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POLICY FORUM: ECOLOGY

China's Forest Policy for the 21st Century

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A half-century policy of forest exploitation and monoculture in China has led to disastrous consequences, including degradation of forests and landscapes, loss of biodiversity, unacceptable levels of soil erosion, and catastrophic flooding. A new forest policy has been adopted in China called the Natural Forest Conservation Program (NFCP), which emphasizes expansion of natural forests and increasing the productivity of forest plantations. This policy is being implemented with a new combination of policy tools, which may have relevance for other countries, particularly developing countries.

Lessons Learned the Hard Way

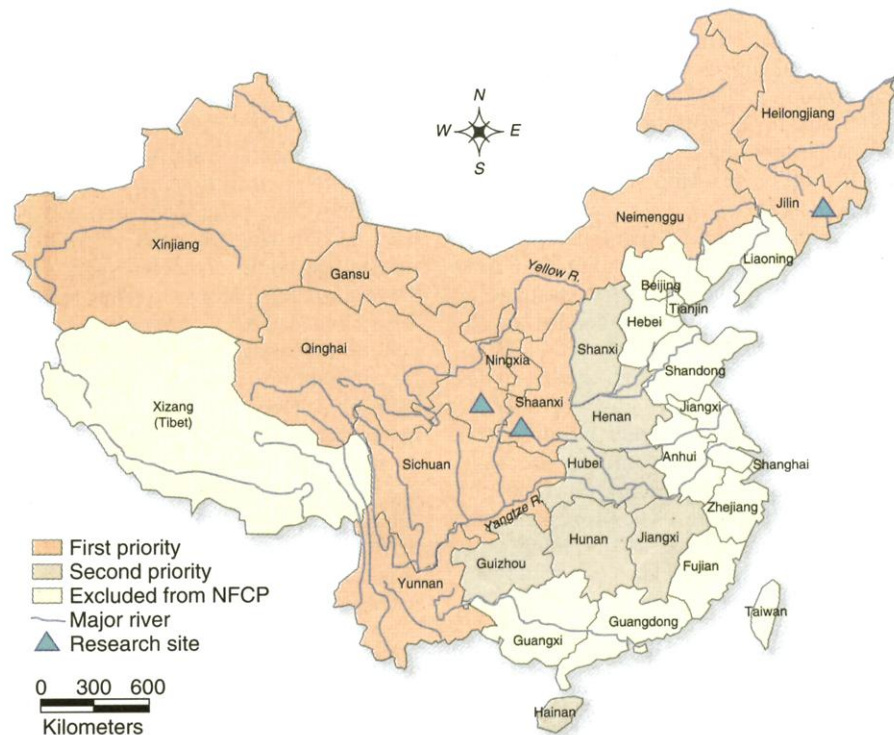
Despite thousands of years of human land-use, large areas of old-growth forest still existed in China at the beginning of the 20th century (1). Before the 1950s, most of China's forests were naturally regenerated. Since then, demand for timber has resulted in extensive cutting of forests, and timber harvests increased from 20 million m³/year in the 1950s to 63 million m³/year in the 1990s (2). Government policy did not require that native tree species be planted after logging (3), but promoted planting of fast-growing tree species, such as larch (*Larix* sp.), poplar (*Populus* sp.), and Chinese fir (*Cunninghamia lanceolata*). Although a large-scale increase of plantation-style forests in non-forested areas increased total forest coverage in China from 5.2% in 1950 to 13.9% in 1995 (4), natural forests declined to 30% of the total forest area in China and unit-area stocking of natural forests decreased by 32% (5).

China's human population has increased about 2.5 times over the past 50 years, yet the human population in forested areas has increased fivefold (5). Scientists

foresaw the potential conflict between human population growth and forest resource use and began advocating changes in China's forest policy as early as the 1960s (6). They had little success. In the 1970s, government policy limited clear-cut

such as ginseng (*Panax ginseng*), are threatened with extinction. Changes in forest composition have also caused severe ecological and environmental disasters. Insect infestations have damaged >9.3 million ha of forests per year, causing >10 million m³ of timber loss (5). Flash flooding, in part the result of loss of natural vegetative cover, caused a total loss of 166.6 billion yuan renminbi (RMB, US\$20 billion) in the summer of 1998 alone (10).

The degradation of natural forests was inevitable because (i) the old forest policy was designed to maximize timber production for economic development, and in its implementation, the amount of timber harvested exceeded that which was sustainable



A countrywide planning map of NFCP in China. The NFCP covers 18 provinces and autonomous regions (including the first and second priorities). The state forest regions are classified as the first priority for NFCP. The two priorities receive different levels of financial support from the central government. The three research sites focus on forest cutting (in Jilin), resettlement of forest dwellers (in Shaanxi), and conversion of farmlands to forest (in Gansu), respectively.

areas to ≤10 ha in northeastern China (7), but departures from this standard were routine in field application. During the 1990s, eroded lands continued to increase by >10,000 km² annually, with the result that 38% of China's total land area is now considered badly eroded (8).

The sharp decline in the quantity and quality of natural forests resulted in loss and fragmentation of natural habitats. At least 200 plant species have become extinct in China since the 1950s, and >61% of wildlife species have suffered severe habitat losses (9). Valuable and rare species,

by at least a third (5); (ii) natural forest conditions were not accurately and systematically monitored; and (iii) no effective effort was made to evaluate the old forest policy.

A New Forest Policy

In 1998, the Chinese government established the NFCP, which articulated the new forest policy. Its purposes are (i) to restore natural forests in ecologically sensitive areas, (ii) to plant forests for soil and water protection, (iii) to increase timber production in forest plantations, (iv) to protect existing natural forests from excessive cut-

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SOURCE: GUOFAN SHAO

ting, and (v) to maintain the multiple-use policy in natural forests. The NFPC applies to 18 provinces and autonomous regions (see the figure on page 2135), which contain the upstream regions of major river systems, including specifically the Yellow and Yangtze Rivers, and which have suffered massive ecological and environmental degradation during the past 50 years. The target area is divided into two priority regions. The state forest regions are classified as the first priority for NFPC. The two priorities receive different levels of financial support from the central government, ranging from 20 to 100% of all costs.

The central government invested 4 billion RMB (US\$500 million) in 1998, 6 billion RMB (US\$750 million) in 1999, and 7 billion RMB (US\$875 million) in 2000 for NFPC. Timber harvests from China's natural forests were reduced from 32 million m³ in 1997 to 29 million m³ in 1998 and to 23 million m³ in 1999. It is projected that timber harvests in 2000 will be 14 million m³, with still lower harvest levels thereafter.

Within the next 10 years, this program is intended to provide an additional 6 million ha of converted marginal farmland to forestland for soil erosion control and to regenerate an addition of 39 million ha of forest plantations and natural forests in degraded forested areas to raise forest cover to 19% of total land area. More natural forests will be protected to increase wildlife-habitat protection areas to 8% of the nation's total area. The process of land conversion has started in 174 counties in 14 provinces. In 2000 alone, nearly a half million ha of farmland have been allocated for conversion.

The NFPC is being managed by a new government agency called the Center for Natural Forest Conservation and Management (CNFCM), which is under the State Forestry Administration. The CNFCM is applying a mixture of public policy instruments to achieve the purposes of NFPC, described below.

Technical training and education. Technical training is conducted at three levels. Fifty provincial leaders are educated by the central government in programs lasting multiple weeks to understand and support NFPC. More than 700 forestry officials from provincial and local forestry bureaus are trained by CNFCM to understand and implement NFPC. Thousands of local forestry cadres, key technicians, and farmers at the township and village levels are taught by forestry professionals to use advanced technologies to regenerate, protect, and manage forests. An example is the application of growth agent in afforestation of converted agricultural lands (11). Inter-

national experts are being hired to assist in the technical training.

Land management planning. Forest lands are divided into nature preserves and commercial forests on the basis of location and characteristics. Forests that preserve species and ecosystem diversity and protect water resources are assigned to the first category. The extent of forested nature preserves is being expanded, and little human disturbance is allowed in them. Commercial forests are restricted to productive growing areas to provide high-quality timber, bamboo, and other economic forest products.

Mandatory conversion of marginal farmlands to forest lands. The central government offers free food to farmers who lose their farmlands, which is intended to be equal in amount to the maximum quantity they would have obtained from the land they lost and also provides financial support to cover the cost of land conversion. This policy is effective for 30 years after land conversion starts.

Resettlement and retraining of forest dwellers. Over a million foresters have been laid off work in areas where natural forests are being protected from timber harvest, reducing access to many resources foresters and their families live on. These people are being reeducated and trained for different jobs. Workers who resettle by themselves receive a settlement allowance that is three times their annual salary.

Share in private ownership. By contracting with local people, government-owned natural forests will tend to be better protected from fire and illegal felling. Under such contracts, local people have the right to manage and use the forestland for growing nontimber products, such as mushrooms, ferns, and frogs (for human consumption). The contracts also ensure that local people have economic benefits if they manage the forests effectively. In newly forested areas, the policy specifies tree ownership for the people who plant the trees.

Expanded research. Research institutions, including the Chinese Academy of Forestry, the Chinese Academy of Sciences, and the Chinese universities, are collaborating in research at three demonstration sites. Xiaolongshan Forestry Bureau of Gansu Province is being used to demonstrate mandatory conversion of marginal farmlands to forest; Matoutan Forestry Bureau of Shaanxi Province is being used to demonstrate resettlement and retraining of forest dwellers; Baihe Forestry Bureau of Jilin Province is being used to demonstrate selective cutting or small-area clear-cutting methods in natural forests.

The NFPC program represents China's first countrywide policy designed to protect natural forests, while developing for-

est plantations as the major source of timber supply. Through locally focused management strategies, biodiversity and forest resources will be sustained, and downstream regions will be better protected from flooding. Countrywide forest inventory and planning were accomplished in the period 1998 through 2000, and land conversion and tree growing demonstrations were implemented in many counties in the targeted areas to establish the feasibility of NFPC.

Forests have long life-spans, and the relative success of the new forest policy will become more apparent as time goes by. The CNFCM is responsible for monitoring the implementation of NFPC. Databases are being developed at CNFCM to update information periodically on land conversion, reforestation, forest protection, timber production, status of forest dwellers, and environmental quality. The CNFCM coordinates independent experts in evaluating NFPC on both a short- and long-term basis. Short-term evaluation focuses on the implementation processes of these policy tools, whereas long-term evaluation focuses on the results of the new forest policy. Statistics from the first 2 years indicated that the investment of the central government was a success in terms of timber production control, land conversion, and resettlement of forest dwellers. A comprehensive evaluation will be made in 2005 to aid the central government in fine-tuning and sustaining the new forest policy. Although the initial success of NFPC is due to the financial and administrative efforts made by the central government, the long-term success of NFPC will depend on China's economy, social systems, public education, and science and technology.

References and Notes

1. N. Shaw, *Chinese Forest Trees and Timber Supply* (T. Fisher Unwin, London, 1914).
2. Ministry of Forestry, *China's Forestry Yearbook* (China's Forestry Publishing House, Beijing, 1997) (in Chinese).
3. S. D. Richardson, *Forest and Forestry in China* (Island Press, Washington, DC, 1990).
4. J. Liu, *A Macro Inventory of China's Environments and Resources and Their Dynamics* (China's Scientific Publication House, Beijing, 1996), p. 353 (in Chinese).
5. P. Zhang, X. Zhou, F. Wang, *Introduction to Natural Forest Conservation Program* (China's Forestry Publishing House, Beijing, 1999), p. 388 (in Chinese).
6. S. Liu, *China's Forestry* 10, 8 (1963) (in Chinese).
7. G. Shao and G. Zhao, *Nat. Areas J.* 18, 334 (1998).
8. P. Zhang, *Sci. Silvae Sin.* 35, 124 (1999) (in Chinese).
9. W. Li, in *China's Biodiversity* (China's Scientific Publishing House, Beijing, 1993), p. 168 (in Chinese).
10. G. Qu, *Environmental Protection Knowledge* (China's Red Flag Publishing House, Beijing, 1999), p. 354 (in Chinese).
11. T. Wang, "A handbook of the ABT [agent of biological tissue] growth agent and its application" (Agriculture Publishing House, Beijing, 1991), p. 330 (in Chinese).
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