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Environmental Security and the Lancang-Mekong River Basin: Conflicting Interests of Stakeholders in China

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Key Points

Both in Yunnan Province in China and in the downstream countries of Laos, Thailand, Cambodia, and Vietnam, there is growing concern about the environmental effects of the intensification of development along the Lancang-Mekong River. In Yunnan Province, where the Lancang (upper Mekong) River originates, a variety of stakeholders with conflicting interests are trying to advance their agendas in a complex interplay that runs contrary to conventional notions about China as a centralized, unitary actor.

- Chinese officials see hydropower development on the Lancang River as vital to China's energy security in the twenty-first century.
- The building of dams on the Lancang River may have a significant impact on plant, fish, and animal life, but this impact has not been extensively studied by scientists in a systematic way.
- Hydropower development on the Lancang River often pits local governments and energy corporations against a number of government functional agencies as well as journalists, scientists, and NGOs, who are becoming more vocal in their opposition to the building of dams.
- Although the Chinese government has implemented measures to limit logging in the Lancang River Basin, the replacement of forest with cash crops, especially rubber and eucalyptus, has become a major threat to biodiversity.
- To better understand China's role, future research on transnational environmental security in the Lancang-Mekong River Basin should pay more attention to conflicts of interest among stakeholders in Yunnan Province.

Introduction

The Lancang (upper Mekong) River originates in the Tibetan Plateau and passes through Yunnan Province for over 1,200 kilometers before reaching the Chinese border with Myanmar. Environmental security issues in the Lancang River Basin are crucial to China, as over 10 million people live in the basin within China. Those issues are equally or even more crucial to downstream Mekong River countries, as nature does not recognize artificial borders between nation-states, and environmental shifts in the Lancang River Basin have profound effects far beyond the political boundaries of China.

This paper aims to assess the state of environmental security in the Lancang River Basin, with a special emphasis on analyzing the conflicting interests of stakeholders in China concerning environmental security issues. Existing models of transnational environmental security often implicitly reduce sovereign countries to single rational decision makers. This paper attempts to show that the assumption of states as unitary actors may be too simplistic, even for a non-democratic regime like China.

During the post-Mao era, economic liberalization, integration into the world market, and fiscal decentralization have gradually increased economic, social, and even political plurality in China. The upsurge of foreign or domestic non-governmental organizations (NGOs) in recent years has further complicated the conflict of interests among stakeholders over environmental security issues. Therefore, taking into account the multitude of interests, each holding a stake in the development and environment of the Lancang River Basin, may produce a more useful conceptual framework to understand the environmental security issues as well as to draw up constructive policy recommendations across national boundaries. In particular, this paper will focus on the two most important and pressing issues of environmental security in the Lancang River Basin: hydropower development and "green deforestation."

Hydropower Development

One of the most significant developments that affect the environmental security of the Lancang (upper Mekong) River Basin is the construction of large hydroelectric plants on the river, which have long-lasting and irreversible impacts on the displaced human population and on local plant, fish, and animal life. However, to political decision makers, those potential damages have to be balanced against enormous economic, strategic, and environmental benefits that hydroelectric production can

bring. This issue is further complicated by the divergent interests and preferences of different levels of governments, of different functional departments, and of various social groups.

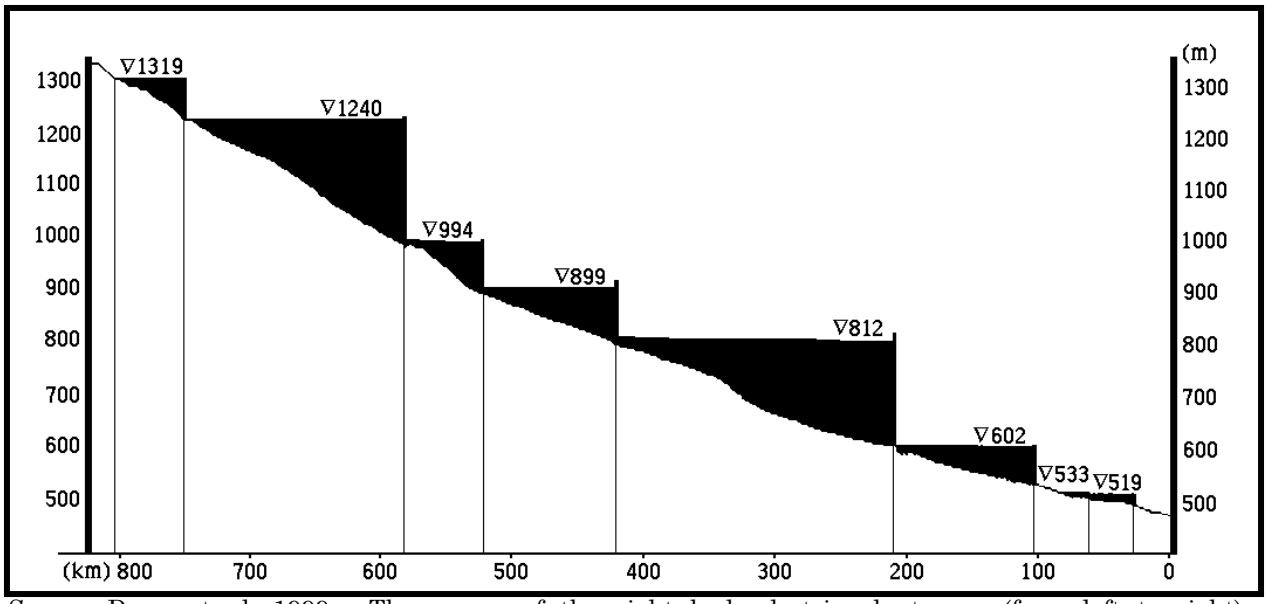
To the Chinese central government, hydroelectric development provides great economic and strategic advantages. It is the only technologically well-developed alternative to fossil fuels, and is also clean, abundant, and renewable. The replacement of fossil fuel consumption with hydroelectricity usage can also have environmental benefits by reducing pollution and greenhouse gases.

Since the Chinese economy took off nearly three decades ago, domestic demand for energy resources has multiplied, and China is now the second-largest consumer of oil in the world, trailing only the United States. Despite being the fifth-largest oil producer in the world, China has become a net importer of oil since the early 1990s, currently buying over three million barrels a day from abroad (CIA 2006). China's dependence on foreign oil that has to be sourced from unstable areas in the world has become a growing strategic concern not only for China but also for the United States, India, and other countries that in the near future might have to compete against China for a dwindling supply of oil.

The central government in China has started to pay more attention both to energy production and energy conservation. On March 14, 2006, the National People's Congress passed the 11th Five-Year Plan of the National Economy and Social Development, which devoted one full chapter to energy resources and specifically designated the Lancang River as one of the four "hydroelectric bases." Half of the world's 40,000 largest dams are already in China, and China is planning a series of eight projects on the Lancang River and a 13-dam cascade on the Nu River—the upper Salween River of Myanmar (Magee 2006). Hydroelectric power production in China has already more than tripled from 127 terawatt hours in 1990 to 417 terawatt hours in 2006, of which Yunnan Province accounted for 36 terawatt hours (State Statistical Bureau 2006), and is expected to grow at an even faster pace in the future (Yunnan Statistical Bureau 2007).

To the local governments in Yunnan Province, hydroelectric development also brings tangible economic, fiscal, political, and other benefits, including 1) An area of heavy investment in the central government's ambitious "Great Western Development" campaign since the late 1990s has been the construction of hydroelectric plants (State Council Leadership Group on the Development of the Western Region 2006). A large hydropower project can easily bring in billions of yuan of investment from the central government. Those kinds of large investment projects are highly valuable to local governments in the Lancang River drainage basin area.

Figure 1
The Eight Hydroelectric Plants Built or Planned on the Lancang River



Source: Duan et al. 1999. The names of the eight hydroelectric plants are (from left to right): Gongguoqiao, Xiaowan, Manwan, Dachaoshan, Nuozhadu, Jinghong, Ganlanba, and Mengsong. The vertical dimension shows altitude (in meters) of the normal water level of the reservoirs. The horizontal dimension shows distance (in kilometers) from the China-Myanmar-Laos border.

The 1,250-megawatt Manwan (Phase I) hydroelectric plant on the Lancang River was a joint investment project in which 70 percent of the funds came from the then Ministry of Electricity Industry. The 1,350-megawatt Dachaoshan hydroelectric plant on the Lancang River was funded 50 percent by the state development investment corporation, 30 percent by the Hongta Group (a tobacco company in Yunnan), 10 percent by the Yunnan Provincial Investment Corporation, and 10 percent by the then Yunnan Provincial Bureau of Electricity Industry (Zhu 1998). The state-owned China Huaneng Group, headed by the son of former Chinese Prime Minister Li Peng, plans to invest a total of 80 billion yuan (US$10 billion) on five hydropower projects on the Lancang River, and has already invested 23 billion yuan (US$3 billion) of fixed assets in those projects. On the Lancang River, Manwan Hydroelectric Plant (Phase II) will be completed in June 2007, followed by Jinghong Hydroelectric Plant in May 2008, and Xiaowan Hydroelectric Plant in October 2009 (State Council State-Owned Assets Supervision and Administration Commission 2006).

2) Yunnan Province boasts a theoretical hydropower potential of 394 terawatt hours per year, or one fifth of the total theoretical hydropower potential of China (Yang and Daming 2001). To put that in perspective, actual hydroelectric power production in the entire United States peaked at 356 terawatt hours in 1997 (Energy Information Administration 2006). The Lancang River in China alone has a theoretical hydroelectric capacity of 36.56 gigawatts, of which the main stream in Yunnan Province accounts for 25.45 gigawatts (Yunnan Huaneng Lancang River Hydropower Company 2005). However, only a small fraction of that potential has been developed so far, and Yunnan Province actually suffers from a severe electricity shortage, exemplified by the frequent power outages in Kunming and other cities in the province. Electricity production in Yunnan Province has not kept up with the ever-increasing demand from residential, commercial, and industrial usage. From 1990 to 2005, Yunnan Province's population increased from 37 million to 45 million, and GDP increased from 40 billion yuan to 347 billion yuan (US$42 billion), while electricity production increased from 14 terawatt hours to 62 terawatt hours, about half of which comes from hydroelectric plants (State Statistical Bureau 2006). The Yunnan provincial electric grid reported that electricity supply fell short of demand by six terawatt hours in 2004, compared with the gap of four terawatt hours in the previous year (Yunnan Provincial Government Research Office 2005). To catch up with the demand, Yunnan Province produced 21 percent more electricity in 2006 than in the previous year, while the provincial GDP grew by 12 percent. However, because of the severe drought in the province (rainfall dropped by more than a third from the 2005 level), hydroelectric production only increased by less than 2 percent (Yunnan Statistical Bureau 2007a). New hydroelectric plants on the Lancang River are expected not only to bring new production capacity but also to increase the efficiency of existing downstream plants on the river, because the dams increase water flow during the dry season between November and May when downstream hydroelectric plants cannot produce at full capacity (Duan et al. 1999).

3) Local governments and the state-owned provincial grid want the income from selling electricity to booming coastal provinces and Southeast Asian countries. The coastal Guangdong Province is the main consumer, accounting for 6.9 out of the 7 terawatt hours of total electricity exported from Yunnan Province in 2004 (Yunnan Provincial Government Research Office 2005). During the first 11 months of 2006, the Yunnan provincial grid sold a total of 10 terawatt hours of electricity to other provinces and 0.7 terawatt hours to Vietnam, a growth of 67 percent and 130 percent, respectively, compared to the same period in 2005 (Zhao et al. 2006). The economic development plan of Yunnan Province predicts that in 2020 the province will have an electricity generation capacity of 60 to 80 gigawatts, of which 80 percent will be from hydropower plants. Hydropower will become a "pillar industry" of the province, with sales expected to reach 45 billion yuan (US$5.8 billion) by 2020 (Yunnan Huaneng Lancang River Hydropower Company 2005).

"The economic development plan of Yunnan Province predicts that in 2020 the province will have an electricity generation capacity of 60 to 80 gigawatts, of which 80 percent will be from hydropower plants. Hydropower will become a 'pillar industry' of the province..."

4) The imposing structure of a dam visibly symbolizes the economic achievement of local leaders. In the reform era, the political careers of local officials are linked to the retrospective economic and fiscal evaluation by superior Communist Party committees. Therefore, local leaders are more likely to prioritize visible projects such as the construction

of river dams at the expense of less tangible and hard-to-measure achievements such as environmental protection.

5) The dams are expected to smooth out water levels and thus alleviate the effects of droughts and flooding. Yunnan Province is prone to both drought and flooding in most years. From 1998 through 2004, flooding caused over 1,800 deaths in the province. In 2004, severe drought in the province affected over 2 million people (Yunnan Provincial Government Research Office 2005). The drought from April 1 to June 10 in 2005 was the most severe in Yunnan Province since 1961 (Lui et al. 2007), and the year 2006 was even worse (Yunnan Statistical Bureau 2007). The pressing needs of disaster preparedness add to the strength of the argument for building dams on the main stream and tributaries of the Lancang River. The dams may increase the availability of water during the dry season, although that function depends crucially on the operation of the hydroelectric plants (Cogels 2007).

The incentive structures of central and local governments concerning hydropower development are further complicated by the divergent interests and preferences of functional departments within each level of government. The General Administration of Environmental Protection and the Administration of Tourism, together with their functional counterparts in the subnational governments, are often at odds with the state development and reform commission, the national electric grid, and local government heads on the issue of hydropower development. The former are concerned about the potential negative impact of large dams on the environment and on tourism, whereas the latter tout the tremendous economic, financial, and strategic benefits. Tourism is another "pillar industry" of Yunnan Province that plays an increasingly important role in the local economy. In 2006, the total income from tourism in Yunnan Province amounted to 50 billion yuan (US$6.4 billion), an increase of 16.7 percent from the previous year. The total foreign currency earnings from tourism in Yunnan reached US$658 million in 2006, compared with US$165 million in 1995 (Yunnan Statistical Bureau 2007). Few other economic sectors in the province enjoy such phenomenal growth and potential.

The argument against building dams also finds resonance among China's burgeoning environmental NGOs and local residents who are to be displaced by reservoirs. The debate carries over to the journalistic and scientific communities, with each side making accusations against the other at seminars and symposia; in newspapers, magazines, and books; and on the Internet, BBS (Bulletin Board System), and blogs. In recent years, some international organizations and local prospective migrants have become increasingly vocal in their opposition to the building of dams. On August 17, 2003, three thousand local residents staged an unprecedented sit-in protest at the Manwan Hydroelectric Plant on the Lancang River (Cheng 2004).

The compensation to the migrants displaced by the construction of hydroelectric plants is often insufficient to maintain the living standard they had before migration. Local residents who were displaced by the Manwan Reservoir on the Lancang River in the late 1980s were compensated at less than 3,000 yuan (US$797 at the 1989 exchange rate) per capita plus an annual "development assistance fund" of 400 yuan (US$106 at the 1989 exchange rate) per capita afterward (Cheng 2004). The compensation to displaced populations used to be 9 to 16.5 yuan per square meter. Nowadays it has been raised to between 25.5 and 34.5 yuan (US$3.27 to US$4.42) per square meter (Zhang 2007).

However, most of the compensation has been used for one-time living expenses rather than providing long-term sources of income for migrants. Due to its proximity to the Lancang River, the area immersed by the Manwan Reservoir in 1991 used to be more affluent than the surrounding region. After the Manwan Hydroelectric Plant was completed, the net per capita income of the displaced population fell to 46 percent of the average level for Yunnan Province for 1996 (Chen et al. 2003). All reservoirs belong to the state, which tightly controls fishing and fish farming activities that might otherwise have brought extra income to the local residents. Finally and ironically, the displaced residents often have to move to mountainous areas that do not have access to the very electricity generated at the hydropower plant, the development of which forced them out of their homes.

Besides the social and economic impact on the displaced population, the building of dams on the Lancang River can also have a significant environmental impact on local physical conditions and plant, fish, and animal life. This impact has not been extensively studied by scientists in a systematic way, and is subject to debate among concerned journalists and scholars. Moreover, the environmental impact of hydropower development on the Lancang River can reach far beyond Yunnan Province. The dams have been blamed for exacerbating a variety of threats to environmental security in the lower Mekong River countries, ranging from droughts to floods, food shortages, river bank erosion, and sea water invasion, among others. However, according to a letter published January 9, 2007 in the *Bangkok Post* by Oliver Cogels, Chief Executive Officer of the Mekong River Commission Secretariat, "the overall downstream impact of hydropower dams on the Lancang in China is often exaggerated in the public opinion."

In recent years, some Chinese scientists have started to conduct studies on the physical impact of the Lancang River dams. One researcher reported that the

rate of sedimentation at the Manwan (Phase I) Reservoir on the Lancang River from 1993 to 1996 was five times faster than what engineers had originally calculated (Cheng 2004). Another study conducted by the Yunnan Province Central Environmental Monitoring Station shows that after the completion of the Manwan Hydroelectric Plant on the Lancang River, water quality actually improved in the three monitoring sites downstream from the dam. Heavy metal pollutants increased within the reservoir and decreased downstream due to the deposit of sediments above the dam. Most of the pollution in the Lancang River downstream is caused by the sugar and rubber factories and fertilizer usage in Xishuangbanna Prefecture, which borders Myanmar and Laos (Zhang et al. 2005).

"Green Deforestation"

Environmental protection in China has come a long way since the Maoist slogan of "mankind must defeat nature." Large-scale yet disastrous economic development strategies during the Maoist era often have been blamed for many of the environmental problems that continue to haunt the Lancang River Basin today. Most of the region's virgin forest, which covered nearly half of Yunnan Province and nearly two thirds of the lower Lancang River Basin in the early 1950s, was cut down during the Great Leap Forward from 1957 to 1961. By the 1960s, less than half of Xishuangbanna Prefecture was covered by forest. Later efforts to prepare for potential "imperialist invasions" from the Pacific to the east and from Siberia to the north led to large-scale production of strategic materials in the "third frontline" areas inland, including extensive rubber plantations in the lower Lancang River Basin. During the Cultural Revolution from 1966 to 1976, a blind emphasis on grain production led to even more deforestation. By 1978, only about 34 percent of Xishuangbanna Prefecture was covered by forest (Zhang 2003).

During the reform era, the impact of economic activities on environmental security and sustainability has been of a different nature. The environmental damages of deforestation and pollution have been widely recognized, and the Chinese government has made serious, albeit often ineffective, efforts to curb both. The massive flooding in the late 1990s was a wake-up call that prompted the government to implement a comprehensive logging ban and a systematic reforestation project in 734 counties and on 167 state-owned forest farms. The central state will invest a total of 96.2 billion yuan (US$12.3 billion) on the project over the period from 2000 to 2010 (State Forestry Bureau 2000).

This project has not completely stopped deforestation in the Lancang River Basin, but it has significantly reduced its scale. In the southern part of the Lancang River Basin, a major cause of deforestation is the growing demand for grains and firewood after decades of rapid population growth. The traditional slash-and-burn method of agricultural production requires at least 14,000 to 20,000 square meters per capita, and each household needs about 125.7 cubic meters of firewood per year (Furukawa and Yin 2003). It is estimated that about half of all wood felled in Yunnan is used as firewood in the rural areas (Yang and He 2001). Some residents have expressed strong interest in using solar heaters as an alternative source of power, but the amount of initial capital investment required seems daunting to the average family in the region (Feng 2006).

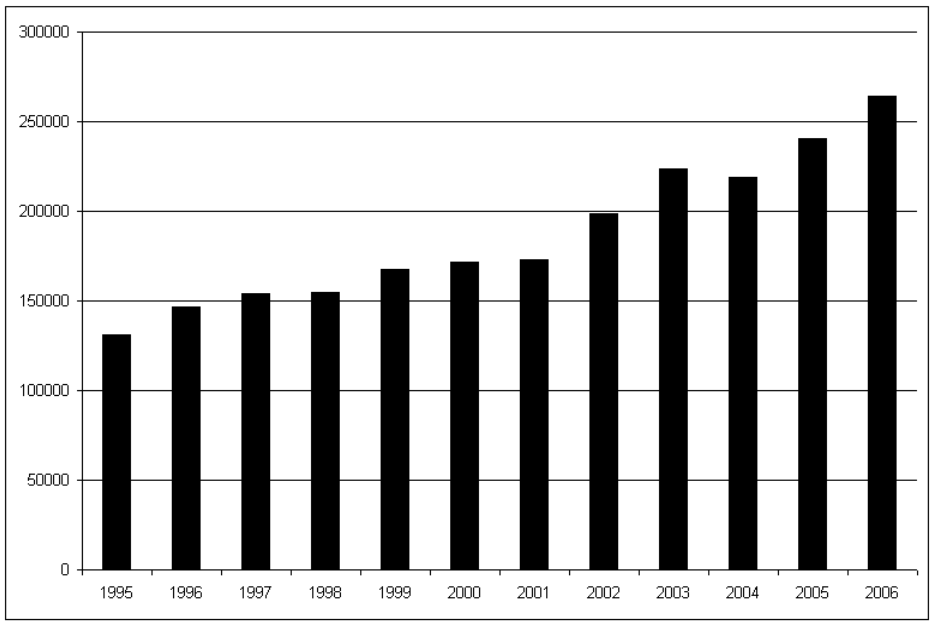
"The environmental damages of deforestation and pollution have been widely recognized, and the Chinese government has made serious, albeit often ineffective, efforts to curb both."

Another form of deforestation that has gained prominence in the region is the replacement of natural forest with cash crop plantations. In the first decade and a half of the reform era, local governments in the Lancang River Basin encouraged unscrupulous felling of trees for profit and the expansion of cash crop fields. Between 1980 and 1997, tobacco output increased tenfold and tea leaf output almost quadrupled, while by 1995 total forest in Yunnan Province shrank to less than a quarter of the land area (Yang and He 2001).

The consequent sharp reduction of biodiversity certainly seems a less urgent and less visible problem to local government officials. Seen from the sky, most of the Lancang River Basin is still covered by green plants, although they are almost perfectly uniform, either rubber trees, tobacco, tea, or eucalyptus, while virgin forest has all but disappeared. One researcher estimated the area of real virgin tropical rainforest in Xishuangbanna Prefecture at about four square kilometers (Zhang 2003). The loss of biodiversity has accelerated especially in recent years due to the development of cash crops in the Lancang River Basin. The ambitious reforestation project does not automatically solve the latter problem, and indeed could even threaten biodiversity on a large scale. This paradoxical phenomenon has been referred to by some scientists, journalists, and environmentalists as "green deforestation." They argue that biodiversity is one of the most invaluable assets of the Lancang River Basin, the most biodiverse region in all

of China. Reducing biodiversity increases the chance of widespread infectious diseases among plant, animal, and ultimately human life, and leads to the loss of potentially new kinds of food, drink, medicine, and |industrial materials. The rising frequency of flooding, windstorms, and erosion of surface soil has also been blamed on the replacement of rich protective rainforests with uniform plantations (Li 2003). Some scholars have suggested that biodiversity in the Lancang River Basin is a highly valuable strategic resource for China and should be protected in the interest of national security (Hou et al. 2006).

Figure 2
Natural Rubber Production (in tons) in Yunnan Province 1995-2006



Source: State Statistical Bureau 2005 and 2006; Yunnan Statistical Bureau 2007.

The threat to biodiversity in the Lancang River Basin has come mainly from the expansion of four types of cash crops: rubber, tobacco, tea, and eucalyptus.

Rubber

The production of natural rubber in the Maoist era was mostly driven by the strategic concern over the Western trade embargo against the Chinese mainland. Since then, in the context of market-oriented reforms, natural rubber has instead become a major source of income and profit for local residents, firms, and governments in the Lancang River Basin. During the Cultural Revolution, 100,000 so-called "sent-down youths" from Shanghai, Sichuan, and Beijing developed 267 square kilometers of rubber plantations and planted over 10 million rubber trees in Yunnan Province (China Central Television 2006). The production of natural rubber is concentrated in the Xishuangbanna Prefecture on the Lancang River that borders Myanmar and Laos. In 1996, the total output of rubber in Yunnan was 146,938 tons, and Xishuangbanna Prefecture accounted for 118,993 tons (Yunnan Provincial Government Research Office 1997).

In recent years the production and area of natural rubber plants in Yunnan Province have risen dramatically. The total production of natural rubber in Yunnan Province has more than doubled since 1995, reaching 264.2 thousand tons in 2006 (Yunnan Statistical Bureau 2007). Total area of rubber plantations in Yunnan Province increased from 1,435 square kilometers in 1995 to 2,104 square kilometers by the end of 2000. By March 2006, the total rubber plant area in the province was nearly 2,667 square kilometers (Wang and Yang 2006).

The domestic demand for rubber has grown rapidly as China's automobile industry has seen double-digit annual growth for the past decade. Especially in the three years from 2001 to 2004, total annual output of automobiles more than doubled (State Statistical Bureau 2005). China is currently the largest consumer and importer of natural rubber in the world, accounting for about a quarter of total consumption and 7 percent of total production in the world (Ramachandran 2007). The domestic price for natural rubber has risen steadily. In the mid-1990s, the price of natural rubber averaged 13,000 yuan (US$1,557) per ton and peaked at 16,500 yuan (US$1,976) per ton (Zhang 2003). In May 2005, the price of natural rubber started rising again and in just the first two months of 2006 increased by 3,300 yuan (US$423) to hit a historical record high of 22,000 yuan (US$2,821) per ton (Wang and Yang 2006). If the trend continues, a large proportion of the remaining natural forest in the Lancang River Basin will be converted into lucrative rubber plantations, posing a serious threat to the most biodiverse ecosystem in China. Botanists in Xishuangbanna Prefecture have started experiments on planting tea under rubber trees to increase the utility of the land. However, even if that practice becomes widespread, the improvement of biodiversity would still be extremely limited (Wu 1997).

Tobacco

Yunnan Province is the main producer of tobacco in China, and tobacco production has also grown rapidly in recently years. From 1995 to 1996 alone, tobacco fields in Yunnan Province increased by 10.6 percent to 5,039 square kilometers, and tobacco output increased by 17.4 percent to 0.9 million tons (Yunnan Provincial

Government Research Office 1997). In 2004, Yunnan Province accounted for nearly 30 percent of all tobacco fields in China (State Statistical Bureau 2005).

Tea

In 1996, tea plantations in Yunnan Province covered 1,645 square kilometers and total output was 68,000 tons. By 2005, the total area of tea plants in the province had risen to 2,187 square kilometers, and total output had reached 116,000 tons. No other province in China boasts a larger production of tea (Duan 2006).

Eucalyptus

In September 2002, the giant multinational logging company, Asia Pulp & Paper (APP), signed an agreement with Simao, a prefecture-level city on the Lancang River, to plant eucalyptus as paper-making material. From 2003 to 2004, 346 square kilometers of eucalyptus were planted in Simao. Local governments in Yunnan argue that the project raised the living standard of local people by creating jobs, generating tax revenues, and building roads and other infrastructure in the area (Yunnan Province Forestry Bureau 2005).

Controversy over the project arose in November 2004, when Greenpeace China accused APP of illegally destroying natural forests (Greenpeace China 2004), and the Zhejiang Province Hotels Association immediately asked its 417 member hotels to boycott APP paper products (Zhejiang Province Hotels Association 2004). APP argued that the eucalyptus trees were only planted on the so-called "barren mountains" and emphasized the benefits of the project to local farmers (Sinar Mas Group–Asia Pulp and Paper Company 2005). Other environmental NGOs, such as the Global Village of Beijing, started to get involved in the debate.

In January 2005, the State Forestry Bureau asked the Yunnan Province Forestry Bureau to conduct a thorough investigation of the controversy, and the bureau's final report mostly agreed with APP's argument (Yunnan Province Forestry Bureau 2005). On August 30, 2006, APP signed an agreement with the Yunnan Provincial Development Investment Corporation to invest 700 million yuan (US$90 million) in the restructuring of a state-owned paper mill in Yunnan. As part of the agreement, APP also gained 667 square kilometers of paper-making material forest base. Environmental groups as well as some scientists and journalists have expressed worry that the expansion of APP's operations in the Lancang River Basin will bring about irreversible damages to biodiversity (Greenpeace China 2006). On February 7, 2007, a spokesperson for the State Forestry Bureau announced that the Bureau had sent a letter to the Yunnan Provincial Government asking that the purchase be stopped as soon as possible because the agreement was against state policies on the transfer of state-owned forest (Xinhua News Agency 2007).

Besides APP, some local companies are also involved in logging natural forest to make paper or other lumber products. On June 25, 2006, the China Central Television station exposed one such operation in Simao, a prefecture-level city on the Lancang River, during its primetime Focus Interview program (China Central Television 2006). According to the program, a local private company bought and felled over five square kilometers of natural forest for lumber and paper mills, which was against China's Forest Law of 1998.

Together with other cash crops, the total area covered by the so-called "economic forest" in Yunnan Province increased by 36 percent, going from 16,700 square kilometers in 2000 to 22,700 square kilometers in 2005, while total output value increased by 83 percent to nearly 20 billion yuan (US$2.5 billion) (Ministry of Commerce 2006). Given the large potential profits, the incentive for local governments, companies, and farmers to practice "green deforestation" will continue to rise.

Conclusion

To study transnational environmental security in the Lancang-Mekong River Basin, we need a conceptual framework that pays more attention to conflicts of interests between stakeholders. The simplistic assumption that China behaves as a unitary actor hinders our ability to understand and assess the environmental issues facing the Lancang-Mekong River Basin. It can also produce overly pessimistic predictions of the prospect for regional cooperation on environmental security and sustainability if, for instance, we only focus on the extremely asymmetrical balance of power between China and the downstream Mekong River countries. On the two most important issues concerning environmental security and sustainability in the Lancang River Basin, this paper shows that China—or even a single province of China—is far from a monolithic entity with a concerted voice. Further analysis of stakeholders' interests will deepen our understanding of hydropower development and the expansion of cash crops in the Lancang River Basin and help to find potential avenues and mechanisms for information sharing, coordination, cooperation, and conflict resolution.

Preliminary Recommendations

To the Government of the People's Republic of China:

1) Declare environmental security a component of national security and establish it as a strategic priority for the country.

2) Centralize the authority of environmental protection bureaus and tourism bureaus to diminish the influence of local party and government leaders over those agencies.

3) Increase spending and international cooperation on the research and development of alternative energy sources such as wind, solar, geothermal, and biomass.

To the Government of Yunnan Province:

1) Develop a strategic plan for sustainable development in the Lancang River Basin, with emphasis on the conservation and production of energy, land use planning, and sustainable tourism.

2) Lead by example in applying principles of sustainable development and environmental protection to provincial government projects and investments.

3) Start demonstration projects for residents in remote areas to use solar or wind energy instead of firewood.

4) Employ information technology to establish a network for county and township governments and village committees to report natural or man-made hazard events.

5) Set up official channels with Myanmar, Laos, Thailand, Cambodia, and Vietnam for the sharing of information on weather conditions, natural hazards, river levels, and pollutant or toxic spills.

To the private sector:

1) Apply principles of sustainable development and environmental protection both to domestic projects and to investments in Myanmar, Laos, Thailand, Cambodia, and Vietnam.

2) Expand telecommunication services to remote areas to facilitate the exchange of potentially vital information on disaster prevention and response.

To civil society:

1) Take actions to promote awareness of and solutions to environmental risks to individual, local, and national security.

To international donors:

1) Work with the Chinese government to strengthen the information-sharing capacity of local environmental protection bureaus, water resource bureaus, forestry bureaus, and tourism bureaus.

2) Support research and development as well as local efforts to expand the utilization of alternative energy sources such as wind, solar, geothermal, and biomass.

3) Provide funding for research projects in environmental and social sciences in institutions of higher education in Yunnan Province to study the environmental impacts of economic development in the Lancang River Basin.

4) Help local media in Yunnan Province to disseminate the above information and research findings to the general public.■

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