A CHINA ENVIRONMENTAL HEALTH PROJECT RESEARCH BRIEF

Desertification and Environmental Health Trends in China

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The vast deserts in northwest and north-central China are moving east. Overgrazing and excessive water withdrawals for agriculture have catalyzed a rapid rate of desertification, and spring dust storms blanket Beijing, blowing dust particles to Korea, Japan, and even the U.S. west coast. The Asian Development Bank estimated that in 2006 the livelihoods of 400 million people are threatened by the encroachment of the three largest deserts, the Gobi, Taklimakan and Kumtag. [1] In these dry areas of China, 10,400 square kilometers of arable land or grasslands were consumed annually by desert in the late 1990s. In the early 2000s the rate of land lost to desert dropped to 3,436 square kilometers. [2] In 2005 the State Forestry Administration claimed that nearly two decades of tree-planting campaigns have brought marked progress in the battle against desertification, in that today only 1,283 kilometers a year of land is lost to the ocean of sand moving east. [3]

FACTORS LEADING TO DESERTIFICATION

A number of natural and human-induced factors exacerbate desertification in China:

Global Warming

In 2006 and 2007, reports of unseasonably warm, dry weather in northern and western China have multiplied. For example, in Heilongjiang and Inner Mongolia, rainfall decreased by at least 30 percent in 2006, resulting in forest fires and more desertified farmland. [4]

Poor Regulations

Damaging incentives for restoring land. China's Farmland Protection Law (1994) requires businesses that build on farmland in one area must establish replacement farmland in some other area. This law has led businesses in eastern China to build on high quality farmland near major cities and then buy and cultivate cheap, marginal land on the boundaries of the deserts, exacerbating water shortages and making that land very susceptible to desertification. [5]

Destructive land-use incentives. From campaigns beginning in the 1950s to encourage irrigation agriculture in fragile grassland areas, to current food self-sufficiency policies that encourage farmers to plant more land-intensive grains, unsustainable land-use practices are exacerbating desertification. [6]

Campaigns

Go West Campaign. The Go West Campaign to promote infrastructure and economic development in the western regions of China, has contributed to desertification by encouraging larger numbers of people to live, build, and raise animals in sensitive plain ecosystems. According to Wang Yahua, the provinces of Qinghai and Inner Mongolia have seen losses of 4.4 million hectares of pasture and 9.73 million hectares of grassland since the campaign began. More than 10 million people are short of drinking water in this region. [7]

Tree-planting campaigns. To address desertification, the State Forestry Administration has prioritized planting trees over native grasses and shrubs—which are more drought-tolerant and have broad shallow roots that could hold the soil. Such plants could be a more effective and water-saving method to halt the spread of deserts. [8]

Over Grazing

As China's demand for meat has increased with growing per capita income and the market for cashmere production has grown, the incentive to have as many animals as possible on grasslands has increased. The result is large numbers of range sheep, goats and cattle that trample and strip the protective vegetation. Limitations on how far nomads can move their flocks also have meant more animals are grazing on fewer grassland areas. Xinhua reports that 90 percent of China's grasslands have been degenerated by over-grazing, a figure that increases by 2 million hectares a year. [9]

THE DOMESTIC THREAT OF DESERTIFICATION

The growing desertification is causing serious environmental and health problems within and beyond China, which has led to a growing number of domestic and international initiatives to help in grassland protection, reforestation, and water conservation.

Economic Costs

The state media estimated that in 2005 direct and indirect economic losses due to desertification were more than $40 billion. [10] Besides monetary losses, there is the issue of environmental refugees. According to a United Nations study, by 2010 there could be as many as 50 million environmental refugees in China, many fleeing water shortages and sand dunes. [11] Gansu Province alone reported 4,000 villages at risk of being buried in drifting sand.[12] As much as 900 square miles of former farmland is blown away by the wind each year in northern China, according to National Geographic. [13] With 25 percent of the world's population already living on only seven percent of the total arable farmland, desertification trends raise food security issues, especially when added to arable land in China lost to erosion and construction.

Health Costs

Dry soil that has been exposed by the process of desertification is very light, and spring winds can blow it great distances. Beijing is infamous for its blinding spring dust storms that can cause economic damage by closing down much of the city and airports due to poor visibility. Such storms also pose serious health hazards for humans, particularly children and the elderly. Such fine dust can be inhaled deep into the lungs creating respiratory problems. Eye infections are also common during such storms. [14] These dust storms have apparently reduced in frequency from some 20 a year to close to 10; [15] however, their intensity appears to be increasing. [16] Chinese news media reported that the storms in 2006 were the worst in six years. [17]

GLOBAL IMPACTS

Every year in April, dust storms swirl over the Korean Peninsula. The resulting reduced visibility forces airports to shutdown and sensitive groups of the population are asked to stay indoors. These same dust storms affect Japan, and even deposit Chinese soil as far as the Rocky Mountains. [18] Dust and other pollutants, and even bacteria, from China are potentially nullifying improvements to air quality U.S. west coast states have made under the Clean Air Act. Japan and South Korea have filed official complaints and are working with Chinese legislators to combat the dust storms. [19]

THE FUTURE

The Chinese government is taking the threat of desertification very seriously, particularly with the desert cropping up less than 250 kilometers from Beijing. Besides domestic campaigns and technologies, international assistance has been growing in this sector. Some initiatives include:

Tree Planting

Tree planting has been over emphasized and many trees planted as part of campaigns have died due to little subsequent care. Some tree shelterbelts have had a positive effect, such as blocking the wind and particles, as well as hindering large moving sand dunes. However, they are expensive with one partially successful tree shelterbelt campaign in the northeastern areas, dubbed the "Great Green Wall," costing about $6.3 billion, but underscored the government's determination to stop the spread of desert around Beijing. [20] In 1995, total forest cover increased in China by 14 percent due to intense tree planting efforts, reducing sand dune buildup by as much as 64 percent in some provinces. [21] Efforts of the afforestation "Combating Desertification Campaign" resulted in 8 million hectares of restored desert by 2000. [22]

Controlling Grazing

In addition to afforestation efforts, the pastoralists have been encouraged—both through resettlement programs and micro-credit initiatives—to reduce their grazing sheep and goats by 40 percent. [23] In 2004, the Ministry of Agriculture invested $3.1 billion to restore 70 million hectares of degenerated grassland through grazing bans and cultivated grazing pastures with more suitable types of grass. [24] Some local government initiatives in Inner Mongolia to promote sustainable grazing have proven remarkably successful in restoring grassland. [25]

Wind Turbines

Another possible method of reducing desertification is the use of wind turbines, which slow the winds that whip away the soil, and provide an alternative energy source from burning trees. [26] However, there is little evidence that this is a widespread phenomenon at this time due to high start-up costs.

Land-Use Rights

One key method to encourage farmers to care for their land in a sustainable way and conserve water is to promote clearer land-use rights. In 2001, the government passed the Law to Control Desertification increasing land-use rights from 30 to 70 years on desertified land, if the user helps restore the land. This law also includes setting aside highly fragile land

for nature reserves. [27] A broader property rights law was passed in 2007, but it is not yet clear if it will impact or protect rural land use.

Logging Bans
In 1998, China passed a moratorium on commercial logging in 13 provinces all over China in an effort to combat desertification, erosion, and flooding. These bans have led to the most dramatic harvesting decrease in the world: 20 million m3. [28]

Water Trading
To promote water conservation in dry areas, some, albeit officially illegal, water trades have taken place. For example, in 2000 in Inner Mongolia, a new coal power plant lacked sufficient water because the province had no extra water allocation available from the Yellow River runoff. Therefore, the plant invested 89.5 million Yuan to develop water-saving projects in irrigation districts in the area. In return for the investment, the local government permitted the plant to obtain a 50 million cubic meter (m3) water withdrawal right from the Yellow River. [29]

International Projects
The World Bank has been active in loans and projects focused on grassland restoration in north and western China. One of the more striking success stories has been the little-heralded Loess Plateau Restoration Project. Initiated in 1994 with funding and expertise provided by the World Bank and the International Development Association, the Loess Plateau Watershed Rehabilitation Project successfully broke the cycle of environmental degradation and poverty by engaging the local population in planting trees, shrubs and grasses.

The Asian Development Bank has donated considerable funding to combat desertification in China primarily through the sub-project People's Republic of China/Global Environment Facility (PRC/GEF) Partnership on Land Degradation in Dryland Ecosystems. There also have been numerous tree-planting projects supported by Japanese nongovernmental organizations.

Chinese Environmental Nongovernmental Organizations (NGOs)
Within China, there are also a number of NGOs doing work to combat desertification. Some of these are listed below—for a larger list of green organizations in China, please see the Inventory of Environmental Projects in China in the *China Environment Series*.

• Friends of Nature started a program of grassland conservation in 2004 aimed at creating a network for activists and researchers in the field.
• Green Camel Bell in Gansu Province edits textbooks for desertification education among school children.
• Han Hai Sha, initiated in 2002, runs a volunteers website concerning desertification and organizes case studies, lectures and seminars on healthy agriculture in vulnerable grassland areas. This NGO has also worked to link together urban scientists who work on desertification with communities struggling with the problem.

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