism*, which is a bedrock idea in the formation of civil society. The pluralist approach conceives of the market (and the broader society) as configured into different interest groups and associations. The groups are voluntary associations, free to organize and gain influence over state policy equivalent to their political resources. The state may or may not intervene regularly in the market, but it serves as a real or potential arbiter of market conflict. In pluralist systems, the state appears to be weak, in the sense that it can be penetrated by the strongest interest groups, frequently by dominant business groups and coalitions. Thus, the direction in which the state is influenced is the outcome of interest group conflict.

Corporatist systems,[14] on the other hand, are those in which the state may be strong enough to formulate economic policy without becoming captive to rent-seeking groups. Whether strong or weak, the state is actively involved in the market, and attempts to influence the use of both public and private resources in accord with a vision of how the industrial structure of the country should be evolving. Unlike pluralism, where there may be open competition between groups in society and where groups are potentially equal and have access to centers of political authority, corporatism observes a hierarchy of interest representation and unequal access that is institutionalized. Both business and labor unions are hierarchically ordered, which has obvious implications for environmental movements challenging business power. The corporatist perspective does not ignore the development of new social forces but denies them autonomy.

Corporatist institutions configure a system of interest representation in which a small number of strategic actors (invariably capital, and sometimes labor), which are organized in peak associations, represent most of the population in an 'encompassing' fashion. Pluralist institutions, on the other hand, shape a large number of atomistic interest groups engaged in a competitive struggle to influence national policy. Two recent studies suggest that corporatist institutions are more likely to reduce pollution levels than pluralist ones.

Crepaz asks whether corporatism retards pollution, because the inclusive structure of corporatism allows the internalization of externalities. This hypothesis is based on Mancur Olson's argument[15] that the more encompassing organizations become, the more their interest and the general interest converge. Corporatism, Crepaz suggests, uniquely resolves collective action problems, limits transaction costs, and reduces uncertainty, and this enables it to tackle environmental problems.[16]

A second study, by Scruggs (1999) also argues that there is a robust positive relationship between corporatist institutions and national environmental performance. Just as corporatist institutions promote economic public goods (for example, wage restraint), so they provide non-economic public goods by overcoming collective action problems characterizing environmental sustainability.[17]

Why might corporatist institutions be more conducive to environmental regulation of production than pluralist ones? Scruggs suggests several reasons. First, under corporatism, the government retains the threat to use direct regulation. Second, monitoring and enforcement, necessary to effective environmental regulation, are more acceptable when there is a history of producer-government trust. Third, corporatist institutions seem to have a better ability to pursue public goods than do pluralist ones, because of three factors: 1) national peak associations have power over local units and can reduce parochial interests and avoid policy paralysis; 2) corporatist arrangements have better schemes to compensate losers with economic adjustments, and thus socialize the distributional costs of environmental policies; and 3) producers in corporatist states are active agents in resolving environmental problems.[18]

These studies concern the role of the state and business in the reduction of atmospheric pollution. This is a different environmental issue than biodiversity conservation. Air pollution is relatively easy to measure and in most nations (including China and Taiwan) the issue has higher salience than the preservation of species and ecosystems because of its direct impact on human health. Endangerment of non-human species and ecosystem degradation are less immediate and typically affect humans indirectly. Yet there is no reason to suspect that the form of state-society relationship will be unimportant to mitigation of disturbances.

Applications to China and Taiwan

Most scholars studying the impact of different models of state-business relations have worked in the capitalist and liberal environments of North America and Europe, and one should not assume that the concepts are of immediate applicability to China and Taiwan. Yet a number of scholars have

tussled with their applicability, given the increase in number of social groups following industrialization and some political liberalization.[19]

In China, there has been a veritable explosion of economic organizations in the 1980s and 1990s, matched by a proliferation of environmental groups in the 1990s (discussed in Chapter 7). During the 1980s, as the economy liberalized, the government created a large number of business associations. The structure of the non-governmental associations (*minjian xiehui*) resembled the corporatist type found in Taiwan at that time, for they were officially registered and only one organization represented each sector. The party-state still controlled the structure and personnel of most associations in the 1990s, but some had demonstrated independence. This prompted a United Front Department official to opine that 'the non-public economic sector … has started to seek the political means to protect its own interests'.[20] Studies of labor organizations also pointed to evidence of autonomy in unions.[21]

The degree in autonomy of economic organizations vis-à-vis the state is the crucial issue, and most analysts have cautioned that while the Communist Party remains in charge of the state, it will continue to monitor social groups, curbing their independence. In recognition of this, the hybrid concept 'state corporatism' is used by several scholars to capture the growth of social groups consequent to economic change, within the framework of a Leninist party-state.[22] This does not satisfy all scholars who seek to explain the state's continued domination of labor, through the All-China Federation of Trade Unions,[23] and state-business relationships in rural areas.[24]

Saich summarizes the general applicability of the corporatism concept to China:

> '[C]orporatism as a theory captures well the top-down nature of control in the system and how citizens are integrated into vertical structures where elites will represent their perceived interests. However, such explanations risk obscuring both important elements of change and oversimplifying the complexities of the dynamics of the interaction … New social organizations, for example, can have considerable impact on the policy-making process by retaining strong linkages to the party and State, far more than if they were to try to create an organization with complex operational autonomy … These social organizations with close government links often play a more direct role in policy formulation than in other developing countries as they do not have to compete in social space with other NGOs for dominance and access to the government's ear on relevant policy issues.'[25]

During this transitional phase of state-society relations in China, perhaps the most that can be said is tautological: groups with linkages to the state have new avenues for influence and may embed some of their environmental goals in policy.

Our question is how economic organizations as major drivers of environmental change (such as loss of biodiversity) are connected to the state. In

Chapter 4 we pointed to the lack of integration and centralized unity in the institutional framework of biodiversity conservation, which is consonant with Lieberthal's discussion of 'fragmented authoritarianism'.[26] The fragmented nature of the policy structure does open up opportunities for economic and environmental organizations, principally in the absence of a basic consensus on issues. Social groups thus have the opportunity to negotiate and bargain until a new consensus is formed. As Unger notes:

> 'If China is to attain an organized "public space" of the type that is projected by theories of civil society, it is likely to be through this route of associations gravitating from state corporatist to a societal corporatist mode of organization.'[27]

Thus, the somewhat fluid nature of the Chinese corporatist system gives opportunities to business enterprises and also to environmental organizations.

The state-business relationship in Taiwan has long been described as dominance of the 'developmental state', which has four elements:

1. A coherent, effective bureaucratic system. The system is led by technocrats and 'pilot organizations' as a whole. Rational bureaucrats initiate policies pertinent to export-led growth, and avoid rent-seeking behaviors from the business community.
2. An authoritarian political system to suppress political as well as economic demands from the society. The authoritarian system protects the state's autonomy from social and business penetration.
3. Direct intervention of the state into economic life. The state picks the 'winner' and reorganizes domestic business structures to implement economic goals initiated by the bureaucracies.
4. East Asian developmental states are embedded in a Confucian political culture emphasizing public instead of private interests. This cultural background fosters the emergence of a strong state.[28]

Consonant with the developmental state model, during Taiwan's authoritarian era, business interests were channeled through the patron-client framework of the one-party political system. By means of condensed networks with local factions and state-owned enterprises, the Taiwanese business community developed a reciprocal relationship with the authoritarian state. The rise of new social forces in the era of democratization influenced patterns of state-business interaction. Domestic big enterprises consolidated their relationships with the state through direct participation in electoral politics. Large firms also formed strategic alliances with the ruling as well as opposition parties to enhance their political influence. They made campaign donations and helped establish policy think tanks for politicians. For SMEs, the common way to increase political power was to establish business associations. This

maximized political influences through collective action such as informal group consultation and lobbying.[29]

The 1980s and 1990s were also decades of rising social consciousness and mass movements in Taiwan. Of these social groups, the environmental and labor movements influenced enterprises the most. Anti-pollution activists launched 108 protest campaigns in total between 1981–88. Most of them targeted large enterprises such as Formosa Plastics and Du Pont's proposed chemical factory in Lukang.[30] In the 1990s, labor strikes and conflicts with management became more frequent. Civic protests reminded businesses of the need to participate in the state rule-making process so as to accommodate rising social challenges. Involvement in politics was the most effective way to retain corporate influence.

The transition of political power in the year 2000 did not change the basic structure of state-business relations in Taiwan. The Democratic Progressive Party (DPP) co-opted owners of some business groups as major economic and political partners through the establishment of the National Advisory Group. Core members of the National Advisory Group, such as Yin Qi of the Continental Engineering Group, then won large government contracts such as Taiwan's high-speed railways. The DPP government successfully penetrated state-owned enterprises and rewarded its political supporters with Chief Executive Officer (CEO) posts in these enterprises. Many pro-DPP enterprise groups also gained from the privatization of former state-owned enterprises. In brief, the DPP inherited many of the state-business networks established during the KMT's 40 years of governance. Overall, the state included business interests in a corporatist-type system, but the new democratic context required the ruling party to solicit business support. As we note below with respect to biodiversity conservation, the state has paid relatively greater attention to business pressure than during the authoritarian era.

THE SPECIAL ROLE OF MULTINATIONAL CORPORATIONS

Multinational corporations have had both positive and negative impacts on environmental outcomes in China and Taiwan. International business corporations have diffused environmental protection policies to China and Taiwan chiefly through the process of global standardization. The impact of this source of change has accelerated as both China and Taiwan have become more dependent on foreign trade, investment, and credit. China's standardization laws have increasingly incorporated the recommendations of international commissions, particularly those of the International Organization for

Standardization. This organization's work largely is driven by companies in advanced industrialized countries.

Second, two world scale events in China – the 2008 Olympic Games and the 2010 Expo Shanghai – already have stimulated the diffusion of environmental technology. The central government promises that the events will be 'green', and has emphasized environmental protection projects and renovation. Examples of environmental technology already scheduled for purchase from abroad are catalytic agents for garbage treatment, natural gas engines, auto emission purification equipment, medical waste incinerators, and water recycling equipment.[31]

International standards promoted by multinational corporations have had an even more direct impact recently in Taiwan. Representative agencies of multinationals in Taiwan, particularly the American Chamber of Commerce and the European Council of Commerce and Trade, have pressured the government to improve environmental protection, while emphasizing the use of market-based incentives instead of traditional command-and-control means. For example, the 1999–2000 'Taiwan White Paper' of the American chamber asked government agencies to 'add environmental value in their daily work', and to focus efforts to 'improve quality of life in Taiwan while preserving the ecosystems that shelter diversity of species or guarantee the continued provision of natural services'.[32]

Both China and Taiwan, however, have suffered from the behavior of those multinationals able to afford investments which do not degrade the environment, but which are unwilling to do so. These corporations threaten to retreat from China or Taiwan, and may stage 'investment strikes' to bargain for a better investment environment.[33] In the case of Taiwan, such an 'opportunist strategy of bargaining' has had a significant impact in slowing implementation of environmental protection measures, because the state and major elite groups believe in the necessity of keeping large corporations, particularly in petrochemicals, nuclear power and other highly polluting industries, as a sign of national economic strength and maturity. Diffusion itself is a neutral concept, and this type of behavior indicates that it may have adverse consequences as well as positive ones.

For multinational firms, the image their activities in host countries project may affect the bottom line, and thus, whether they are 'green' and evoke a sense of 'corporate social responsibility (CSR)' in their operations is a matter to be taken seriously. Behaviors of multinationals may indeed be directed at the improvement of environmental outcomes. According to Flaherty and Rappaport (2002), exemplar multinationals 'seek greater uniformity in process, production and product standards', and see significant competitive advantages in environmentally benign policies.[34] On the other hand, critics of corporate environmentalism term the 'greening' of business 'greenwash'.

They regard it as a public relations gesture to comfort elites and mass publics, while the firms continue to degrade the environment of the countries in which they do business.[35]

We present four cases of vertical diffusion from multinational corporations in China and Taiwan. The first case concerns a petrochemical complex in southern Taiwan with significant foreign investment; the second treats a proposal by Bayer to locate a petrochemical facility in central Taiwan. Both reflect negative aspects of diffusion but with some positive outcomes for environmentalism. The third and fourth examples are of Shell and EDAW, both operating in mainland China, and they are broadly positive.

Taiwan's Lin Yuan Industrial Zone

Petrochemicals were one of the pivots of Taiwan's export industrialization strategy in the 1970s and 1980s. The national government facilitated industrial growth through the establishment of industrial zones. This provided a convenient network of transportation routes and facilities, sewage and water treatment systems, and public utilities. One such complex was established for petrochemical development in Kaohsiung County, and by the late 1970s some 18 companies had begun operations there. The firms included large domestic companies, for example, Formosa Plastics and TSMC, as well as joint ventures of multinationals such as Samsung, Bayer, and the China American Petrochemical Corporation (CAPCO), with a 50 percent investment by British Petroleum (BP).

Both local and national government turned a blind eye to the management of operations at the Lin Yuan complex. At this time, the petrochemical industry contributed 20–30 percent of Taiwan's GDP, and thousands of downstream manufacturers depended on its products.[36] For example, CAPCO produced purified terephthalic acid, a primary ingredient in chemical fibers and also polyester bottles and film. The complex as a whole generated about three-quarters of the raw materials used in Taiwan's chemical industry.[37]

For the decade before 1988, a number of accidents in production process and waste treatment at the Lin Yuan complex polluted the Kaohsiung coast with industrial waste and petrochemical effluents. This destroyed marine species in the coastal zone and polluted fish ponds; it ruined the coastal fishery for residents. Complaints to and negotiations with industrial zone managers did not rectify the damages. Local officials and especially the DPP magistrate of Kaohsiung County, Yu Chen Yu-ying, organized residents and mobilized grass roots resistance. The opposition movement organized a large demonstration at the complex in October 1988. An estimated 20 000 protesters laid siege at the site, forcing the closure of two naptha crackers for four days – at a cost of NT$200 million in lost sales.[38]

The importance of the petrochemical industry to Taiwan's economy instantly involved national officials of the ruling party in the incident, but they did not mandate the immediate modification of water and sewage treatment facilities. Instead, companies were required to compensate villagers for lost income, in the amount of NT$250 million,[39] and to modify plants within a year. Yet the compensation settlement was considered a victory at an early stage in the development of Taiwan's environmental movement.

It is interesting that since this incident, CAPCO has taken environmental protection quite seriously. Using BP as a standard, it promoted total quality control, re-engineering its operations to improve safety and lower resource consumption in order to reduce pollution. It formed a pollution prevention team responsible for research, coordination, and tracking of all operations related to environmental protection. In 1999, CAPCO published the first annual report on safety in Taiwan's petrochemical industry. These efforts won a series of plaudits and awards from the Taiwan government, including the first-ever award for reductions in voltaic organic compounds. The company routinely contributes to disaster relief, assists with greening of school campuses, and donates to other local educational and cultural activities.[40]

The Bayer Case

The petrochemical industry of Taiwan has played a major role in the country's development. Despite the need to import most needed raw materials, the industry has prospered because of cooperation among upstream and downstream producers, and strong downstream processing capacity. In 1986, the government decided to allow the private sector to integrate upstream into ethylene production, as a means to both retain and attract petrochemical investment.

When Taiwan manufacturers began to step up their offshore investment, there was serious concern that the trend could lead to a hollowing-out of the Taiwan economy. Those fears heightened when medium and large companies began to shift production facilities to China's Fujian province, across the Taiwan Strait, in the late 1980s and early 1990s. A new generation of industries emerged to usher Taiwan into its next phase of economic development. The focus was on industries that produced advanced materials, high-quality textiles, transportation equipment, and petrochemicals. The government promised to provide necessary assistance if these companies faced difficulties in acquiring land or recruiting workers.[41]

Bayer AG, a German multinational chemical and pharmaceutical giant, proposed to build a US$1.8 billion plant on reclaimed land in the western port city of Taichung, in central Taiwan. The plant would manufacture toluene diisocyanate (TDI), a substance used in the manufacturing of coatings and rigid foams for upstream products such as plastic used in the aerospace industry and

for automotive components. The plant was designed to have an annual output of 100 000 tons of TDI, 90 percent of which would be exported to Asian markets.[42]

Taiwan's economic authorities saw Bayer's project as a major boost to Taiwan's bid to become an Asia-Pacific business hub. However, residents of Taichung were adamantly opposed to the project, staging protests and citing potential pollution as well as industrial safety problems. Newly elected Taichung county head Liao Yung-lai was of the DPP, which controlled 12 out of 23 of Taiwan's local governments after its landslide victory in Taiwan's local elections of November 1997. He insisted that a referendum be held to decide the fate of the Bayer project.

Using referenda to block environmentally polluting enterprises is a different form of horizontal diffusion from western nations. DPP legislators pursued an amendment to the Self-governance Law for Provinces and Counties of 1994, which would allow local governments to hold referenda on public issues. Critics of the legislation described it as anti-business, and both the European Council of Commerce and Trade and the American Chamber of Commerce urged support for the Bayer project.

American Chamber President Jeffrey Williams argued that, 'the use of public referenda as part of the approval process for private investment projects' was 'unprecedented' and 'inconsistent with the concepts of transparency and regulatory procedures which are essential to maintaining a vital and attractive investment climate'.[43]

The Taichung County Government delayed issuing permits while a local referendum, scheduled for June 1998, was pending. After a long struggle through a combination of the ballot box and protests, the citizens of Taichung County were successful in their attempts to stop construction of the TDI plant. Thereupon Bayer officially withdrew this project and built the plant in Texas.

Shell in China

Royal Dutch/Shell is a global energy giant, which has traded and invested in China for more than 100 years. Since China's opening in the late 1970s, Shell has invested about US$2 billion, a larger amount than other international energy companies. Shell has 18 wholly owned or joint venture companies in China and employs about 1600 staff. All its core businesses are represented in China: exploration and production, gas and power, oil products, chemicals, and renewable energy.[44]

In early 2001, PetroChina (China's onshore oil/gas SOE) invited Shell to tender an offer for participation in the West-East Gas Pipeline Project.[45] This US$8.5 billion project, the second-largest infrastructure project in China's history, was designed to move compressed gas from the Tarim Basin to

Shanghai, through a 4000-kilometer underground pipeline. Because the pipeline moved gas from China's energy-rich but economically underdeveloped western provinces to energy-poor but economically developed eastern provinces, it has been controversial from the outset. The pipeline route crosses a wide variety of geographic areas, including deserts, mountains, and heavily farmed areas, presenting technical challenges. The pipeline route also intersected nature reserves and areas of cultural heritage value, including the Great Wall, which raised biodiversity issues.[46]

Shell has been a dominant player in the manufacture of liquefied natural gas (LNG); it has plants and terminals throughout the Asian Pacific region. Shell's experience in gas production and marketing, as well as the history of its operations in China, recommended the firm to PetroChina in this first-ever invitation of foreign firms to participate in an infrastructure development project. Shell was the lead or preferred partner, heading an international consortium including ExxonMobil and Gazprom. Throughout, Shell's approach was to conceptualize the project in the context of the corporation's global image:

> 'The key area was Shell's reputation. We focused on health, safety, environment and social standards. We talked about what standards would be adopted and implemented. We knew that we had to demonstrate consistency globally… We said we would follow Chinese standards and laws, but that we had our own global standards, and that we needed to be consistent. We would follow Chinese standards, but they could be improved.'[47]

Although foreign investors ultimately were not involved in the pipeline construction, Shell played an influential role. In its 18-month involvement, and while spending about US$15 million in preparatory expenses, it influenced both routing and pipeline construction decisions. Initially, PetroChina planned to cross the Great Wall in 12 places. Instead, Shell proposed to use directional drilling under the Great Wall and 'to do micro-routing – to go through gaps in the wall and not follow straight lines'. PetroChina first thought the pipeline would cross four nature reserves, but discovered it intersected two additional reserves, just in the process of approval. One of these reserves was Lop Nur, a former nuclear testing site in China's West, which is the habitat for a herd of 300 endangered wild camels. Shell convinced PetroChina to alter the routing to avoid the areas of camel habitat.

Altogether, some 350 000 people living along the pipeline route had to be resettled, which involved Shell's environmental consultant, Environmental Resource Management, in detailed consultation with more than 10 000 residents. Although PetroChina had attained all necessary government approvals and wanted to begin construction soon after signing its initial joint venture agreement with Shell, the foreign corporation urged delay:

> 'We thought this process was not transparent. We had many discussions and formed joint audit teams and engaged the local population. A PetroChina/Shell team did audits of compensation/resettlement in each affected province. There were problems at the start, but PetroChina adopted it. It was a documented process, so you could return to it in the future if there were problems. This brought about a change in mind set.'[48]

In the process of evaluating social impacts from pipeline construction, Shell established the Shell Foundation in China to 'find sustainable solutions to social and environmental problems linked to energy production and consumption, as well as to harness the potential of globalization to enhance the development prospects of vulnerable communities'.[49] Shell worked with the United Nations Development Programme (UNDP) in the establishment of this foundation, which is the first of its kind in China.

For a variety of commercial reasons, Shell did not participate in the construction of the West-East pipeline. An environmental officer summarized Shell's experience:

> 'Shell worked through and balanced a myriad of arrangements, including building the case to go beyond mere regulatory compliance; justifying broader approaches to stake-holder consultation; undertaking an environmental and social impact assessment (ESIA) (not required under Chinese law); and putting in place health, safety, environmental, and social standards and sustainable development principles that would be followed and that met all potential partners' needs.'[50]

Shell also introduced new environmental standards in the construction of its US$4.3 billion Nanhai Petrochemicals Project. It initiated a resettlement action plan to provide for the resettlement of over 8000 people, which included monitoring the resettlement process every six months.[51] This plan was based on World Bank guidelines on resettlement, used the first time in China for this project. Finally, Shell helped form and sits on the steering committee of the China Business Council for Sustainable Development. Shell has received an award for environmental best practices from SEPA, which burnishes a corporate image tarnished by projects elsewhere in the world with adverse environmental consequences.[52]

EDAW

EDAW is an American design and engineering firm, which markets architecture, planning/urban design, and ecological planning services, including the design of wetlands parks, to Chinese provincial and local governments. EDAW is the only firm of its kind in China; one of its model projects, based on the firm's experience in both Australia and the US, is reconstruction work in the Yancheng Wetlands National Ecological Park. This coastal zone of the

Yellow China Sea in Jiangsu Province is the habitat for globally threatened birds such as the spotted greenshank and the spoon-billed sandpiper. The company constructed wetlands in the core zone to protect threatened shorebirds and established separate areas for fish, fauna, and flora.[53] Another of its projects has been in the Pearl River estuary, where it is partnering with city governments to restore mangrove forests and protect bird migration routes of international significance.

A landscape architect of the firm described the means through which good environmental practices had been diffused from the US to China:

> 'We use our [Geographic Information System] GIS expertise imported from the US We map the areas and prioritize the sensitive areas. We decide where to put the wetlands, and where to have the economic development. We have offices in the US and China, and there's a cooperative relationship among the staff. We use cutting-edge American staff and use best practices but stress economic benefits. There needs to be an economic angle to it to produce revenues for government; otherwise, they wouldn't be interested.'[54]

EDAW occupies a niche market, and shows that profits can be made by preserving wetlands near heavily populated areas. Its projects in China have brought recognition from the UN Commission on Sustainable Development and the American Society of Landscape Architects.[55]

CROSS-STRAIT TRADE: A RACE TO THE BOTTOM?

The last area we discuss briefly is the relationship between Taiwan and China in the evolution of environmental mitigation strategy and policy. The pattern of trade and investment has been asymmetric, from Taiwan to China, and this has influenced the diffusion of environmental ideas and practices. The most significant change occurred in the late 1980s when Taiwan began to implement the second export-oriented industrialization policy because of the challenge of cheaper labor in Southeast Asia and China, as well as greater competition in the world manufacturing market. Government policy then began to emphasize incentives for conglomerates to expand domestic investments. The government financed selected medium-sized enterprises to produce higher value-added products in Taiwan, and it indirectly encouraged medium and small-size enterprises of sunset industries to move out of Taiwan.[56]

This policy change motivated SMEs to move overseas if they lacked sufficient capital to invest in pollution abatement equipment. Hsiao notes that such 'runaway enterprises' escaped from domestic environmental regulations and transferred the social costs of environmental pollution to less developed countries, primarily China and Southeast Asia states, which either had more

relaxed regulations or implemented them more loosely.[57] Hsiao calls this an 'opportunist strategy of exit', which he compares to the behavior of multinational corporations entering Taiwan before 1980.

Table 6.1 presents information on cross-strait trade from 1997 to 2005. Table 6.2 summarizes Taiwanese investment in China in more recent years. Clearly, the opportunity for environmental effects from trade and investments of this size is immense.

Table 6.1 Cross-strait trade values (1997–2005)

Year	Taiwan's exports to mainland China	Taiwan's imports from mainland China
1997	22 455.2	3 915.4
1998	19 840.9	4 110.5
1999	21 312.5	4 552.2
2000	25 009.9	6 223.3
2001	24 061.3	5 902.2
2002	29 465.0	7 947.7
2003	35 357.7	10 962.0
2004	44 960.4	16 678.7
2005*	37 295.0	14 510.5

Notes: Units = US$millions.
*January–September 2005.

Source: *Cross-Strait Economic Statistics Monthly*, no. 155, Mainland Affairs Council, Executive Yuan, see http://210.34.17.189/new_page_trade2.htm. (Taiwan's exports are based on statistics of Taiwan's Customs Division.)

Table 6.2 Taiwanese investment in mainland China

Year	Approved by the MOEA	
	No. of applications	Investment amount
2003	1 837.00	4 595.99
2004	2 004.00	6 940.66
2005	1 297.00	6 007.00
Accumulated value since 1991	344 520.00	47 256.20

Notes: Units = US$ million. Figures include late reports and approvals. The 2003–05 figures are not totalled because of rounding errors.

Sources: Investment Commission, Ministry of Economic Affairs (MOEA), Taiwan, Republic of China. Also see http://www.mac.gov.tw/big5/statistic/em/157/12.pdf.

Indications of the motivations driving Taiwanese firms to mainland China come from several sources. For example, some two-thirds of the business association leaders interviewed by authors in the late 1990s indicated that pollution and other environmental standards caused serious adjustment problems, and this had prompted plans to move older factories across the strait.[58] In short, an argument can be made that Taiwan improved its environmental climate in the late 1980s and 1990s by exporting old smokestack industries to China, an example of negative horizontal diffusion effects.

However, this research also indicated that a smaller number of business firms manufactured and sold environmental technology to China wholesale. Although Taiwan's labor costs were rising, its relatively high level of industrial technology gave it a comparative advantage in production, much like that enjoyed by Japan in the 1980s. Most of the firms focused on the Chinese market, where their sales had increased dramatically in recent years. These firms were the clearest example of positive horizontal diffusion.

The expansion of global trade has increased the risk of environmental degradation. The entrance of both China and Taiwan to the World Trade Organization (WTO) in 2002 signifies the increased penetration of corporate forces, while WTO rules do little to enhance environmental protection.[59] In the global bid to remain competitive, countries may fail to strengthen environmental regulations, a process which is referred to as the 'race toward the bottom', a 'political drag' on environmental policy making. Internationally, there is mixed evidence of a race to the bottom, and that would seem to be the case for cross-strait trade.

Economic relationships between China and Taiwan are complex, convoluted, and subject to several degrees of political entanglement. China welcomes investment from Taiwan, and Taiwan's policies have failed to halt the stampede into the Chinese market. The business community in Taiwan has developed political networks on both sides of the Taiwan Strait to maximize economic benefits. Too, investment projects in China are potent bargaining chips for Taiwanese business firms to use in gaining domestic advantages. Irrespective of state controls and prohibitions, the Taiwanese business community is autonomous in its explorations of the Chinese market.[60]

Our first case concerns Taiwan's 'plastics king', Wang Yung-ching. In mid-1990, after several trips to the mainland, Wang, president of the Formosa Group, announced plans to build a US$5 billion petrochemical complex on Haicang Island near the coastal city of Xiamen in Fujian province. The Haicang Project was a major challenge to Taiwan's ban on direct investment in mainland China, and opened a new round of state-business bargaining. In late 1991, under pressure from high-ranking government officials, Wang postponed but did not cancel the Haicang Project. Simultaneously, he urged

the government to renegotiate terms with his group on a proposed petrochemical complex in Taiwan. This US$2.2 billion project had been stalled because of high land costs and environmental opposition.

In June 1992, the government finally approved Wang's naphtha cracker project in Mailiao (Yunlin county). Although the government declined to lift its prohibition on the Haicang Project in China, it allowed Wang to increase the size of the Mailiao project. Called Taiwan's sixth naphtha cracker, the US$9.5 billion project was three times larger than the earlier proposal.[61]

A more recent case concerns a large conglomerate, the Chi-Mei group, founded by Hsu Wen-lung in the 1960s. Hsu and his Chi-Mei group maintained excellent relationships with politicians. His strong support for Taiwanese independence helped him create a solid alliance with former President Lee Teng-hui and the current DPP regime.

The Chi-Mei group is the world's largest manufacturer of a plastic material called ABS, and China is its major market. In 1996, the firm established a petrochemical complex in Zhenjiang (Jiangsu Province). After planned expansion, the conglomerate's investment will total US$600 million; production capacity will exceed that of the group's Taiwan facilities.[62]

The Chi-Mei group's political tendencies prompted a backlash from China's leaders. After the re-election of President Chen Shui-bian in 2004, the spokesman of the Taiwan Affairs Office of China's State Council stated that China did not welcome the 'green Taiwanese businessman'[63] and called Hsu a 'Big Shot' supporter of Taiwan independence.[64]

However, the deterioration of China's relations with the Chi-Mei group opened a new window for business in Taiwan. Shortly after the publication of the 'Green Taiwanese businessman' editorial, Chi-Mei Optoelectronics signed an agreement with 35 Taiwan banks for a syndicated loan of US$2 billion. The institutions include large government banks such as the Bank of Taiwan, Chang Hwa Commercial Bank, Chiao Tung Bank, Hua Nan Bank and others.[65] The loan will fund the construction of Chi-Mei's plant in the Southern Taiwan Science Park. The large bank loan redressed damages to Chi-Mei in China. By locating its plant in Taiwan, the conglomerate demonstrated support for the administration's policy of 'keeping roots in Taiwan'.[66]

The cases of Formosa Plastics and the Chi-Mei group reveal another dimension of cross-strait trade and investment. In addition to transferring high-pollution industries and selling environmental technology to China, some Taiwanese enterprises used investment projects in China to gain greater domestic leverage in Taiwan. To persuade enterprises to 'leave roots in Taiwan', the state offers preferential treatment and relaxes environmental standards for enterprises that damage ecosystems. Formosa Plastics' sixth naphtha cracker project is a good example. Chi-Mei's location of its new high-tech project in Taiwan also hints at possible loopholes in environmental

standards and corrupt state-business relations.[67] A serious state-society confrontation arose from the seventh naphtha cracker project (Binnan Project) in the Qigu area, discussed in Chapters 7 and 8.

An investigation of the economic sectors in which Taiwan's businessmen invest shows the potential for the 'race to the bottom'. Table 6.3 presents a sectoral analysis:

Table 6.3 Taiwanese investment in mainland China by sectors (1991–2005)

Sectors	% by amount
Electronic and electric appliances	34.79
Basic metals and metal products	9.20
Chemicals	6.69
Plastic products	6.01
Food and beverage processing	4.21
Textile	3.35
Non-metallic minerals	4.92
Transport equipment	3.73
Machinery equipment	3.46
Precision instruments	5.45
Agriculture, forestry, fishery, and animal husbandry industry	0.46
Services	3.48
Others	14.25
Total	100

Notes: Unit = %. Figures include laggard reports and approvals. The figures do not add up to the total shown due to rounding up.

Sources: Investment Commission, MOEA, ROC. Also see http://www.mac.gov.tw/big5/statistic/em/157/12.pdf.

The electronics industry, as well as chemicals, plastics, and equipment manufacturing, all have the potential to produce pollution and damage ecosystems, certainly in the immediate environment of the facilities. There is increasing evidence of this environmental risk from Taiwanese enterprises in mainland China. According to a survey conducted in Zhangzhou, Fujian Province, very few Taiwanese corporations pay attention to pollution monitoring and management. Most Taiwanese companies have contributed various degrees of water, air, and solid waste pollution to the local environment. Mainland Chinese academics have called for strict regulations of Taiwanese companies that move highly-polluting industries from Taiwan to China.[68]

In addition, pollution generated by Taiwanese companies has also led to protests and even social unrest in some localities. The most recent case occurred in April 2005. A Taiwanese battery factory in the Caozhou city of Guangdong Province was found releasing poisonous wastes into the local river. The effluents then polluted adjacent fishing farms and caused severe damages to fish farmers. On 15 April, 2005, thousands of villagers attacked the factory and seized equipment and machinery. As the battery factory is owned by Mei Mei, a large corporation with more than 8000 workers, this incident attracted attention from the general public. However, local officials did not provide sufficient security to maintain order. The Taiwanese factory owner filed complaints with the central government, accusing local officials of incompetence.[69]

CONCLUSIONS

The economic structures of states shape incentives for productive enterprises, which affects the pressure they put on the environment. In China, the greatest environmental destruction occurred during the Maoist era, when huge SOEs used raw materials and energy willy-nilly, without concern for environmental effects. The post-Maoist economic reforms have reduced the SOE's role in the economy, but they have created new opportunities for local enterprises whose dynamic expansion comes at a high environmental cost. In Taiwan, SOEs have played a less conspicuous role; SMEs, the engines of Taiwan's rapid growth, are easier to control for environmental effects, because their size does not rival the state's.

State-business relationships in both China and Taiwan are more intimate than in most western capitalist nations. It is relatively easier for the state to penetrate business firms, and they, in turn, can more easily obtain access to state decision-makers than non-economic groups (and by extension, are able on occasion to corrupt political processes). The European corporatist model applies imperfectly to China and Taiwan. Taiwan still has some characteristics of the developmental state, and China displays residual traits of state corporatism. This does not present opportunities for linkage of the state, large business firms or peak associations, and environmental coalitions as seen in some European countries. This is largely because the core interests of the state in China and Taiwan do not yet emphasize environmental conservation values.

Foreign multinationals play large roles in both China and Taiwan, by providing FDI and advanced knowledge. They have been channels for diffusion of global environmental standards and technology. We saw this in the cases of Shell and EDAW in China, which compare, at earlier times, to multinational operations in Taiwan (such as those of Singer). On the other

hand, by deals struck with governments, multinationals may occasionally degrade environmental conditions. The activities of the Lin Yuan petrochemical complex in Taiwan demonstrate this potential. Yet during Taiwan's new democratic era, county residents in Taichung mobilized against what they saw as an environmentally threatening chemical factory development, and were able to stop it. The final question pertains to cross-strait trade and its environmental effects. Most goods, services, and capital travel from Taiwan to China. Many SMEs have dirtied China's environment with their polluting equipment. A smaller number of firms export clean technology to China. However, the intense trade and FDI flows to China threaten to hollow out Taiwan's economy. To the extent the state tries to keep corporations' 'roots in Taiwan', especially by financial incentives and relaxation of environmental controls, it worsens Taiwan's own environment.

In Chapter 7 we examine how ENGOs have developed and operated in both countries, to curtail or at least limit these adverse environmental modifications.

ENDNOTES

1. Dryzek, John S., David Downes, Christian Hunold, and David Schlosberg with Hans-Kristian Hernes (2003), *Green States and Social Movements*, London: Oxford University Press, p. 11. Dryzek et al. contend that environmental conservation can attach itself to either of two 'core interests' of the modern state: economic development or legitimation.
2. Qian Yingyi and Barry R Weingast, 'Institutions, state activism, and economic development: a comparison of state-owned and township-village enterprises in China', in Mashiko Aoki, Hyung-ki Kim, and Masahiro Okuno-Fujiwara (1996), *The Role of Government in East Asian Economic Development*, New York Oxford University Press, p. 259.
3. Scholars do not agree on the exact contribution of different types of enterprises to industrial output. For instance, Ma and Ortolano give these somewhat different figures: SOEs (28.5 percent), urban collectives (8.2 percent), town-village enterprises (TVEs) (31.1 percent), small private (15.5 percent), and other (16.6 percent). See *Environmental Regulation in China*, Lanham, MD: Rowman & Littlefield, 2000, p. 41.
4. The profitability of state-owned enterprises (SOEs) is a subject of contention. For example, Laurenceson and Chai suggest that, although SOEs do not perform as efficiently as non-state-owned enterprises, nevertheless their economic performance is better than generally believed. They suffer from incomplete price reform in industries such as energy, fuel and raw materials, which influences profitability. Also, because they provide benefits to workers such as pensions, health and child care, and subsidized housing, their costs are higher and this reduces profitability. See James Laurenceson and J.C.H. Chai (2000), 'The economic performance of China's state-owned industrial enterprises', *Journal of Contemporary China*, **9** (23) (March), 21–39.
5. At the national level, the situation of SOEs borders on the precarious. Smyth and Zhai's review of statistical bureau figures indicates that 'the debt-asset ratio for the state-owned sector as a whole in China is 75–80 percent. Media reports suggest that when 'hidden losses' are considered, the debt-asset ratio might be as high as 85 percent and that in 30 percent of China's loss-making enterprises it is in excess of 100 percent'. See Smyth, Russell and Zhai Qingguo (2003), 'Economic restructuring in China's large and medium-sized state-owned enterprises', *Journal of Contemporary China*, **12** (34), 173–205.

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50. Seymour, Mike (2004), 'Partnerships to support sustainable development and conservation: the West-East pipeline project, China', *Conservation Biology*, **18** (3) (June), 614.
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7. ENGOs, civil society and biodiversity conservation[1]

Preceding chapters have discussed the institutional framework and operation of biodiversity conservation in China and Taiwan. In this chapter we shift our focus to the bottom-up dynamics of environmental non-governmental organizations (ENGOs). They are major agencies of change, as they alert institutions to the existence of problems in species and ecosystem preservation, monitor the performance of institutions, and even play roles in the administration of government programs.

ROLE OF NGOS IN ENVIRONMENTAL GOVERNANCE AND CIVIL SOCIETY

The increasing importance of environmental non-governmental organizations in environmental governance has attracted attention from scholars as well as policy makers. As William Clark argues, in the scheme of 'global governance', the third sector composed of non-governmental organizations (NGOs) has undergone the greatest change vis-à-vis the environment. Such organizations have existed for a century or more, but it is only in recent decades, and particularly since the success of NGOs in shaping the Rio Conference on Environment and Development in 1992, that their numbers have multiplied. The NGO community has shown a remarkable ability to utilize emerging information and technologies and to aggressively construct ad hoc coalitions to address issues.[2] Table 7.1 summarizes the trajectory of NGOs by showing the three stages of environmental movements and environmental reforms.

As noted in Table 7.1, ecological modernization in the third stage of environmental reform is a process of environmental restructuring. Ecological modernization is expressed in various transformations regarding the traditional central role of the nation-state in environmental reform. First, there is a trend toward more decentralized, flexible and consensual styles of national governance, at the expense of top-down hierarchical command-and-control regulations; second, non-state actors increasingly take over traditional tasks of the nation-state, seen in the emergence of ENGOs and the formation of alliances between the private sector and ENGOs; finally, international and

Table 7.1 Characteristics of the Three Waves of Environmentalism

	First wave	Second wave	Third wave
Beginning	ca. 1900	ca. 1970	Late 1980s
Central notion	Nature conservation	Limits to growth	Global change
Focal point	Protection of reserves and species	Minimizing additions and withdrawals	Sustainable development
Geographical range results	Industrializing nation-states	Industrialized nation-states	Globalizing world
Major social theories on environment	–	Deindustrialization, neo-Marxism	Ecological modernization

Source: Arthur Mol (2003), *The Ecological Modernization of the Global Economy*, Cambridge: MIT Press, p. 49.

supra-national institutions emerge and begin to undermine the traditional role of the nation-state in environmental policy making.[3]

These conceptualizations of environmental movements and change are based on a global perspective and may not well represent developments in late modernizing societies, and particularly those outside the West. This chapter examines the burgeoning literature on ENGOs as it applies to the specific context of growth and change in Taiwan and China. Much of the information is descriptive, based on our investigations into the evolution of environmentalism in both Chinese contexts. The analytical questions we ask are: 1) To what extent have ENGOs been able to influence environmental outcomes, and in particular the identification and mitigation of threats to species and ecosystems?; and 2) How have ENGOs influenced the growth and dynamics of civil society? Although sections of this chapter do discuss the linkage between ENGOs and democratization, this is not emphasized due to a series of conceptual and practical comparative difficulties.

The chapter begins with an historical and then topical treatment of environmentalism in Taiwan, focusing on changes to the strategies and objectives of ENGOs as the Taiwanese state underwent democratic consolidation after the 2000 presidential elections. Then we consider the rise of environmental groups in China, which in the early twenty-first century remain under Leninist party-state control. We present a typology of China's ENGOs and provide examples of each type from the area of biodiversity conservation. We conclude with a comparison of Taiwan and China, surveying the

significant differences between the ENGO portfolios of the two states, and the contribution they make to the development of civil society.

THE ENVIRONMENTAL MOVEMENT IN TAIWAN

Historical Review

Early environmental consciousness in the 1980s

Taiwan's environmental movement is a part of the rise in Taiwan's civil society during the 1980s. After the crackdown of the 'Formosa Magazine Incident',[4] a severe street confrontation between police and opposition forces in Kaohsiung in the late 1970s, Taiwan's political opposition movement gradually regained support from the middle class and grassroots elements in the 1980s. The Taiwan state adopted a more accommodative policy to develop new channels of dialog with opposition forces. The Kuomintang's (KMT) policy of indigenization also opened the door for the native political elite to be integrated into the KMT's soft authoritarian regime.

Taiwan's economic miracle was achieved at the cost of environmental deterioration. In the 1980s, environmental problems had reached crisis proportions. Coinciding with the rise of civil society, serious pollution incidents such as that caused by Du Pont in 1986 and the Lee Chang Rong Chemical Factory in 1982 erupted and drew public attention. The Du Pont pollution case showed that local residents finally had gained environmental consciousness due to unbearable pollution and environmental damage. At this stage, environmental protests led by opposition politicians reflected 'NIMBY'ism (not in my back yard) – complaints about local environmental pollution. Opposition politicians also used their version of mass mobilization to generate grassroots support. They organized large-scale rallies, sit-ins, and even direct blockages of polluting enterprises and the bureaucracies supporting them. Many opposition leaders were successful in achieving environmental justice and accumulating political capital among the general public. No institutionalized channels between the state and society were established or utilized as vehicles for implementing sustainable development.

The apogee of the environmental movement in the early 1990s

As the regime suspended martial law and launched democratization programs in the late 1980s, the environmental movement also gained momentum and developed a national instead of a local focus. As compared to the grassroots demonstrations and protests of the previous era, the scale and intensity of environmental issues attracted public attention. The general public gradually learned to think beyond local instances of environmental abuse and paid

greater attention to ensuring balance in national policy among economic development, environmental protection, and social justice. Nation-wide ENGOs formed from the early to mid-1990s. In addition to organizing grassroots demonstrations, these ENGOs also educated the public on environmental issues.

The institutionalization of environmental protection

From the late 1990s to the present (2005), Taiwan's ENGOs have mastered more complex skills in addressing governmental bureaucracies and accommodating domestic demands. Mass demonstrations are less raucous, and ENGOs have developed greater expertise in monitoring governmental policies. Environmental NGOs have used the results of opinion surveys and field research to expose Taiwan's environmental situation. Environmental NGOs have also linked Taiwan's environmental issues to international concerns. Environmentalists and local politicians have cultivated a special relationship of 'struggle and co-existence'. For instance, ENGOs and some local politicians promote the use of the referendum to decide on major construction projects (as noted in Chapter 6). In addition to focusing on community pollution and NIMBY effects, ENGOs have raised new environmental concerns such as wetlands protection and the conservation of biodiversity. This is reflected in the passage of Environmental Impact Assessment (EIA) laws in 1994 and the revision of the Wildlife Protection Laws in the mid-1990s.

In reviewing Taiwan's environmental movement history since the 1990s, one notes that two major obstacles, corruption of money and power, have emerged on the long road toward sustainable development. In some instances, pollution compensation has distorted the essence of environmental protection. Politicians staged large-scale protests in order to negotiate higher compensation amounts from enterprises, chiefly from state-owned enterprises (SOEs). The major task of local leaders then is to guarantee the arrival of compensation money and to see that it is distributed equitably to all villagers. In order to win political support at the grassroots level, the central government even directly orders SOEs to provide cash compensation. This diminishes the ability of government to design correct mechanisms to remedy environmental pollution.

Transformation of ENGO Strategies and Activities

In its early years, Taiwan's environmental movement was subject to intense political manipulation. Since the year 2000, the first democratic transition of power in Taiwan, ENGOs have adopted functional and accommodative strategies to guide their activities. At the first stage of Taiwan's environmental

activities, grassroots activities dominated the movement. Huang Fuxin, who is President of the Association for Promotion of the Qigu Lagoon National Scenic Area, contends that the targets of movement pioneers (who opposed the mammoth Binnan petrochemical and steel plant construction proposed in Qigu [see Chapter 8 for a full description]) were: '1) The masses were the first priority; 2) Local and central legislators; and 3) Mass media'.[5]

Political considerations and calculations of politicians were the catalysts for environmental mobilization at the grassroots level. Professor Huang Mingqin of the National Chengkung University in Tainan was among the first pioneers advocating lagoon protection and the preservation of black-faced spoonbills (a globally endangered species) in the Qigu area. Huang argued:

> 'The villagers at the grassroots level do not have the necessary knowledge about environmental protection. They only have a vague idea to protect their homeland from external penetration. They have enthusiasm, passions, but no professional knowledge. They are subject to political manipulation'.[6]

For some pro-development residents in the Qigu area, political mobilization by ENGOs conflicted with local interests. They criticized mass movements organized by ENGOs and local politicians as an irrational attempt to replace the institutional deliberation of public policy making. Wu Zhongchang, Executive Secretary of the Greater Qigu Development Commission (a pro-development body) believed that the purpose of grassroots movements was to reverse accumulated professional analyses and opinions. The most appropriate channel for deliberation, he opined, was through institutional mechanisms such as the Village Representative Council. The use of demonstrations and other forms of direct action would hurt the general investment environment, discourage foreign investment, and eventually have adverse impacts on people's livelihoods. He believed that politicians and intellectuals, without an understanding of people's needs, manipulated movements to their own advantage.[7]

Since the Democratic Progressive Party (DPP) became the ruling party in 2000, ENGOs have entered a transition period. For instance, mass mobilization (used in the mid-1990s) no longer dominates Taiwan wetlands' activities. Qiu Yiren, President of the Tainan Chapter of the Wetlands Association, indicates:

> 'According to my past experiences, the real impact of grassroots activities is still limited in the current situation. In the long run, we need key individuals to endeavor in grassroots education and to mobilize bottom-up dynamics. In order to educate the public and maintain good relationships with the mass media, an "elite line" is necessary for the next stage of development'.[8]

In reality, even at the early stage of Taiwan's environmental movement,

ENGOs adopted a dual strategy of mass movement and peaceful advocacy of environmental protection ideas. During Huang Mingqin's tenure as the head of the Tainan Bird Association after 1999, major strategies beyond grassroots mobilization included: releasing press reports, organizing public hearings, communicating with the mass media, and drafting opinion reports about EIA.[9]

The transformation of ENGO strategies can be noted in the recent direction of the Taiwan Environmental Protection Union (TEPU), one of Taiwan's largest environmental groups. From TEPU's perspective, the major role of ENGOs is to promote public policy making and set the agenda of public issues. At the early stage of Taiwan's democratization, the DPP required allies to enlarge its social base. Environmental NGOs needed robust political partners to apply heavier pressure on the ruling KMT, from the central to the local level. This new possibility of mutual benefits within civil society has led to an intimate alliance between the TEPU and the DPP.

Since the current focus of TEPU is on promoting public policies, its major task is to analyze environmental situations and plan appropriate strategies before taking action. The TEPU adjusts its role according to changes in social and political environments. Lately, it has selected 'soft lines' to do so and also attract attention from the mass media. The TEPU employs both elite and grassroots action.[10]

Since the passage of the EIA law in 1994, Taiwan's ENGOs have been involved in formal and informal institutions of environmental policy making. However, ENGOs remain skeptical about the sincerity of bureaucrats in promoting environmental protection. For instance, the Tainan Chapter of TEPU plans to promote more comprehensive participation in institutional and extra-institutional activities simultaneously. Mass mobilization is not the only instrument to use in performing organizational goals.

The TEPU opposes the usage of 'sustainable development' because of the concept's ambiguity. It argues that bureaucrats, who dominate the EIA process, still make development the first priority, and use the term sustainable development as a smoke screen. Recently, the Tainan TEPU Chapter has concentrated on grassroots training and socialization, and is emphasizing household ecological matters such as recycling. The Tainan Chapter identified new mechanisms for resource recycling, and has applied to the national Labor Affairs Council for support of its model. It has also asked local politicians to pledge support for environmental protection policies during electoral campaigns.

Jiaohua Chen, president of TEPU and director of the TEPU Tainan Chapter, indicated:

> 'In Taiwan, it is easier to attract religious and cultural volunteers. People are skeptical toward environmental volunteers. Fund raising is also difficult. ENGOs have to develop multiple strategies of struggling. Effective negotiations with

> governmental branches require professional knowledge. For instance, to comprehend the EIA report, you need to have professional training to understand the tricks and traps set by the developers and development agencies. However, grassroots support is always important. Politics and environmental protection are mingled together. ENGOs should not neglect grassroots support. If the Binnan Project is restarted, the Tainan Chapter will mobilize the masses at the grassroots level again.'[11]

In addition to confrontation and mass movements, ENGOs also engage in environmental education and socialization. Qiu Yiren, the President of the Tainan Chapter of Wetlands Taiwan, is an elementary school teacher. He believes that helping children understand the importance of grassroots environmental protection will have long-term impacts on their socialization. The most successful cases of environmental work at his school are resource recycling and the classification of wastes.[12]

Other ENGOs such as the Wilderness Society (WS) also promote environmental education. Chang Hung-lin, the WS Secretary General, mentioned his interest in a division of labor with other ENGOs. Instead of joining large-scale mass movements, the WS provides a platform for the general public to learn from Mother Nature, with an emphasis on educating the middle class. It uses multiple channels to engage the middle class, such as the Internet, electronic newsletters and broadcasting programs. By these means, WS hopes to broaden its social bases, which is critical to its goals of monitoring government policies and educating the general public.[13]

Political Connections: ENGO Interactions with the DPP and other Political Parties

We noted that ENGOs and the DPP had developed mutually beneficial relationships to consolidate grassroots support and achieve environmental goals. However, once the DPP became the ruling party in 2000, alliances between ENGOs and the DPP have begun to fracture.

Several respondents expressed their disappointment with the DPP. For example, an academic stated that while Taiwan deepens its democracy, the environmental movement still faces large obstacles. Democracy and environmental protection are two parallel lines that do not intersect.[14] Other respondents were aggrieved that when the DPP became the ruling party in 2000, it established closer connections with the business community. This made it necessary for ENGOs to continue to mobilize local supporters and focus on local environmental concerns. Only if the ENGOs win grassroots support would the ruling party listen.[15] The close connection with the business community is the main reason that ENGOs kept a distance from the KMT, said Huang Fuxin:

> 'In general, the DPP is more pro-environment than the KMT. However, ever since the DPP became the ruling party in 2000, the situation has changed. In the past, the close interaction between business and the KMT constrained the KMT's autonomy in policy making. However, the current ruling DPP is facing pressure from the business community due to electoral concerns. The co-existence between the DPP and business community has been established and consolidated.'[16]

The failure of the KMT recently to establish a sound relationship with ENGOs suggests that the KMT's social base did not expand after 2000. The KMT, as an opposition party, does not include environmental issues among its strategies to increase local support. For example, TEPU is classified as 'deep green' from the KMT's perspective, making it seem untrustworthy. Yet, the local TEPU chapters work with individual politicians whether they are green or blue. Color does not appear to be a major concern at the local level.[17]

Whether ENGOs should be color blind is a contentious issue in the ENGO community. The shrinking of ideological ties between the ruling DPP and ENGOs creates new opportunities for the latter to forge linkages with local officials. Local chapters of Wetlands Taiwan deal with governments and politicians irrespective of party affiliation. Even when encountering DPP magistrates, they still raise their concerns and object to any development in the Qigu region. Tainan magistrate Su Huanzhi, once the darling of environmentalists, in 2001 suggested building an international airport. From TEPU's perspective, this new policy orientation eroded the consensus between ENGOs and the Tainan county government.[18]

Yet Taiwanese ENGOs clearly recognize the political nature of the environmental movement. Although relations between TEPU and the Taiwan government have cooled recently, TEPU's success in stopping the Binnan development was the result of a skillful public relations campaign and a mutually beneficial alliance with Su Huanzhi. Furthermore, political lobbying is very important to the ENGOs. Due to its long-existing relationship with the DPP, TEPU could lobby directly with the Presidential Office.[19] Thus, the DPP connection has a lingering value to Taiwan's ENGOs.

Alliance Formation among ENGOs

Environmetal NGOs have burgeoned in tandem with Taiwan's democratization movement. However, in their evolution they did not establish a peak association to coordinate activities. Our interviews with ENGO representatives did not elicit much information about pan-ENGO alliances. In some sensitive areas such as the movement opposed to the construction of the fourth nuclear power plant (NPP4), ENGOs formed a grand alliance in order to demonstrate strength and forge common action. Under normal circumstances, ENGOs have friendly but aloof relationships with each other.

For instance, Wetlands Taiwan calls itself a 'functional' environmental NGO, focusing mainly on wetlands habitat issues. Other issues such as opposition to nuclear plant construction are not a priority.

In some cases, conflicts and splits occur within the ENGO community. Major conflicts tend to concern matters of ideology and organizational interest. At the early stage of development, groups argued about ideas of environmental protection. As more groups emerged in the late 1990s, conflicts of interests preoccupied ENGOs. For example, in the case of the endangered black-faced spoonbill, Wetlands Taiwan and the Tainan Bird Association disagreed about setting the agenda, coordinating overlapping activities, and streamlining strategies to deal with the media. In the first months of the Binnan/Qigu environmental movement, members of Wetlands Taiwan were also members of the bird association. Differences in ideology, as well as financial conflicts, led to a split into two separate organizations. As all ENGOs need financial resources to survive, competition over resources is a primary cause of conflict.[20] In the case of the black-faced spoonbill, one divisive issue was whether ENGOs should be able to profit from eco-tourism ventures featuring the rare bird.[21]

Several ENGOs develop productive relationships with governmental agencies, operating as quasi-GONGOs (government-organized NGOs). For instance, Wetlands Taiwan has quasi-official ties with the local, as well as central, governments. The Zhouzai wetlands, under the sponsorship of the Kaohsiung City government, are a landmark example of local government cooperating with an ENGO to promote environmental protection. Many wetlands in Taiwan are managed by Wetlands Taiwan, which functions as a de facto governing body. This partnership relationship with government has gradually whittled away at the once radical orientation of some ENGOs.[22]

International Influences and ENGO Connections

In the case of Taiwan, international environmental organizations are not regular participants in domestic environmental protection. Taiwan's diplomatic isolation constrains its participation in major international organizations, and international lending institutions such as the World Bank and Asian Development Bank are not actively involved in its environmental policies. Yet, on occasion, ENGOs have built close relationships with major international NGOs (INGOs). In the past, domestic ENGOs exposed cases of trafficking in illegal wildlife and ecological degradation to the international mass media and invited INGOs to monitor Taiwan's mitigation record. The recent Binnan environmental case has refocused international interest in Taiwan, amid the globalization of environmental affairs.

In the Binnan case, publicity about the plight of the black-faced spoonbill played a key role in stopping the development project. Taiwan's ENGOs invited famous international figures such as the Dalai Lama, in 1997, and Jane Goodall, in 1998, to observe the Qigu habitat. The black-faced spoonbill was the turning point for the Binnan project, for without international intervention, the project would have been approved without delay. The endangered spoonbill was utilized as an instrument for the environmental protection of the Qigu area.[23]

ENGOs also invited international scholars to provide critical commentary on flaws in the environmental review process. They pointed out omissions: analysis of carbon dioxide emissions, limited water supply, the impact on wetlands of international significance, impacts on the rare and endangered black-faced spoonbill, and impacts on the existing economy and quality of life. Since the EIA failed to consider viable alternatives, the EIA review committee's action was seriously flawed when evaluated by scientific standards accepted in leading nations. Furthermore, the open processes expected in a democracy were short-circuited by secret meetings that excluded public debate on key topics. Finally, the EIA review committee had negotiated, instead of giving full attention to scientific data.[24] Reports from international scholars increased media scrutiny of the Qigu case, and imposed more pressure on the government to reconsider the case, as it did.

Pro-development groups at the grassroots level, however, oppose international intervention as an impediment to Taiwan's local development. From their perspective, western standards do not apply to the current situation in Taiwan. The Secretary General of the Qigu Development Promotion Commission contended:

> 'The ultimate goal in the Binnan case is to pursue the win-win outcome of economic development and environmental protection. During the colonial period, Taiwan was squeezed by the Japanese as a resource provider. However, it was a plain fact of the uneven division of labor at that time. Recognizing the reality of Taiwan's current economic development, we have no choice but to be a part of the global division of labor. That is why we still need to attract foreign direct investment and build up our industrial complex. One key point is to improve the people's livelihood. This is the only road for a sustainable Taiwan. The Americans are not good guys. If we follow their high standard of environmental protection, the local economy will run into a dead end. The environmental organizations tend to introduce foreign experts and foreign media, but these "foreign actors" do not understand the domestic situation. These ENGOs, along with foreign forces, always threaten to impose international sanctions on Taiwan. They suggested enlarging the black-faced spoonbill protected areas into 6000 hectares. They do not understand the limited land and economic resources in Taiwan. They plan to transform Taiwan into places like somewhere in continental Africa.'[25]

In addition to inviting international involvement in Taiwan's domestic

environmental protection policies, ENGOs have begun to establish international networks of environmental protection. For example, the WS has an ambitious plan to globalize its activities. It has formed overseas chapters in Nicaragua, Australia and Malaysia, where it works with ethnic Chinese, and promotes knowledge of sustainable development. The Wilderness Society's purpose is to improve the image of the ethnic Chinese, and to aid implementation of sustainable development. The Malaysia Chapter has grown slowly due to protests by China, but the concentration of ethnic Chinese in specific regions provides a good platform for WS activities. The operation in Australia runs smoothly because of less intervention from China. Ethnic Chinese have a strong sense of *chuanzong jiedai* (to continue one's ancestry, to deliver offspring). To maintain the prosperity of the future generations, WS contends that ethnic Chinese need to save their environment for the children. The WS is endeavoring to link the concepts of traditional China with modern canons of sustainable development.

The WS also raises awareness about the impact of cross-strait relations on Taiwan's environmental protection. Worrying about the hollowing-out effects on the economy of large corporations planning to relocate to the mainland, the Taiwan government has provided incentives for these enterprises to 'leave their roots in Taiwan'. Many industrial complexes on the west coast of Taiwan including highly polluting industries, such as petrochemicals and steel plants, are the result of such governmental incentives. This is the environmental impact of the cross-strait tug-of-war.

The WS has frequent contacts with ENGOs on the other side of the Taiwan Strait, but to the present has failed to develop collaborative efforts to supervise the highly polluting Taiwanese plants moving to China. As most Taiwanese plants in China operate under special permission from the local and even central government, local Chinese ENGOs are not allowed to contest pollution cases without permission from the government. As to other less controversial topics such as reforestation and wildlife protection in the inland areas, cooperation between Taiwanese and mainland Chinese ENGOs is more obvious.[26]

The environmental movement played a role in Taiwan's democratization and is an important factor explaining Taiwan's robust civil society in the early twenty-first century. Individuals and groups seeking conservation of biodiversity can use their autonomous social power to influence policy and even direct outcomes, as the examples given of Taiwan's ENGOS show. We summarize Taiwan's ENGOs in Table 7.2. Taiwan has a relatively small number of ENGOs, and while specialized into different environmental issues areas, they operate primarily at two levels, the national and local. This contrasts with the more complex arrangement of groups in China, to which we now turn.

Table 7.2 Taiwan's ENGOs (2005)

Types of ENGOs	No. of ENGOs
National ENGO	141
Local Environmental Protection Organizations	126
Others	33
Total	300

Source: Environmental Protection Administration, Executive Yuan, ROC, retrieved from http://www.epa.gov.tw/a/a0400.asp?Ct_Code=02X0000013X0007650, 27 December, 2005.

ENVIRONMENTALISM IN CHINA

The state of environmentalism in the China of 2005 resembles that in Taiwan 20 years previously: a few thousand environmental activists, divided among a small number of environmental organizations monitored by the state, and focused chiefly on local problems of air, water, and land pollution. Of course there are significant differences, such as the role of government-organized and international environmental groups, to which we refer below. Yet the similarities suggest the importance of political and economic variables in the development of environmental movements. We examine a few of these political-economic conditions before analyzing the types of environmental associations in China and the extent to which they express characteristics of civil society.

The Political Economy of Environmentalism

Command economies in totalitarian states provide an inhospitable environment for the growth of social associations.[27] It was largely economic reform in the direction of marketization, accompanied by a degree of political liberalization that provided structural incentives for social group formation in China. The lack of completion to these reforms by 2005 and the continued dominance by the Leninist party-state are the primary disincentives for the flowering of an environmental movement and development of an autonomous civil society.

Starting with Deng Hsiaoping's economic reforms beginning in 1978, the focus of economic planning and growth switched from SOEs to TVEs, while all public sector enterprises began to emphasize productivity and profitability and gradually increased accountability of managers. The simultaneous opening to the West attracted foreign direct investment (FDI) and foreign joint ventures, and by the twenty-first century the non-state sector composed of

these as well as most TVEs (a large number of which had been privatized), and a domestic private service sector, collectively produced more than half of China's Gross Domestic Product (GDP).

Downsizing of the central government bureaucracy (itself a drag on economic growth) was a cost of marketizing reforms and economic devolution, as the state lost revenues from enterprise operations to provinces, municipalities and counties. It was logical, then, for the state to allow the formation of social organizations in areas of business, social welfare, gender equity, health, and especially the environment. Social organizations could perform myriad functions of benefit to the state. They could disseminate state policy, educate the public, employ part of the increased surplus labor force (for example, laid off or retired public sector employees), and assist in the resolution of social conflict. Moreover, as China's foreign policy warmed to international government organizations and as she participated in international conventions, social associations provided new interfaces for communication with other countries. Social associations were an indispensable vehicle to trap economic assistance from foreign governments, international financial organizations such as the World Bank, and from INGOs.

As the regime introduced economic reforms, it also loosened political controls over the population. Although the household registration (*hukou*) system has remained in effect, individuals have greater freedom to travel domestically and change jobs and residences. Increasingly, the market and not government controlled their options for employment, housing, education/training, and opportunities for self-actualization. Yet social life and in particular membership in associations remained under government scrutiny.

The continued Leninist regulation of social life is explained not only in terms of the survival instinct of a party that sees any grouping as potentially in opposition to the regime, but also a reflection of perceived challenges to state authority. The Tiananmen incident of 1989, which reflected the organized efforts of students – joined by labor and other mass elements – to liberalize the regime, signified the need on the part of the state to closely regulate social associations. In response, in October 1989, the state issued new regulations for social associations which required that they be sponsored by an agency of the state and meet requirements pertaining to their membership and financing.

In 1998, new regulations[28] from the Ministry of Civil Affairs (MOCA) reinforced the requirement that NGOs be sponsored by a state agency (which Chinese often refer to as a *po po*, or mother-in-law, because of the prospect that the agency will interfere in associational life), and excluded the opportunity for the social association to register as a business affiliate. Membership in the group was limited to 50 and it had to demonstrate fiscal responsibility. A group was required to seek separate registration in each place it operated, which effectively prohibited the growth of national associations

not directly part of a national bureaucratic agency. Also, only one social association could register in the same area for a specific activity, such as environmental protection. Overall, the 1998 regulations are a clear example of state corporatism: the inclusion of social group activity within the administrative purview of the state. Schwartz notes: 'As a result, NGOs tread carefully, avoiding strong criticism of government environmental protection failures'.[29]

Altogether, the 1998 regulations have had a dampening effect on the development of social associations in China, especially those with no friends in the bureaucracy. The crackdown on the *Falungong* in 1999 had an even more chilling effect. As the registration requirements do not yet comprehend foreign NGOs operating in China, their activities take place under an administrative cloud.[30] The requirement that a new association find a sponsor in the state bureaucracy is a daunting challenge, because few officials are eager to take the risk of becoming responsible for events and activities performed by an NGO. Moreover, the refusal of one agency to serve as a sponsor typically influences other potential sponsors. Finally, few voluntary associations have the financial means to meet the state requirements. There is no sign that registration requirements will loosen soon. In fact, in response to the 'color revolutions' in countries of the former Soviet Union, NGOs (and particularly those with international headquarters and local organizations receiving funding from abroad) are under increased scrutiny from the regime.[31]

Our interviews with social association representatives revealed, however, that while the registration requirements were strict, they had not prevented the formation of social groups in the area of environmental protection. Saich comments: 'Broadly speaking, those groups working in the field of education and environment have been permitted or have negotiated relatively free space'.[32] Approximately half of the nearly 50 organizations we visited were not registered with the government, yet had operated without mishap. Some were INGOs which operated under a memoranda of agreement with state agencies; others had sponsors in the elite at the national or provincial level. When we asked the indigenous unregistered social associations what impact operating outside the registration system had, the leader of a typical NGO said: 'There are two effects. First, it influences our finances, as we cannot receive foreign contributions [or even set up bank accounts]. Second, it influences the legality of our operations'.[33] Both inhibit organizational growth and contribute uncertainty to associational life. Nevertheless, we estimate that a very large number of environmental groups, and in particular those at the grassroots levels in cities and counties, operate in such a situation. They are tolerated by the state, which seems to recognize the value of civic associations. As Secretary General of the State Council, Luo Gan, declared in 1998: 'Government has taken up the management of many affairs which it should not have

managed, is not in a position to manage, or actually cannot manage well',[34] and he then proceeded to urge an expansion of 'social intermediary organizations'.

A Typology of Chinese Environmental NGOs

Table 7.3 presents our estimate of the array of environmental non-governmental organizations (ENGOs) of China in the early twenty-first century. This table is based on several sources: interviews conducted by the authors in China from February 2004 to May 2005; analysis of reports produced at the NGO center of Qinghua University; a 2002 research report on Beijing NGOs[35]; and estimates by other authors who have studied ENGOs in China.[36] This typology differs from that of Yang[37] primarily because it does not include environmentalists aggregated through the Internet, for two reasons. First, our analysis is of groups of individuals who meet face-to-face to develop strategy, enlarge resources, and respond to situations, which is not likely through the Internet. Second, although China has seen an explosion in the use of the Internet to comment and urge action on social conditions, to the present the blogs have been posted by individuals and do not represent a group effort.

The numbers we present are merely estimates. As in so many areas, Chinese government statistics on NGOs are plentiful. The latest statistics from MOCA give the number of officially registered NGOs as 283 000.[38] The Deputy Director of Tsinghua University's NGO research center said 'Today there are some 2000 (environmental) NGOs', but he added that only 100–300 have serious influence.[39] Ho comments: 'Basic data on the total number and

Table 7.3 China's ENGOs (2005)

Type	Management*	Number (Estimated)	Membership
GONGOs	Professional	350	1–2 million
Beijing, National	Participatory	40–50	3–4000
Student	Participatory	120	10–25 000
Grassroots, NIMBY	Participatory	1–3000	1 million +
INGOs	Professional or Mixed	35	250

Note: * This category refers to the distinction in the literature on comparative environmental politics between associations directed by managers or 'professionals' who make the policy choices and those that emphasize 'participatory' decision making, involving most association members.

Source: Prepared by authors.

geographical distribution of green NGOs and social organizations nation-wide are non-existent'.[40] We agree emphatically with Ho's assessment.

In the sections following we discuss each type of ENGO, illustrating it with examples. The common questions discussed pertain to the age of the ENGO, registration situation, leadership, finance, functions, and effects. Since our focus is on the impact of ENGOs on biodiversity conservation policies, the examples are drawn from this area.

GONGOs

GONGOs, or government-organized non-governmental organizations, are not unique to China, but they surely play a larger role in environmentalism in this country than elsewhere in the world. The concept does not include non-profit service organizations of bureaucratic agencies, designed to strengthen their administrative capacity.[41] Instead, it refers to quasi-government bodies, usually housed in a bureaucracy, which perform public relations, educational, and other functions.

One example of a GONGO in the area of biodiversity conservation is the China Wildlife Conservation Association (CWCA), one of the earliest GONGOs to be established, in 1983. The CWCA's primary affiliation is with the State Forestry Administration (SFA), but it also has a relationship with the Ministry of Science and Technology (MOST). The initial purpose behind its establishment was to provide a vehicle (a non-governmental foundation) for the Chinese government to receive foreign funding in support of species preservation, then principally for the giant panda. This remains a major purpose, but in its evolution it has added three other objectives: 1) emphasis of scientific research and development; 2) education on biodiversity conservation issues; and 3) service as a liaison for China on international conservation issues. Describing the membership base, a director commented:

> 'There are 80 000 members of CWCA … All are individuals. They include soldiers, farmers, groups of individuals. For example, there's a branch in Sichuan Province and a branch further in Meiyang county. We have units nationwide down to the county level … There are too many for us to manage them all.'[42]

Most of CWCA's funding comes from its two ministry sponsors, but international grants have assisted its operations in some years. About half of its 20 staff members worked previously for SFA or MOST, but are now in a non-governmental personnel system. It has relationships to ENGOs in China and especially those working in the area of species preservation, such as the International Fund for Animal Welfare (IFAW). On occasion, it will contact government agencies on behalf of INGOs, and co-sponsor conferences and other events with them.

A second GONGO is the Chinese National Committee for Man and the Biosphere (MAB), established in the mid-1980s to implement China's membership in the United Nations Educational, Scientific and Cultural Organization (UNESCO) MAB program. Of China's more than 2000 protected areas, 26 have met the UNESCO criteria for inclusion in the global network, which qualifies them for government support and opens opportunities through exchanges to learn about the operations of nature reserves in other countries. In recent years, the small staff (a secretary general and five staff) has conducted annual studies of China's protected areas (PAs) to determine their effectiveness in preserving species and habitats.[43] They have facilitated exchanges of PA personnel with other countries, and have also engaged in environmental education. The organization falls under the Chinese Academy of Sciences (CAS), but is applying for joint affiliation with the China Science Association.[44] Its Director, a scientist who specialized in Chinese grasslands before assuming work in the GONGO, is considered one of China's authorities on protected areas.

A third example of a GONGO is the China Environmental Protection Foundation (CEPF), formed in 1993. The CEPF was the first non-profit NGO foundation pursuing environmental protection in China. Its founding Director is Qu Geping, former Administrator of the National Environmental Policy Administration (NEPA) and Director of the Natural Resource Conservation Committee of the National People's Congress. Qu won the UN's US$100 000 environmental prize in 1992 for his leadership in environmental protection work. He donated the entire award to CEPF's establishment.[45]

A major activity of CEPF is environmental education, and in 2005 it granted its first five China Wildlife Conservation Awards to organizations and individuals who made outstanding contributions to species and ecosystem protection. One awardee, Zhang Chunshan, a farmer from Lijiang in Yunnan Province, was recognized for his investigations into illegal stripping of Chinese yew bark and reporting it to government authorities.[46] The CEPF partnered with the INGO WildAid in selecting awardees and publicizing their contributions.

Both the Chinese National Committee for Man and the Biosphere and CEPF have considerable autonomy from state control, a feature of some GONGOs that suggests they may evolve into important elements of civil society. A recent report by Wu contends:

> 'The GONGO sector in China is quite diverse in terms of political independence and strength, but they are distinctive from the government and NGOs in that they straddle and sometimes bridge the world of government agencies and NGOs.'[47]

As the CEPF example shows, they have access to the international environmental community through partnerships with INGOs in China.

National, Beijing ENGOs

This second type of environmental organization is country-wide with respect to its objectives, but because the registration system does not permit umbrella groups with branches throughout China, they are registered and physically located in the national capital, Beijing. They have short histories; the oldest, Friends of Nature (FON), was established just in 1994. Although they have relationships with INGOs and have received funding from them, they defray most operational expenses through membership dues or out of the pockets of directors. An exception to this generalization is the Alxa Social Entrepreneurs Ecology (ALXA SEE) Ecological Association, founded in 2004 by nearly 100 entrepreneurs and enterprises. Its broad purposes are to improve and restore the ecology of the Alxa area of Inner Mongolia (the origin of sandstorm activity in China), particularly to reduce the severity and frequency of sandstorms. Also, it seeks to imbue China's businesspersons with greater ecological and social responsibility.[48]

Friends of Nature is the best-known of China's ENGOs. It was established by Liang Congjie, a former history professor, member of the Chinese Political Consultative Conference, and grandson of the early Republican China luminary Liang Qichao. Those last two credentials explain perhaps why it was possible to establish FON, although as the founder mentions, it was a difficult course nonetheless. The State Environment Administration (SEPA) rejected his application for second-tier affiliation because it already sponsored a cultural association called the 'Green Cultural Association', and so Liang sought affiliation with the China Academy for Chinese Culture, a grouping of distinguished professors and intellectuals, to which Liang belonged. Its official, Chinese name is 'Green Cultural Academy', but the ENGO uses its English name, Friends of Nature.

Friends of Nature has the largest membership of any indigenous environmental NGO – approximately 2000, half in Beijing and half in other locales. A council of 25 develops its strategy and directs the activities of a staff of 10 with a budget of RMB$1.2 million (about US$150 000). The main activity of the association is environmental education. It publishes a monthly newsletter and operates a mobile environmental education van outside Beijing. It has focused on solid waste pollution, water quality and sufficiency issues, and it has directed attention to several endangered species problems. It sought a protected area in the Yunnan province for the preservation of the snub-nosed monkey, which was established there. It has participated in the revision of environmental legislation and regulations, and engages in advocacy as well. The FON has benefited from the recent liberalization of the Chinese press, which increasingly carries articles on environmental problems and turns to organizations like FON to supply information.[49]

A third example of a Beijing-based ENGO is the Global Village of Beijing

(GVB), established in 1996 by environmental activist Liao Xiaoyi. Like a few other Beijing-based ENGOs, GVB is registered as an enterprise under the Department of Commerce and Industry. It has an active environmental education program and emphasizes women's role in environmental change. In its brief history it has hosted a weekly television show on Central Chinese Television, sponsored China's first recycling program, and piloted programs in 'green lifestyles', including a back-to-nature training base near Beijing.[50] A different type of Beijing-based NGO is the Center for Legal Assistance to Pollution Victims. Environmental law professor Wang Canfa established this ENGO, which is affiliated with the Beijing University of Politics and Law. It has a number of lawyers who take on cases of pollution victims, with more than a 50 percent success rate.

A fourth example of an indigenous ENGO is the Desert Control Volunteers Network. This is a relatively new organization, operating out of Beijing. Its chief purpose is to change popular attitudes about the desert and control of desertification, while communicating information in China's cities about special land forms, plants, and animals found in desert terrain. Most of its dozen members are Beijing-area university students or young professionals. They work with grassroots organizations in areas adjoining deserts, provide training for them in capacity building, and then share these experiences with urban residents. Altogether about 60 volunteers work on programs, and they maintain contact through the Internet. The organization's work on sustainability is guided by traditional Taoist thought as well as by Gandhian precepts.[51] The Desert Control Volunteers are not registered, because the 'complicated process' in China 'doesn't have much to do with the kind of an association we are'.

A final example is the Global Environmental Institute (GEI), registered in 2003. This organization crosses the ENGO-INGO border, as it has an affiliation with the World Watch Institute, and international members sit on its Board of Directors. It has several areas of focus: biodiversity conservation in hotspots, energy efficiency advocacy (including renewables), and rural finance. The GEI often partners with institutes in the CAS.[52]

Student environmental associations

The third type of environmental association is composed of student groups at university campuses throughout China. Most colleges and universities with environmental education programs (about 130 in 2005)[53] also have student organizations focusing on the environment and development or sustainable development. These groups are free-forming, lack paid staff, and develop activities based on students' interests.[54]

The best-known student environmental organization is the Green Camp Volunteers, which formed in 1996. The 'spiritual leader' of Green Camp

is Tang Hsiyang, a former editor and author of *Green World Tour*. In 1996, Tang organized a college student camp in the Shangralila area of Deqing County in the Yunnan Province, to focus attention on the golden monkey whose habitat was threatened by rapid deforestation. Students wrote reports on what they observed and submitted them to provincial officials. In succeeding years, students traveled to different locales, such as Xinjiang, Hainan Island, Tibet, and Gansu. There are four products of their tours: 1) students' papers expressing their feelings about local and regional developments; 2) photo collections which they exhibit to campuses; 3) a video of the trip, also for exhibition; and 4) public presentations to college students. Green Camp organizations are also found in Xian, Fuzhou, Canton, and Shanghai.[55]

The Beijing area has had a city-wide student environmental association in the last three years. Student environmentalists are interested in spreading grassroots organizations and forming a national student environmental organization. Although it is far easier for students to establish clubs and voluntary associations at universities, the regime's reaction to a national student association is uncertain.

Local grassroots ENGOs

Environmental groups at the grassroots level, in cities, towns, and villages, are the fourth type of ENGO in China. No census has been done of local grassroots ENGOs, but they probably number in the thousands.[56] Few have a permanent, paid staff, and they are unlikely to have an office. These associations typically form to oppose environmentally degrading practices of businesses or governments. Thus they express 'NIMBYism', opposition to ecological disturbances happening in one's own back yard.

One example of a grassroots organization is the Upper Yangtze Organization (UYO), established in Zhiduo County, a western county of Yushu Tibetan Autonomous Prefecture of Qinghai Province in 1998.[57] The UYO was founded by a group of Tibetan herders, some of whom had participated in the Wild Yak Brigade, a quasi-official anti-poaching patrol. Three objectives describe the range in activities of UYO. First, in collaboration with the township government, it has formulated a multiple-use land management plan, to establish local nature reserves for the protection of snow leopards, Tibetan antelopes, Tibetan wild asses, black-necked cranes, and wild yaks. Second, and also in concert with the township government, it created an ecological protection committee to monitor wildlife populations and use. Third, the group has promoted basic education, including the establishment of a primary school, including ecology courses. The UYO has partnered with and received financial assistance from a number of external agencies, including Canada's Plateau Perspectives, Global Greengrants Fund, and Fauna and Flora

International. In 2002, Founder and Director Drashi Dorje received an Earth Award from the SFA.

Recently, the Critical Ecosystem Partnership Fund[58], an affiliate of Conservation International (CI), conducted a survey of 24 grassroots NGOs in Southwest China, focusing on the difficulties they encountered in their programs and planning.[59] About three-fifths of the NGOs surveyed had never received training in financial management and decision making. Most (54 percent) were not registered with the government, and 37 percent lacked offices and did not issue annual financial reports. Operating budgets were small: 30 percent had budgets of less than US$1200; some 30 percent had budgets between US$1200 and US$6000; only 15 percent had annual budgets greater than US$12 000.[60] Organizational objectives included education and raising awareness for environmental protection (63 percent) and water pollution prevention (54 percent) among others. Nearly three-fourths (70 percent) had worked with other local NGOs, schools, and local governments. A number of INGOs have begun to focus on capacity building of grassroots ENGOs, as we note briefly below.

International NGOs

The final level of NGOs is composed of environmental organizations with headquarters in North America or Europe, which focus on environmental problems in China of global significance. These organizations are the richest ENGOs operating in China, with offices and full-time paid staff members. They operate in the silence of the law until China develops regulations for the registration of foreign NGOs (planned for 2006); yet, when developing projects, the International NGOs (INGOs) typically reach memoranda of agreement with central government agencies, such as SEPA and SFA, or with provincial governments.

The leading example (in 2005) of an INGO is The Nature Conservancy (TNC), which entered China only in 1998, but has now developed 15 project areas in the northwest Yunnan Province, one of the most biologically diverse temperate ecosystems on the planet. The goals of the TNC's Yunnan Great Rivers Project are: 1) to establish a system of nature reserves in the region characterized by their effective management and enforcement and participation of the local population in reserve objectives; 2) to initiate enterprises that generate economic benefits for local communities while protecting natural and cultural resources; and 3) to develop effective policies and build capacity among governments, communities and NGOs for sustainable conservation and economic development.[61] Some 35–40 TNC program staff work with provincial government officials and with a host of grassroots NGOs, including women's groups, cultural associations, indigenous knowledge centers, and newly formed village economic enterprises; another 15 associates staff the

Beijing national office.[62] The Nature Conservancy's commitment to this region is for the next 5–10 years;[63] although more a catalyst than a status quo conservation organization, its annual expenditure of US$4.5 million and wide range of partnerships suggest that it is positively influencing biodiversity conservation efforts.

A second example is the World Wide Fund for Nature (WWF). It has been involved in conservation activities in China for nearly 25 years, but its Beijing office was not established until 1996. Most of its earlier work was coordinated from Hong Kong. In 2005, WWF is China's second largest INGO, with an office staff of 20 and a 2002 budget of around US$400 000. It began its work in China in 1979 by assisting the government in the establishment of the Wolong Giant Panda Reserve. The panda is WWF's logo in China, and it continues panda preservation efforts in the Minshan region, in the Qinling Panda Focal Project (Shaanxi Province) and supports surveys and studies on pandas and their habitats. Also, it has been active in the restoration of wetlands on the Yangtze, development of sustainable ecotourism projects, and wetlands conservation in Tibet.[64] In 2001 the organization launched a China species preservation program, emphasizing protection of less well-known species. It gives RMB$5000 (about US$617) grants for investigative and species preservation work.[65]

International NGOs in China are relatively specialized in their areas of operation. The International Fund for Animal Welfare (IFAW), in Beijing since 1994, has been most active in monitoring protection of endangered species, such as the Asian elephant and Tibetan antelope. Wetlands International has been in China since 1995 and monitors PAs in which there are wetlands (around 300). Greenpeace has had a program office in Beijing since 2002 and has focused on genetically modified organisms (GMOs) and biosafety issues. Conservation International (CI) established a program office in Beijing in 2002; its major project is in the mountains of southwest China hotspot where it maps sacred sites, assesses their biodiversity values, documents and gathers indigenous knowledge and works with local grassroots NGOs to assist in their capacity building.[66] The International Crane Foundation (ICF) specializes in bird species conservation and also is active in preservation of wetlands.

INGOs in China are especially valued for the funding they import for environmental work, collectively estimated to amount to US$100 million annually. They support grassroots ENGOs in Beijing and other locales, and connect them to other INGOs, to foreign governments, and other international funding sources.

Civil Society and China's NGOs

China's ENGOs are at an early stage of evolution when compared even to

those in Taiwan and other newly democratizing Asian states. The oldest, dating just to the 1980s, are GONGOs, which extend the reach of the central, and in some cases provincial, and local governments. Most ENGOs have been established for less than a decade, and thus any analysis about their contribution to the growth of civil society in China has to be provisional. Yet, on the surface, ENGOs meet relevant criteria: most are situated between the state and individuals; most have at least a degree of autonomy from the state; and they form voluntarily.[67]

The evolution of ENGOs has been gradual. The stringent regulations on registration of social associations do not appear to have curbed the rise of new ENGOs, but if they remain unregistered, they have difficulties raising funds, attracting members, and they operate in the realm of uncertainty. Few leaders of the indigenous ENGOs have training in the environmental sciences and environmental protection work. Although leaders of Beijing-area ENGOs are familiar with one another's activities, and may sponsor programs, workshops, and activities jointly, to the present they have not developed an umbrella organization, a large-scale coalition of environmental groups. Of greater importance, only a few ENGOs have developed linkages with NGOs in other areas, such as poverty alleviation.

In fact, the watchful state has recently organized an environmental peak association, the All-China Environmental Federation, which seems designed to preempt coalition formation among ENGOs. On Earth Day 2005, Vice Premier Zeng Peiyan addressed the inaugural ceremony, hoping that it would assist the government and link it to the public on environmental issues. The Federation's goals include improving the implementation of sustainable development strategies, enhancing environmental protection in all sectors, and safeguarding environmental rights and the public interest. Among the Federation's leaders are a 'noticeable number of concurrent or former senior government officials'. The Ministry of Finance allocated RMB$1.29 million (US$155 000) to its programs.[68]

Media in the development of civil society

The ENGOs all engage in environmental education, and the ones we have examined most closely spread knowledge about endangered and threatened species and ecosystems. The media are critical to this effort. There are congenial relations between the Beijing-based and national ENGOs and China's media. The print media carry daily stories about threatened species and ecosystems, pollution, and other environmental problems. Yang emphasizes the 'homologous relationships' ENGOs have with the media, as they share 'structurally similar' positions.[69]

Earlier we mentioned the critical view that as China remains a Leninist state, the party constrains what appears in the press, on TV, and radio.

Moreover, on large environmental issues such as hydropower development, proponents of development are likely to be closely allied to powerful ministries and may have personal relationships with them.

We have also mentioned that environmental concerns are less sensitive than issues such as labor protest and human rights, and for this reason journalists report on the environment frequently. China's large media groups provide many channels to spread information: '2200 newspapers, 8135 magazines, 1210 broadcasting stations, 1000 TV stations, 2400 cable networks'.[70] Not all report on environmental problems, but some, such as *China Environmental News*, have been in business for nearly 20 years.

Most reports tend to be innocuous, as there are dangers to investigative reporting and not just from censors. For instance, Lu Meng, a reporter for *West Times*, investigated illegal logging at a state forest farm in Sichuan Province, and published a highly critical article on it. When conducting a follow-up study, the farm's guards seized his press card, mobile phone and camera, and beat him, as well as his driver and the whistleblower who had alerted him to the illegal practices. Apparently, farm security personnel did not intervene.[71]

A late 2005 episode of violent environmental protest shows the continuing restrictions on media reportage. On 6 December, some 300 residents of the south China village of Dongzhou, armed with spears, knives and dynamite, protested a power company's plans to develop a power plant on their land, without agreed upon compensation. In addition to forcible seizure of land, the economic development project would install a coal-fired generator, which would heavily pollute the village. Plans to fill in a local bay as part of the project would ruin a fishery used by villagers for generations; blasting a nearby mountainside for rubble to use in the landfill and fill in the bay would threaten biodiversity.

When complaints to authorities and a sit-down protest failed to gain the support of county and provincial (Guangdong) authorities, villagers assembled in the town center, confronted by hundreds of police. Without warning, police violently suppressed the demonstration, in the largest use of armed force against civillians since the Tiananmen protests of 1989. The police left 20 protestors dead in automatic weapons fire and at least 40 missing. The regime imposed a blackout on all news about this episode of environmental protest. The New China News Agency reported a skeletal version of the event only four days later.

Thus, although journalists are developing relationships with NGOs in China, most screen their critical faculties and look for lurking shadows of the state and society. The opening example of this volume demonstrates that censorship of critical environmental reports, and of inflammatory environmental protests and demonstrations, continues.

Self-constrained advocacy

Most ENGOs participate in what we call 'self-constrained advocacy'. When they learn about a new environmental problem, their tendency is to write a letter to the relevant government ministry or agency or to representatives in the National People's Congress. If leaders have personal relationships with members of the policy elite, they may call them or meet them in person, but the usual strategy is to compose a letter, asking for clarification to, or revision of, policy. Most participation remains top-down: governments invite ENGOs to participate in drafting regulations or preparing implementation plans.

Environmental NGOs operate in a country ruled by a Leninist party, and opposition to the party-state, as revealed in the Tiananmen incident and Falungong, is forbidden. For this reason, ENGOs do not take direct action in support of environmental protection objectives, as has been commonplace in Taiwan. National groups do not stage protest demonstrations or engage in ecological resistance, tactics employed by ENGOs in many developing countries, notes Ho.[72] They are moderate in their approach to the government, non-confrontational, and search for the most effective tools to use in the Chinese context. Said one ENGO coordinator: 'Some actions we might take would be counter-productive, for example, blocking the driveway to the Premier's house. We are not protesting for the sake of protesting'.[73] The founder of GVB explained the 'mildness' of her organization's approach in these terms:

> 'We still adhere to our principles: guide the public instead of blaming them and help the government instead of complaining about it. This, perhaps, is the "mildness" referred to by the media. I don't appreciate extremist methods. I'm engaged in environmental protection and don't want to use it for political aims.'[74]

Business groups and ENGOs

In both Taiwan and China, some ENGOs have formed strong relationships with business firms. Although neither state facilitates business funding of ENGOs, through provisions in tax codes allowing write-offs for donations to non-profit organizations, ENGOS do appeal to the 'corporate social responsibility (CSR)' of modern firms.

In Taiwan, the WS has adopted accommodative policies toward the business community. Instead of fighting with enterprises, WS invited business leaders to join its Board of Directors, in the belief that enterprises needed to improve their social image. At the same time, WS gradually built webs of influence from the bottom up in these firms. It organized training programs to educate employees of major enterprises on the importance of environmental protection. The fund-raising campaigns of WS extended to all corporations in Taiwan, large and small. The WS has also jointly sponsored, with firms,

summer camps and weekend activities for young children. The WS's flexible linkages with the business community, however, make it an atypical ENGO. Other ENGOs labeled WS pro-business instead of pro-environment. The WS itself claims that the different forms of environmental protection reflect a new division of labor in Taiwan's ENGO community.[75]

In China, we noted the recent organization of 100 entrepreneurs and firms into the ALXA SEE Ecological Association, to mitigate ecological degradation in Inner Mongolia. Multinational corporations doing business in China contribute often to biodiversity conservation projects. For example, the HSBC Group invested millions in a WWF project to restore natural connections between now disconnected lakes and the Yangtze River. Moreover, IKEA has joined with the WWF in projects to maintain and enhance high conservation value forests.[76] The TNC's China programs benefit extensively from joint ventures of multinationals such as Kodak, Cargill and Pepsico. Indigenous ENGOs such as FON also receive funding from business firms. A Director of FON acknowledged sponsorship of a series of programs by China Shell. When asked whether Shell's international reputation affected the ENGO's interest in partnership, he remarked: 'We are only concerned with how corporations work in the Chinese environment, and Shell has been a good environmental citizen'.[77]

Environmental NGOs in China, like other social associations, do provide training in political participation for leaders and members. They bring together individuals on a voluntary basis, individuals who are not kin, and they work together on common objectives. In the process, they learn to value the contribution that each person can make to a common enterprise. Yang comments: 'They provide the rare opportunity for their participants to acquire the skills and habits of self-governance'.[78] They develop skills in communication, and learn how to organize resources and apply them to the attainment of group objectives. This is an essential step in the development of civil society.

However, China's ENGOs do not yet form a coherent environmental movement in the sense in which this concept is used globally.[79] At the current stage, they are not integrated nationally, and do not share a common discourse. Ma summarizes: 'China's NGOs may always have closer relations with the state than do their western counterparts'.[80] Thus, they are a weak reed in the growth of civil society in China at present, but may grow stronger.[81]

In 'hard authoritarian' societies like China, civil society in general, and ENGOs in particular, operate in ways different from the western concepts of the third sector in society. In China, scholars argue that working class activism is presently sporadic and isolated, tending more toward passive resistance than active participation. Deprived of broad-based organization and coherent intellectual leadership, the political power of the working classes remains

largely dormant. Political participation among China's private entrepreneurs is focused on narrow business interests and is defensive in character, with limited potential for collective political actions. At present, the economic resources at the disposal of the rising middle class provide them with increasing access to various informal channels of participation. While these channels do serve to promote elite societal interests to various extents, they also reduce the incentive for the bourgeoisie to demand institutionalized participation.[82] Yet as noted above, China's growing wealth (and middle class) supply the personnel and an increasing share of the financial resources used by ENGOs.

CONCLUSIONS: COMPARISONS OF ENGOS IN TAIWAN AND CHINA

The interaction between the state and society is embedded in the special political environment of China, which differs significantly from Taiwan after 60 years of independent development. Given the problem of registering as a social organization, many NGOs dress in camouflage. There are several ways of doing this: register as an enterprise or as a subsidiary organization under a façade institution; establish an informal 'club' or 'salon'; or avoid registration altogether. Social associations that are formally registered are generally organized by those with strong connections to the government. As mentioned, many government institutions have set up GONGOs, partly to devolve certain government functions to the market as a result of budgetary pressures, and partly in order to attract foreign funding.[83]

The emergence of Chinese NGOs implies the rise of a public sphere, and new forms of state-society interaction. Generally, the participation of registered social organizations in the policy process takes the form of invited consultation and comments on policy changes, including drafting and amendments of relevant regulations and laws. Participation typically is initiated from above rather than from below. However, governance processes in China increasingly are fragmented, localized, and untidy, despite continuing attempts by the central party-state to exercise macro control. The restructuring of state organizations in the late 1990s has reduced the capacity of officials to monitor social organizations, while local officials are willing to be lax about the implementation of regulations where the activities of non-registered groups benefit local development.[84]

A core issue to Chinese NGOs is their degree of autonomy. A few influential organizations remain under the control of the government and the Communist Party in terms of financial and personnel resources and decision making. At the same time, seemingly independent organizations have emerged in large

numbers, especially at the local level. Then there are the 'quasi governmental, quasi people' (*banguan banmin*), or 'governmental as well as people' (*Yiguan yimin*) organizations. These do not depend entirely on the government for their income and have more freedom in decision making. On the whole, Chinese NGOs gradually seem to be moving out from under governmental control. Social organizations have created new programs, mobilized citizen participation, promoted multiple interests, provided alternatives for professional and social services and practiced democratic procedures.[85]

The situation of Chinese ENGOs reflects the general tendencies of Chinese civil society and other NGOs. As Ho observes, Chinese environmentalism has two main features: its broad development and the lack of confrontation with the national government. We can add a third: its gradual evolution. Green social organizations are increasingly courting government approval and influence in policy making instead of seeking a potentially dangerous confrontation with the state. Previously we described the variety of green organizations, which differ widely in origins, scope of activities, and manner of resource mobilization. Some social organizations work on issues that attract widespread attention by the media; others opt for a low public profile, working on highly specialized technical or legal issues. Due to their recent development, many are weak in terms of organization, and human and financial resources.

What is striking about China's contemporary social associations is their heavy dependence on a strong and charismatic leadership, which could prove problematic in the long run.[86] This is particularly true of environmental groups, such as Friends of Nature and the Global Village of Beijing. Individual initiative has also spawned a growing number of volunteer organizations, which provide advice and services in a wide range of areas, including health-care, personal counseling, assistance to the disabled and elderly, and legal information.[87]

In contrast, Taiwan's environmental movement is characterized by the largely domestic nature of its financing, staffing, agenda setting, and implementation. Michael Hsiao argues that international governmental and non-governmental organizations make no direct contribution to the rise and operation of Taiwan's social movement and indigenous NGOs.[88] During the process of Taiwan's democratic transition, NGOs accumulated social capital and public trust in Taiwanese society. ENGOs helped to create a plural society through the enlargement of channels of social participation and communication. They were champions and advocates of Taiwan's democratization at the early stage, and laid a foundation for democratic consolidation after the mid-1990s. Upon the transition of political power in 2000, Taiwanese NGOs began to develop a different relationship with the DPP. The DPP-ENGO partnership became especially unstable because as a ruling party, the DPP acknowledged

the need to develop ties with the business community. In short, the rise of NGOs, especially environmental NGOs, was closely connected to Taiwan's democratic movement. Environmental NGOs formed myriad alliances with grassroots environmental activists, opposition parties, and specific political elites.

There was an international dimension to Taiwan's democratization, and observers wonder whether ENGOs in China may be a channel along which international democratization impulses may travel. It is the case that international aid agencies and foundations have played a key role in stimulating the emergence of organizations concerned with social issues. Activities of international NGOs grew in the 1990s, which has catalyzed the development of a number of associations and centers[89] particularly at the grassroots level. Activities of INGOs such as TNC, ICF, WWF, and CI in capacity building are an important but relatively small-scale means for the diffusion of democratic ideas of participation. Furthermore, in order to improve its international image and guarantee the 2008 Olympics bid, the Chinese central government, on several occasions, has endorsed a degree of international participation in China's ecological issues.

In contradistinction to the Taiwan case, the environmental movement and ENGOs have had little direct impact on the embryonic democracy movement in China. Few ENGOs have reached out to other NGOs to develop common goals of political change.[90] China lacks a competitive party system. Environmental NGOs may have friends in the elite, but there are no political parties to dance with as was the case in Taiwan after 1986. Thus Chinese ENGOs are knowledge providers and agenda setters, but not agents of value change in a new democratic movement.[91]

However, ENGOs bring new people in to politics. Increasingly, they are active at the grassroots level, where elections are now held for village councils. Although they have not, as associations, figured in local elections, they may in the near term because they take positions on issues of interest to electorates. At both local and national levels, ENGOs have linkages to foreign democratic nations, whose INGOs stress political participation and capacity building.

Thus, to answer our second question (How have ENGOs influenced the growth and dynamics of civil society?), China's ENGOs have broadened civil society but are a less vibrant element in it than the ENGOs of Taiwan. To answer our first question (To what extent have ENGOs been able to influence environmental outcomes?), individual ENGOs have affected environmental outcomes, particularly in their work of identifying threats to endangered species and ecosystems and publicizing these threats. In Chapter 8, we consider their more general impacts on the conservation of biodiversity.

ENDNOTES

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5. Interview with the President of the Association for Promotion of the Qigu Lagoon National Scenic Area, Qigu, Taiwan, 2 April, 2005.
6. Personal interview with Professor Huang Mingchin, Tainan, 1 April, 2005.
7. Personal interview with Wu Zhongchang, Executive Secretary, Greater Qigu Development Commission, Qigu, Taiwan, 7 July, 2005.
8. Personal interview with Qiu Yiren, President, Tainan chapter, Wetlands Association, Tainan, 20 July, 2005.
9. Interview with Professor Huang Mingchin, Tainan, 1 April, 2005.
10. Personal interview with He Zongxun, Secretry General, Taiwan Environmental Protection Union, Taipei, 22 June, 2005.
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13. Personal interview with Chang Hunglin, Secretary General, Wildernes Society, Taipei, 1 August, 2005.
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18. Ibid.
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24. Byrne, John, Randolph Hesterand and G. Mathias Kondolf (2000), 'An open letter on the Pinnan Issue', *Taipei Times*, 25 April, p. 8. Byrne is a professor at the University of Delaware; Hester and Kondolf are professors at the University of California, Berkeley.
25. Personal interview with Wu Zhongchang, 7 July, 2005.
26. Personal interview with Chang Hunglin, 1 August, 2005.
27. The literature is confused about the correct English term for non-governmental organizations (NGOs) in China. What the Chinese call *shehui tuanti* translates roughly into social associations. These non-governmental groups are also referred to as *minjian tuanti*, which means 'people's' or 'popular' associations in English. The direct translation of non-governmental groups is *Fei Zhengfu Zuzhi*, which has not been used prevalently, because it connotes a grouping that may potentially be anti-government and thus a danger to the regime. Nonetheless, leaders of Chinese social associations, especially in the environmental area, frequently refer to themselves, in English, as NGOs.
28. See Schwartz, Jonathan (2000), 'Environmental NGOs in China: roles and limits', *Pacific Affairs*, **77** (1) (Spring), 38.

29. Ibid. See also Saich, Tony (2000), 'Negotiating the state: the development of social organizations in China', *China Quarterly*, (161) (March), 129; and Howell, Jude (2004), 'New directions in civil society: organizing around marginalized interests', in Jude Howell (ed.), *Governance in China*, Lanham, MD: Rowman & Littlefield.
30. In late 2005, the regime announced that foreign ENGOs would need to follow the same registration requirements mandated for domestic groups, including affiliation with a government office.
31. See Young, Nick (2005), 'NGOs will have to "negotiate the state" for some time yet', *China Development Brief*, **IX** (5) (June), 3, and 'Under scrutiny', *China Development Brief*, **IX** (7) (September), 1.
32. Saich (2000), op cit, n. 29, p. 137.
33. Personal interview with NGO representative, Beijing, 17 March, 2004.
34. Quoted in Saich (2000), op cit, n. 29, p. 128.
35. See New Century Youth Series (2000), *Research on Beijing's Non-governmental Organizations* (in Chinese), Beijing: Beijing Publishing Co.
36. Schwartz (2004), op cit, no. 28, p. 36.
37. Yang Guobin (2005), 'Environmental NGOs and institutional dynamics in China', *China Quarterly*, (181) (March), 50.
38. See Li Fei (2005), 'NGOs getting more prominence', *China Daily*, 22 April, p. 6.
39. See Qin Chuan (2005), 'Fledgling NGOs told to raise the bar', *China Daily*, 30 March, p. 2.
40. Ho, Peter (2001), 'Greening without conflict? Environmentalism, NGOs and civil society in China', *Development and Change*, **32**, p. 907.
41. For an analysis of these service centers, which include research institutes, environmental education, environmental monitoring, and pollutant discharge supervision and management institutions, see Lo, Carlos Wing-Hung, Jack Man-Keung Lo, and Kai-Chee Cheung, 'Service organizations in the environmental governance system of the People's Republic of China', in Lo, Lo and Cheung (2001), *Remaking China's Public Management*, Westport, CT: Quorum Books, p. 41–66.
42. Personal interview with CWCA Director, Beijing, 5 January, 2005.
43. See, for example, Han Nianyong, Jiang Gaoming and Li Wenjun (2002), *Management of the Degraded Ecosystems in Xilingol Biosphere Reserve* (in Chinese and English), Beijing: Tsinghua University Press.
44. Personal interview with Secretary General of the Association, Beijing, 4 January, 2005.
45. Personal interview with Program Director, CEPF, Beijing, 3 January, 2005.
46. Chinese yew is an endangered and protected plant growing in northwest Yunnan. The natural substance paclitaxel, proven effective in treatment of some cancers, is concentrated in yew bark. When paclitaxel was commercialized in the mid-1990s, thousands of villagers around Lijiang stripped bark and destroyed trees, selling bark to Sino-American Yunnan Hande Biotechnology Co., the largest manufacturer of paclitaxel. Following Zhang's investigation and reporting, the provincial government fined the company RMB$10 million and sentenced about 100 bark smugglers. See CEPF (2005), 'The China Wildlife Conservation Award', March, p. 8.
47. Wu Fengshi (2002), 'New partners or old brothers? GONGOs in transitional environmental advocacy in China', *China Environment Series*, issue 5, p. 45.
48. ALXA SEE Ecological Association, 'Duty and Dream', June 2004. Also, personal interview with an Executive Director, Beijing, 8 January, 2005.
49. Personal interview with President, Friends of Nature, Beijing, 23 June, 2004.
50. Personal interviews with GVB representatives, Beijing, 18 May, 2005.
51. Personal interview with coordinators, Desert Control Volunteers Network, Beijing, 4 July, 2004.
52. See: www.geichina,org/en/about/briefintro.htm, accessed 28 May, 2006.
53. See http://www.zhb.gov.cn (last accessed 18 August, 2005)
54. A survey of Beijing-area university students in 1998–99 indicated that less than 6 per cent had joined environmental protection associations in colleges; more than 80 per cent claimed an interest in activities of these groups. See Wong Koon-Kwai (2003), 'The environmental

awareness of university students in Beijing, China', *Journal of Contemporary China*, **12** (36) (August), 533.
55. Personal interview with Green Camp activist, Tsinghua University, Beijing, 25 May, 2005.
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57. Information on the UYO is drawn from J. Marc Foggin's 'Highland encounters: building new partnerships for conservation and sustainable development in the Yangtze River headwaters, the heart of the Tibetan Plateau', a book chapter commissioned by the Innovative Communities Initiative, a joint project of the United Nations University and the UNEP (September 2003).
58. Critical Ecosystem Partnership Fund (or CEPF) is a joint initiative of Conservational International, the Global Environmental Facility, the government of Japan, the MacArthur Foundation and the World Bank. The partnership focuses on advancing conservation of biodiversity hotspots. See www.cepf.net and CEPF Fact Sheet, January 2003.
59. Conservation International, *Building Conservation Capacity among NGOs in the Mountains of Southwest China*, Beijing, no date available.
60. Ibid.
61. The Nature Conservancy, China Program, April 2004 report.
62. For a view of the change in dynamics of discourse that TNC's work in Yunnan represents, see Litzinger, Ralph (2004), 'The mobilization of "nature": perspectives from North-West Yunnan', *China Quarterly*, (178) (June), 488–504.
63. Personal interview with TNC Staff Director, Kunming, 27 May, 2005.
64. See WWF (2003), *2001-03 WWF China Programme Report*, Beijing.
65. Personal interview with Communications Officer, WWF, Beijing, 1 July, 2004.
66. Personal interviews with INGO Directors, Beijing, 22 June, 2004; 23 June, 2004; 10 January, 2005; 11 January; 2005 and 26 May, 2005, and program materials.
67. See Wapner, Paul (1995), 'Politics beyond the state: environmental activism and world civic politics', *World Politics*, (47) (April), 311–40.
68. Qin Chuan (2005), 'Government turns up NGO volume', *China Daily*, 26 April, p. 5.
69. Yang (2005), op cit, n. 37, p. 56.
70. See Hu Kanping and Yu Xiaogang (2005), 'Bridge over troubled waters', in Jennifer Turner (ed.), *Promoting Sustainable River Basin Governance*, Tokyo: IDE-JETO, p. 129.
71. 'Illegal logging exposé lands reporter a beating', *China Daily*, 23 February, 2005, p. 4.
72. Ho (2001), op cit, n. 40, p. 917.
73. Personal interview with ENGO representative, Beijing, 15 June, 2004.
74. Liao Xiaoyi, cited in Ho (2001), op cit, n. 40, p. 916.
75. Personal interview with the Secretary General of Wilderness Taiwan, Taipei, 1 August, 2005.
76. World Wide Fund for Nature (2003), *2001-03 WWF China Programme Report*, Beijing, pp. 25, 35.
77. Personal interview with FON Director, Beijing, 14 May, 2004.
78. Yang, David Da-hua (2000), 'Civil society as an analytic lens for contemporary China', *China: An International Journal*, **2** (1) (March), 10.
79. For example, Bryner, Gary C. (2001) notes: 'Environmental issues are marginalized if they are reduced to simply the agenda of special interest groups'. See his *Gaia's Wager: Environmental Movements and the Challenge to Sustainability*, Lanham, MD: Rowman & Littlefield, p. 21.
80. Ma Qiusha (2002), 'Defining Chinese nongovernmental organizations', *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, **13** (2) (June), 128–9.
81. For a glimpse of the debate about the relationship between the growth of civil society in China and democratization, see Johnson, Ian (2003), 'The death and life of China's civil society', *Perspectives*, **1** (3), 551–54; David Yang (2000), op cit, n. 78; Rebecca Morse (2001), 'China's fledgling civil society: a force for democratization?' *World Policy Journal*, **18** (1), 56–66; and Ho (2001), op cit, n. 40, pp. 893–921.

82. Yang Da-hua David (2004), 'Civil society as an analytic lens for contemporary China', *China: an International Journal*, **2** (1) (March), 1–27.
83. Ho (2001), op cit, n. 40, p. 904.
84. Howell (2004), op cit, n. 29, p. 163.
85. Ma, Qiusha (2002), op cit, n. 80, p. 130.
86. Ho, Peter (2000), 'Greening without conflict? Environmentalism, NGOs and civil society in China', *Development and Change*, **32**, 893–921.
87. Moore, Rebecca (2001), 'China's fledgling civil society: a force for democratization?', *World Policy Journal*, (Spring), 59.
88. Hsiao, Michael (2004), 'Taiwan de feizhengfu zuzhi, minzu zhuanxing, yu minzhu zhili' [Taiwanese NGOs, democratic transition, and democratic governance] (in Chinese), *Taiwan Minzhu Jikan* [*Taiwan Democracy Quarterly*], **1** (1) (March), 69.
89. Howell, Jude (2003), 'New directions in civil society: organizing around marginalized interests', in Jude Howell (ed.), *Governance in China*, Lanham, MD: Rowman & Littlefield Publisher, p. 149.
90. See Economy, Elizabeth (2004), *The River Runs Black*, Ithaca, NY: Cornell University Press, pp. 254–55, for a discussion of the importance of this linkage.
91. Tong Yanqi, 'Zhuanxing shehui zhong de huanjing baohu yundong: taiwan he zhongguo dalu de bijiao yanjiu [Environmental movement in the transitional society: a comparative study of Taiwan and China] (in Chinese), in Maogui Zhang and Yongnian Zheng (eds) (2003), *Liangan Shehui Yundong Fenxi* [*Social Movements across the Taiwan Strait*], Taipei: Xinzhiran, pp. 391–414.

8. Politics and biodiversity conservation

This volume is a study of the governance of biodiversity conservation, meaning that it extends beyond the operations of political institutions to include non-governmental organizations (NGOs), such as grassroots groups, national environmental NGOs (or ENGOs), and international environmental NGOs, as well as scientists who have specialized expertise and strong interests in the development and implementation of policy. As we compare mainland China with Taiwan, the concept of governance is most appropriate, as it equalizes the reference frame in the two quite different jurisdictions. Both have distinct, albeit different, governance processes.

In this chapter we broaden our inquiry to consider the 'politics' of biodiversity conservation. Politics refers to all those actors and processes which influence the allocation of scarce values in a polity, and in democratic nations the sphere of action is far more vast, inclusive, and transparent than in authoritarian systems. Democratic states grant decisional influence not only to NGOs and specialized groups with expertise, but also to public opinion of the mass public, demonstrations and protests, political party competition, electoral campaigns, and even to individual and group contacting of decision-makers.

In this chapter, we turn to the politics of biodiversity conservation, by first examining the shared political milieu – bureaucratic politics – from which modern China and Taiwan emerged. Then we briefly reiterate the evolution of Taiwan's democratization movement and its linkage to environmental policy formation and implementation. The core of the chapter presents two contrasting case studies. The first narrates the organization and mobilization of democratic protest against plans to develop a petrochemical complex and steel plant adjacent to one of Taiwan's last protected areas, the Qigu wetlands. The richly complex activities transpire over more than a decade and involve a host of actors, interests, and institutions. The contrasting case concerns attempts, successful up to late 2005, to halt dam construction on the Nu River in the northwest Yunnan Province, one of the few remaining unspoiled biodiversity hotspots in China. The chapter concludes with a comparison and contrast of the cases, for what they reveal about the efficacy of politics in the preservation of rare and endangered species and ecosystems.

TRADITIONAL APPROACHES AND BUREAUCRATIC POLITICS

The Pattern in China

The Chinese bureaucracy is the world's oldest. From the Han Dynasty, it was a system whose members were selected on the basis of merit; its offices were extremely well defined, and their functions were highly specialized. Authority lines were generally clear and provided for regular reporting, rewards for good performance, and monitoring of compliance. Of course, the 'inner face' or personal dimensions of the bureaucracy diverged, in some eras greatly, from the ideal; nevertheless, as Lieberthal mentions, the bureaucratic system was 'extraordinary in its scope, capabilities, and "modernity" … It was a profoundly nonpluralistic system, based squarely on the notions of hierarchy, centralization, and the state as the propagator of the correct moral framework for the society'.[1]

Politics was never absent from the bureaucracy, and the influence of officials usually depended on more than their examination skills and capability. Family connections, personality, drive or ambition, region/county of origin, friendships: all described different kinds of *guanxi* or relationships which configured officials into different factions competing for influence with leaders.[2]

The development of a rigidly authoritarian communist regime in China after 1949 transformed but did not extinguish the basic values of bureaucratic culture. Indeed, the specification of the leadership in terms of the standing committee of the Political Bureau of the party's Central Committee clarified elite status. Through the Maoist era, some indication of the probable success in the implementation of a policy line could be ascertained by knowing the ranking of proponents and opponents on the Politburo.

As the regime added environmental protection offices and functions from the late 1970s to the present, it did not appoint to the positions individuals of extremely high rank in the Party. Moreover, the ranking of environmental officers never equaled those focused on economic development:

> 'The National Environmental Protection Administration, for example, has a lower bureaucratic rank than that of the various production ministries (it is an "administration" rather than a "ministry"). While it can raise issues and draft regulations, it cannot issue binding orders either to the ministries or to the provinces, which have ministry rank, and thus lacks the authority to force their compliance.'[3]

The State Forestry Administration (SFA), also an 'administration' but one rank below the State Environmental Protection Administration (SEPA) in the

2000s, has even less authority to issue binding orders to the ministries or provinces. Yet, the status of ministries and administrations is in flux, and changes in power at the apex of the system influence bureaucratic politics decisively. One of our respondents made these observations on the status of SEPA as compared to other units:

> 'It depends on what you compare it to. Definitely, it (SEPA) is weaker than economics and finance ministries. But it certainly is not toothless when compared to the Ministry of Agriculture. The most important factor is the new national leadership. Wen Jiabao and Hu Jintao give more attention to environmental agencies. Wen Jiabao formerly supervised the agriculture related-ministries when he was vice premier.'[4]

Thus, notwithstanding the institutional weakness of SEPA and SFA, the primary agencies of China in biodiversity conservation, their influence may be bolstered by changes in political coalitions and new leadership.

The devolution of decision making authority and finance to the provinces, municipalities, and counties after the onset of economic reforms vastly complicated bureaucratic politics. In Chapters 4–6 we pointed out the difficulty that central government environmental protection authorities have had in supervising the implementation of biodiversity policy, particularly when it conflicted with economic development objectives of local governments. The difficulty has a source in the structural characteristics of bureaucratic government under conditions of rapid decentralization. As Saich notes, the structure is 'highly-fragmented, making consensus-building central', and produces these consequences:

> 'First, problems tend to get pushed up the system to where supra-bureaucratic bodies can coordinate response and have sufficient leverage to bring together the different parties. Second, the fragmentation of authority means that at each stage of the decision-making process strenuous efforts have to be made to maintain a basic consensus to move forward. Third, for a policy to be successful, it needs the concerted support of one or more top leaders.'[5]

Thus, while it was relatively easy for the regime to adopt Agenda 21 and the new concept of sustainable development, it has been far more difficult to revise and implement carefully, through a host of provincial and local governments, legislation such as the Environmental Impact Assessment (EIA) Act of 2003 and the Wild Animal Conservation Act of 1988. One of our respondents saw two sources to administrative problems:

> 'First is economic development and an awareness of differences in economic interests. Different levels of government have different interests; but our government structure is unitary, and it assumes that everyone will share the same interest. This is delusion of thought … The state does compromise, but decision

making mechanics are not inviting of groups … Second, we now have a market-based economy and consumerism. These reasons lead to conflicts among different levels of government, and they fight for budgetary resources and financing. Institutions need resources in order to grow.'[6]

The Pattern in Taiwan

Taiwan's economic development in the post-World War II era has been achieved at the expense of ecological degradation. At early stages in the rise of environmental consciousness, the government adopted a 'command-and-control' style of management. In 1987, the Committee on Environmental Protection under the Executive Yuan initiated the first National Environmental Policy Guidelines as a common basis for the establishment of environmental programs. Yet, notwithstanding the guidelines, the central government pursued an industrial policy that among other incentives provided grants to support heavily polluting industries. The development-first credo of the ruling Kuomintang (KMT) government in the 1970s and 1980s reflected the idea that Taiwan's economic development depended on high growth rates.

In practice, while using the command-and-control style of environmental management, Taiwan adopted a 'grow first, clean up later' strategy in the initial stages of modernization. It was not until the late 1980s that governments, civic groups, and enterprises began to undertake more rigorous environmental conservation efforts. Despite improvement in the island's overall pollution record, regions at lower levels of economic development tended to lag behind environmentally compared to regions at higher levels.[7]

The KMT's dominance of local politics also made local control of pollution problematical. The KMT offered a variety of tangible rewards in exchange for political activities conducted by local factions, such as providing votes for KMT candidates, political support and allegiance. Many businesses operated by KMT factional leaders spewed wastewater and other pollutants into the environment. Local officials turned a blind eye toward pollution laws and protected illegal activities conducted by local factions. Faced with double pressures from the central KMT apparatus and faction-controlled businesses, local governments conducted few enforcement activities to ensure regulatory compliance by targeted groups. County magistrates were also inclined to regard environmental regulations and policies formulated by the central government as merely empty words.[8]

Tang and Tang maintain that local governments and enterprises formed 'development coalitions' to pursue economic growth projects and evade environmental regulations. For example, residents of Huben village, a gravel extraction site, objected to the county government's approval of a permit. Although the EIA Act required that all development projects above a certain scale be reviewed for environmental impacts, the extraction company failed to

fulfill this requirement. The entire extraction site totaled 107 hectares, but the developer, a conglomerate of several enterprises, applied for several separate permits covering less than five hectares each. (The Environmental Protection Agency [EPA] ordinance exempted projects covering less than five hectares from the EIA Act requirements.)[9] This demonstrates the complicity of local government and business in obstructing the intent of the law, a condition facilitated by Taiwan's bureaucratic politics before democratization.

THE IMPACT OF DEMOCRATIZATION IN TAIWAN

The making of environmental policy experienced large changes in the democratic transition of the 1990s. The traditional command-and-control style of environmental management could not be sustained. Three new patterns emerged during Taiwan's democratic reforms: legitimization of environmental protests, restructuring of political coalitions and decentralization, and incorporation of NGO participation in decision-making processes.

At the debut of democracy in Taiwan, large-scale environmental movements were regarded as major threats to social stability. When Hau Pei-tsen served as Taiwan's Premier, he openly condemned 'three kinds of hoodlums' – environmental, labor, and agricultural.[10] Indeed, it was common then to regard the environmental movement as a threat to social order. Kuomintang officials portrayed environmental activities negatively, and called them artifacts of the opposition. This hostile attitude reflected the fact that the state was still adjusting to the rise of civil society.

Even in the early 1990s, the central government often superseded local governments by using coercive measures to suppress environmental movements. However, when Lien Chan became Premier in 1993, the cabinet decentralized the power of managing environmental incidents. It invested local governments with sufficient authority to resolve conflicts between enterprises and local residents. Local governments were also empowered to preserve order and implement environmental regulations and policies. At this time, also, ENGOs began to establish local branches in order to create grassroots support. Then ENGOs formed ties with residents, local governments, and enterprises.

As the official attitude toward ENGOs switched from confrontation to accommodation, they also gained recognition at the policy making level of governmental agencies. Central ministries and agencies invited ENGOs and scholars to participate in advisory committees, such as the Wildlife Protection Advisory Committee, the EIA Review Committee, and the Sustainable Development Committee, all at the cabinet level. This is not to imply that ENGOs and scholars sat at the table with officials and made policy. In fact,

their impact was quite modest, and they played a more important role in enhancing the legitimacy of these committees than affecting the results. For instance, because the Council of Agriculture (COA) had accumulated years of experience in dealing with ENGOs, it kept a low profile during meetings of advisory committees, but retained control over ensuing policy. The common practice was for joint committees to offer vague policy guidelines, and transfer the responsibility of implementation to local governments.[11] Advisory committees at the central level served as a forum for NGOs, but the real battlefield for ENGOs was at the grassroots level, where local governments played key roles.

The 2000 presidential election was a milestone in Taiwan's democratization. The Democratic Progressive Party (DPP) candidate Chen Shui-bian won, the KMT lost, and Taiwan accomplished the first democratic power transition in its history. At the beginning of Taiwan's environmental movement, DPP politicians mobilized and organized the grassroots forces. Once the DPP became the ruling party in 2000, observers expected it to enact its long-standing party policy of environmental protection.

However, these hopes were not realized. As the DPP mutated from a mass party into a parliamentary party, vote-maximizing became its prime concern. It needed to form alliances with business communities at the central and local levels in order to finance campaigns to win re-election. Thus, the party converted radical pro-environment positions into moderate ones. The best example concerns the construction of Taiwan's fourth nuclear power plant, which the DPP had opposed adamantly. After Chen's inauguration and several rounds of conflict with opposition politicians (who held the majority) in Taiwan's national assembly, the Legislative Yuan, the DPP finally abandoned its anti-nuclear party line and allowed the plant construction to resume.

CASES OF BIODIVERSITY CONSERVATION

In this section we examine the way ENGOs and bureaucracies operate in an environment of controversy, by considering the Binnan/spoonbill case in Taiwan, and the Nujiang hydroelectric power development case in China.

The Binnan Case

The proposed Binnan Industrial Complex was designed for the Qigu Wetlands, one of the last large lagoons on the west coast of Taiwan. The project would present a major threat to the economy and ecosystem of the Zengwen Coastal Plain, including a productive fishery employing 16 000 people and a primary roosting site located less than eight kilometers away.[12]

The Qigu Wetlands are composed of sandbanks, lagoons (the largest is

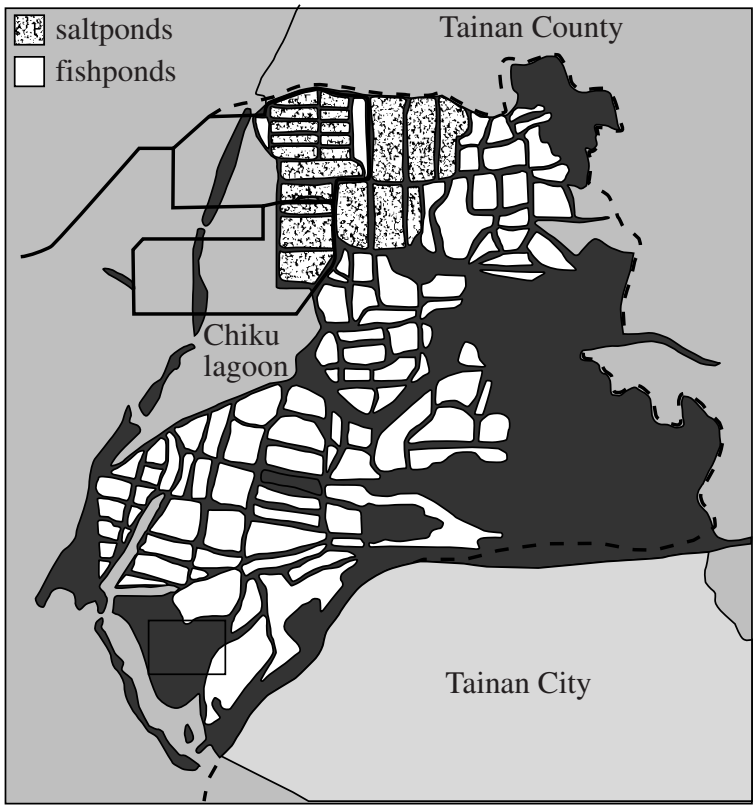
Qigu lagoon with an area of around 1700 hectares), fishponds, and salt ponds. They are located in Qigu village of Tainan County, to the north of Tainan City and on the southwest coast of Taiwan. The wetlands have a total area of over 5000 hectares.[13] Residents use the Qigu lagoon for oyster farming and fishing with fixed nets. Oyster farming is also done in tidal ditches sprawling around the area. The coastal sand in the area is also well suited for clam farming.

When developers planned the Binnan project, they advertised it as a spark plug for Tainan's economic development. Tainan is one of Taiwan's poorer counties. Its stagnant economy and high unemployment rate push the young out of their hometowns and into cities such as Kaohsiung and Taipei. Although the population of Tainan County is growing steadily, the population in Qigu Township has declined slowly. Given few jobs and low incomes in the Qigu area, young people (mostly between the ages of 20–49) emigrate to the cities. On the other hand, the percentage of residents above the age of 65 in the total population of the Qigu area (including the townships of Qigu, Jiangjun, and Beimen) is 13.6 percent, indicating an aging population. The geographical location of the Qigu region is demonstrated in Figure 8.1.

The Qigu Wetlands, and especially the lagoon area, are an important biodiversity preservation region in Taiwan. The black-faced spoonbill is one of the rarest birds in the world, and 62 percent of the global population winters in the vicinity of Qigu lagoon (north of the Zhengwen River Estuary).[14] These wintering grounds offer broad and interconnected natural wetlands, generations-old aquaculture ponds, and mangrove forests. Were it not for this habitat, the black-faced spoonbill probably would already be extinct. In addition to the spoonbills, the habitat supports at least 100 000 waterfowl of more than 150 species, making this one of the richest ecological areas remaining in Taiwan.[15]

The black-faced spoonbill, *Platalea minor*, is one of six species of spoonbills. It is a medium-sized white water bird,[16] with a black face, a long spoon-like bill, and long black legs. Remaining parts are white, except in the breeding season, when the spoonbills grow yellow plumage around the neck and head. Due to a lack of baseline data, population variability over time is unknown.[17] Conservationists estimate that at present, the world population of black-faced spoonbills is less than 1000.

The threat to the spoonbill is proposed industrial development adjacent to its habitat. In 1993, the Tuntex group submitted a petrochemical construction plan to the Ministry of Economic Affairs (MOEA). This would become Taiwan's seventh naptha cracker. The Yeh-loong group simultaneously proposed a large 'steel city' project for the same area. Developers of the Binnan project calculated that the total investment would be in excess of NT$430 billion (US$13 billion). (Investment by the Tuntex Group is NT$320 billion, while that by Yeh-loong is NT$114 billion.) After the seventh naptha



Note: The authors thank Ching Cheng, Professor of Physics at National Cheng Kung University, for supplying the map of Chigu.

Source: See http://www.phys.ncku.edu.tw/~ccheng/Qiguhp/captions/Qigumap.html.

Figure 8.1 Location of Tainan and Qigu (Chiku)

cracker and the related petrochemical industrial complex become operational, estimates of the annual output are: 18 million tons of crude oil, 1.8 million tons of aromatics, and 1.6 million tons of materials for olefins. The Yeh-Loong Company estimates that it will be able to produce 7 million tons of steel annually. Investment benefits from the petrochemical plant will be an annual production value of NT$205 billion (US$6.2 billion) and 17 156 jobs. Investment benefits from the steel mill will be an annual production value of NT$98.5 billion (US$297 million) and 18 572 new jobs. The Tuntex and Yueh-loong groups are two of Taiwan's most powerful business conglomerates.

The scale of the Binnan project would more than likely cause severe ecological impacts in the Qigu region. For this reason, in May 1994, Legislative Yuan member Su Huanzhi coordinated a public hearing, which was the first episode in a decade-long struggle. Within months (in August 1994), the first anti-Binnan ENGO the Taiwan Coastal Protection Association (TCPA)) was established. Most leaders of the TCPA were university professors from southern Taiwan, and were closely linked to Su Huanzhi. The TCPA and other anti-Binnan activists traveled to villages and organized public hearings, holding at least 11 in October 1994.

In November 1994, TCPA and other ENGOs solicited support from the DPP. They expected assistance because their cause was right environmentally and, after all, the DPP had labeled itself a 'pro-green' party. Anti-Binnan ENGOs planned to use their expected alliance with the DPP as a lever to budge the new magistrate of Taiwan County (who was also a DPP member). Reviewing the requests and demands from the ENGOs in March 1995 at the sixth meeting of the standing committee, the DPP passed a mildly worded resolution:

> '(1) The DPP supports the policy of sustainable development and improving the quality of life; (2) DPP legislators must keep supervising the Binnan projects. Legislators must urge the MOEA (Ministry of Economic Affairs), EPA, COA and other governmental branches to take into serious consideration the sustainable development of the region; (3) The DPP also plans to organize public hearings and seminars to integrate opinions from all parts of the society. Results and resolutions must be passed on to the DPP Magistrate of Tainan County, Tangshan Chen.'[18]

This soft response was very disappointing to ENGOs. Essentially, the DPP failed to provide substantive assistance and declined to play a leading role in the Binnan case. Its response implied that the central party leadership was empowering local Tainan leaders to make the critical decisions. The party bureaucracy simply 'reminded' Magistrate Chen of the party's position that environmental protection was necessary; it did not order him to oppose development.

In the Binnan case, two political figures within the DPP camp espoused quite different attitudes toward the proposed development. In contrast to Su's anti-Binnan stance, Chen Tangshan, the DPP's first elected magistrate of Tainan County, adopted a different position. Chen argued that even though the DPP was a green political party, it was not opposed to all economic development projects, nor was it hostile to businesses. As the highest elected official of Tainan County, Chen believed he had to listen to every voice and make his decisions based on the interests of the people. The local government could not reject an application for an industrial park without following the procedures in a formal review. The review process did not permit

predetermined conclusions on any application, or any 'black-box operations' (lack of transparency).[19]

Meanwhile, Legislator Su Huanzhi called a press conference entitled 'Perspectives on Qigu's Binnan Industrial Complex' at the Legislative Yuan. Su emphasized that opposition to construction of the fifth and sixth naptha crackers and the fourth nuclear power plant was the DPP's long-term and consistent environmental position. If the Binnan project were approved, it would be a significant reversal of policy for the party, weakening its credibility.

Legislator Su Huanzhi led the anti-Binnan movement without the direct support of his political party. As we shall see, he was a policy entrepreneur who used the issue to bolster his political career. The Tainan County magistrate Chen Tangshan, also a DPP member, took an ambiguous stance toward the Binnan project. Cherishing good relationships with the business community, Chen refused to adopt a clear anti-Binnan stance. The DPP adopted a soft position and urged further discussion and debate, as seen in the resolution adopted at the central party policy making level. The anti-Binnan ENGOs soon realized that the DPP was an unsteady pillar of support for its campaign.

The EIA process, 1995–2000

The first EIA meeting about the Binnan project was held in 1995. The EIA process was the start of institutional and extra-institutional struggles between anti- and pro-Binnan groups. From 1995–2001, more than 66 meetings were held.

As the Binnan project would bring economic benefits to the poor Qigu region, in April 1995, supporters convened the first (and organizational) conference of the Association for Promotion of the Rights of Qigu Residents (APRQR) at the Qigu elementary school. Led by Tainan County legislator Fang Longsheng, APRQR sought to mobilize Tainan County legislators as well as leaders of 23 villages in the region.

Heated confrontations between advocates and opponents of development occurred outside the formal EIA process. The first face-to-face hostile clash of groups occurred during the initial EIA field inspection in August 1995. Both groups marshaled supporters and rented more than 100 tour buses to travel to Taipei to demonstrate their power. The two groups conducted street demonstrations outside the first EIA meeting at the EPA headquarters in Taipei (November 1995). Such demonstrations accompanied the 66 EIA meetings from 1995 to 2001.

The EIA opinions on the Binnan case did reflect continuous compromises and revisions. In November 1995, the EIA preliminary report required developers to submit alternative locations in the region to take into account

fishing resources, ecological protection, water usage, pollution, and related issues. In January 1996, the EIA opinion requested that planned usage of the lagoon shrink to 60 percent in the alternative project location. The EIA participants also reached the consensus that developers had to provide detailed information about impacts on environmental, ecological, and social conditions at the new location before the project could advance.

In May 1996, the EIA reached a preliminary conclusion that the Binnan project was 'conditionally passed', which meant that it moved to the second stage of EIA for detailed deliberations. Since controversy had centered around the ecological impacts on the lagoon, the EIA report instructed that lagoon usage be limited to 30 percent or less.

This was the first stage of the EIA process, and both scholars and ENGOs who opposed development were frustrated with the results. They contended that governmental agencies had set preconditions to the Binnan case, and that passage of the first stage EIA was a green light for ecological disaster. Scholars and professionals reasoned that from an ecological point of view, the Qigu area lagoon should not be sacrificed on the alter of economic development. Allowing developers to use up to 30 percent of the lagoon, which was the conclusion of the first EIA stage, would jeopardize the environment of the entire region. Pollution and eventual destruction of the lagoon would also have serious impacts on the adjacent habitat of the black-faced spoonbills.[20]

After this defeat, the anti-Binnan group revamped its strategy. The MOEA's announcement in June that the Binnan project would break ground within six months stimulated opponents to make their campaign efforts more inclusive. They formed a new alliance, including Wetlands Taiwan, the Green Association of Kaohsiung, the Association of Environmental Protection of Chengkung University, and student associations. Their first step was to write letters to the President, the Minister of Economic Affairs, and the Tainan County magistrate. Major arguments in the joint letter included:

> '(1) The Binnan project would damage the water supply system of southern Taiwan. Industrial use of water would distort the allocation of water resources and negatively impact the entire region. 2) The project would further contaminate air quality in the southern part of Taiwan. Emissions problems alone would imperil Taiwan's status under the Kyoto Protocol. For example, the environmental impact report on the Binnan Industrial Complex noted that the seventh naptha cracker would release 9.8 million tons of carbon dioxide a year, while the steel plant would release 10.7 million tons, bringing the total yearly carbon dioxide emissions to 20.6 million tons.[21] 3) The Binnan project would ravage fishing and agricultural industries in the Qigu region, and those dependent on these resources would be forced to leave their homes. In contrast, large corporations would gain enormous economic rewards. Overall, the project disturbed social justice and the distribution of economic benefits.'[22]

In the second stage of the protest, Legislator Su Huanzhi became the paramount leader of the movement, and he organized most of the subsequent protest activities. In October 1996, Su launched the '1004 Anti-Binnan Petitions Campaign' and mobilized more than 5000 people from Tainan County to demonstrate on the streets in downtown Taipei. From September to November 1996, Su arranged about 40 public hearings in Tainan and the Qigu area in order to increase grassroots support.

The most dramatic event occurred in August 1996, when Su organized the *Nanying Kuxing* (Suffering March in Nanying). The event attracted nation-wide attention and created an unexpected alliance among anti-Binnan groups and other environmental organizations in Taiwan. On 11 August, 1996, after a worship ceremony at his Tainan County headquarters, Su shaved his head bald and began a 100-kilometer march toward the Qigu lagoon area, which passed 22 townships and villages, in a display of traditional customs and religious rituals. Anti-fourth nuclear power plant groups from northern Taiwan joined Su and his followers. The bald-headed Su successfully combined the moral aspects of environmental protection (portraying himself as protector of the land) and religious beliefs in a moving appeal to the grassroots level.

The Binnan project soon became a focus of elections for the Tainan County magistrate. In October 1997, Su declared he would compete with Chen Tangshan in the DPP primary. Su blamed Chen for unrelenting DPP and KMT support for the Binnan project. However, Su lost the primary race because he was unable to crack Chen's solid local-level base of support.

The second stage EIA review, at the central level, began in April 1998, with a new focal point of energy consumption and emissions. Immediately prior to this review, Su formed an Association of Sustainable Development (ASD) in the Legislative Yuan, and it became a new subcommittee to promote environmental protection. The ASD organized a team to observe the Third Conference of the Parties (COP3) climate change meeting in Kyoto. The ASD and other anti-Binnan ENGOs characterized the Binnan project as a reflection of the 'inconsistent land development policies' of the central government. They called on the central government to balance competing economic and social goals for the small island of Taiwan.

Concerns about the upcoming 2000 presidential elections served to expedite attempts to complete the EIA process. The KMT-controlled central government, under pressure from its factions in Tainan County, sought to gain final approval for the construction of the controversial industrial complex before the presidential election.[23] Local factions in Tainan threatened to swing their support to the independent presidential candidate James Soong, instead of the KMT's Lien Chan, if the project were stopped,[24] an action that the KMT wanted to preempt.

In December 1999, the EIA committee resolved to 'conditionally pass' the second stage EIA on the Binnan project. Review at this stage had included more pro-development professionals and scholars in committee deliberations, and voices from ENGOs were muted. Hsieh notes that the EPA made its decision in accord with its 'pre-existing position'.[25] Then, on 26 April, 2000, one month before the inauguration of the new DPP government, the EPA convened the last meeting on the Binnan project to confirm its decision. Protests of ENGOs and legislators caused the EPA to postpone this meeting until after the change of government and the formation of the new DPP cabinet.

In May 2000, ENGOs issued a five-point statement to question the validity of the second stage EIA conclusion:

> '(1) In addition to a strict review of materials used to inform the conclusions reached at the 66th review meeting, the EPA should also require developers to provide further information and detailed evaluations of alternative sites, industrial port alternatives, and mitigation measures for the black-faced spoonbills;
> (2) The EPA should require the project to undergo a 'Policy Environmental Impact Assessment' in order to demonstrate the legitimacy of EIA laws and the credibility of the EIA system.
> (3) The industrial harbor should be included in the scope of the project's EIA.
> (4) The EPA should set a clear figure, instead of imprecise estimates, for the maximum area in the Qigu lagoon that the project is allowed to use.
> (5) The EPA should require developers to submit a written statement of full responsibility for risks the project poses to the ecology as well as the lives and properties of residents in and around the area. Also, land for the project should only be leased, not sold outright, so that developers could not engage in land speculation in the name of industrial development.'[26]

In response to ENGOs' attacks on the EIA process, the EPA counterattacked and contended that:

> '(1) The EIA review process was not careless, rough, or hasty. Participants in the review process included 29 committee members, scholars and experts, 41 related institutions and agencies, 25 concerned groups, and one legislator. Since 1993, 66 review meetings had met to discuss the Binnan project.
> (2) A ban on private use of the lagoon required concrete scientific proof of negative influences. The EIA review conclusion limited maximum use of the lagoon to 5 percent. This usage did not apply to the Binnan project, but

only to a future industrial harbor project, which had not yet been formally approved.
(3) The site for the Binnan project was nine kilometers away from the black-faced spoonbill habitat, and thus would not cause harm to the species.
(4) In compliance with the Kyoto Protocol, Taiwan would set tentative targets to keep carbon dioxide emissions at year 2000 levels by the year 2020. The Binnan project would be reviewed in accordance with these principles. According to the EIA review, carbon dioxide emissions for the Binnan project had to be cut by at least 8.5 million tons per year, and emissions quantities would be approved by the EPA based on scheduling and zoning. The Binnan project had also been instructed to make use of the best available clean technology.
(5) According to allocations of MOEA's water resource bureau, the Binnan project could obtain a maximum of 80 000 tons of water per day. This allocation would not cause water shortages for residential and agricultural use, or for the Tainan Science-Based Industrial Park (TSIP). In fact, the TSIP would receive the major portion of allocated water supply, with the remainder going to the Binnan project.'[27]

Based on the preceding statements, the EIA review further indicated that EPA was not the designated agency in charge of national land planning, determination of protected areas (PAs) for the black-faced spoonbills, determination of industrial policy, or the distribution and conversion of water resources. However, the EIA was designed to play an important role in preventing or mitigating environmental impacts. The EIA report also launched an attack on ENGOs:

> 'Every time a development project involves controversial issues, some NGOs continue to censure EIA review authority and ignore any positive review conclusions. To these criticisms, one should ask, is the forestallment of all development projects the only way to protect our environment? Or, rejecting all economic development, how would we maintain current standards of living?'[28]

According to Su Huanzhi, the review committee approved the EIA in order to satisfy money interests and KMT local factions. The KMT-dominated central government rushed through two postponed national projects during the election season to win votes at the local level. As the presidential election approached, the government approved the EIA to show local factions that the KMT looked after their interests.[29]

Post-2000 development of the Binnan proposal

Since the resolution of the second stage EIA, the focus has shifted to the implementation of the Binnan project. One of the major points of controversy

is the plan to establish a PA for the black-faced spoonbill. In October 2000, DPP Magistrate Chen submitted a proposal to include 1210 hectares of land as the spoonbill PA. However, ENGOs insisted on including an additional 300 hectares of fish farms in the region. The Tainan County government agreed to add 30 hectares, and reserved the remainder for the usage of National Tainan University and Chimei Hospital.

Under considerable pressure from ENGOs to add additional protected area coverage, Chen opined that economic development and ecological protection were 'equally important'. Chen argued that residents of Qigu should not have to sacrifice their livelihoods merely for the sake of birds and fish. Moreover, ecological protection would not help Taiwan rejoin the United Nations (a leading national campaign). Chen said ENGOs needed to exercise self-constraint: 'Eco-imperialism' was unacceptable in Tainan County.[30]

Some local residents and villagers opposed the expansion of the PA for the black-faced spoonbills. In August 2001, the Qigu Village Council attacked the COA, and resolved that the PA should not be further expanded unless the county government launched the Binnan petrochemical and steel project. Village representatives complained that the long delay of the Binnan project had damaged economic development opportunities for Tainan County.[31]

The real purpose of the COA's Qigu PA plan was to integrate the black-faced spoonbill PA and the Sicao Wildlife PA in the northern part of Tainan County. The steel plant proposed for the Binnan project was to be located between Sicao and Qigu. In October 2001, the COA declared that the Binnan project was canceled because of the economic downturn. The MOEA objected that short-term economic cycles should not influence long-term investment plans. Since the Binnan project was sponsored by the Bureau of Industry in the MOEA, the enterprises had to report to the bureau if they planned to withdraw from the project, and they had not done so.[32]

The sluggish economy in the southern part of Taiwan was a reason to restart the Binnan project. On October 26, 2001, the speaker of the Tainan County Council openly supported it. He argued that the project would not conflict with usages of Qigu lagoon and the black-faced spoonbill habitat. Given the economic recession, the Binnan project would provide job opportunities and restart economic growth. Revisions to the Binnan project, which limited usage to no more than 5 percent of the lagoon, would guarantee the survival of the fishing industry in the region. The original developer of the Binnan project, Yeh-loong, had merged with the state-owned China Steel Company. China Petroleum also was interested in the construction of the seventh naptha cracker plant in the Qigu region. These two state-owned enterprises (SOEs) would attract other companies to form a large industrial complex, and thus bring prosperity to the region.[33]

After the DPP became Taiwan's ruling party in 2000, ENGOs opposed to

the Binnan project gradually lost momentum to forward new initiatives. Paradoxically, opposition sentiment cooled when Su Huanzhi was elected as county magistrate in 2001. Su won by a slight margin of the total votes, but won a landslide in Qigu and the adjacent areas of Xigang, Xuejia, Jiangjun Village and Jiali Township. The anti-Binnan movement had provided Su with a strong political base, but now he was an incumbent official, with responsibilities for the county's economic growth.

In April 2005, the EPA formally approved the final version of the developer's EIA review on the Binnan industrial complex, thereby bringing to a close this procedural stage of the process. The district committee of the Ministry of the Interior (MOI) will begin an evaluation of feasibility. Given the strong opposition by Magistrate Su, however, it is uncertain whether this investment – with a real value over NT$300 billion (US$9.1 billion) – will go forward. The Qigu Wetlands have now become an eco-tourism site after President Chen Shui-bian expressed his full support for Magistrate Su's plan to establish a 'Nanying National Scenic Area' in August 2002. The COA of the Executive Yuan announced a wildlife PA, providing a wintering site for the spoonbill in Qigu Taiwan in November 2002.

Political factors played key roles in the twists and turns of the Binnan project. Among all these factors, the political skills of Su Huanzhi should not be ignored. From the local fishermen's perspective, the previous magistrate was not responsive to the needs of fish farmers. They thought that the local KMT apparatus cooperated with the central government to promote development and sacrifice local fishermen's interests. Yet Su Huanzhi became an advocate. He was born in the Qigu area, into a poor family; and he understood the suffering of local residents.[34]

In addition to trusting a native son, the local environmental movement needed a political leader to fight with existing interests and local factions. Su emerged at the right time to satisfy grassroots needs, and founded the Love Your Homeland Foundation to promote protection of the Qigu Wetlands. One Qigu veteran leader remarked that most leaders at the village and township levels supported development when the Binnan project was first announced. Village and county representatives supported development too. The fishermen lacked resources and power to contend with local leaders and elites. Under the leadership of Su Huanzhi, fishermen finally organized a protest against the development project.[35] However, Su's interest in the Qigu case was connected to his own political career. His residence and work in Tainan County, the home town of President Chen Shui-bian, helped promote a patron-client relationship with the highest level of the central government. In contrast, Su's predecessor Chen Tangshan was not a direct client of President Chen, and also Chen had a more balanced view toward environmental protection and economic development. President Chen and Su were both DPP members, but the tangle

of ambitions and competing interests led to the dissolution of the client relationship.[36] Su joined the anti-Binnan movement and played the leading role for opportunistic reasons. For him, the protest was a useful political tool to increase his exposure and popularity.[37]

Political implications of the Binnan case

This case demonstrates that Taiwan's democratic change does not necessarily lead to sound environmental governance. The macro social and economic environment, as well as the need for local economic development, forced the now ruling DPP to compromise. The DPP, a symbol of Taiwan's democratic transition, played an ambivalent role in leading the struggle of the grassroots environmental movement with developmental groups. At the central level, the DPP turned a cold shoulder to large-scale anti-Binnan demonstrations. At the local level, incumbent magistrate Chen Tangshan sought balance and tried to accommodate business interests. High expectations for Su Huanzhi, the key figure and promoter of the movement, gradually diminished after Legislator Su became Magistrate Su in 2001. Su continued to block the construction of the Binnan complex after the passage of the final EIA procedure. However, the real reason for halting the project is the diminishing business interest in it.

The prolonged nature of the process in this complex case indicates that it is a new pivot to state-society interactions. Mutual trust and shared perceptions between bureaucracies and civil society are based on a very weak legal foundation. The attempts to pass the second stage EIA review before the presidential election reflected the continuous entanglement of elections, local factions, and business interests. In the post-EIA implementation stage, the uncooperative attitude of local governments also initiated a new tug-of-war between the center and local governments, and between development agencies and pro-environmental bureaucracies within government ranks.

Political skills and leadership were key factors in the emergence of the anti-Binnan movement. Under the leadership of Su Huanzhi, grassroots dynamism and environmental enthusiasm bourgeoned. Critics objected to Su's use of the anti-Binnan movement as a stepping stone, to make himself a national political figure. The other side of the coin, however, is that Su's organizational abilities rescued the black-faced spoonbill and lagoons in the Qigu area. The human factor still dominates the operation, coordination, and transformation of biodiversity governance in Taiwan.

The Nujiang Case

China's most recent and controversial environmental protection case concerns the proposed construction of dams on the Nu River in Yunnan Province. The Nu River (*Nujiang*, meaning 'angry' in Chinese) is a major international river.

It originates in the southern slope of the Tanggula Mountain on the Qinghai-Tibetan Plateau of Qinghai Province. Then it flows through the Gaoligong Snow Mountain and the Nushan Mountain in the Tibet Autonomous Region and Yunnan Province, before entering Myanmar (where it is named the Salween River).[38] The Nu River valley is sometimes referred to as an 'oriental Grand Canyon', because of its pristine beauty and majesty.

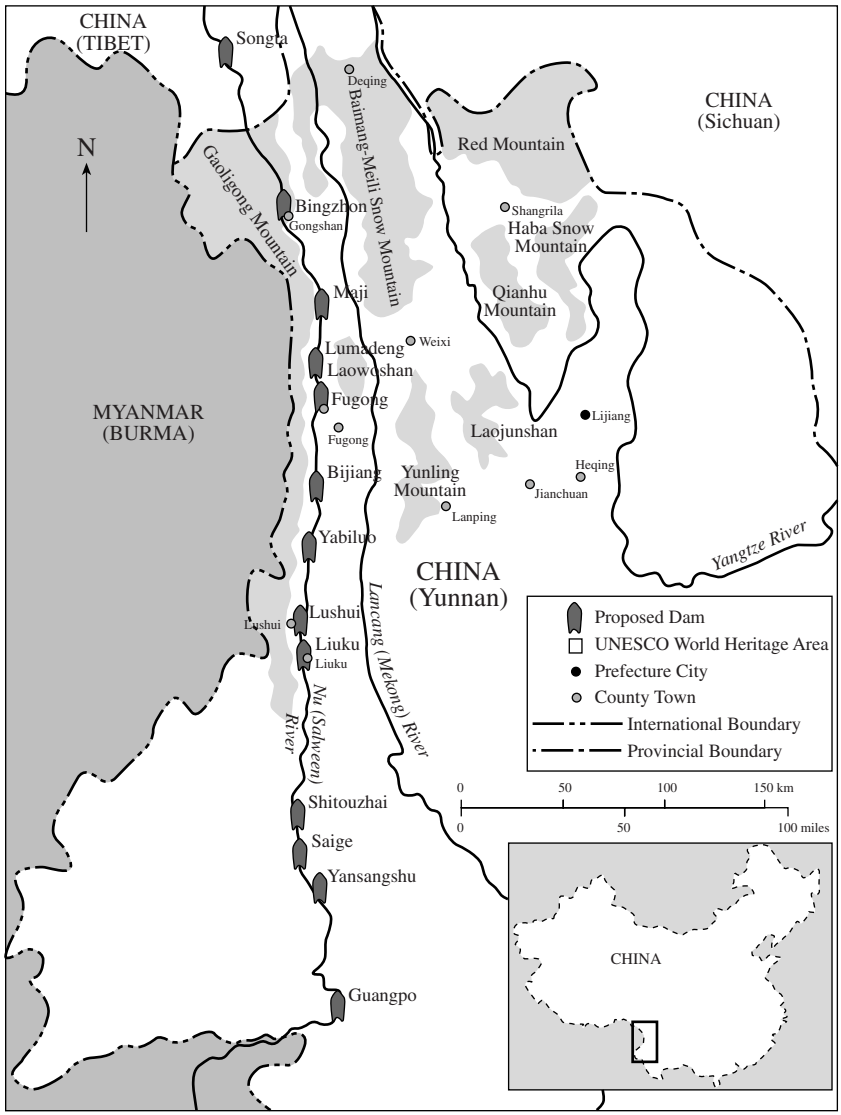
The Nu River is one of three rivers (the other two are the Lancang [Mekong] and Jinsha rivers) which follow a parallel course in the northwestern Yunnan Province. The Three Rivers Area is a region under the national PA status of the Chinese government;[39] in 2003, some 1.7 million hectares within the region were approved as a world heritage site by the United Nations Educational, Scientific and Cultural Organization (UNESCO).

In addition to its natural beauty, the Nu River Valley and more broadly the Three Rivers Area are sites of rich ecological and cultural diversity. The area has endemic animal species composing 25 percent of the global and 50 percent of the Chinese total, and more than 7000 different plant species. This makes it an international 'hotspot', of extraordinarily rich biological diversity. Furthermore, living in the area are 22 minority nationalities, including the Naxi, Lisu, Tibetan, Bai, Yi, Pumi, Nu and Dulong ethnic groups. These people live hard lives, and poverty alleviation is a priority concern of local and national governments. They depend on the resources of the Nujiang watershed for their livelihoods, using fisheries as a primary source of protein and nutrients in the water to sustain vegetable gardens in the dry season and fertilize farmlands.[40] The Nu River is one of only two rivers in China that has never been dammed (the other is Yarlung Zangbo in the south of the Tibet Autonomous Region).

To some observers, Nujiang is just the latest 'assault' on southwest China, which is the most fertile biodiversity region in China (but also quite poor). Economic development in the region, and particularly dams and hydropower development, are the primary threat to rare and endangered species and habitats[41] One of our respondents put the Nujiang case in context by telling three brief stories, all based on hearsay:

> 'The Three Gorges Dam project and construction of the big dam introduced conflict with the Ministry of Agriculture. The local government opposed construction of the dam and wanted to protect its area of responsibility, to no avail. Second, the boundaries of protected areas are now being adjusted to allow construction of dams. In the Upper Yangtze area, local people oppose construction of a dam, as there is a protected area for fish species. Authorities changed the boundary of the core area in the PA to accommodate dam construction. Third, southwest China has the most water resources in China and also the most biodiversity; thus potential for conflict is greatest in this region.'[42]

Precipitating the Nujiang controversy was planning by the Huadian Group to build hydroelectric dams in this area. Huadian signed a cooperative agreement



Source: International Rivers Network. We thank Aviva Imhof for supplying the map of Nujiang.

Figure 8.2 Nujiang Development Region

with the Yunnan provincial government in early 2003 to accelerate electric power development. In mid-2003, a joint venture firm called the Yunnan Huadian Nu River Hydropower Development Company[43] formed, drawing resources from the China Huadian Corporation, the Yunnan Development Investment Company, the Yunnan Electricity Group and Construction Company, and the Yunnan Nu River Electricity Group;[44] and it prepared plans, which were reviewed by the National Development and Reform Commission, a powerful national ministry (which had already approved blueprints for reservoirs and cascades in the middle and lower reaches of the Nu River.)

In June, 2003, the new development corporation revealed ambitious plans to build a 13-step dam system in 20 years, and proposed construction of the first, 180 000-kilowatt station at Liuku to begin in September, 2003. With over 2.1 million kilowatts total capacity upon completion, the project would exceed the Three Gorges Dam in output and become one of the world's largest dam projects. While construction companies would recoup large economic benefits from the project, the local government would stand to gain increased revenue in the amount of RMB$1 billion (US$123.3 million). Provincial and local governments expressed strong support for the project, pointing to its consistency with the national 'Great Opening of the West' campaign, the benefits to local economic development that hydropower would bring to the region, as well as jobs in dam construction.

Opposition to dam construction grew quickly in the second half of 2003 and involved a developing and ad hoc coalition of journalists, scientists, and ENGOs. The initial strategy of the opposition was supplied by the Southeast Asia Rivers Network (with its headquarters in Bangkok), which organized protests in Thailand, and contacted both Friends of Nature (FON) and the Green Volunteers, asking them to join the campaign to stop dam construction.[45] The Nu River flows into both Myanmar and Thailand, and the Rivers Network objected to any planned dam construction that would affect the livelihood of people living downstream, who had not been consulted about the project. The Rivers Network also coordinated a petition drive to the Chinese People's Political Consultative Conference. In fact, the Thai Director of the Rivers Network submitted a letter of protest to the Chinese Embassy in Thailand, asking for an immediate suspension of the project.[46] The Director of Yunnan University's Asia National River Research Center, He Daming, organized two conferences in the provincial capital Kunming on the effects of dam construction on rivers and endangered habitats. He commented: 'the purpose of these forums is to raise people's awareness on this matter'.[47] An environmental activist Yu Xiaogang, then working in the Yunnan Academy of Social Sciences in Kunming, went to Nu River to conduct research. In late 2002, Yu had established Green Watershed, the first Chinese non-governmental organization specializing in river management. Although his

environmental activism has had repercussions (with his ENGO being called an 'extremist organization' by local authorities)[48], he communicated concerns at a series of water fora in Kunming, Shanghai and Guangzhou. He organized reporters from national media outlets such as *People's Daily* and CCTV to tour the Nujiang area, and staged photo exhibitions in supermarkets and on the Internet. Yu also communicated with members of the Chinese People's Political Consultative Conference who were preparing a report on the Nu project.

In September 2003, the SEPA invited 30 experts in zoology, forestry, farming and geology to a closed-door meeting on the Nu River dam. The Beijing-area scientists opposed the construction because of its likely adverse impacts on biological as well as cultural resources, its impact on migratory species throughout East Asia, and their concerns that dam construction would cause increased flooding, as had been the case with the Sanmen Gorge Project on the Yellow River several decades previously. The subtext of some of the opposition was concern about the long-term effects of large dam construction, such as the Three Gorges Dam on the Yangtze River.[49]

Scientific opinion was not unanimously opposed to dam construction. Scientists in the Yunnan Province tended to support the economic development objectives of the provincial and local governments, and downplayed the likelihood of adverse environmental impacts. Yet one prominent biological scientist in Yunnan, Yang Yuming, took a leading role in opposition to dam construction. Yang is the Vice President of the Southwest Forestry College of Yunnan, a specialist on the taxonomy, ecology, sustainable use and conservation of bamboo, who had developed an ENGO on biodiversity conservation in southwest China.[50] Yang's advocacy for conservation efforts in Yunnan gained him the Parker/Gentry Award in conservation biology in 2004.

The person who was most responsible for the media focus on Nujiang was Wang Yongchen, a journalist who had worked for China National Radio for 20 years. Wang was the co-founder of Green Earth Volunteers, a Beijing-based ENGO specializing in current environmental issues, and she won the Conde Nast Traveler's 2004 Environmental Award for her work on the Nujiang controversy. The award recognizes her for setting the pace and shaping the national campaign 'by attacking on all fronts – using the media, lobbying the government, appealing to international organizations, and informing residents of the affected region. "She's the one who links all the networks together"'.[51] Her comments on the role of the media reflect optimism:

> 'I see a merging of the roles of journalists and activists here in China … Journalists see everything, and because of that, they have some power. Journalists are considered kings without a crown in China.'[52]

One tactic used to increase awareness was a study tour of the Nujiang area in

February 2004. Some 20 journalists, environmental activists, and scientists visited the dam construction site, met with local officials, and listened as village residents expressed their trepidation about the project because they feared they would be relocated. Group members took thousands of photographs of the region, preparing to sponsor a major educational exhibition on 14 March, the International Day of Action Against Dams. However, government pressure led them to cancel the exhibition, and instead they established a website (http://www.nujiang.ngo.cn/).

Action by the state pre-empted further publicity work, when, on 1 April, Premier Wen Jiabao temporarily suspended construction plans for the first dam on the Nujiang. *Ta Kung Pao* reported that the Premier remarked that such a controversial large hydropower plan should be 'seriously reviewed and decided scientifically'.[53] He acknowledged opposition by stating:

> 'We should carefully consider and make a scientific decision about major hydroelectric projects like this that have aroused a high level of concern in society, and with which the environmental protection side disagrees.'[54]

It seems likely that several factors influenced Wen's decision: division in the elite over the merits of dam construction on the Nu River and perceived adverse effects on biological and cultural resources; division between the central and provincial government (which appeared to be pursuing large projects without central government approval); and adverse reactions of China's Southeast Asian neighbors. Cost-benefit factors do not appear to have been an influential consideration.[55]

Premier Wen acknowledged environmental opposition when he ordered construction to be stopped in 2004, and on a later occasion he did chastise the Yunnan provincial administration for lack of environmental sensitivity.[56] However, it remains unclear the extent to which environmental protests figured in his decision. Nevertheless, this was the first time that any major project in China has been stalled, even if construction ultimately proceeds, because of grassroots pressures. The premier called for a complete review of project design, which engaged China's new Environmental Impact (EIA) Assessment Law, which became effective in September 2003.

The review was not conducted with full transparency and did not involve extensive consultations with affected groups, as environmentalists had hoped. (The law requires comprehensive reviews at the planning stages of major projects, and calls for public involvement including hearings, but does not specify concrete steps or time lines.) These hopes were perhaps unrealistic, for as Tang et al. comment: 'Environmental management structure reflects the distribution of power in a political system'.[57] Nevertheless, it did address several important environmental issues, finding that the region was less pristine than had been presented by advocates and that damage to fish and

other species could be mitigated.[58] The overriding emphasis at the conclusion of review in mid-2005 was the need for hydropower in this poor, remote region in order to fuel economic development. The review apparently recommended that construction of the dam proceed with modifications to its size and number of stations, but the full report remained secret. Environmental protest continued. Some 60 NGOs and 99 individuals sent a letter to the Premier, demanding that the EIA be publicized, and stating that a decision without public participation 'lacks public support and cannot tolerate public scrutiny'.[59]

The situation at the close of 2005 was that the ad hoc coalition of environmental groups urged the regime to adhere to the intent of the 2003 EIA Law, by making earlier reviews public and holding open hearings. Central government authorities had not responded or resolved how to proceed by the end of 2005. The domestic press was silent and officials with information and decisional power declined to speak to the foreign press.[60]

Implications of the Nujiang case

A virtually universal response to the Nujiang case was that it demonstrated the new power of ENGOs in Chinese society. The Director of Tsinghua University's NGO research center said: 'It was an important turning point in that NGOs managed to influence the government's public policy'.[61] A SEPA official remarked:

> 'It was the first time a project of this scope was delayed, and this showed the power of the NGOs. The government did stop the project, even if temporarily. It listened to the NGO voice. From a political perspective, this was new political thought and also new political action, with protests of NGOs and local grassroots groups.'[62]

Experts acknowledged the importance of providing for the poor, but the number of extremely poor people in the direct project area was small. Scientists also pointed out that insufficient information about fish and other species in the region made it difficult to support a decision to abort the project.

Another respondent, a veteran analyst of environmental conflicts in China, thought that what most observers said about the case was too simple:

> 'This is for several reasons. If you ask, whose influence was greatest in the outcome? To say NGOs would be wrong. SEPA also opposed it and that's one element. NGOs and newspapers opposed it, and experts, scientists sent letters. Some of the letter-writers may know Wen Jiabao. He may have been influenced by this. Also, the World Conservation Union and a World Bank committee – their leaders wrote letters to the government. I don't know the contents or if they had any influence, but some say they were very influential. It is impossible to say which was most important.'[63]

The amount of protest generated concerning Nujiang will doubtless have an impact on future hydropower development in China. This nation's hydroelectric reserves in 2004 stood at 40 percent of total conventional energy sources, and its exploitation potential is among the largest in the world. Hydropower is far less environmentally polluting than coal, and thus it will likely continue to be rapidly developed. Already on the drawing boards are plans for a dam at the scenic Hutiaoxia (Leaping Tiger Gorge) on the Jinsha River in Yunnan Province.[64]

To a greater extent than public discussion on the Three Gorges Dam, Nujiang focused on environmental risks. It also tests the role of new environmental laws in what remains a personalistic authoritarian system. For environmental advocates, the case represented 'one step forward, a half step backward',[65] which is a good description of the approach the Chinese State has taken toward conservation of biodiversity.

CONCLUSIONS

This chapter looks beyond governance to the politics of biodiversity conservation in China and Taiwan. Emerging from the same imperial tradition of bureaucratic politics, one might expect considerable similarity in policy and practice of biodiversity preservation. Indeed, in both Taiwan and China, the state remains relatively strong and able to determine environmental outcomes, if there is consensus among the elite. However, both systems have decentralized powers to provincial (in the case of China) and local governments, and this has had the effect of fragmenting policy making, as more interests at different levels compete for resources and influence.

Taiwan has democratized in the last two decades, which means that a large number of groups are involved in policy making and the processes are far more transparent. Democracy per se has not led to 'better' biodiversity protection outcomes, however. The Binnan case demonstrates that increased competitiveness of groups and parties forces some once extreme environmental groups toward the center in a quasi-presidential system, because that is where the votes are. The moderation of the DPP's position was influenced by its need to attract business support and compete with groups emphasizing Taiwan's economic development. Political system characteristics – Taiwan's unusual electoral system and the five-power constitution with a strong presidency – at least partially explain the DPP's policy reversals on environmental issues.

Both cases display environmental NGOs as well as scientists actively engaged in attempts to protect rare species and endangered ecosystems. In the Nujiang case, ENGOs cooperated with one another, short of forming a firm

alliance, even working with foreign NGOs. The ENGOs and the media in both states displayed the symbiotic nature of this relationship. When comparing the role of ENGOs, Taiwan's NGO community is significantly more autonomous. Alliances quickly formed among groups opposed to the Binnan development. Even a pan-ENGO alliance materialized in opposition to planned industrial construction in the wetlands. In China, on the other hand, ENGOs appear to have coordinated strategy and tactics, but the state allowed no opportunity for them to exercise coalition behavior. Most telling is the discouragement of demonstrations and protests, even seemingly innocuous ones such as celebration of actions against dam construction. Clearly, the democratic nature of Taiwan's new polity makes a difference in the ability of groups to seek their objectives.

Less can be said about differences in the role scientists played in the episodes. Both governments had their own science agencies, and they played roles in the EIA process. In Taiwan, opponents of development lacked concrete proof that the petrochemical complex and steel mill would endanger the lagoon and the spoonbill. In this instance, the EIA and wildlife protection laws are more permissive of economic development than laws of some other nations (such as the Endangered Species Act of the United States). The precautionary principle, which does not require conclusive proof of damage in order to halt major development projects, is not embedded in the EIAs or species preservation laws of China and Taiwan. In the Nujiang case, first scientists had less information about the likely impact of dam construction and hydroelectric development on species and habitats. Second, scientists were divided, with those at the central level opposed, and the local scientists mostly supportive. Under these circumstances, it was hard for science to inform policy.

One similarity is the role that foreign groups, institutions, and celebrities played in the cases. Even the Dalai Lama became involved in the spoonbill cause, and in China, foreign media, financial institutions, NGOs, government officials all sought to 'put an oar in the troubled water' of the Nu River. For different reasons, both China and Taiwan are vulnerable to foreign pressure, which may benefit species preservation causes.

Finally, movements protesting environmental change were led by charismatic individuals: Su Huanzhi in Taiwan and journalist Wang Yongchen in China. Leaders make the protest more inclusive and give energy to campaigns. They make creative adaptations to changes in circumstances, and hold the network of activists together by investing their passion in organizations. We have labeled Su a policy entrepreneur, because he used the Binnan case to expand his political career, ultimately displacing a rival to become magistrate of Tainan County. Wang had little opportunity for policy entrepreneurship in China, which is more likely to punish activists than reward

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9. Conclusions

We conclude our study by summarizing the main points of the argument. We then take a different slant by asking whether there are 'Chinese characteristics' to the governance of biodiversity conservation.

SUMMARY

In this volume we have explored the problems and prospects of biodiversity loss and conservation in mainland China and Taiwan. The topic is an important one because China is a mega-diversity country, and China and Taiwan together are thought to possess 10–13 percent of the world's known species. How both states approach problems of biodiversity loss thus has global as well as national repercussions.

The perspective of governance underlies our approach to the topic. Not only have we treated political institutions and administrative agencies; we also have paid attention to the actions of individuals, groups (especially environmental non-governmental organizations (ENGOs)), and communities as they have sought to influence policy and are in turn influenced by it. The methodology we have used is explicitly comparative, and one of our objectives has been to understand the impacts, if any, of the sharply different political and economic systems of capitalist, democratic Taiwan and authoritarian China with its socialist market economy.

China and Taiwan share the world's oldest continuous civilization. Traditional China produced a rich skein of interpretations about human relationships with the environment, including anthropocentric, sentientist, and ecocentric views. Although Confucianism and Legalism were the orthodoxy, with the greatest impact on the behavior of leaders, Taoism, Buddhism, and a host of animistic beliefs taught reverence for nature and even endowed it with spiritual force. These latter belief systems did not put human values first.

When most residents of China and Taiwan today speak about environmental issues, they are more affected by recent history than by the Confucian past. In China, Maoist revolutionary spirit did not die at the establishment of the People's Republic, but pulsed through the Great Leap Forward and Cultural Revolution, both of which were enormously destructive to the environment.

Deng Xiaoping's economic reforms represented different, more calculable environmental risks; yet the ecological cost of rapid economic development did not enter the regime's considerations until the 1990s. In Taiwan, the trajectory of change was more gradual, but industrialization was nonetheless environmentally degrading. Then, political change and a rapid transition to democracy brought environmental groups and interests to public and elite attention.

Contemporary attitudes and opinions reflect these multiple pressures and the tensions between economic development and environmental conservation. In both China and Taiwan, awareness of ecosystem degradation and biodiversity loss has grown within the last two decades. When presented with the trade-off between economic development and environmental protection, however, respondents in China differ from those in Taiwan. Most mainland Chinese people are unwilling to sacrifice economic gains to preserve threatened ecological systems that are not in their immediate back yard, indicating that the regime's embrace of sustainable development lacks mass support. In Taiwan, on the other hand, a growing part of the public rejects the false dichotomy between economic development and sustainability and supports conservation policies – even if they might temporarily affect economic growth targets.

From this background we launched into description and analysis of the current status of species and ecosystems in China and Taiwan. Problems confronting ecological preservation in China are far greater than in Taiwan because of the vast size of the territory (the world's third largest), limited scientific expertise, and limited resources available to mitigate jeopardy to species and adverse modification of habitats. As a result, in 2005, China has relatively more endangered and threatened endemic species (based on a far larger species base) than Taiwan, and four provinces – Jilin, Yunnan, Xinjiang, and Sichuan – contain numerous species and ecosystems hovering on the brink of destruction. In the 1990s this impending crisis stimulated large-scale afforestation and reforestation programs, which represent a massive investment of resources and personnel into biodiversity conservation.

The identification of species and ecosystems at greatest risk has involved a large number of scientists in China and Taiwan. The listing process in China had been relatively closed until the most recent formation of the China Red List; that in Taiwan reflects a system encouraging participation of those outside government. Scientists are a vital intellectual resource in the development of biodiversity conservation policy. Although the scientific establishment is proportionately larger and better trained in Taiwan than in China, scientists do not appear to have had greater influence over biodiversity policy. Nevertheless, in both jurisdictions, science does inform policy.

The legal and institutional framework for biodiversity conservation in

China differs in significant ways from that in Taiwan, but it is not clear that these differences ultimately affect outcomes. Both countries have reasonably complete laws, regulations, and policy statements regarding biodiversity conservation. Notwithstanding the greater independence of Taiwan's Legislative Yuan since democratization than China's National People's Congress, executives dominate both the jurisdictions, and they do so in the absence of a firm rule of law. Even in democratic Taiwan, forming and implementing the law is subject to political and personal linkages (*guanxi*) as well as being subject to rent-seeking behavior of individuals and groups.

China subscribes to all relevant international conventions and treaties on biological diversity – CITES, the Convention on Biodiversity, and Agenda 21 and sustainable development. This participation has benefited China through financial assistance for environmental mitigation and conservation work. Although Taiwan is not a signatory of most international treaties, because China objects to its participation and the legitimacy this would confer on what China continues to regard a renegade province, nonetheless Taiwan adheres to most provisions of these conventions.

This volume has described a host of central and sub-national institutions of government in both states engaged in biodiversity conservation, and large problems of policy fragmentation. It has also pointed out that implementing agencies were smaller in terms of personnel, less well-funded, and considerably less powerful than agencies closer to the core of the states, such as economic and defense institutions. It has also indicated that power, once rigidly centralized in both states, has been diffused (for different reasons) to sub-national governments, and authorities at local levels are far less welcoming of biodiversity conservation initiatives than central agency personnel. Due to China's great size, the devolution of policy has greater effects and more adverse consequences than in Taiwan.

Globally, countries establish protected areas (PAs) to preserve rare and endangered species and their ecosystems, and the inspection of the condition of these protected areas is one way to measure the effectiveness of biodiversity conservation policy. China's system is enormous, including a total geographical area greater than several large European countries. However, China and Taiwan have approximately the same percentage of land (15–19 percent) in categories designed to protect species and habitats.

The Chinese system of PAs is far simpler than that in Taiwan. Nature reserves all have core areas, buffer zones and experimental zones, irrespective of differences in ecosystem type, the type of species protected, or the socio-economic conditions of the area. This one-size-fits-all approach contrasts with the arrangement of protected areas in Taiwan, which broadly follows International Union for the Conservation of Nature (IUCN) categories and is far more flexible.

This volume has also analyzed the challenges to biodiversity conservation presented by each system. Protected areas in both jurisdictions have large problems of administrative organization and co-ordination, because several agencies have missions in land-use management and these missions often conflict. Problems of financing PAs are far greater in China than in Taiwan, because of obvious differences in national wealth. Moreover, China has far greater problems of finding suitable human resources and training of PA staff than does Taiwan, reflecting not only differences in economic development but the more limited spread of secondary and post-secondary education in China.

The two systems also differ in their treatment of local populations and minority cultures (which are more in evidence at the periphery of the states). China's approach remains authoritarian and top-down, and it has not endorsed co-management of PAs with minority populations; Taiwan is edging toward a co-management strategy. This difference is largely explained by the political value of even small populations, such as Taiwan's aborigines, in a democratic context.

Although, on most counts, the system of PAs in China is inferior to that in Taiwan, it has also expanded extremely rapidly (most growth occurred in the 1990s and early twenty-first century). A high-level task force has studied the system and its flaws, and its critical report, *China's Protected Areas*,[1] may prompt comprehensive change. One can hope for systematic improvements in this large and untidy system.

Since the most significant threat to species and habitats today is economic development, we have considered briefly the economic structures of China and Taiwan, and the incentives they give for business firms to reduce or increase pressures on the environment. The economic role of state-owned enterprises (SOEs) has declined in both China and Taiwan, yet some, such as oil/gas corporations, hydropower corporations, and utilities, continue to pose large threats to ecosystems in both states (as noted in discussion of the Binnan and Nujiang cases in the conclusion to this summary). Small and medium-size enterprises (SMEs) in Taiwan and town-and-village enterprises (TVEs) in China, which are today's engines of growth and development, would appear to be easier to control by states. Yet the decentralization of power to provinces and local governments increases opportunities for even small firms to engage in environmentally destructive behavior.

Multinational corporations are a smaller sector of the economies in both China and Taiwan; nevertheless, because of their capital and advanced technology, they have been important sources for the diffusion of global environmental standards and technology. We have examined examples of positive diffusion through the activities of Shell and EDAW in China, while the Lin Yuan petrochemical complex represented negative diffusion, and

Bayer's proposals to construct yet another chemical plant in Taiwan offended local grassroots sentiment.

China and Taiwan provide an opportunity to test the 'race to the bottom' thesis, that is, whether business firms gravitate toward those jurisdictions with the fewest environmental regulations and controls. China's opening to trade and investment from Taiwan in the late 1980s excited an 'opportunistic strategy of exit'. A large number of smokestack factories moved from Taiwan to China, which was then a pollution haven, resembling the behavior of multinational corporations entering Taiwan before 1980. However, some of Taiwan's firms export clean technology to China, which makes the evidence for a 'race to the bottom' less than conclusive. In addition, several large conglomerates have been able to use 'investment strikes' to relax Taiwan's environmental controls.

The role of business organizations in both China and Taiwan is changing, as is the broader set of state-society relationships. We explored aspects of this change most relevant to biodiversity conservation by examining the evolution of ENGOs and their current status in both jurisdictions. In Taiwan, ENGOs formed and multiplied in the 1980s. During the process of Taiwan's democratic transition, they accumulated social capital by enlarging channels of social participation and communication. By emphasizing democratization as well as environmental protection, ENGOs attracted public notice and then trust. However, at the transition of power from the Kuomintang (KMT) to the Democratic Progressive Party (DPP) in the 2000 presidential election, the relationship of ENGOs to the state changed. The party considered by most of Taiwan's residents to be 'green', the DPP, acknowledged the need to develop ties with the business community to remain in power. Still, Taiwan's ENGOs remain a political force.

To some observers, China's ENGOs resemble the state of environmental organizations in Taiwan before the onset of democratization two decades ago. In our view, they are a new and essentially unpredictable agent of social and political change. Until the mid-1990s, most environmental organizations were organized by the government, as governmental-organized non-governmental organizations (GONGOs), to do its work. Since the mid-1990s, other branches have grown on the tree of environmental protest: national ENGOs, student environmental organizations, international NGOs operating in China, and grassroots ENGOs. In 2005, the majority of environmental activists work at grassroots levels on local projects, but only a small number of groups (largely those with offices in Beijing) have much of an impact on government policy.

Individual ENGOs in both jurisdictions have affected environmental outcomes, particularly in their work of identifying threats to endangered species and ecosystems and publicizing these threats through the media. In

both Taiwan and China, ENGOS have broadened civil society. In contra-distinction to the Taiwan case, however, the environmental movement and ENGOs have had little direct impact on the embryonic democracy movement in China. They have reached accommodations with the authoritarian state, engage in what we call 'self-constrained advocacy', and exercise caution in order to avoid challenging the power of the regime.

Chapter 8 investigated the politics of biodiversity conservation through an examination of the most recent cases of environmental protest in Taiwan and China. The example from Taiwan concerned protests against the planned construction of a petrochemical complex and steel mill in the south coast of Taiwan that would threaten the Qigu lagoon and wetlands and the black-faced spoonbill, an endangered species of global significance. The example from China concerned the planned construction of dams on the Nu River, one of only two rivers in China that has not been dammed. The construction would endanger rare and threatened species of fish, animals, and plants in what is called one of the last 'unspoiled places' in China.

In both cases, ENGOs played leading roles in protest. Chinese ENGOs cooperated in opposition to the Nu River dam. They worked with foreign NGOs, and involved scientists and journalists in the campaign (the most prominent leader of the campaign, Wang Yongchen was both a journalist and co-founder of an ENGO). Many ENGOs coordinated strategy and tactics, but they did not form a firm alliance, and the state provided no opportunity for them to exercise coalition behavior, such as by sponsoring an educational exhibition in observance of the international day of action against dams. In response to this protest, Premier Wen Jiabao temporarily halted construction planning and called for a systematic environmental review, the first time a major project in China has been stopped (which may be temporarily in this case) because of environmental protest. The rationale for dam construction – providing cheap energy in an impoverished area – may overwhelm environmental objections, but if so modifications will likely be made to designs, in order to mitigate effects on species and threatened ecosystems.

Taiwan's ENGOs are considerably more autonomous than those in China, and shortly after industrial development plans were announced, groups quickly formed a chorus of opposition to Binnan, and then a pan-ENGO coalition. However, environmental organizations had competitive relationships, and they quickly learned that they could not rely solely on support from the local DPP magistrate or the national party center, even after some environmental activists were recruited into government posts under the DPP after 2000. During the 10-year period of controversy, the DPP was in the process of gradually reversing its stance on policy issues in order to consolidate power locally and attain it nationally. Winning elections became the DPP's first priority; environmental justice and long-standing devotion to

the environmental movement was a casualty of intense political competition. Thus, even though Taiwan's democratization has permitted the involvement of a large number of groups in processes that are far more transparent than those in China, democracy itself did not lead in this case to the desired biodiversity protection outcome – a permanent halt to industrial development planning in the Binnan area. The real reason that the Binnan project has not gone forward is change in business interests, not the endeavors of the incumbent DPP government.

It is difficult to generalize (from these two cases alone) the future of biodiversity conservation in China and Taiwan. Yet they do illustrate challenges and opportunities in the current environmental governance systems of both states. Democratization in Taiwan by itself does not guarantee any particular environmental outcome. It has made the state somewhat more porous to penetration by groups, but these may be large business conglomerates as well as environmental alliances. Definitely, the decision-making process is more transparent. Fragmentation of power in China and the appearance of what might be 'softer' forms of authoritarianism have created openings for environmental organizations, scientists, journalists, and others in the general public seeking a sustainable future.

BIODIVERSITY CONSERVATION WITH CHINESE CHARACTERISTICS?

No country has resolved competitive pressures between conservation of endangered/threatened species and ecosystems and expansion of human settlement and economic development. This book has emphasized the problems in policy and practice of biodiversity conservation in China and Taiwan, but it would be unbalanced if it did not mention those Chinese approaches that differ from those of other nations and appear to have advanced conservation goals. Five characteristics bear mention, and we qualify each with respect to its applicability to Taiwan.

Mobilization by the State

China retains a Leninist system of government into the twenty-first century, and the central government still has the capacity to mobilize the population and direct it toward environmental protection goals. The devolution of power and authority to provinces, special administrative districts, and local governments has weakened the implementation of policy, yet when the leadership forms consensus on the urgency of an environmental issue, it has the capability to act. Both reforestation and afforestation programs of the late

1990s are examples of the state's power to mobilize society in pursuit of environmental protection objectives. Planning for this campaign may have been flawed and truncated, as indicated by the large number of monocultural plantations and selection of tree species poorly adapted to diverse environmental conditions. Nevertheless, the total amount of newly planted forests is unheralded in human history, and makes China one of a small number of countries that can play an important role in global carbon sequestration.

An experienced environmental agency official made these comments about the role of government in biodiversity conservation:

> 'There is a Chinese essence to the management. There is a bigger role for the government. We want fast action, thus the government provides the movement, the dynamism. NGOs have less influence. The government doesn't let them do too much, yet this is changing. If the government pays attention to an environmental problem, then something gets done.'[2]

In Taiwan, decentralization processes also have weakened the state's capacity, and it can be argued that democratization (including the formation of a resilient civil society, a diverse array of political parties, and a demanding general public) has reduced the reach of the state still further. The state continues to have strong motivations to promote biodiversity conservation, but its mobilization capabilities are constrained by the rising power of the business community. Also, state autonomy is challenged by local concerns such as fostering economic growth and defending/attacking local administrations through elections. Moreover, sluggish economic performance after the 2000 elections, the fear of the 'hollowing-out effect' in cross-strait economic relations, and increasingly aggressive behavior by China in the debate over unification of Taiwan into China all force the state to emphasize economic development as the first national development priority.

Influence of Science on Policy

Natural scientists, especially in the biological sciences and ecology, have had a greater influence on biodiversity conservation policy (both individually and collectively) than is the case in most developed nations. Individual scientists have provided the data needed to assess damage to species and habitats. Leaders are likely to pay attention to the reports of scientists, especially those presenting information about critical species and ecosystems. One social scientist observed:

> 'Scholars are important for the initiation of ideas. They have an impact on the National People's Congress. Also, they are important in international negotiations, and in long-term planning. None of our national policies departs much from an academic base. Moreover, they have had influence at early stages.'[3]

The natural science establishment in both China and Taiwan has found ways to influence state policy on biodiversity issues. Natural science disciplines are organized into research institutes in both states. They are under the umbrella of the Chinese Academy of Sciences (CAS) in China and Academia Sinica in Taiwan. Most of the recent research into biodiversity conservation has been organized by these institutes, and they have played a large role in policy development. This is noted in the formation of integrated task forces and commissions on the subject of biodiversity. However, scientists in Taiwan have taken far less advantage of their opportunities for influence. Review committees in Taiwan's environmental bureaucracies regularly invite natural scientists to contribute views, and natural scientists contribute materially to the engineering aspects of environmental disasters, but there is little evidence that they possess a substantial influence on the policy-making process.

Social scientists in both China and Taiwan, on the other hand, have less influence on policy formation and implementation. A veteran political analyst gave these reasons for the difference in treatment of social and natural scientists:

> 'Chinese high officials in general respect natural scientists, but not social scientists. The leaders believe that they know about politics and society, that they are already experts. Also, there is some scientism. They are superstitious about science They don't really look at the overall system. They want progress; they want new technology; they want business growth. They want rapid movement and for this reason they appreciate technology. Our leaders' background is in engineering, like mine. They study building things, so that's why science is important to them.'[4]

Partnerships with INGOs

As noted in Chapter 7, the portfolio of ENGOs in China is considerably different from that in Taiwan. China's ENGOs contribute to the spread of environmental knowledge and force the state to adopt at least some pro-environment policies. In contrast to China, Taiwan's ENGOs have the freedom to organize grassroots support, whereby they gain bargaining leverage to check some state policies. However, the influence of NGOs in China's biodiversity conservation policy should not be discounted. It is ENGOs with foreign linkages that have had relatively free reign to develop biodiversity conservation projects, in partnership with Chinese governments. The leading example is The Nature Conservancy (TNC), which entered China only in 1998 (see discussion in Chapter 7), but has now developed 15 project areas in the northwest Yunnan Province.

The World Wide Fund for Nature (WWF) has also dramatically expanded its programs in China, further attracting government attention to, and interest in, the environment. Like TNC, WWF seeks cooperative relationships with

governments, on the one hand, and with grassroots environmental organizations on the other. In working with Chinese ENGOs, WWF has also emphasized capacity building, and it has joined its biodiversity preservation work with small-scale, pilot, economic development ventures.

A third example is Trade Record Analysis of Flora and Fauna in Commerce (TRAFFIC), which operates in both Taiwan and China (in a collaborative relationship with WWF). TRAFFIC conducts survey work on the illegal use of rare and endangered species listed in the CITES annex. At the conclusion of each project it publicizes its findings, and attempts to draw international pressure on the practices of governments in China and Taiwan. In this sense, it aids governments in monitoring the illegal use of species.

Receptivity to Diffusion of Knowledge and Technology

Both China and Taiwan have been selectively receptive to foreign advice and recommendations, as well as to new environmental technology. The structure of environmental regulation (for example, establishment of environmental protection administrations in both states) and environmental laws bear the imprint of American, European and Japanese practices. Chapter 6 mentioned the extent to which environmental practices have been influenced, both adversely and positively, by transnational corporations. As China has a tighter reign on multinationals than Taiwan, its experience has been more positive. Also, its experience is much more recent, at a time when norms of corporate social responsibility have begun to affect firms' behavior. One multinational corporation representative discussed his firm's successful diffusion of a new resettlement program: 'The government is always suspicious that multinationals are trying to take over the government's role. We just wanted to demonstrate that we were doing well. Then, they relaxed'.[5]

International funding for environmental protection has begun to motivate many of China's most powerful government agencies, such as the State Development Planning Commission and the Ministry of Science and Technology.[6] Of the loans from the World Bank to China in the period 1992–97, approximately 5–10 percent has been directed toward environmental protection. (This resulted from environmental criteria being added to China's loans by leaders of G7 countries at a Houston summit meeting in mid-1990.)[7] Loan covenants frequently carry environmental guidelines addressing project technology and environmental impact. For example, multilateral lenders to China are increasingly reluctant to finance thermal power plants and, when they do, tend to demand stringent compliance with environmental regulations. The significance of the World Bank, however, lies in its activity in all aspects of environmental infrastructure, including water supply, wastewater treatment and waste management.[8]

China receives loans or funds for environmental protection from other development agencies such as the United Nations Environment Programme (UNEP)/Global Environmental Facility (GEF) and Asian Development Bank,[9] most of which are implemented by the World Bank. China has established the Trans-Century Green Project. Multilateral development institutions, including the GEF, have given it US$3 billion in external assistance and export credits, with provisions extending to climate change and biodiversity.

Furthermore, China has received assistance to accomplish specific global environmental objectives. Its commitment to phasing out the use of CFCs in accordance with the Montreal Protocol Convention was assisted by the Montreal Protocol Multilateral Fund. As of late 1997, China had received the largest amount of money from the fund, some $149 million – or 26 percent of the total.[10]

The implication of these practices is that China is a passive recipient of international funding, through which it changes its policy in accord with international standards. However, this is an erroneous interpretation, for the Chinese government has determined the regions in China benefiting from foreign lending assistance and the contours of each large project. Zhang's recent review makes this clear:

> '[I]n the allocation of World Bank aid in China, the Bank, as donor, exercises merely marginal power and the Chinese government, as recipient, plays the decisive role. Many observations, some made by World Bank officials and others by scholars, confirm this point. As Zweig reports, for instance, "[B]ank officials stress that China, not the World Bank, controls the agenda". According to Pieter Botellier, one-time chief of the World Bank's Resident Mission in China, "more than anywhere, they have used us and they have always been in the driving seat."'[11]

In contrast, Taiwan's relative diplomatic isolation means that it is unable to benefit from international lending agencies financially, or with respect to the improvement of regulations and other environmental practices.

Gradual Warming to Environmentalism?

The final aspect of China and Taiwan's approach to biodiversity conservation is also the most recent and tentative – a recognition by leadership of the need to acknowledge objections to large-scale development projects and to provide some visible mitigating measures. In China, this recognition may have motivated the halt (perhaps only temporary) to proposed dam construction on the Nujiang. Definitely, greater regime awareness of environmental necessities influenced the afforestation and reforestation policies and the regime's embrace of sustainable development. In 2005 China is a far greener state than it was in the mid-1990s.

Recent developments in Taiwan are less sanguine. The environmental movement and ENGOs of the 1980s stimulated civil consciousness and civil rights, leading to Taiwan's robust civil society in 2005. The environmental movement also led to high expectations of what democratic government could accomplish in environmental protection. However, political entrepreneurs took advantage of environmental appeals to gain votes; winning office, most returned to pro-development themes. Hopes of environmentalists were dashed when the DPP did not support the anti-Binnan campaign and when President Chen Shui-bian authorized resumption to construction of the fourth nuclear power plant.

There is a danger in making generalizations based on the changes of a few years. After the conclusion of Chen Shui-bian's term in office in 2008, a different party may gain national power. Yet the KMT alliance has not established substantial linkages with ENGOs, and has not yet put environmental issues onto its political agenda. Thus, it seems that to the present, the election-driven system of democracy in Taiwan has marginalized the environmental movement, and has not facilitated long-term policies of environmental sustainability. We should not expect, then, that a transition to democracy in China will lead the state to adopt environmental protection goals into its core values.

ENDNOTES

1. Yan, Xie, Wang Sung and Peter Schei (2004), *China's Protected Areas*, Beijing: Tsinghua University Press.
2. Personal interview with SEPA official, Beijing, May 21, 2005.
3. Personal interview with social science institution chair, Beijing, January 12, 2005.
4. Personal interview with political analyst, Beijing, May 26, 2005.
5. Personal interview with China director of multinational corporation, Beijing, May 23, 2005.
6. See Jahiel, Abigail R. (1998), 'The organization of environmental protection in China', *China Quarterly*, (156) (December), 786.
7. See Vermeer, Eduard B. (1998), 'Industrial pollution in China and remedial policies', *China Quarterly*, (156) (December), 953.
8. Tremayne, Bruce and Penny deWaal (1998), 'Business opportunities for foreign firms related to China's environment', *China Quarterly*, (156) (December), 1030.
9. See http://www.worldbank.org/html/extdr/offrep/eap/china.htm.
10. Wan, Ming (1998), 'China's economic growth and the environment in the Asia-Pacific region', *Asian Survey*, **XXXVIII**, (4) (April), 377–8.
11. Zhang, Guang (2004), 'The determinants of foreign aid allocation across China', *Asian Survey*, **XLIV**, (5) (September/October), 709.

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