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Impacts of Land Degradation in PRC

By the end of 1998, the Government estimated that 7 million hectares (ha) of degraded land has been rehabilitated, including 2 million ha of plantations, 2.5 million ha of fenced desert reserves, 0.5 million ha of aerial seeding and 0.7 million ha converted to high yielding crop lands. Has this effort been optimal and do the benefits justify the costs? What are the main impacts and what do they cost the PRC economy?

Direct Loss of Production - Rice planting and animal husbandry in PRC dates back over 7,000 years and PRC's agriculture is renowned for its intensive farming. PRC's per capita arable land is about 0.11 ha, about one third of the global average. Land degradation threatens the country's ability to continue feeding its 1.3 billion people.

For example, desertification is advancing at 133,000 ha per year in Qinghai Province. More than 5 million people in 21 counties are living in desertified areas, with considerable reduction in their potential agricultural production. More than 60 percent of the province's poor are located in desertified areas, with little prospect of escaping poverty.

Siltation and Sedimentation - The Yellow River has a total length of 5,464 km and a drainage area of 750,000 km². It is the second longest river in the PRC after the Yangtze River. The middle section of the Yellow River passes through the loess and fine sand areas of Shaanxi and Shanxi Province where it picks up 1.6 billion tons of sediment load annually resulting to yellowish coloration even in period of low flow. Although the middle section of the Yellow River has been the historically the center of ancient empires, 80 per cent of the loess plateau is now unpopulated or thinly populated because of soil instability and unpredictable shift of the river course from siltation and erosion. Erosion has carved gullies 200 to 250 m deep in Shaanxi and Shanxi province. Control of the erosion by planting trees and grass has been very limited because of the poor moisture holding capacity of the loess and sand as well as reckless destruction of the young trees for fuel and the grass by goat herders. Whatever vegetation survived the drought is often washed out in the next storm.

The lower reaches of the Yellow River pass through the North China Plain where a large quantity of the eroded sediment is unloaded. It is estimated that 400 million tons of sediment is deposited in the North China Plain and to control the annual flooding levees are built higher every year. In a number of sections, the riverbed is higher than the surrounding areas. In Kaifeng City, the Yellow River high water and low water marks are 12 and 5m above the surrounding countryside respectively. In the 5,000 years of Chinese recorded history, the Yellow River overtopped its levees 1,500 times and changed course drastically 26 times. Such extensive damage to property and human lives took place during those incidents that the Yellow River is also called China's sorrow. In 1993, the latest major flooding of the Yellow River, more than 3,000 villages were buried in silt and 18,000 people were killed.

An estimated 20 billion m³ of river flow is needed to flush the sediment from the river and prevent further siltation and increased risk to the surrounding cities. Approximately 1.3 billion tons of sediment is deposited annually at the Yellow River estuary. In the 100 years from 1870 to 1970 the landmass at the Yellow River estuary has been increasing at the rate of 20 km per annum. However water consumption in the North China Plain is

increasing at 4.7 per cent annually. In 1970, the river ran dry in Shandong province for 21 days, but in 1996 it was dry for 133 days, further increasing to 226 days in 1997. Low or no flow in the estuary has resulted in coastal erosion and encroachment of saline flows up the river.

The total eroded area along the Yangtze River is 52 million ha, yielding 2.24 billion tons of sediment annually, of which 1.2 billion flow into Dongting Lake (a key flood detention lake). The surface area of the lake has declined from 430,000 ha in the 1950's to 280,000 ha today, thus contributing to recent disastrous floods.

Sand encroachment and mobile dunes around Aybi Lake in Xinjiang Province have been spreading at an annual rate of 4,000 ha since the 1990's, while the lake surface is reduced by 1,200 ha every year.

Damage to Public Infrastructure - Tens of thousands of villages, thousands of kilometers of roads, railways, and irrigation canals, as well as reservoirs and hydropower facilities are damaged by shifting sands and sediment. As the Western Development Strategy progresses, it will become even more urgent to protect roads, railways, canals, and pipelines from being overrun by mobile sand dunes. The National Report on the Implementation of UN CCD and the National Action Program (April 2000) <http://www.library.utoronto.ca/pcs/state/chinaeco/> even suggests that Beijing City could be buried by drifting sands in only a few decades, as the nearest sand sheets are only 70 km from the downtown area.

Sandstorms - Since the 1950's more than 70 heavy sandstorms have affected the northern part of PRC and neighboring countries. In May 1993, more than 12 million people were affected, 116 people killed or missing, and 12,000 head of livestock killed. Direct economic losses were estimated at Y540 million. The past few years have seen a dramatic increase in the number and severity of sandstorms, with 8-12 sandstorms per year, causing huge losses to transportation (including air transport) and damage to the affected population.

Economic Damage - Economic damage of land degradation is difficult to estimate. but the annual loss is substantial including loss of arable and grazing land, destruction of roads and other infrastructure, loss of reservoir storage capacity, and impacts of dust storms in urban areas. *An Assessment of the Economic Losses Resulting from Land Degradation in China*, (Ning Datong, undated) estimated losses of Y59.3 billion (\$7.1 billion) per year, with 24.3 percent from lost farmland, 27.3 percent from lost nutrients in runoff, 42.2 percent in reduced reservoir functions, 5.4 percent from disrupted shipping, and 0.8 percent from salinized soil <http://www.library.utoronto.ca/pcs/state/chinaeco/>. Pollution costs the Chinese economy anywhere from 3 to 8 percent of GDP each year, according to various estimates. Ecological damage potentially costs another 5 to 14 percent. Even at the low end of these estimates, total environmental damage roughly cancels out annual economic growth.

Direct evidence of the costs of land degradation is difficult to obtain. For example, the loss of nutrients in topsoil is estimated to be equivalent to 54 million tons of chemical fertilizer, twice the amount that PRC produces in a year.