



## National-level Soil Erosion Control Policies in China

**Short title:** National-level Soil Erosion Control Policies in China

**Key Message:** National Level Soil Erosion Control Policies in China is evidence that a single piece of legislature has many diverse effects as it has not only curbed soil erosion but also affected National forest and agricultural policies as well as rural social policy.

**Suggested citation:** TEEBcase (2010) National-level Soil Erosion Control Policies in China, available at: [TEEBweb.org](http://TEEBweb.org)

### What is the problem?

Following heavy rains in the summer of 1998, 29 provinces in China experienced extraordinarily heavy flooding. The Yangtze River, the Huasong and Nen rivers in the Northeast, and the Pearl River in the South all breached their banks. More than 4,000 people died in the floods, and 22 million hectares of farmland were submerged and destroyed.

Throughout the 1990s, the Ministry of Agriculture repeatedly identified soil erosion as a problem that might lead to flooding (Rozelle 1997). The floods of 1998 presented the central government with convincing evidence that erosion was a problem, and it acted quickly to address the issue. A pre-existing legal project, the National Forest Protection Program (NFPP), was accelerated and broadened in scope. Released in 1999, the NFPP banned harvesting of natural forests altogether in certain provinces, and curtailed the quotas for harvests in other provinces. A mechanism for distributing subsidies to affected industries was introduced during the period of 2000-2004. A second program, the Conversion of Sloping Farmland to Forest ('Grain to Green'), offered farmers in the upper reaches of the Yangtze and Yellow Rivers cash and food subsidies if they retired farmland and converted it to forest or pasture. Grain to Green entered trials in 1999 and was implemented on a large scale beginning in 2000.

Although the motivation for both Grain to Green and the NFPP was the need to control floodwaters, the programs were also necessary for China's social and economic development. China's dam construction projects require minimizing soil erosion in upstream areas to ensure the safe operation and electricity output of new dams. Secondly, by simultaneously retiring farms and forests and providing affected groups with subsidies, Grain to Green and the NFPP give poor farmers and foresters time to engage in 'off-farm labor,' either by migrating to cities or engaging in other forms of local industry. The NFPP has failed, however, to provide rural communities dependent solely on forestry with new occupations. Finally, both Chinese agriculture and the Chinese timber industry were managed at unsustainable levels in the decades preceding the 1998 floods. Exhausted, salinated, and polluted farmland presents social

and ecological problems beyond flooding and Grain to Green has removed a large amount of vulnerable land from the cycle of lower yields and higher abuse. And, notwithstanding its rigidity, NFPP is an attempt to stabilize China's domestic timber supply, which may ultimately enable sustainable use of forest resources across China (Zhu 2003). These programs therefore should be considered new developments in rural social policy and national agricultural and forest policy, as well as erosion-control measures.

### **Which Ecosystem services were examined? And how?**

Grain to Green and the NFPP were instituted after very short feasibility trials in 1998-1999. Both programs proceeded quickly, from the top down, and without systematic analysis of how trials affected silt flows downstream. (Li 2008), It remains difficult to determine how the programs are performing on a national level. It is also not safe to assume that reforested land, often planted with a single species, performs the ecological function of a natural forest (Zhu 2003). But these programs do fit into the broader background of Chinese agricultural and forest policy, and are currently producing measureable effects against other important historical trends.

The total Chinese agricultural yield grew at an average annual rate of around 2% during the period 1950-1978, with the total for land under cultivation remaining close to constant. This growth was combined with a slow increase in the use of fertilizers and improvement in irrigation throughout the country. Following the death of Mao Zedong in 1976, agricultural collectives were broken up into profit-generating family farms and farmers also began to use more sophisticated chemical fertilizers and hybrid plant breeds to boost yields. Annual grain yield rose at an average of 5.9% in the period of 1978-1984. After this point, however, yields began to stagnate and fall, despite widespread use of late-generation hybrids and fertilizers. Provinces located in the arid Loess Plateau saw the sharpest decline in productivity (Rozelle 1997). The statistics indicate that farmers in post-reform China cultivated their land very intensively and, within a decade, the most fragile fields – on mountain slopes and throughout the Loess Plateau – began to lose productivity. The Ministry of Agriculture in the early 1990s was aware that the loss of productivity was accompanied by soil erosion and contamination and that these problems could lead to flooding in the river plains.

Grain to Green's effect on soil erosion has not been systematically addressed, but its effect on agricultural yield has received attention and the program has been found to be 'cost-effective.' Researchers working with national-level statistics have also found that total agricultural yield in China has fallen only very slightly since 2000, confirming that Grain to Green has removed mostly unproductive land, while leaving productive and level land active. Whether this precise allocation was voluntary or due to local bureaucratic pressure has been hard to determine (Uchida 2005; Demurger 2005) but the program appears to be universally popular among farmers because the combined in-kind and cash compensation usually exceeds the opportunity cost of retiring the land.

It is also more productive to discuss the NFPP in terms of an early attempt at national sustainable forest policy rather than in terms of how it has concretely affected soil erosion. Chinese forests were not well managed during the 20<sup>th</sup> century and they provided much of the energy for China's industrialization efforts under Mao Zedong. The dissolution of the collectives also led to more uncontrolled deforestation in the 1980s, as farmers (fearing land tenure rules would change yet again), often cut down and sold the trees on their land (Demurger 2005). The government began to classify natural forests as 'ecological' and 'economic' in the early 1990s with the goal of stopping harvesting in ecological forests. Following the flooding of 1998 the NFPP completely halted the operations of all timber enterprises and placed strict limits on the

amount of firewood individual households may collect from local forests. In the Northeast, NFPP allows commercial enterprises to continue harvesting timber but has curtailed their quotas by 40%.

Under NFPP quotas, domestically harvested timber cannot satisfy the domestic market, which is driven by demand from construction, home decoration, and paper industries. Over the past decade, however, China has successfully met demand by importing wood from abroad. Since China has found trade partners, and since domestic demand far exceeds maximum sustainable domestic supply, future versions of the NFPP are not likely to open up Chinese forests extensively.

### **What policy changes resulted from examining ecosystem services?**

Forests administered by the NFPP are divided into two regimes: a strict regime in the Yellow and Yangtze River catchment areas, and one that still allows logging in the Northeast and on Hainan Island. In the Yellow/Yangtze zone, the government has banned commercial logging (through 2010) in over 30 million hectares of forest and has placed another 30 million hectares under permanent protection. Further, it has initiated reseedling, replanting and strict closed-access protection on 13 million more hectares of hillside. In the Northeast and on Hainan, NFPP has extended permanent protection to 30 million hectares and reduced timber quotas by 40% in the remaining open forest. Additionally, subsidies have been distributed to enterprises in the Yellow/Yangtze zone, many of which are state-owned, in an attempt to cushion and re-train forestry workers whose occupations have disappeared. Reports indicate that this effort did not restore the local economies in the Southeast that were most affected by the law. The government had allocated 96 billion RMB for implementation by 2001.

To date, the Grain to Green program has been implemented in 25 provinces and in over 14 million hectares. The value of the annual subsidies to farmers retiring their land varies according to the productivity of the land. It ranges from 1,500 to 2,250 kilos of grain and 400 - 600 RMB per hectare. Farmers also receive seedlings for trees that they are expected to plant and their subsidies are contingent on the success of the seedlings. According to the original regulation, 80% of forests planted under Grain to Green were supposed to be composed of non-productive, 'ecological' trees for which farmers would receive eight years of subsidy payments. 20% would be economically productive trees and for these, farmers would receive annual payments for five years. Observance of this proportion, however, has varied regionally.

The next generation of regulations, under the NFPP, have not yet been announced. The government recently announced that Grain to Green program payments would be renewed on a new cycle in the year 2010 in order to consolidate and continue progress against erosion.

### **Resources**

Démurger, Sylvie, Martin Fournier, Guozhen Shen. "Forest Protection Policies." *China Perspectives (Perspectives Chinoises)*, 59, 2005.

Rozelle, Scott, Gregory Veeck, Jikun Huang. "The Impact of Environmental Degradation on Grain Production in China 1975-1990." *Economic Geography*, 73:1 Jan 1997, pp. 1-44

Li Dengke, Jing Zhuo, Zhihui Sun. "RS and GIS Monitoring of the Effects of The Grain to Green Project." *Agriculture Infrastructure Journal (Nongye Gongcheng Xuebao)*, 24:12, 2008, pp 120-126.

Uchida, Emi, Jintao Xu, Scott Rozelle. "Grain for Green: Cost-effectiveness and sustainability of China's Conservation Set-Aside Program." *Land Economics*, 81:2 May 2005, pp 247-264.

Zhu Chunquan, Rodney Taylor, Guoqiang Feng. *China's Wood Market, Trade, and the Environment*. Science Press USA: Beijing, 2004