

Chinese Initiatives to Combat Desertification

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Abstract

The serious situations and damages of desertification are introduced. With the development of integrated measure systems for combating desertification significant achievements have been made.

Key words : combating desertification, desertification in China

1. General Introduction

China is one country facing some of the most serious desertification problems in the world. The China Country Paper to Combat Desertification, published by the CCICCD in 1997, shows that the affected lands are mainly distributed in the western part of North-east China, North Central China and most of North-west China. There 791 counties in 13 provinces and autonomous regions are threatened by desertification. The total area of the affected land is approximately 2.622 million sq. km, covering 27.3% of the total land territory of China, and it is estimated that 400 million people are suffering from the impact of desertification. Areas of desertification as a result of different causal factors are in Table 1. The overall trend of desertification in China is that, despite partial improvement and effective control, desertification is expanding and land is deteriorating on the whole. The annual growth of the spread of desertification by wind erosion only throughout the country is approximately 2,460 km².

2. Calamitous Aftermath of Desertification in China

The occurrence and development of desertification have damaged human living and production conditions seriously in China. The aftermath of desertification is also calamitous, manifesting in some aspects, mainly as follows :

2.1 Decrease in arable land area and reduction of rangeland grazing capacity

Since the establishment of the PRC in 1949, more than 667,000 hectares of arable land and 2353,000 hectares of rangeland have deserted according to an estimation by the Chinese Academy of Sciences. Annual loss of organic materials as well as N, P, and K by wind erosion in affected regions amounts to approximately 55.9 million tons, which is 9.5 times the nationwide fertilizer output. Land desertification results in a decrease in farmland productivity and rangeland grazing capacity. For example, in the Fengning county of Hebei province where desertification is becoming serious day-by-day, the average crop

Table 1 AREAS OF DESERTIFICATION
DUE TO DIFFERENT CAUSES

Causal factors	Area (thousand sq. km)	% of total area of desertification
Wind erosion	1607	61.3
Water erosion	205	7.8
Frozen and melting processes	363	13.8
Soil salinization	233	8.9
Other causation factors	214	8.2

yield per hectare was 1335 kilograms in the 1960s and 900 kilograms in the 1980s, but in the 1990s it was only about 450 kilograms. In Yikezhao prefecture of Inner Mongolia, as a result of declining rangeland yield and quality as well as large number of livestock, the average weight of sheep fell to 15 kilograms in 1980s from 25 kilograms in the 1950s.

2.2 Living space shrinking or loss as a result of degraded eco-environment

More than 24,000 villages and townships are affected by desertification in China. In Etok Banner of Inner Mongolia, more than 2,200 houses and livestock sheds were buried by shifting dunes, resulting in emigration of about 700 families. The lowering of the water table of the Minqin Oasis in the lower reaches of Shiyang River in Gansu Province at a mean annual rate of 0.5-1.0 meter led to a water-shortage condition for 70 thousand people and 120 thousand livestock, and 20 thousand hectares of farmland was abandoned. Consequently the inhabitants had to emigrate. Even more serious is the higher frequency of occurrence of dust storms. Since the 1950s, the number of dust storms causing serious damage has been nearly 70.

For instance, the unprecedented dust storm which occurred on May 5, 1993, affected the eastern part of the Hexi Corridor in Gansu Province in the southwestern part of Inner Mongolia and the northwestern part of Ningxia Hui Autonomous Region. The direct economic loss is nearly 540 million RMB Yuan. In short desertification in China not only results in incalculable damage to ecosystems and social economies, but also destroys the human vivosphere.

2.3 Restriction of economic prosperity in affected regions

In desertification-affected regions, there are about 3300 kilometers of railways of which 42 percent suffers from sand burial, about 30 thousand kilometers of highways menaced by wind erosion and thousands of reservoirs and 50 thousand kilometers of irrigation channels suffering deposition due to shifting sand. Longyangxia Reservoir, a famous reservoir in the affected regions, has, for example, a mean annual of 31.3 million tons of deposition input, which causes economic losses of more than 47 million RMB Yuan. Many factories have also had to stop producing as a consequence of desertification. In the Jilantai Saltworks of Inner Mongolia, for example, 16.9 of 37.2 square kilometers was buried by sand. In addition, some large cities such as Beijing have been affected seriously by sand carried by strong winds.

2.4 Vicious circle formation among population, poverty and unwise land use

According to statistics, about one fourth of the poverty-stricken population lives in desertification-affected areas. The output value per capita in affected areas was 1014 RMB Yuan in 1995, which is only 34.2% of nationwide average level and is one fifth that of developed regions in eastern China. Traditional cultivation patterns resulted from a shortage of input: the only input people could provide was labor: and this formed a strong population-increasing mechanism. In the lower and middle reaches of the Yellow River, the annual natural population growth rate in 1990 was 22.8%, which was 0.47 percentage higher than the nationwide average value during the same period. Population pressures forced farmers to exploit formerly protected areas to get more crop land, so then serious soil erosion occurred and these lands were abandoned. There was loss of soil fertility and land productivity, and new protected land will face the same fate if the tendency continues unchecked. Then, many regions will have to be deserted and ecorefugees will increase drastically.

3. Achievements of Combating Desertification in China

Through about 50 years of efforts, significant achievements in combating desertification had been attained and governments at all levels have paid great attention to combating desertification. As early as the 1950s, the government organized people to improve the areas affected seriously by wind erosion, water erosion and soil salinization as a priority task. Since the late 1970s, China has initiated and successively implemented such major ecological development programs as the Three-North (namely northwest, central north and northeast of China) Shelterbelt Programme, the Coastal Shelterbelt Programme, the Plain Farmland Shelterbelt Programme and the Programme for Shelterbelt Development along the Middle Reaches of the Yellow River, which have provided successful experiences and remarkable achievements. For example, in the "Three North" regions where

desertification is the most serious, 16.63 million ha of plantations were established, the forest cover ratio changed from 5.05% in the late 1970s to 9% at present and more than 16 million ha of farmland and 10 million ha of rangeland has been put under effective protection. Comprehensive exploitation and use of resources in sandy areas, such as wind energy and solar energy, has been developed in several places. Through the unremitting struggle against desertification, the environment in some places has been improved significantly, facilitating local economic and social development and gradually improving the living standards of inhabitants desertified area.

4. Science and Technology Role in Combating Desertification

Undoubtedly, science and technology play a vital role in combating desertification in China. On the one hand, they provide applicable techniques and measures for protecting and soundly utilizing lands subject to desertification, and on the other hand lay a theoretical basis for the anti-desertification practice. The details are as follows:

4.1 Establishment of technical systems of remedial measures for desertified land

4.1.1 Natural vegetation restoration by enclosure or fencing in overgrazed rangeland and transitional regions;

4.1.2 Artificial revegetation by air-seeding in semi-arid areas;

4.1.3 Establishment of dryland shelterbelt systems;

4.1.4 Fixation techniques for drifting sands and shifting dunes in peripheries of deserts;

4.1.5 Water-saving irrigation techniques;

4.1.6 Small watershed comprehensive management techniques in mountainous areas;

4.1.7 Greenhouses and solar and wind energy utilization;

4.1.8 Transformation of salinized soil by salt-resistant species;

4.1.9 Slope stabilization engineering in mountainous regions;

4.1.10 Planting of firewood and fodder species;

4.1.11 Desert oasis development on the basis of water-saving techniques;

4.1.12 Agroforestry practices to establish stable and productive ecosystems;

4.2 Theoretical basis for practice of combating desertification

4.2.1 Desertification assessment and monitoring;

4.2.2 Feedback mechanisms between human activities and desertification, namely, structure, function and change of land-use systems with human disturbance;

4.2.3 Relationships between desertification and other environmental problems such as global-warming and biodiversity.

5. Actions After Signing of CCD

Since the signing of the CCD in October 1994, the Chinese Government fulfilled her obligations in earnest and made active efforts, which are detailed as follows :

5.1. Establishment of the National Committee for Implementation of the UN Convention to Combat Desertification.

For better implementation of the CCD, China has set up the National Committee for Implementation of the UN Convention to Combat Desertification and Drought with members from 16 ministries, commissions and bureaus, with a secretariat in the National Forestry Bureau, and 16 senior experts from relevant institutions who have been invited to form a senior consulting group so as to raise the scientific level of decision making.

5.2. Formulation of China's Action Plan for the UN Convention to Combat Desertification. The Plan (draft) has been discussed by senior experts and consultants and reviewed. The main contents of the Plan, which was declared at the Sixth Session of Inter-governmental Negotiation Committee of the Convention in 1995, consist of 7 parts, namely, the general situation of desertification and its control in China, the strategic objectives of combating desertification, the priority projects for combating desertification, a guarantee of the implementation of the Plan, the institutions and agencies for coordination, organization and implementation of the Plan, international cooperation and expenditure and fund-raising channels. In addition, under the framework of China's Agenda 21 and the Convention, some important documents including the contents of combating desertification, such as the Forestry Action Plan for China's Agenda 21 and Environmental Protection for China's Agenda 21, have been formulated. Furthermore, the Law on Combating Desertification is in preparation on the basis of existing laws in a bid to improve the legal system for combating desertification.

5.3. Assessment of the status of desertification has been accomplished, series maps of the extent, inten-

sity and different causation of desertification have been drawn up, and the China Country Paper to Combat Desertification has been published.

5.4. Capacity building has been enhanced and public awareness raised. The China National Research and Development Centre on Combating Desertification, the Chinese Training Centre on Combating Desertification and China National Desertification Monitoring Centre were set up in 1995. Desertification, along with environmental problems, has been listed as a key problem to be solved in national scientific and technological plans. Publicity activities for combating desertification and a training programme aimed at raising public awareness of the Convention have been conducted routinely.

5.5. Active participation in international activities for combating desertification. China has actively participated in follow-up negotiations of the Inter-governmental Negotiation Committee of the Convention and other international conferences for combating desertification organized by the United Nations. With joint support given by the Convention Secretariat, UN Office of the Special Coordinator for Africa and least developed countries and the Japanese Government, the Asia-Africa Forum on Combating Desertification was held by the Chinese Government, making great contributions to combating desertification in the two continents. Shortly after ratification of the Standing Committee of the National People's Congress in December 1996 in February 1997, the Chinese Government successfully held the Asian Ministerial Conference on the Implementation of CCD under the auspice of the Secretariat of the CCD in May 1997.

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