

UNDP/GEF-CPR/03/G31/A/1G/99

UNDP/GEF-NCSA Project
Implementation of UNCCD in China

UNDP/GEF-China
National Capacity Needs Self-assessment for Global Environmental Management
Thematic Area of UNCCD

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Mar. 2005

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1 Overview of desertification in China and its action in negotiating of UNCCD

1.1 Overview of desertification in China

Desertification means land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities. Soil erosion caused by wind and/or water, deterioration of the physical, chemical and biological or economic properties of soil and long-term loss of natural vegetation are included. Desertification means degradation of land resources, deterioration of eco-environment, economic and life quality degradation. It is not only an ecological problem, but also an economic problem.

China is one of the countries seriously affected by desertification. The desertification affected area is about 2.674 million km², which is 27.9% of the total land area, of which sandy desertification area enlarged at the rate of 3436 km² annually. There are about 400 million people affected by desertification in China and eco-refugees have appeared in some regions due to desertification. The annual economic loss caused by desertification is about \$ 6.5 million. And desertification has seriously affected regionally economic and social sustainable development of China

1.2 UN Convention to Combat Desertification (UNCCD)

After Rio Earth Summit in 1992 and UN 47/188 resolution, one special team named Inter-government Negotiation Committee (INCD) on UNCCD was organized by UN in 1993. After 5 meetings from May, 1993 to June 1994, the text of United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD) was formulated on June 17, 1994, and left for open signature in Paris. The UN 49th Assemble Resolution declared that from 1995, June 17 each year was the World Day for Combating Desertification and Mitigating the Effect of Drought.

UNCCD integrated environment protection with economic development, and pointed out that desertification was caused by combinations and interaction of natural, biological, political, cultural and economical factors. Therefore, desertification combating is not only an environmental issue, but also a social and economic issue. It should be controlled comprehensively under the framework of sustainable development. Because desertification mostly occurs in developing countries and the priority task in these countries is to realize sustainable development, desertification control should be integrated into general economic development and poverty alleviation plans. Only in these ways can sustainable development be realized.

UNCCD has set up a set of international cooperation mechanisms. It affirms the importance of international cooperation and South-North cooperation in combating desertification and mitigation of drought. Based on UNCCD, developing countries frame national sub-national and regional action plans to combat desertification and developed countries have promised to support these action plans under their agreements. These supports include funds and other types of assistance as well as technical transfers. In financial mechanisms, besides the existing bilateral and multilateral channels, UNCCD have also set up a global mechanism to promote developed countries to provide funds to these affected countries. UNCCD also encourages South-South Cooperation among developing countries, such as cooperation under the Regional Implementation Annex to formulate regional and sub-regional action plans to coordinate, complement and improve national action plan efficiency. These co-operations in multi-channels and multi-sectors will promote international

coordination in combating desertification and boost combating desertification worldwide.

UNCCD emphasizes public participation in combating desertification. To combat desertification is not only to frame national action plan (NAP) by the government departments, but also to mobilize public participation, raise public awareness and actively support grass-roots organization works in combating desertification. UNCCD also emphasizes participation of women, NGOs and other social communities in combating desertification. There are some special provisions for propaganda, education, training, public awareness-rising and capacity building in combating desertification. These give combating desertification in both bottom-up and top-down approaches in establishing national action plans and its implementation.

UNCCD also emphasizes the importance of science and technology in combating desertification. In part III, there are special articles on scientific cooperation, which include information collection, analyses and exchange, scientific research and technology transferring, *etc.*. A Committee on Science and Technology (CST) had been established as a subsidiary body of the Conference of the Parties (COP) to provide information and advice on scientific and technological matters relating to combating desertification and mitigating the effects of drought. It emphasizes that effective combating desertification should be under direction of science and technology.

UNCCD is one of the fruits of Rio Earth Summit and one of the important UN Conventions after Rio Earth Summit together with UNFCCC and UNCBD in environmental protection and sustainable development worldwide. The main aim of UNCCD is to setup a set of international cooperation mechanisms to promote global cooperation in combating desertification and mitigating the effects of drought.

1.3 Chinese Government and UNCCD

The Chinese Government has been active in UNCCD negotiations. The Chinese Government took part in the whole negotiations of INCD from May 1993 to Oct., 1994 and made great contribution to formation of UNCCD. The Chinese Government signed UNCCD on Oct. 14, 1994 and the Chinese Parliament ratified it on Dec.30, 1996. The China National Action Plan to Implement UNCCD was made in 1996 and revised in 2003. China is the first country to setup national desertification monitoring as a follow-up action.

After signature of UNCCD, the Chinese Government has participated in all the COPs and their annex institution meetings. Chinese delegates have been elected as vice president of CST and coordinators of special groups in the first COP. Promoted by the Chinese delegation, the Committee for the Review of Implementation of the Convention (CRIC) was set up in COP5 and it has played an important role in the implementation of UNCCD. In COP6, Chinese delegates had been elected as vice president of COP6 and the chairmen community.

Chinese delegation also actively participated in side meeting of COPs of UNCCD. In COP3, a poster introducing Chinese strategies in combating desertification was well organized. A Chinese senator also took part in COP5's parliament meeting of UNCCD. The Combating Desertification Law of China was also introduced at COPs. NGOs from China also took part in the COPs and their related meetings of UNCCD. The Chinese Government also support establishment

of a Roster of Expert organized by Secretariat of UNCCD in combating desertification. The Chinese Government had sent human and fund resources to The UNCCD Regional Representative Office in Asia from 2001 to 2004.

2 Activities in capacity building for implementation of UNCCD in China

Since signature of the UNCCD in 1994, The Chinese Government has been active in implementation of the UNCCD. China National Action Plan to Combat Desertification had been compiled in 1996 and revised in 2003 based on the new data. In past ten years, a series of activities have been carried out to implement UNCCD and to combat desertification.

2.1 Institution building

China is one of countries seriously affected by desertification in the world. The Chinese Government had paid much attention to combat desertification. After signature of UNCCD in Oct. 1994, lots of activities had been carried out in implementation of UNCCD. China National Committee for Implementing the United Nations Convention to Combat Desertification (CCICCD), China National Desertification Monitoring Center, China National Training Center on Combating Desertification and China National Research & Development Center on Combating Desertification, and Senior Experts Consultant Group in Combating Desertification had been established successively. Related institutions for combating desertification had been setup in related provinces and autonomous regions (Fig1.Framework of institutions for combating desertification in China).

2.1.1 Establishment of Coordinating & Leading Group on Combat Desertification

Facing the serious situation of desertification, Chinese Government (State Council) set up a National Coordinating Group on Combat Desertification in 1991. After signing of the UNCCD in 1994, this had been renamed as National Coordinating & Leading Group on Combat Desertification and alias as the China National Committee for Implementing the United Nations Convention to Combat Desertification (CCICCD) to strengthen coordination & leadership in desertification combating. In April, 2001, 17 CCICCD member institutions had been reorganized as follows: State Forestry Administration(SFA), Ministry of Foreign Affairs, Ministry of Finance, State Development & Reform Commission, Ministry of Science & Technology, Ministry of Railways, Ministry of Communication, Ministry of Land & Resources, Ministry of Water Resources, Ministry of Agriculture, People's Bank of China, State Tax Supervision Bureau, State Environment Protection Administration, Chinese Academy of Science, State Council Leading Group Office of Poverty Alleviation & Development, Office of Integrated Agricultural Development Leadership Group of State Council, China Meteorological Administration.

2.1.2 Establishment of Secretariat for implementation of UNCCD

The office of National Coordinating & Leading Group on Combat Desertification, attached to State Forestry Administration (SFA), has also acted as Secretariat for implementation of UNCCD, which was the working institution of CCICCD and in charge of negotiation and implementation of UNCCD. Since the signature of the UNCCD, the Chinese Government took part in all the activities related to UNCCD, which include attending COPs, CST meetings. The Chinese Government organized the first session of Asia-Africa Forum on Combating Desertification in 1996, Beijing Ministerial Conference on Regional Cooperation to Implement the UNCCD in Asia in 1997, Rounded Table Meeting for Combating Desertification in 2001. It was China that

suggested and organized the Asian Thematic Program Network on Desertification Monitoring and Assessment thematic programme networks (TPNs) in Asia, and TPN1 was undertaken by China. Secretariat of CCICCD organized a Roster of Expert in combating desertification, published Traditional Techniques for Combating Desertification, and participated in organization of Project of Prevention of Dust & Duststorm in Northeast Asian. All these activities were highly appreciated by the Secretariat of the UNCCD.



Fig1. Institutional Framework for combating desertification in China

2.1.3 Establishment of National Bureau to Combat Desertification

The National Bureau to Combat Desertification has established in SFA by State Council, which is one of administration departments in SFA and also the working institution of CCICCD. It is responsible (a) to make policies, guidelines and regulations in combating desertification and supervise their implementation in China; (b) to formulate long and medium-term national program to combat desertification, to guide provincial departments for formulation of local long and medium-term national program to combat desertification, and to organize and implement inter-provincial and inter-regional projects to combat desertification; (c) to make annual working programs and be in charge of project guiding, inspecting and checking & approval; (d) to organize and coordinate national desertification monitoring; (e) to be in charge of information collection, analyses and statistics; (f) to organize personnel and technical training & extension in combating desertification; (g) to implement UNCCD and international cooperation; (h) to act as project office of Beijing & Tianjin Sand-wind Source Control Program; (i) to guide desertification combating in Three North Protective Forest Program (Green Great Wall Program); (j) to supervise the China National Society for Sand Control and Sand Industry, China National Desertification Monitoring Center, China National Training Center on Combating Desertification and China National Research & Development Center on Combating Desertification; and (k) to undertake routine work as Secretariat of CCICCD.

2.1.4 Establishment of Senior Experts Consultant Group in Combating Desertification

The National Senior Experts Consultant Group in Combating Desertification, established in 1994 and reorganized in 2001, consists of 20 senior experts with 7 academicians and 13 famous professors in different fields from research institutions and universities in member ministries. Its main task is to provide consultation in national key program and policy making in combating desertification. It had played important roles in making NAP, national desertification monitoring and national report to combat desertification.

2.1.5 Establishment of China National Training Center on Combating Desertification

China National Training Center for Combating Desertification (CTCCD), attached to Beijing Forestry University, was established in 1995. Its main tasks are: (a) to train officials for desertification affected areas and raise their management level and awareness in combating desertification; (b) to carry out the technical training and extension to increase benefits of the projects; (c) to raise public awareness and mobilize the public to combat desertification; and (d) to carry out international training for developing countries in combating desertification. In the past few years, CTCCD has trained more than 1000 persons including officials and technicians from different ministries, provinces and counties.

2.1.6 Establishment of Research & Development Center on Combating Desertification

Research & Development Center for Combating Desertification (R&DCCD), attached to Chinese Academy of Forestry, was established in 1995, its main tasks are: (a) to organize key scientific research for desertification combating projects; (b) to introduce techniques from foreign countries; (c) to carry out technical consultation and extension; and (d) to maintain Desertification Information Network (DIN) and provide desertification information for the public.

Based on resolutions of the Asia-Africa Forum on Combating Desertification, China, in cooperation with the UNCCD Secretariat, opened a new International Training Centre (ITC) on Combating Desertification on October 15, 2004 in Beijing. The primary objective of the Centre is to offer cross-border exchange and capacity-building opportunities for experts who develop sustainable land management solutions. It has been situated at the International Network for Bamboo and Rattan (INBAR) in the Beijing, China.

2.1.7 Establishment of China Desertification Monitoring Center

The China Desertification Monitoring Center, attached to Chinese Forestry Academy of Surveying and Planning, was established in 1995, its main tasks are: (a) to formulate technical method for desertification monitoring, data process and management and forecast the trend of desertification; (b) to guide the establishment of local desertification monitoring system; and (c) to formulate national and regional desertification project feasibility report and progress assessment. Up to now, the center has participated in two terms of national desertification monitoring and drafted out “China Desertification Monitoring Technical Regulations” and “China Desertification Monitoring Indicator System”.

2.1.8 Establishment of local desertification combating institutions

Based on the characteristic of desertification patterns in China, 14 provinces and autonomous regions facing serious desertification in north China have set up their own desertification coordination or leading groups and special institutions which are in charge of desertification combating management. In most these regions, the members of Coordinating & Leading Group on

Combat Desertification are similar to CCICCD in central government, and the working offices are located in department of forestry. Even if the government institution reforming in 1998, the desertification coordination or leading group have been reserved in most provinces and autonomous regions. Local institutions in charge of combating desertification management were established in some local governments such as Chifeng and Hothot in Inner Mongolia and Yulin in Shaanxi Province. In addition, there are about 1058 forest farms in north China, of which 503 located in desertification region. All these constitute a perfect system for desertification combating management from central government to local governments, which promotes desertification combating in China and makes desertification combating program well organized and progress as planned.

2.2 Legislation system building

After 20 years, a perfected desertification combating legislation system has been setup in China. At present, the laws related to combat desertification include Law on Combating Desertification, Forest Law, Land Contract Law, Land Management Law, Soil and Water Conservation Law, Water Law, Environment Protection Law, Grassland Law. These laws are related to land degradation control, forest protection and management, desertification combating, soil and water conservation, farmland protection, water resources protection and allocation, *etc.*.

The Law on Combating Desertification, entering in to force on Jan. 1, 2002, is the first integrated law to desertification combating. It has 7 chapters and 47 articles, including desertified land prohibition and protection, desertified land control, desertified land development and management, promotion mechanism for combating desertification, *etc.*.

The Forest Law, revised in the second meeting of ninth people's congress in April 1998, has 7 chapters and 48 articles, including forest protection, tree planting and afforestation, forest cutting and management, promotion mechanism for forestry construction, *etc.*.

The Soil and Water Conservation Law, entered into force in June, 1991, having 6 chapters and 42 articles, including soil erosion and soil & water conservation, steep slope farming and management, promotion mechanism for soil & water conservation, *etc.*.

The Grassland Law, passed in 1985, revised in Dec, 2002 and entered into force on March, 1, 2003, has 9 chapters and 75 articles, including grassland protection & construction, grassland use and management, promotion mechanism for grassland construction, *etc.*.

The Land Management Law, enacting in 1986 and revised in 2004, includes farmland protection and subsidy policy for farmland impropriation, measurement used to land degradation control, farmland reversion to forest and grassland, grassland reversion to lake, contractor's incumbency, bylaws in contracting barren mountain, barren beach, barren gully and barren sand, regulations in developing eco-agriculture and improving eco-environment, *etc.*. In addition, the Land Contract Law entered into force in Aug. 2002.

The Environment Protection Law entered into force in Dec. 1989 which includes environment management, protection and improvement, *etc.*.

The Water Law, entering into force on Oct.1, 2002, declared that national long-term water planning and long-term watershed plans should be based on features of watershed resources in China and that the national economic development plan, inter-watershed water resources transportation, ecological water uses, and water saving techniques should be assessed scientifically, etc..

Following development and perfection of the legislation system, a lot of bylaws, regulations and outlines have been established in the past few years, which include The China National Planning Program for Social and Ecological Environment Improvement, China Agenda 21, China National Agenda 21 for Environment Protection, Forestry Action Plan of China Agenda 21, China National Action Plan for Implementation of UNCCD, Regulation for Reversion of Farmland to Forest, Opinions for Grassland Protection and Construction, Provisions to Promote Individual & Enterprise in Combating Desertification, Administration Regulation in Desertification Combating for Profits, Decisions to Speed up Forestry Development, etc..

At the same time, a lot of local laws and regulations (including implementation regulation) have been issued by local governments, such as Forest Resources Management & Protection Regulation in Beijing issued by Beijing Municipal Government, Regulation for Implementation of Law on Combating Desertification in Gansu issued by Gansu Province. In Yulin region, local government had passed the favorable policy that combating desertification achievements can be inherited to promote public participation in combating desertification. In Wulanchabu, Inner Mongolia, the local government advocated a policy of farmers seeding 1 mu (Chinese land area unit which equal to 1/15 ha) corn and reverse 3 mu desertified land to grass. All of these promoted local farmers and herders to participate in combating desertification and speeded up the combating of desertification.

2.3 National Desertification Combating Program

Chinese Government listed combating desertification into the National Economic & Social Development Plan and China Agenda 21. A ten-year combating desertification program (1990-2000) started in 1990. Since signature of UNCCD, the China National Action Plan for Implementation of UNCCD, authorized in 1996 and revised in 2003, has been implemented. The National Combating Desertification Program consists of Forestry Ecological Program, Soil & Water Conservation Program, Grassland Construction Program and Reversion of Grassland, Integrated Agricultural Development Program, Natural Reserve Construction Program and National Poverty Alleviation & Development Program.

2.3.1 Forestry Ecological Program

Since 1978, the Chinese Government has started a series of ecological Programs aimed to protect eco-environment and combating desertification. Which include the Three North Protective Forest Project (Green Great Wall Project) started in 1978. In 2001, Government integrated all these forestry ecological programs into 6 forestry ecological programs, *i.e.* Natural Forest Protection Program, Conversion of Cropland to Forest Program, Key Protective Forest Program in Three North and Yangtze River, Combating Desertification Program in Blown-sand Source Area Around Beijing & Tianjin, Wildlife Conservation & Natural Reserve Development Program, Forestry Industries Base Development Program in Key Regions with a Focus on Fast-growing & High-yield Timber Plantation, *etc.*, of which the Combating Desertification Program in

Blown-sand Source Area Around Beijing and Tianjin and the Fourth Phase of the Three-North Protective Forest Program cover more than 85% of Chinese desertified lands, forming the main body of the effort of national combating desertification program.

2.3.1.1 “Three North” Protective Forest Program (Green Great Wall Program)

“Three North” Protective Forest Program (Green Great Wall Program), started in 1979, straddles 13 provinces and autonomous regions in west of northeast, north and northwest of China with a total area of 4.069 million km², covering 42.4% of territory area of China.

The on-going Fourth Phase of the Three-North Protective Forest Program involves 13 provinces and autonomous regions with 590 counties; its planned duration is 2001 to 2010. Construction tasks include forest resources management, artificial planting, mountain and sand closure for forest regeneration, air-seeding, protective forest planting for sand fixation and for farmland and grassland protection, planting for soil & water conservation. It aims at establishing stable protective forest with rational structure and high efficiency. Through the program, the serious desertification areas in Mu Us, Kerqin and Hulunbeir will be controlled. Desertification in surrounding regions of eight sandlands of China will be basically controlled. High standard shelterbelt systems for farmland protection will be constructed in oases and the natural forest (*Populus diversifolia*, *Tamarix spp.* *Holoxylon spp.*) in west Alashan (Alaxa), lower reach of Tarim River will be recovered. The spread of deserts will be limited. Ecological environment in these regions will be improved and the weather of duststorm will be decreased. Non-state-owned economy have been encouraged in the construction of the program and since 2001, more than 13 million ha desertified land had been controlled, 1.4 million ha of forest planted and 1.1 million ha of mountain and sand closure for forest regeneration.

By these integrated controls, timber volume had increased from 720 million m³ in 1977 to 1.0 billion m³ in 2003. 20% of desertified land in these regions and 40% of soil erosion area in Loess Plateau had been basically controlled. 65% of farmland (21.3 million ha) had been protected by protective forest. Annual grain yield increase by 11.07 million tons. The spread of desert has been limited in a part of the “three north” regions and the ecological environment had been improved.

2.3.1.2 Combating Desertification Program in Blown-sand Source Area around Beijing and Tianjin

The Combating Desertification Program in Blown-sand Source Area around Beijing and Tianjin involves 75 counties in Beijing, Tianjin, Hebei, Shanxi and Inner Mongolia. Total project area is 0.46 million km², and duration is from 2001 to 2010. It aims to solve the sandy and dust storm weather to realize the green Olympics.

Construction tasks: to stop cutting and promote protection of vegetation, closure for forest and grass regeneration; to converse the steep slope cropland into forests & grassland; artificial replanting; to close mountain and sand for forest and grass regeneration; air-seeding; shelterbelt forest planting for sand fixation and for farmland and grassland protection; to adjust animal husbandry structure and improve production manner, implementation of pen to speed up grass recovery; to plant forest for soil & water conservation and to construct water conservancy to keep ecological water uses; to implement ecological immigration in these ecological fragile regions; to establish stable protective forest with rational structure and high efficiency.

Objectives of program: To harness the whole sandy desert land area which can presently be

controlled, to decrease sandy and dust storm weather in these regions by combinations of biotic and abiotic measures, and to improve ecological condition and optimize agricultural structure.

At the end of June of 2004, the total controlled area reached 4.91 million ha, occupying 33% of ten year target. It was this project that has effectively improved the ecological environment of the Capital and its surrounding regions. Based on monitoring in 19 sampled counties at end of 2003, compared to those in 2000, the total sandy desertification area had decreased by 436900 ha, or 16.08%, desertified farmland area decreased by 265400 ha, or 26.77%., desertified grassland area decreased by 82800 ha, or 5.05%, the number of towns affected by desertification decreased from 259 to 227, the population affected by desertification decreased from 296.03 million to 278.72 million. Vegetation (forest & grass) covering rate increased by about 20% and whole ecological regime has become better and significantly improved in some regions. Desert spread had been preliminarily kept within limits and sandy & dust storms decreased markedly. The inhaled particles in atmosphere in downtown Beijing has decreased by 7.8%. Sediment in Miyun Reservoir has decreased by 100000 tons.

2.3.1.3 Conversion of Farmland to Forest Program

The Conversion of Farmland to Forest Program started as trials in 1999 and covered 363 counties in Hebei, Beijing, Tianjin, Shanxi, Inner Mongolia, Henan, Shannxi, Gansu, Qinghai and Ningxia. The main task is reversion of farmland to forest and afforestation. In order to implement them successfully, the government enacted special regulations for the program.

The objectives of this Program are to restore forest ecosystems in these regions, to improve the eco-environment in middle and west of China, especial in middle and upper reaches of the Yellow River, to accelerate economic development of West China, and to adjust economic structure in the countryside and to ensure poverty alleviation for local people.

The Program is the most participatory program in forestry history of China. It started trials in 1999 and now has implemented in 25 provinces (municipals and autonomous regions). Since then, afforestation area has reached 13.3258 million ha, including conversion of farmland to forest by 6.4365 million ha, afforestation in bare mountain by 6.8893 million ha. Forest cover rate increased by an average 2% per year. Soil erosion & desertification were controlled and the desert spread kept within limits in some regions. About 97 million people in 20 million households benefited from the Program.

Based on monitoring in 16 sampled counties in 2003, compared to those in 1998, sandy desertification area has decreased by 420000 ha, or 24.01%. In the trial regions of Yulin and Yan-an regions in Shaanxi Province, bare and lower vegetation cover land area decreased by 7.81%, middle and high vegetation cover land area increased by 8.45% and in some regions the beautiful landscape reappeared. In Sichuan Province, river sediment content decreased by 22-24% after reversion from farmland to forest in just 2-3 years. The sediment to the Yangtze River decreased 560 million tons since 1999.

The mid-term assessment by the China International Project Consultant & Assessment Cooperation concluded that the policy of the Conversion of Farmland to Forest Program issued by Chinese Government was right, the favorable regulations were deliberate and executed strictly, which were supported and appreciated by local governments and farmers. The project had been

well implemented and some benefits had appeared.

2.3.1.4 Natural Forest Protection Program

The Natural Forest Protection Program in China was implemented due in part serious flood in China in 1998. The project ranges involve 734 counties and 167 forestry centers in 17 provinces (autonomous regions), its duration is from 2001 to 2010.

The program aims to improve ecological environment and adjust agricultural and economic structure of countryside. The main tasks of the program are to stop cutting the natural forest and re-arrange resultant unemployed forestry workers. Farming on steep slopes was banned, ecological forests planted, and nurseries established.

Since implementation, log cutting amount reduced. Natural forest cutting had completely stopped in 13 provinces (autonomous regions) in upper reach of Yangtze River and middle and upper reaches of Yellow River since 2000. The cutting levels in Northeast and Inner Mongolia decreased from 18.53 million m³ in 1997 to 11.02 million m³ in 2003. The aim of reducing cutting quotas by 19.905 million m³ yearly had been realized. In the past 6 years, the total reduction of forest resources consumption was 320.0 million m³, equal to two years national wood consumption in the tenth five year plan. Ecological forest area increased by 9.8 million ha and 95.33 million ha of natural forest had been better managed.

The implementation of the Program had kept the over-consumption trend of natural forests within limit, increased forest resources and improved ecological environments. Based on on-site investigation in 22 counties in upper reach of Yangtze River and middle and upper reaches of Yellow River, compared to those before implementation, soil erosion area decreased by 5.99%, the trend of forest ecological function degradation had been reversed in some key national forest regions and ecological environment markedly improved.

2.3.2 Soil & Water Conservation Program

The Soil & Water Conservation Program, based on national ecological construction strategies in China, is a national key program combating serious soil erosion. It includes many projects: Project of Sediment Control in Middle Reach of Yellow River, Sand Fixation in Agro-Pastoral Transitional Area, Inland River Watershed Ecological Recovery, National Key Soil & Water Conservation Projects in 7 Watersheds, Soil and Water Conservation in Blown-sand Source Area Around Beijing and Tianjin, Water Resources Protection in Beijing, Tarim River Watershed and Heihe River Watershed Integrated Harness Project, Soil and Water Conservation Monitoring Network & Information System Construction, World Bank Loan Project for Soil and Water Conservation in Loess Plateau, Soil and Water Conservation Ecological Restoration Project, Check-dam Construction Project in Loess Plateau, Land Protection in Northeast Blackland, Soil and Water Conservation in Upper Reach of Pear River. In the ninth five-year-plan period, the total area controlled was 230,000 km² and preventing area 200,000 km². In the past 5 years, the central government invested 6.75 billion Yuan RMB for soil and water conservation, equal to the sum of investment from 1949 to 1997 and 20 times of the eighth five-year-plan period. Total area controlled reached 266,000 km² and mean annual controlled area was over 50,000 km², equal to two times of the previous period.

Through implementation of the Program, soil erosion has been kept within limits, ecological

environments in the controlled regions improved, great ecological, economical and social benefits achieved, production and living conditions improved, sediment to the rivers and lakes decreased. Based on the survey, the total yield for grain has increased by 15 billion kg and fruit by 20 billion kg, which solved food problem for 12 million people, sharply increased income for 23 million people and trapped 250 million tons sediment annually.

2.3.3 Integrated Management in Yellow River and Inland Watersheds

The Yellow River, Heihe River and Tarim River Integrated Management and unified water allocation had gotten off successfully. Since 1999, the government has implemented unified water allocations in the Yellow River. The drying-up period decreased in lower reach of the Yellow River in the premise of ensuring basic water uses for living and industries and agriculture along the river. From 1990 to 1998 prior to unified water allocation, the river bed dried up every year in the lower reaches with maximum of 226 days in 1997, while after unified water allocation, drying-up days decreased to 42 days in 1999, 8 days in 2000 and even zero days in the drought year of 2001.

The Tarim River Integrated Management Project started in 2000. Using abundant water in Kaidu River and high water level in Boshiteng Lake, about 2.38 billion m³ water from Boshiteng Lake and about 1.764 billion m³ through the Daxihaizi Reservoir discharged to lower reaches of the Tarim River and into Taitemahu Lake for four times. Especially in 2003, with additional water from Cherchen River, the area of Taitemahu Lake reached 200 km², the historic record in the past hundred years. Regional ecological environmental conditions had improved and the confidence of governments and the public for restoration of the Tarim River ecological environment was further enhanced. Based on the plan, water will be supplied to lower reaches annually after 2007.

In 2000, the State Council started up the emergent project of water resources management in Heihe River. Based on the water allocation scheme, Zhangye City, whist getting 1.58 billion m³ water resources from upper reaches in normal years, must increase by 255 million m³ its water discharge to lower reaches for 950 million m³ of the water allocation scheme to ensure productive and ecological water uses. Since 2000, the water allocation scheme had been implemented successfully for the past three years and the water reached to East Juyanhai Lake and ecological environment has been improved in the lower reaches. It was this project which reversed the threatening basic environment in the lower reaches of the Heihe River. In 2004 the normal water allocation scheme was implemented to transport water to lower reaches in the Heihe River.

2.3.4 Grassland Protection and Restoration Program

In order to implement the Grassland Law and Opinions for Grassland Construction and Protection issued by state council, eight projects, *i.e.* grassland prohibiting and fencing, rotational grazing, artificial seeding, air seeding, grassland improvement, grassland irrigation infrastructure construction, grassland reserve construction and rodent extermination, have been implemented in the past few years. Northern part of China was listed as a key region to implement fencing, artificial seeding, grassland improvement and infrastructure construction, grazing closure for restoration, rotation grazing, grassland ecological environment monitoring, *etc.*, about 9 billion Yuan RMB has been invested and grass-seeding applied to area of 42.67 million ha, fencing applied to area of 26 million ha (planned area 42.67 million ha). Through implementation of household responsibility system, grassland protection and restoration activities were undertaken, including 1.5 million ha of air seeding area, 16 million ha of artificial and improved grassland, 10

million ha of fencing area, 90 million ha of rodent extermination area and 11 natural grassland reserves set up. Grassland yield increased 6-10 times. From 2003 to 2004, removal trials of livestock for grassland restoration project started, State invested 2.82 billion Yuan RMB and controlled 12.67 million ha of degraded grassland. This project is characterized by low investment and quick returns, and can be used to adjust agriculture and animal husbandry industry structure, to extend industry to control 66.67 million ha of grassland.

The Program covers 96 counties in Inner Mongolia, Xinjiang, Qinghai, Sichuan, Yunan, Gansu, Ningxia, and the middle degraded rangeland in grassland, desert and resource region of Yellow River and Yangtze River in east Qinghai-Tibet Plateau. The main tasks of this Program are: to protect grassland and to accelerate natural vegetation recovery through self-resilience of grassland by means of prohibiting and fencing, rotation grazing, pen raising, *etc.* After Removal of livestock from the project areas, the fodder base should be established for pen raising. Emigration measures can be adopted in some regions that are unfavorable for pen raising.

The objectives of the program are (1) to control 66.67 million ha of degraded rangeland in West China and to recover grassland in these regions, (2) to restore grassland and keep dynamic equilibrium between livestock and grass, and (3) to establish grassland ecosystem suitable to sustainable development of animal husbandry industry.

2.3.5 Eco-Agriculture and Countryside Energy

In order to control unplanned farming causing desertification, government implemented the Eco-agriculture and Energy Project, dryland water-saving irrigation and protective farming project, and balance fertilizing and soil enriching project in the countryside. Ecological counties reach 300 which covered 6.67 million ha or 7% of total farmland in 30 provinces of China, about 305,000 ha or 60.5% of sandy degraded farmland has been controlled,. In addition, 450 rainfed farming demonstration counties have been established. In arid areas, about 60 ecological counties have been established in west China, 1.099 million households in 843 counties participated in ecological construction projects. Since 2002, 92 rainfed farming and protective cultivation demonstration counties have been established with an area of 670,000 ha, it is planned to extend that to 10 million ha in the coming 5-10 years to accomplish protective cultivation in an 18% of dryland. Protective cultivation zones will also be established around Beijing and in northwest sandy areas.

2.3.6 Integrated Agricultural Development Program

The Integrated Agricultural Development Program aims to improve productive condition, increase yields and control desertification as well as to protect ecological environments, through lower yield farmland improvement, water conservancy and perfection of irrigation conditions, tree planting and grass seeding, inter cropping, and agro-forestry, etc. In the past 5 years, newly planted forest reached 109 million ha, artificial seeding and grassland improvement 730,000 ha. 5.23 million ha farmland has been protected by newly-established shelterbelt systems and 28,500 km² of soil erosion controlled.

2.3.7 Natural Reserve Construction Program

By the end of 2003, there had been about 1999 natural reserves in different types and levels in China (excluding Hong Kong, Macao and Taiwan), with an total area of 143.9805 million ha (137.95 million ha for land area and 6.03 million ha for marine area), accounting for 14.37% of

territory area of China, in which 30 reserves with an area of 38.6 million ha are distributed in desert regions for desert biodiversity conservation and another 28 key desert natural reserves will be established in the future.

2.3.8 Wetland protection and desertification combating

Chinese government has issued and implemented the China Wetland Protection Action Plan and authorized the National Wetland Protection Plan (draft). In northwest region with serious desertification, wetland areas were reduced even dried up by drought and overuse of water resources in upper reaches of rivers. Some original lakes and wetland, such as Luobubo and Juyanhai had disappeared and even become the sources of dust-storm, simultaneously biodiversity in arid regions is facing serious threat. The key tasks for wetland protection in arid regions are (1) to establish wetland reserves, and (2) to enhance water resources conservation management and water resources coordination to protect and restore wetlands. In the cold Qinghai-Tibet Plateau, the key task is to protect ecological security, through wetland reserve setup and revegetation, of sources region of key rivers of China, such as the Yangtze River, the Yellow River and the Lancangjiang River. For example, the Natural Reserve in Sources Area of Three Rivers of Qinghai, covering 2/5 of Qinghai Province, was called the “Chinese Water Tower”, desertification is serious in this region because of overgrazing, unplanned mining. Combating desertification and wetland protection are two sides of the same coin.

2.3.9 Combating Desertification and Poverty Alleviation

The Chinese government has issued and implemented National “8.7” Poverty Alleviation Program. In China, poor populations are mainly located in the western region. The “poverty” counties in desertification affected areas account for 22% of the total number. By the end of 2003, the absolutely poor population has decreased to 29 million from 80 million in 1993. The poverty population rate decreased to 3.1% from 8.7% in countryside and the United Nations Millennium development Aim of 50% reduction of poor population has been realized in advance.

2.4 Financial mechanisms

China had set up financial mechanisms for combating desertification by year-by-year efforts. Because most of the desertification regions are in less developed regions of China, local governments and people are very poor and even face shortage of food in some regions and incapacity to invest in combating desertification, the framework of financial mechanisms for the desertification combating related projects will be invested mostly by central government, matched in part by local governments, and fund raised from NGOs and international cooperations. In recent years, new investment methods have been sought, such as grain subsidy methods used in the Reversion of Farmland to Forest Program. At same time some favorable policies were issued to promote individuals and enterprises to participate in combating desertification. All these have got good results.

Central government financial mechanisms: 1) combating desertification had been brought into the National Social & Economic Development Plan. Central government had special funds for combating desertification, subsidy loans, special funds for integrated agricultural development; poverty alleviation funds can also be used partly in combating desertification and desertified land development. Based on statistics in 2003, central finance investment was 5.51 billion Yuan RMB in natural forest protection, 47.2 billion Yuan RMB in reversion of farmland to forest, and 8.515

billion Yuan in the project of Combating Desertification in Blown-sand Source Areas around Beijing and Tianjin. 2) Government has adopted repayment policy for ecological forest. Central government had special subsidies for individual and community ecological forests. From 2001 to 2003, central finances subsidized 1 billion Yuan RMB each year for ecological forest and it is estimated to reach 7.5 billion in the coming years. It is the fundamental policy for commonwealth forest management. 3) National ecological programs are invested in mainly by central government. For local fund raising, local governments shared investment for national ecological projects and also invested in local project for environmental protection based on national planning.

Over the past several years, many laws and favorable regulations have been issued to promote public raising of funds to participate in combating desertification in different ways and through different channels. They include (1) central government issued favorable taxes incentives, such as the 10-year tax free policy for these products from reversion of farmland to forest; (2) central government issued subsidized loan policy for combating desertification; (3) central government has introduced a policy for desertified land development and management. The Management Regulation for Beneficial Development of Combating Desertification policy encourages individuals to contract in the reversion of farmland to forest, afforestation and closure for regeneration, all the benefits will belong to the contractors; (4) central government provide subsidy to farmers who implement reversion of farmland to forest; (5) central government has a policy of auction use rights of barren mountain, barren gully, barren floodplain and barren sandland (four barren lands). About 23.33 million ha of “four barren lands” now have clear developers in China, and 6.5 million ha had been auctioned and about 2 billion Yuan fund collected by these activities; (6) Forest Law regulates that in China, citizens who is 11-60 years old for male, 11-55 years old for female have obligation to plant 3-5 trees every year; (7) in order to encourage afforestation and ecological construction, China Green Foundation had been established to collect funds domestically and internationally.

In June 2003, the Central government issued the Decision to Accelerate Forestry Development to adjust forestry system, mechanism and policy. The decision emphasizes on: (1) property rights. It aims to clarify forestry property rights of owners and managers; (2) non-state owned forestry development. Government encourages non-state owned forestry development in the first time; (3) forestry supporting policy. Ecological forest is enclosed into public fiscal budget and favorable tax policy had been issued to ecological forest; (4) afforestation investment. Central government investment is used partly to purchase individuals and other social community’s non-state owned ecological forest; (5) fair play. Every investment in different economic matters of afforestation should be treated equally. All these changed policies have eliminated restrictions for forest development in policies and system and have created a level platform for forest development. It will encourage all parties of society in forest construction. Based on the present situation, the Chinese government is working to issue new favorable policy for combating desertification.

2.5 Scientific and technological supporting

2.5.1 Education for Combating desertification

Special courses related to combating desertification have been established in many universities and colleges since late 1950s. These were merged and renamed as the Specialties of Soil & Water Conservation and Combating Desertification from “Soil & Water Conservation” and “Combating Desertification” when specialties were adjusted in 1998 by the Ministry of Education of China.

There are 11 universities and colleges that offer courses of Soil & Water Conservation and Combating Desertification in China, including Beijing Forestry University, University of Northwest Agricultural & Forestry Technology, Shenyang Agricultural University, Inner Mongolian Agricultural University, Beijing Normal University, Sichuan Agricultural University, Huanghe Water Conservancy College, Jiangxi Water Conservancy High School, *etc.* At same time, the courses on combating desertification have been included into the curriculum for students majoring in resources and environment in many universities and colleges in China.

2.5.2 Scientific research for combating desertification

Scientific research institutions: a lot of research institutions have been established for combating desertification from national, provincial to local levels since 1950s. The national institutions in Chinese Academy of Sciences include Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences(CAREERI,CAS) which was newly re-organized as an institute in June 1999 from three institutes in Lanzhou, *i.e.* the Institute of Glaciology and Geocryology, Institute of Desert Research and Institute of Plateau Atmospheric Physics, The Institute of Geographical Sciences and Natural Resources Research, Eco-environment Center, Xinjiang Geographical Research Institute, Shenyang Applied Ecological Research Institute, Northwest Soil & Water Conservation Research Institute, Botany Research Institute, *etc.* The research institutions under the leadership of ministries include: Chinese Academy of Forestry (State Forestry Administration), Chinese Academy of Agriculture (Ministry of Agriculture), Huanghe Academy and Soil & Water conservation Stations located in Tianshui, Suide and Xifeng (Ministry of Water Resources), Chinese Academy of Environment Science, Lake and Environment Science Institute in Nanjing, Sino-Japan 21st Century Environment Research Center (State Environment Protection Administration), *etc.*

Provincial research institutions include Gansu Desert Research Institute, Shaanxi Desert Research Institute, Liaoning Desert Research Institute, Ningxia Desert Research Institute, Forestry Research Institute of Inner Mongolia, Forestry Research Institute of Xinjiang, Shaanxi Soil and Water Conservation Research Institute, Gansu Soil and Water Conservation Research Institute, Shanxi Soil and Water Conservation Research Institute, Liaoning Soil and Water Conservation Research Institute, Qinghai Soil and Water Conservation Research Institute, and agricultural research academies in different provinces.

As a national key research program, the Ministry of Science and Technology had implemented many research projects in the field of desertification monitoring, combating desertification techniques and demonstration, and sand fixation techniques. In the period of the ninth five-year-plan, the basic researches have been carried out in fields of dynamics of desertification, landscape ecology, sustainable development of drylands, water resource uses, desertification control models, *etc.*, research and demonstration for sand fixation around Capital (Beijing) had also been implemented. Many research results, such as sand fixation along railways, techniques for soil and water conservation, air seeding, *etc.*, had been extended into combating desertification practices. In the period of the tenth five-year-plan, the government had invested 400 million Yuan RMB into scientific research on combating desertification, including key research 250 million Yuan, and techniques extension 150 million Yuan. The national key research projects in the period of the tenth five-year-plan include Control and Demonstration in Key Eco-fragile Zone of West China, Key Techniques for Sand Fixation and its Demonstration, Key Techniques for Forest Ecological Construction, Agricultural Techniques Transforming in Development of West China,

etc.. Many field stations were also established and a lot of technicians trained under the research programs.

At same time, government included combating desertification into hi-tech research programs (it is named “863”) and basic research programs (national science research foundation) and research result extension programs. The government regulated that 3% of investment in the national 6 forest ecological programs should be used as scientific research supporting funds to solve the problems in the program and many hi-tech experiment of zones were established to promote the uses of new techniques in the programs.

In recent years, sustainable development strategy studies in desertification related fields have been completed successfully, in which Sustainable Development Strategy Study on Forestry in China put forward 7 strategies for desertification combating, Strategy Study on Water Resources Allocation, Ecological Construction and Sustainable Development in Northwest China formulated 10 strategies for ecological re-building in arid northwest China, all these studies provide scientific reference in theory for combating desertification and regional sustainable development in China.

2.5.3 Technical training for combating desertification

Many types of technical training activities had been carried out by governments in combating desertification, such as training seminars, TV specials, visiting & exchange. The training contents include project management techniques for project officials, traditional & practical techniques training for grassroots, training of local leaders in key desertification regions, training women for combating desertification. The government also organized technical visiting & exchange abroad, and some experts have been invited to China to introduce key techniques, project design and implementation, and policy for combating desertification. Training was also combined with international cooperation in combating desertification.

2.5.4 Techniques extensions & service for combating desertification

Chinese government had established a set of techniques extension & service systems (they were called techniques extension & service stations) in agriculture since 1954, which related to agriculture, forestry, water conservancy, animal husbandry, *etc.*. However, after twice reforming and changing the system, these techniques extension & service systems have faced shortage of funds, human resources and institutions. At present, techniques extensions & service systems have developed in various ways. The first is an evolution of the traditional techniques extension & service system; the second is media such as broadcast and TV agricultural channel; the third is internet. Since signing of the UNCCD, the government has paid much attention to extension of techniques & services in combating desertification. Technical brochures have been published and experts organized to conduct field consultation. A series of manuals for combating desertification, traditional as well as practical, have been published, of which one was in English (Traditional Knowledge and Practical Techniques for Combating Desertification in China).and it was presented in COP2 and appreciated by international societies and UNDP had awarded it the Best Practical Award in Combating Desertification. In 2004, five ministries organized experts to the countryside to solve the problems faced by farmers. Agricultural & forestry scientific and technical books have been sent to the fields. All these efforts have achieved much in combating desertification.

At the same time, the government has established many demonstration zones in desertification

affected areas to extend and apply new technologies, and established many models and techniques in integrated measures, water conservancy measures, horticultural methods, grassland protection and regeneration measures, tree planting techniques and shifting sand fixation, such as techniques for vegetation regeneration in these regions along key communication lines and around enterprises, shifting sand fixation along railway, oasis development and protective forest techniques for farmland protection, desertification monitoring techniques, sandstorm forecasting techniques, agro-forestry techniques, water saving irrigation techniques, watershed management, protected farming, crop residue for soil conservation, deep soil preparation and mulching techniques, anti-drought by chemicals, measure-based soil fertilizing, dryland farming, water tanks, terracing, soil salinization control, degraded rangeland fencing and enclosure techniques, improved livestock species introduction, breeding and propagating, planting of replacement fodder, natural vegetation protection and regeneration techniques in desert and degraded land, afforestation for sand fixation, air seeding, water-conserving artificial vegetation building techniques, cash tree planting and Chinese herb medicine introduction and rearing, artificial rain-making, *etc.*.

2.6 Desertification monitoring

China is one of the few countries in the world which has carried out two terms (1994, 1999) of national desertification monitoring since signing of the UNCCD. National desertification database has also been established. These were admired by the Secretariat of UNCCD. The third term of national desertification is currently under way. The results of national desertification monitoring not only provided support for decision making in implementation of the national combating desertification program, but also played very important role in Western Development of China Program.

Desertification monitoring of China consists of national monitoring (including drought monitoring), key (sensitive) regions and on-site monitoring, desertification project benefit monitoring and sandstorm monitoring.

National desertification monitoring: undertaken by means of 3S techniques and taking one province as a monitoring unit, the period is 5 years.

Key (sensitive) regions monitoring: Puts emphasis on those regions where desertification is active but controlled effectively. The scope and periods are determined based on case by case situations.

On-site monitoring: Monitoring stations in different typical regions have been setup for a long time and system monitoring of detail of causes, control measures and benefits. It provides detailed support for national monitoring.

Benefits monitoring for desertification controlling projects: it is implemented to national key projects for desertification control and aimed at perfecting project management. It includes project quality monitoring and benefits monitoring.

Sandstorm monitoring: China Meteorological Administration (CMA) is in charge of sand storm monitoring in cooperation with State Forestry Administration, State Environment Protection

Administration, and Chinese Academy of Sciences. China Central Meteorological office has released sandstorm broadcasting since 2001 and it can be monitored and broadcasted on time. At the same time, the sandstorm website was also established by CMA, which provides a platform for the public to exchange information in raising public awareness in sandstorm prevention and reducing sandstorm damages. China Desertification Monitoring Center, of the State Forestry Administration, had also set up GIS-based national desertification, sandy desertification and sandstorm disaster assessment system. At present, China has formulated sandstorm emergence prevention plan to reduce effects of sandstorm to the economy and peoples' life.

2.7 Diversified economy and combating desertification industry

There exist rich rare bio-resources in desertification regions of China. As the market economy progresses in China, it comes better and better in resource development and diversified economy in desertification affected areas. For example, E-lion Company in Kubuqi Desert, developed desert industry by establishment of *liquorice* base, fast growth timber base, *caragana* bush base, *Helianthus tuberosus* base, *Ginseng* base, *Cistanche spp* base, sheep commercial industry and 100 km eco-tourism line, and had gotten great achievements in combating desertification with high ecological, social and economic benefits. They also developed tourism industry by uses of local desert landscape and minority grassland cultures. Dongda Company in Dalate Banner developed a desert-based industry by planting bushes and fixing shifting sand, achieving ecological, economic and social benefits simultaneously.

2.8 Raising public awareness for combating desertification

The Chinese government pays attention to combating desertification awareness education. Combating desertification has been included into the curriculum of national higher education. The Chinese government, in cooperation with the Secretariat of UNCCD, held UNCCD public awareness training seminar in 1995. At the same time, the government also awarded 10 National Model Institutions, one National Hero, 10 National Model Individuals to Combat Desertification; National Model Institutions and Individuals in Soil & Water Conservation to raise public awareness and to attract the attention of the whole society to combating desertification.

From 1997 to 2000, integrated with UNDP/China Project of Capacity Building in Combating Desertification, more than 1,500 people were trained by different awareness seminars and classes. The trainees came from central ministries and local government departments as well as technicians and grassroots workers. By these activities, public awareness has been raised, information exchanged and management levels improved. Sustainable development ideas were impressed on farmers and herdsmen. Advanced dryland management ideas were also introduced from abroad. In recent years, county level leaders training classes have also been held by Ministry of Personnel to raise their awareness in combating desertification.

Since 1994, on June 17 every year, the World Day of Combating Desertification, large scale activities have been organized to raise public awareness by poster, TV tape, broadcast, newspaper, seminars, workshops, *etc.*. All these activities have been greatly successful in raising public awareness.

2.9 International cooperation in combating desertification

China has cooperated with more than 70 countries and tens of international institutions (as UNEP, UNDP, WFP, FAO, ADB, UNESCAP) in the field of desertification combating. Chinese has held desertification combating seminars and training classes for UN bodies and organized the third international conference on desert development. Under the Framework of Sino-African Cooperated Forum, training classes had been held for African countries. In recent years, a lot of experts were sent to African countries to help these countries to combat desertification.

2.9.1 Cooperation under framework of UNCCD

The Chinese government cooperates actively with the Secretariat of UNCCD. The Asia-Africa Forum on Combating Desertification also held in Beijing 1996. Ministerial Conference on Regional Cooperation to Implement the CCD in Asia was held in Beijing in 1997 and passed the Declaration of the Beijing Ministerial Conference on Regional Cooperation to Implement the CCD in Asia. The Thematic Program Networks (TPNs) framed priorities projects in Asia were outlined. The Chinese Government also actively undertook TPN1 (The Asian Thematic Programme Network on Desertification Monitoring and Assessment) in Beijing. The starting meeting of TPN1 was held in Beijing in July, 1997 and passed its aims, structure, the main plan, priorities action plan as well as operation guideline as annex. There are 20 member countries in TPN1, *i.e.* China, Japan, India, Iran, Jordan, Kazakstan, Kyrgyzstan, Kuwait, Lebanon, Mongolia, Pakistan, Philippine, Syria, Tajikistan, Thailand, Turkmenistan, Uzbekistan, Vietnam, Yemen. The first expert working meeting of TPN1 was held in Nov. 2001 and assessment and monitoring baseline and indicator system were put forward. At present, the TPN1 website is operating (<http://www.asia-tpn1.net>). The Asia-Africa seminar on early warning and second focal point meeting of Asia were held in China in 1999 simultaneously. China also actively participated in other TPNs in Asia ad hoc meeting of assessment and monitoring baselines and indicators. The Coordination Meeting on Partnership Building and Resources Mobilization for UNCCD Implementation in China co-organized by Secretariat of UNCCD, GM, UNDP, ADB, was held in 2001, about 11 countries and 17 UN institutions attended the meeting. It was this meeting that promoted cooperation and exchange in combating desertification between China and the rest of the world. Thereafter, the Strategy Recalled Seminar on Implementation of UNCCD in China was held. In Cooperation with UNESCAP, UNEP and the Secretariat of UNCCD, the National Consultation Meeting on Prevention of Duststorm in Northest Asia was held in May 2005 in Beijing, about 20 representatives from 10 international institutions, 5 countries and 15 representatives form ministries of China attended the meeting. Based on the framework of UNCCD, it deepened understanding by presenting parts to China's implementation policy on UNCCD and harmonized aiding plans of UNDP, ADB, and Germany to China. In Oct. 2004, CST and its expert meeting were held in Beijing and International Training Center on Combating Desertification of Secretariat of UNCCD was established in Beijing, China, which plays an important role in strengthening regional and global cooperation.

2.9.2 PRC-GEF partnership on combating land degradation in dryland ecosystem

This is GEF's first nationally implemented project for combating land degradation in dryland ecosystem in the world, under framework of OP12 of GEF. It aims to promote adoption of the integrated ecosystem management (IEM) approach to address land degradation (LD) problems, and provides technical and financial support to solving problems of inter-agency and cross-regional natural resource management. Through development of partnerships with target

countries, the medium- and long-term programming approach was used to integrate environmental objectives into national development planning and strategy.

The general objectives of the project are to support to sustainable development in the Western China and to protect global environment. The project has drawn one 10-year national framework plan, and under this framework, a series of projects will be funded and implemented according to their importance values to control land degradation. PRC-GEF partnership on combating land degradation in dryland ecosystem has undergone 3 stages from preparing of the partnership, formulation of the Country Program Framework and implementation of a project for land degradation control under the Country Program Framework (CPF).

From October 2000 to March 2001, a consultant team including domestic and international consultants was organized to draft the Program Framework for the Partnership on LD Prevention and Control in the Western China and its 6 annexes. Requested by ADB, an international workshop was held on April 3, 2001 to discuss the framework. From Jan. 2002, ADB consulting expert team started preparation of Country Program Framework, and, expert team toured to six provinces (regions) organized by the Project Management Office (PMO), the CPF Brief was submitted to and approved at the GEF Assembly and the Council Meeting held in Beijing in October 2002.

The CPF is a 10-year program framework and will be implemented sequentially. The first project (Project One) of the framework is "Strengthening the Enabling Environment and Building Institutional Capacities", which will be implemented from 2003 to 2006. This project covers all 6 northwestern provinces/regions (Shaanxi, Gansu, Qinghai, Ningxia, Inner Mongolia, Xinjiang) and contains 6 components: 1) improving policy, legal and regulatory framework; 2) improving national and within-province coordination; 3) improving province/region and county level operational arrangement; 4) improving institutional capacities; 5) developing operational mechanism for LD monitoring and evaluation; and 6) implementation arrangements.

Ministry of Finance (MOF) is the GEF focal point of the Chinese Government; State Forestry Administration is the implementing agency of the project. Each province has set up its own implementing agencies. It is estimated that a total US\$ 1.5 billion over ten years will be spent for the PRC-GEF partnership on combating land degradation in dryland ecosystem, of which, GEF will fund US\$150 million. Project One started in July 2004 and with a budget of US\$15 million and GEF shared US\$7.7 million, ADB shared US\$1.0 million in technical Assistance (TA) and rest of US\$6.3 million is shared by the Chinese Government.

2.9.3 Other international cooperation projects

Since 1990, a lot of international cooperated projects, which relate to desertification combating and land degradation control, have been carried out by different channels.

2.9.3.1 Bilateral projects

(1) China-Germany Afforestation Project: including afforestation for ecological restoration projects in North Shanxi Province, Helanshan of Ningxia, Yan'an in Shaanxi Province, afforestation for Sand Fixation Projects Inner Mongolia and Liaoning Province, Monitoring System of Green Great Wall Project, Afforestation in Miyun Reservoir for Soil & Water Conservation, Tree Breeding in Shanxi and Afforestation in Tianshui, Gansu Province.

- (2) China-Korea joint project: including Afforestation in Miyun Reservoir for Soil & Water Conservation, Afforestation in 5 provinces of northwest China, Desertification Combating & Sand Industry Development Project (joint research), Sandland Development Project (1997-2006).
- (3) China-Australia Joint Project: Desertification Combating Project in Alashan of West Inner Mongolia.
- (4) China-Netherlands Joint Project: Desertification Monitoring Network in China.
- (5) China-Japan joint project: including Afforestation for Sand Fixation Project in Yanchi of Ningxia, Shelterbelt Planting Project in Ningxia, Afforestation Project in Daning, Shanxi Province and Japanese Loan Afforestation Project (Shaanxi, Ningxia, Gansu, Inner Mongolia).

2.9.3.2 Multilateral Cooperation

The Chinese Government has been actively in cooperation with other international institutions in environmental protection since the middle of 20th century, such as WFP, FAO, UNDP, GEF, IFAD, WB, ADB, UNESCAP and other international institutions. Of these, WFP has funded projects in China the longest, but most of their projects are integrated agricultural development and poverty alleviation projects. After UNCCD came into force, only a few project focused on combating desertification in China. Some projects related to desertification combating are listed briefly as follows.

- (1) WFP Projects: including Integrated Development Project in Qinghai Province, Poverty Alleviation and Environmental Protection in Guyuan of Ningxia, Integrated Agricultural Development in East Qinghai Province, etc.
- (2) FAO Projects: including Sandland Control Project in Hebei Province, LADA Project and Salinized Land Control in Heilongjiang Province, etc.
- (3) UNDP Projects: including Capacity Building for Implementation of UNCCD in China (CPR/96/111) and Gansu Desert Control Project (CPR/91/111).
- (4) International Fund for Agriculture Development (IFAD): including Agriculture Development Loan in Hainan Zhou of Qinghai Province, at same time, IFAD also implemented projects related to combat desertification in Ningxia, Shaanxi and Shanxi Provinces.
- (5) World Bank (WB) project: including Project of Soil & Water Conservation in Loess Plateau, Irrigation, & Immigration Integrated Project in Hexi Corridor of Gansu Province, Watershed Integrated Management Project, etc.
- (6) Asia Development Bank projects (ADB): including the Grassland Development Project in North China, Combating Desertification Project in West China, Desertification Combating Project in Gansu Province (TA3663/PRC), Prevention of Dust & Duststorm in Northeast of Asia (TA-ADB-GEF RETA 6068), etc.

2.9.4 Cooperation with NGOs

International NGOs are also active in combating desertification in China, such as International Union for Conservation of Nature (IUCN), World Wildlife Foundation (WWF) and another 10 institutions. These NGOs pay more attentions to biodiversity protection and only limited work have been focused on combating desertification.

Other NGOs, such as NGOs in Korea and Japan and even some enterprises also participated in combating desertification and the shifting sand fixation in China. For example, Northeast Forestry Forum of Korea, Desert Green Jointed Agency (China agency), Japan Tokuyama Company, Korea Real Estates Association, Toyota Auto Company, have donated funds for afforestation and sand fixation as well as duststorm prevention in China.

In addition, ECO foundation in Albert University of Canada also funded afforestation in Changping, suburb of Beijing. TC foundation of Belgium, NGOs in Germany, USA as well as in Hong Kong also donated funds to China for combating desertification, for example Chinchshe in Hong Kong has implemented projects to combat desertification in mainland of China.

By implementation of these international cooperation projects, firstly, environment in the project regions has been improved by aid of international fund, a lot of advanced management experiences and techniques have been learned, the management level has improved. For example, advanced and strict management techniques from project planning to quality control, financial management, inspecting and auditing have been introduced into China in afforestation by China-Germany Afforestation Project, which provides management experiences to the Program of Reversion of Farmland to Forest in China. Secondly, advanced techniques have been introduced into China which includes techniques of resources monitoring, remote sensing, combating desertification, water-saving irrigation methods, integrated ecological assessment, *etc.* Thirdly, the implementation of international cooperation projects has advanced the Chinese participant's technical levels of project management. Some technicians were trained overseas and these become valued human resources for future cooperation. Fourthly, ideas have been changed and people's environmental protection and legal awareness have been raised. The participatory idea in project management has been formed gradually.

2.10 Enterprises, societies and NGOs in Combating desertification

The participations of Chinese domestic enterprises, societies and NGOs in combating desertification in China have undergone course from understanding to participating. It is only recently that Chinese domestic enterprises, societies and NGOs have actively participated in combating desertification in different ways and manners.

Domestic enterprises have participated in combating desertification in two ways, *i.e.* donation and investment. Since 2000, some enterprises have participated and invested in the program of demonstration plots construction for combating desertification, which were organized by Ministry of Science & Technology. About 20 enterprises participated in the program. At same time, some enterprises invested into desertification combating related projects. For example, the milk industries of Yili, Mengniu and Wandashan, based on the national program of grassland restoration, built milk stations in pasture areas to collect milk from herdsmen which solves the difficulty for these herdsmen to sell their milk. It has promoted implementation of the national program of grassland restoration in pasturing areas. Other resource development enterprises, like Dongda Group in Erdos, invested to establish paper-making factory by use of sandland shrub resources. The enterprise purchase shrub in sandland regions, which provides ways to use shrub resources and increase income to local people, and in turn, encourages local people to plant shrubs in sandlands.

There are more than 2000 NGOs in environmental protection and desertification combating. Societies related to combating desertification in China include China National Sand Control & Desert Industry Society (CNSCDIS), Soil & Water Conservation Society of China, Forestry Society of China, Ecological Society of China, *etc.* These societies and associations play an important role in combating desertification planning and ecological project implementations. They organized science & technology exchange, technical consulting and integrated scientific

investigation and participated in science popularizing, technology extension and consulting to promote desertification combating in China. In order to encourage social participation, China Green Foundation was set up in 1985 and about 60 million Yuan RMB have been collected and 37 pieces of international friendship forest planted and more than 60 international greening projects implemented.

The real NGOs in China are young and less in number, but they are also active in participating in combating desertification and environmental protection, such as Friend of Nature and Earth Village. Even if NGOs in China are at an initial stage, they have been playing a role in reflecting public wishes and communication between public and government.

There are also volunteers all over China. Every year in Tree Planting Day, World Environment Day, Water Day, and World Day to Combat Desertification & Drought, a lot of volunteers participate in planting trees and combating desertification. Even in spring every year, some volunteers from other northeast Asian countries jointed tree planting in China for the Earth greening and sand fixation. Many special forests named as Journalists Forest, Youth Forest, Forest of Labor Union, Women Forest, Friendship Forest have been planted in past years.

At same time, over the past decades, a large number of model institutions and individuals in combating desertification have been awarded prizes, such as Ms. Niu Yuqin and Mr. Shi Guangyin in Shaanxi province, Ms. Wang Guoxiang in Ordos and Mr. Tang Chen in Chifeng, Inner Mongolia. In 2003, National Greening Committee, Ministry of Personal and State Forestry Administration jointly awarded more than 100 model individuals for their contribution to desertification combating, and asked people to learn from these model individuals.

2.11 Local government (province) activities in combating desertification

Limited by economic conditions, local governments of desertification affected areas have not enough funds to implement combating desertification project, most of them just organize and implement projects funded by central government. In some regions with better economic conditions, local governments invest themselves into desertification combating projects. In order to ensure implementation of national desertification projects as expected, local governments have set up special project management institutions in departments of forestry, agriculture, water resources, environmental protection.

Local governments also promulgate local regulations to prevent desertification and encourage public participation in combating desertification. Inner Mongolia, Ningxia and Shaanxi Provinces have promulgated some regulations to ban grazing in rangeland, which effectively controlled rangeland desertification caused by over-grazing. In some regions, governments prolong land contract periods to encourage the public and enterprises to participate in combating desertification and invest in resources and desertified land development. All these have achieved much in combating desertification.

Annex: Activities for combating desertification in 6 Key province

1. Inner Mongolia Autonomous Region

Inner Mongolia Autonomous Region is the only province which 6 National Forestry Ecological Programs involved. In recent years, regional protective forest systems, consisting of shrub, tree and grass, and in shape of piece, belt and network, have been established in some regions, about

3.33 million ha of farmland and 5.33 million ha rangeland have been protected by establishing protective forest, about 8 million ha of land implemented soil & water conservation projects. Vegetation cover recovery in the Mu Us Sandland and the Kerqin Sandland have reached to 20% and 15% respectively. Ecological conditions in the Hunshandake sandland have been improved significantly. The number of natural reserves administrated by the departments of forestry is 131 with areas of 9.0 million ha, occupying 7.6% of territory area of Inner Mongolia Autonomous Region, of which 14 are national, 34 provincial, and 83 at county level.

In recent years, central government started programs of restoration of natural vegetation (artificial grassland construction and fencing), rangeland fencing projects (fencing and rotation grazing) and rangeland restoration (graze banning, rotation grazing). The artificial grassland area has reached 6 million ha.

Measures used in changing production methods include from extensive management to intensive management by extension of mechanized protective farming, dryland farming, protective farming, *etc.* Modern farming techniques have been used to protect farmland from desertification. Ecological emigration measures had been adopted in some sandy regions to accelerate restoration of natural vegetation. Emigration projects include civil affairs emigration, poverty alleviation emigration and forest ecological project emigration, which were also classified into emigration from sand source region, ecological fragile region, arid rangeland and mountain regions.

2. Shaanxi Province

Shaanxi province, in the tenth five-year-plan outline for social and economic development, determined detailed tasks for agriculture, forestry, water conservancy, environmental protection and soil & water conservation.

- Under an agriculture aspect, tasks include that from 2003 to 2015, 333,000 ha farmland is reversed to forest, 33,000 ha grassland seeded by air-seeding , 80,000 ha farmland protected, 37,000 households of biogas developed in the countryside by 2005, and 74,000 expected by 2010;
- Under a forestry aspect, tasks include planting 82,000 ha of forest for sand fixation and 24,000 ha of forest for soil & water conservation, 6,000 ha of natural forest in sandland area, 153,000 ha of forest planted by air-seeding, 2000 ha of artificial forest planted, 240000 ha of farmland reversed to forest;
- Under a water conservancy aspect, tasks include Yaozhen Reservoir in Shenmu County being constructed as soon as possible, water pools in the south and water tanks in the north, and wells in central province should be selected to provide water resources for agricultural production and local peoples' life;
- Under environmental protection aspect, tasks include establishing 15 ecological protect demonstration zones at county or city level, 40 ecological demonstration zones at township level, and 300 ecological demonstration zones at village level, improving 13 natural reserves and establishing 26 new natural reserves, natural reserves would total 50 with an area of 837,000 ha, about 1,067 ha of abandoned land in mined areas would be reclaimed;
- Under soil & water conservation aspect, the controlled area would reach 821,000 ha, including 113,000 ha terrace, 164,000 ha forestation, 163,000 ha cash and fruit orchard, 147,000 ha of grass-seeding and 234,000 ha closed, 2533 check dams built.

3. Gansu Province

In the tenth five-year-plan outline for social and economic development and Agricultural Sci & Tech Development Outline (2001-2010), Gansu Province plans that pollution and degradation in ecological environment would be kept within limits, soil erosion would be controlled.

By 2005, reversion of farmland would reach 330,000 ha (all the farmland with over 25 degree slope to forest), forestation 670,000 ha, closure of 630,000 ha of mountain to vegetation recovery and raise forest cover rate to 10.3%.

For soil and water conservation, the controlled area would reach 18000 km², by year of 2010, target to return farmland with slope over 16 degree to forest 330,000 ha, afforestation in mountain regions 670,000 ha, closure for vegetation restoration 630,000 ha.

The main projects consist of soil & water conservation in the Loess Plateau, inland rivers and Yangtze River Watershed of Gansu province, harness and development of salinized soil and sand industry development.

4. Qinghai Province

In the tenth five-year-plan period: Qinghai Province plans to undertake the following ecological projects related to desertification combating:

- (1) Program of natural forest protection. The program covers 37 counties in sources region of the Yangtze River, the Yellow River and the Lancang River, Qianlian Mountain and Valley of Hehuang River with area of 303,300 ha, from 2001 to 2010, 1,983,300 ha of natural forest will be protected, 7,500 ha of artificial forestation planted, 29,000 ha of mountain closed for regeneration, 136,000 ha forest planted by air-seeding. Up to now, 6,600 ha of artificial afforestation and 88,700 ha of closure for regeneration have been completed;
- (2) Program of reversion of farmland to forest. This trial program was from 2000-2001, 365,000 ha of farmland revers to forest and 729,000 ha artificial afforestation in mountains has been planned within ten years, 167,000 ha of farmland has reversed to forest and 208,000 ha of barren mountain afforested, about 200,000 households consisting one million people have benefited from this program;
- (3) “Three north” protective forest program (Green Great Wall Program). In the fourth period of the program, 300,000 ha of artificial afforestation, 360,000 ha of mountain prohibition, 200,000 ha of air-seeding afforestation are planned, and 77,900 ha of artificial forestation and 293,700 ha of mountain closure have been completed.
- (4) Construction of natural reserves in source regions of three rivers, Chaidamu Basin and Qinghai Lake. There are 8 natural reserves in these regions, including 5 at national level, 3 at provincial level with a total area of 207,600 km². 4 infrastructure constructions in the core region of the Three River Resource Natural Reserve have been completed.
- (5) Rangeland construction program. Through 2 years of implementation, 103,000 ha of degraded “black soil” rangeland has been controlled, 2,666,400 ha of rangeland fenced, 1,827,000 ha of rangeland expected to be protected from grazing and rodent damage area deceased from 200 million per ha to 120 million per ha.

5. Ningxia

In the tenth five-year-plan period, Ningxia plans that forest cover will reach 12%, 330,000 ha of farmland with over 25 degree slope will be returned to forest in the south loess hill region, green cover in cities will reach 20%, sewage treated will reach 76%. At the same time, The Tenth Five-year-plan Period Combating Desertification Plan, Ecological Investigation Report of Ningxia, Ecological Zoning in Ningxia, Land Resources Remote Investigation of Ningxia and Wetland Protection Feasibility Report have been compiled and authorized.

6. Xinjiang

Xinjiang implemented 5 key national forest programs, *i.e.* Natural Forest Protection Program, Conversion of Farmland to Forest Program, “Three North” Protective Forest Program, Wildlife Conservation & Natural Reserve Development Program, and the Forestry Industries Base Development Program in Key Regions with a Focus on Fast-growing & High-yield Timber Plantation. Xinjiang Autonomous Region has been ranked as one of the 11 test provinces in forest classification management and ecological subsidy. The subsidy is 75 Yuan RMB per ha.

Under the agriculture aspect, water saving irrigation projects has been implemented in Xinjiang. Since 2000, the quantity of water consumed for farming has decreased at the rate of 5% every year, 8 dry farming and water conserving demonstration sites, will be established in the “10.5” period. Under the water conservancy aspect, the Tarim River Ecological Environment Integrated Control Program has been implemented. Under the rangeland management aspect, restoration of natural rangeland by fencing, rangeland protection from grazing projects are also implemented.

3 National Capacity Needs Assessment for Implementation of the UNCCD in China

Since signature of the UNCCD in 1994, many of the activities have been carried out by the Chinese Government for implementation of the UNCD and also achieved much. The achievements in combating desertification in China have been highly praised worldwide, and a lot of experience also summarized. At the same time, China is one of the largest developing countries with serious desertification; desertification is still expanding, which affects not only production in industry & agriculture and people’s life, but also national sustainable development, even national as well as world environments. Therefore, it is very important to understand the problems existing in capacity building for implementation of UNCCD and also helpful in confirming the priorities and action plan in capacity building.

3.1 Institution construction and operation mechanism

China is a developing country with 27% of desertification area; sandy desertification enlarges at the rate of 3436 km² each year. Desertification has badly affected regional social & economic sustainable development in the 21st century. As functions prescribed by state council, department of forestry is in charge of desertification management. Implementation of the UNCCD involves a lot of sectors and relates to many departments. The National Coordinating Group on Combat Desertification, consisting of 16 ministries, was established in early 1990s and reorganized in 2001. The State Forestry Administration (SFA) set up the National Bureau to Combat Desertification, the Secretariat for implementation of UNCCD, Senior Experts Consultant Group in Combating Desertification and three centers in desertification monitoring, training, research & development.

3.1.1 Problems

Problem1: coordination among departments at central government level

CCICCD consists of 17 ministries institutions related to departments of planning, finance, foreign affairs, law, tax, science & technology, agriculture, forestry, water, communication,

environment protection, meteorology, poverty alleviation, etc., therefore, it needs active cooperation and coordination among departments. Limited by awareness, number of personnel and other factors, some problems still exist in the operations of the CCICCD. Although an inter-ministry joint meeting system has been set up by National CCICCD, squabbles for department's benefits still exist even over trifles. All these have constrained the exertion of manpower, material resources and financial resources in combating desertification.

Problem 2: Institution construction at local government level

For desertification management in local governments (provincial level or lower levels), there is no clear responsibility classification in desertification management among different departments. Except that a few provinces affected seriously by desertification have special institutions for desertification management, most provinces and lower level governments have no special institutions. In particular, at county and grassroots level, relevant institutions also face shortage of outlay and personnel resources for most of regions,. Especially after government institution reform in 1998, coordination capacity of desertification management department (forestry) has been reduced greatly in project planning, arrangement and implementation. This has somewhat affected desertification combating.

Problem 3: Roles of Senior Experts Consultant Group not effective

The establishment of Senior Experts Consultant Group in Combating Desertification is to provide policy and technical consulting for central government and to heighten decision making capacity in combating desertification. In review, the operation of the Senior Experts Consultant Group in Combating Desertification in recent years, their functions have been limited by many factors. It works only in meetings and participates little to guide key programs.

Problem 4: The functions of the training center and R&D center are limited

Affected by operational mechanism and shortage of funds, functions of the training center and R&D center on combating desertification have been limited. Since 2000, the training center and R&D center on combating desertification have almost been in maintenance states. They can not effectively organize large training activities on research and development projects. Cooperation with the UNCCD Secretariat, International Training Centre (ITC) on Combating Desertification established in 2004, but it has not received any funding and nor to host any training activities.

3.1.2 Needs

Based on the present institutions situations in combating desertification and for capacity building, first priority is to pay attention to capacity building in institutions establishment and perfection at central government, provincial government and grassroots levels. At the central government level, national UNCCD implementing institutions capacity should be strengthened in program planning, project management and decision making; capacity in coordination and cooperation among ministries should also be strengthened. At the provincial government level, while perfecting institutions, management capacity should be strengthened in combating desertification. At the grassroots level, institutions should be established and perfected and the essential management facilities and equipment should be installed (i.e. traffic & communication tools). Management capacity should also be strengthened. The functions of Senior Experts Consultant Group in Combating Desertification and the Training Center and R&D Center on Combating Desertification should be strengthened.

3.2 Law and policy in combating desertification

In recent years, a series of laws have been promulgated and revised. They include Law on Combating Desertification, Forest Law, Land Contract Law, Land Management Law, Soil and Water Conservation Law, Water Law, Environment Protection Law, Grassland Law, Mineral Resources Law. A lot of bylaws and regulations also issued, such as the Administration Regulation in Desertification Combating for Profits, Resources Administration Regulation for “4-barren lands” development in Countryside, etc. All these laws and regulations have played important roles in combating desertification.

3.2.1 Problems

Problem 1: The laws articles are rough with low flexibility

Most of laws and regulation related to combating desertification are formulated only in principle and the laws articles are rough with low flexibility. Irrational human activities are difficult to be controlled by laws. For example, the Law on Combating Desertification passed in 2001, still lacks implementation regulations and problems come out while implementing.

Problem 2: Poor relation and weak coordination among laws

Each law in China has its own independent system and was drafted out by a different department of government; therefore, it carries administration department's opinions and leads to poor relations and weak coordination between laws.

Problem 3: Low attention to law popularity and implementations

Due to shortage of special fund, laws related to combating desertification have not been well popularized. At the same time, many problems exist in the law execution environment. Limited by undeveloped economic conditions, public laws awareness is poor. In some regions bureaucracy is more powerful than law, which has negative impacts on legally combating desertification.

Problem 4: Present policies difficult to mobilize whole society in combating desertification

The present policies and mechanisms, especially the policies and measures in financial supporting, favorable taxes, land use policy as well as investor right protection to encourage individuals and non-state owned economic sectors to participate in combating desertification, need further perfecting. Only in this way, can whole society be mobilized to participate actively in combating desertification.

3.2.2 Needs

Legal construction in combating desertification should be accelerated, including implementing the regulations of Law on Combating Desertification, law implementation system (to strengthen law execution forces, to improve law execution conditions, to enhance law execution levels, and to increase law execution supervision capability). Attention should be paid to laws propaganda and education. While in combating desertification, priority should be given to preventive measures.

New policies for combating desertification should be formulated based on the broad and detailed investigation, for example, land ownership, use-right and managing rights should be separated to encourage people to combat desertification. Land use rights can be bought by different economic components, land used for ecological construction and its use right should be allowed to be inherited and transferred, *etc.*

3.3 National project to combat desertification

Since 1990, especially in the last ten years, the Chinese government has invested huge funds in implementing the National Action Plan to Combat Desertification. many projects (Forestry Ecological Program, Soil & Water Conservation Program, Grassland Construction Program, Integrated Agricultural Development Program, Natural Reserve Construction Program and National Poverty Alleviation & Development Program) related to combat desertification have been implemented and great achievements have been realised.

3.3.1 Problems

Problem 1: Investment

Desertification in China is serious with large areas and huge damages. At the same time, economy is less developed and life in desertified regions is poor. In these regions, even if huge funds had been increased to the program of combating desertification by central government, the total investment to combat desertification is still relative short of needs; the effects in combating desertification had been restricted seriously.

Problem 2: Projects planning and management

Desertification combating related projects have been planned and implemented by different departments (*i.e.* forestry, agriculture, water conservancy, integrated agricultural development, environmental protection, etc.), hence projects are often like broken pieces and lack of a unified plan. This situation has restricted their effects on combating desertification. In recent years, government at different levels has invested and implemented a lot of projects in combating desertification; their benefits have been restricted because of limitation of departments and decentralization of projects as well as management by different departments.

Problem 3: Shortages of effective project management mechanism

Most projects for combating desertification are not effectively implemented according to strict project management procedures. Poor quality control, auditing, inspection, checking and approval have led to a lot of quality problems and restricted the effects in combating desertification.

Problem 4: Shortage in anti-drought strategy in the National Action Plan (NAP)

There are shortages of anti-drought strategy and activities in the National Action Plan (NAP). More attention has been paid to harness resources and less to conservation in the implementing projects, which lead to a lag in conservation measures.

3.3.2 Needs

A sustainable national investment mechanism in combating desertification should be established and perfected, and the domain of government's investment be clarified. Non-state owned economy participation in combating desertification should be encouraged by policy guiding and inspiring. Public participation into combating desertification should be mobilized by laws, favorable policy and by perfecting subsidy and service mechanism for ecological benefits. At the same time, demonstration of the policy and mechanism to attract private participation in combating desertification should be perfected.

Cooperation and coordination among departments should be enhanced; the national ecological project to implement inter-departmental, inter-industries, inter-regional and national combating

desertification programming unified. At the same time, project management should be enhanced and modern project management ideas (project planning, assessment, examining and approving, auditing and inspecting) carried out. The process of project supervising, auditing, inspecting and approval should be implemented to enhance project benefits.

In cooperation with the national combating desertification program, items of anti-drought should be added. Different types of models and demonstration plots should be established in ecological treatment coordinated with economy development and of high standard, in high quality and characteristics. These models and plots should be used as demonstrations and seed functions in implementating combating desertification projects. They can also be used as windows to extend the results of combating desertification domestically and abroad and accelerate social economy development.

3.4 Scientific research and technical extension

3.4.1 Problems

Problem 1: Scientific research

Problems in scientific research include theory shortages and lag time to practices in combating desertification program construction, which has affected the speed of combating desertification and its effects. The first problem in scientific research in combating desertification is that science and technology have not been incorporated into practice in combating desertification, research and production, demonstration and extension, education and training have been disjointed. The second problem is a shortage of systemic research in combating desertification, coordination among departments is not done well, Science and technology resources are separate and have no powerful key research group, which has affected breakthrough in key researches and the achievement's extension and application; The third problem is that some key technical issues have not been solved yet, including combating desertification & social economy sustainable development, desertification monitoring & assessment techniques, degraded rangeland protection, restoration & improvement techniques, *etc.*

Problem 2: Technical extension

The first problem existing in traditional technical extension is that the extension system faces fund shortages and personnel instability. In the last 10 years, affected by family responsibility, market economy and institution reforming in local government and grassroots, the technical extension institutions (including forestry, agriculture, water conservancy, animal husbandry, etc.) and system in county and its lower levels are seriously challenged, which makes advanced techniques not extended in time and the projects have lower benefits. The second problem is that a multi-extension mechanism is still under construction. Restricted by infrastructure, some of the techniques extended by TV, radio broadcasts, even networks, can not be received in some rural regions, the only method is the activities of sending techniques and books once each year, which also can only cover a small area and few people. The third problem is that at present, scientific & technical extension and production are separate, some of the research results have no extension funds and cannot be transformed into productivity. In addition to shortage of theory in desertification dynamics and key techniques in combating desertification, the benefits in combating desertification projects have been affected negatively.

3.4.2 Needs

The key researches in combating desertification should be enhanced, the rate of transforming scientific results into projects of combating desertification be increased, and theory research reinforced further in order to provide technical support to combating desertification projects.

At same time, establishment and multiplication of technical extension and services system (extension fund, extension system and large scale application) should be promoted, stable and a sustainable extension system established to extend advanced technology and research results. Some advanced results should be selected and used in projects to combat desertification. Scientific supporting organizations should also be enhanced to ensure the functions of the Senior Experts Consultant Group.

3.5 Information exchange and sharing

3.5.1 Problems

Problem 1: Poor intra-national desertification information exchange and sharing mechanism

Although the Desertification Information Network (DIN) of China was established in 2000 (www.din.net.cn), it has been still in a standing state and issued some information periodically. Restricted by an integrated mechanism in information exchange and sharing in China, it is difficult to get material information from the DIN website. At the same time, restricted by funds, technical maintenance personnel are few and it is difficult to exert their functions in information exchange and sharing.

Problem 2: Information exchange and sharing mechanism is lacking at local level.

Restricted by funds, human resources and other technical conditions, information exchange and sharing mechanisms at local level are lacking. Some provinces lack special institutions charged with management of desertification or it is difficult to get information related project implementation from such institutions and more difficult to get the former data, not say nothing for information exchange and sharing.

Problem 3: Poor in scientific research data and results exchange and sharing

There are many research institutions related to desertification, these institutions belong to different departments and have little exchange and sharing, which sometimes leads to makes the same research topics being studied by many institutions in same region without cooperation. At the same time, because of lack in data sharing, some research works cannot get complete preceding data for different periods by different institutions in the same region. All these factors lead to waste of manpower, material resources and financial resources.

3.5.2 Needs

Firstly, national desertification information sharing mechanism should be improved, the relation of DIN with international networks of desertification strengthened to take DIN as a platform to introduce international desertification information and resources; at the same time, domestic information on progress and achievements of national programs of combating desertification and on implementation and the experience of international cooperation projects should be shared through DIN to provide useful information for different organizations and personnel interested in combating desertification.

Secondly, local information sharing mechanism should be established. Trial sites in information exchange and sharing could be carried out in these provinces and counties which have rich data, better facilities and higher quality staff. For those county governments with serious desertification, detailed database can be acquired, established and updated in cooperation with local government.

Thirdly, trial sites of scientific research data exchange and sharing mechanism should be established; on-site monitoring stations participated in by multi-departments can be used as pilot to establish on-site monitoring data exchange and sharing mechanisms to explore scientific research data exchange.

3.6 Public awareness and participation

3.6.1 Problems

Problem 1: Public awareness of combating desertification

The first problem of public awareness of combating desertification is lack of understanding of desertification causes and effects. Especially in their social transforming period, the public pays much more attention to economic issues and less to environmental issues, which leads to disregard and ignore potential desertification consequences. The second problem is the unclear understanding of the definition of desertification. Affected by translation, scientific speciality classification and previous propaganda, most people think desertification as simply desert encroachment, which leads to too narrow a sense of the term. The third problem is that local officials have not enough understanding of the importance of desertification; they pay much more attention to economic development and ignore environmental issues, which lead to ignoring decision making on combating desertification and its effects.

Problem 2: Public participation to combating desertification

The first problem for public participation to combating desertification is an unperfected mechanism. The second problem is the lack of a smooth channel for public participation; the channels for public participation and feedback have not been established in some government departments. The third problem is that no legal provision regulating public opinion consultation in decision making process. The fourth problem is that restricted by local people's knowledge level, public participation awareness is low in public affairs management, which affects public participated quality and effectiveness. The fifth problem is that the society lacks any monitoring mechanism for public participation and can not ensure public opinion in decision making.

At the same time, restricted by historic reasons, most societies and associations are approved by administrations, their operation funds come from these administrations or governments; it is difficult for them to act as real non-governmental organizations.

In China, the other NGOs are young with shortage of experiences and fund, hence their levels of participation are very limited. Restricted by poor social cognition and their behavior, the trusted and communication channels have not formed between NGOs and government agencies. Even those NGOs that can provide platform for the public to express their wishes and opinions, they act more emotional than rational. Some activities from extremists or opportunists for environmental protection have also affected NGOs' participation in combating desertification.

As for enterprises, lack of favorable policy regulations (i.e. favorable tax incentives) has somewhat restricted activities of their participation of combating desertification.

3.6.2 Needs

Overviewing the half century of experiences in desertification combating in China and facing the situation of desertification controlled in part and expanded as a whole, much attention should be paid to public awareness raising and education, so that the public can understand the severity of the problem and the importance, necessity and arduousness of desertification combating. By propagandizing, the importance of “prevention first and integrated prevention with control” should be imposed on local leaders and communities. Desertification combating must be combined with environmental protection, local economic development, and regional sustainable development. Modern tools such as TV, radio broadcast, newspaper, poster and other mass media measures should be adopted to raise public awareness of ecological environment construction. Some environmental protection content should be included in the textbooks for high school students. At the same time, effort should be made to help people understand the future of desertification combating and resources development to mobilize whole society to participate.

Meanwhile, attention should also be paid to widen the channels and encourage scientific societies and associations, NGOs and enterprises to participate in combating desertification.

3.7 Desertification monitoring and assessment

3.7.1 Problems

Problem 1: Imperfect monitoring system at national level

Although two terms of national desertification monitoring in China have been carried out and the third one is in progress, the monitoring system is still imperfect because of limitations in techniques, facilities and instruments. Firstly, due to the shortage of human resources, desertification monitoring are carried out by unqualified technicians in some regions; secondly, due to the scale of desertification in a large country such as China, shortage of facilities and instruments is still seen in some regions, although government has invested huge funds to purchase facilities and instruments for desertification monitoring; thirdly, the monitoring methodology and techniques for micro- or watershed level are still imperfect, for example, monitoring indicator system and expert system and other key techniques are still only at initial stage and can not meet the needs for desertification monitoring.

Problem 2: Participatory monitoring and assessment are not carried out

Desertification monitoring at national level is to provide decision making support for the central or provincial governments. At county and lower levels, the aim is to provide detailed suggestions and plans of desertification combating for local government and people. Therefore, participatory desertification monitoring and assessment at county and lower levels are essential. This provide basis for implementation of national macro decision making. FAO has started the project of Land Degradation Assessment in Dryland (LADA) and China has been involved as a pilot country. Participatory assessment method is used by FAO in LADA. However, it is not implemented yet.

Problem 3: Shortage for UNCCD implementation monitoring

Since the Chinese government signing UNCCD, much work has been carried out for its

implementation. However most of works are carried out based on the ecological environment situation and ecological environment construction plan of China. Although all the work forms parts of the UNCCD components, it may not be undertaken conforming totally to UNCCD. The monitoring for UNCCD implementation is still weak and more work should be done on this.

3.7.2 Needs

Firstly, monitoring system building at national level should be enhanced. Based on the present desertification monitoring system of China, training of technicians, reinforce learning of advanced monitoring techniques from abroad, supplement facilities and instruments purchased to perfect infrastructure in desertification monitoring, studies of basic theory and techniques in desertification monitoring strengthened to improve and perfect desertification monitoring and assessment system.

Secondly, trial and demonstration sites of participatory monitoring and assessment in counties and lower levels should be started up, which can be implemented on the basis of established on-site monitoring to accelerate desertification monitoring and assessment in surrounding areas.

Thirdly, capacity in implementing of the UNCCD should be enhanced and improved, experts could be invited to assess and monitor the capacity of implementing of the UNCCD in manner of projects. By these independent experts' assessments, constructive suggestions can be drawn and it will be helpful to combine into national combating desertification programs with implementing of the UNCCD.

3.8 International cooperation

3.8.1 Problems

Problem 1: Some international cooperation projects are not well combined with national key programs

The Chinese government has invested huge funds and implemented a lot of programs in combating desertification. These programs have great importance in improving regional environment on the basis of local natural and social conditions. In the given period, these programs are the national foci in combating desertification. Only international cooperation projects combine with these programs, can they get greater exertion in resources, ideas and experience. At the same time, they should pay attention to laws and regulations, such as Law to Combat Desertification, Grassland Law, and to make these projects become carriers to deliver implementations of these laws. While establishing international cooperation projects, much attention should be paid to understanding the situation of China and to combine strategy and measures of desertification combating to select cooperation directions. Local opinion as well as farmers' and herders' opinions should be also heard. Ideas and working manners used in international cooperation must be fitted to the local conditions. Only international cooperation projects combine with national key programs can they be guaranteed the human resources, materials and financial resources for successful implementation.

Problem 2: Shortage of combated desertification project

Up to now, many international cooperation projects have been implemented in ecological environmental fields of drylands by UN bodies and developed countries, which make great contributions to improve environment and alleviate poverty somewhat in the arid regions of

China. But projects focusing on desertification combating are few. In the past ten years, the representative projects in combating desertification were the UNDP projects of Capacity Building for Implementation of UNCCD in China (CPR/96/111) and Gansu Desert Control (CPR/91/111). The projects focusing on desertification combating can combine well with national programs and domestic allocated funds. The results from international cooperation projects can also be extended and play an important role in combating desertification in China.

Problem 3: More unilateral fund and less bilateral exchange

The Chinese government has paid much attention to combating desertification. A lot of experiences and number of techniques have been achieved in the past years. These experiences, models and techniques are helpful for other developing countries in combating desertification. But China is also a developing country with serious desertification which also needs help from the rest of the world. Most of international cooperation projects in China are aid-received projects. Although some bilateral training projects have been carried out by China for the developing countries, but the number of technical exchange projects are still few due to the lack of mature channels and models. Therefore, international aid is needed to accelerate technical exchange and cooperation to share the techniques for combating desertification worldwide.

3.8.2 Needs

Firstly, the international cooperation framework for combating desertification should be completed. The framework can be finished based on the national programs and the ongoing key projects in the manner of project consultation and used as a guideline for international cooperation in a given period to avoid blindness or subjectivity of donors or sequaciousness of aid recipients to ensure successful project implementation and the expected results.

Secondly, international cooperation project focused on combating desertification should be enhanced. Attention should be paid to deepen world understanding of desertification in China and to widen cooperation channels. World societies should support China in the field of combating desertification.

Thirdly, supported by the third parties, technical exchange and cooperation should be undertaken among developing countries. The Secretariat of UNCCD and other UN bodies can act as bridges and cooperate among developing countries by supporting from donors or parties to UNCCD. Chinese techniques can thus be exported to other developing countries.

3.9 Negotiation capacity for implementation of UNCCD

3.9.1 Problem

China has done much and played an important role in framing UNCCD and its implementing negotiations. Limited by funding, human resources constitution of UNCCD implementing member ministries and institutions, the negotiation capacity for UNCCD implementing in the member ministries and institutions are insufficient. The first problem is that the funds for thematic study of UNCCD implementation is too little, which can not provide supporting for UNCCD implementing negotiations. The second problem is that, restricted by personnel number in implementing negotiation of UNCCD, some of the related seminars have no Chinese delegates (technicians) or representatives. The third problem is shortage of personnel in studies of international desertification issues such that negotiators are unfamiliar this issue worldwide and affect

negotiation effectiveness.

3.9.2 Needs

Considering the problems in UNCCD implementing negotiation, capacity building in these issues should be undertaken first to improve negotiator capacity and negotiating skills, to study policy, mechanisms and related techniques of UNCCD, to develop international cooperation and learn international negotiation experiences. Second, exchange among the member ministries of CCICCD and with international organizations should be strengthened, including official training abroad in related fields of international conventions. Third, GEF funds should be applied to train Chinese negotiators in fields of UNCCD and to support CCICCD in capacity building for implementation of UNCCD.

4 Priorities & action plans for capacity building in implementing of UNCCD

Priority 1. To perfect institutions and enhance management

Facing serious desertification over large areas, severe damages and formidable tasks in combating desertification, and combining the patterns of institutions in management of combating desertification, in light of capacity building, attention should be paid to enhance institutional capacity for management at central, local and grassroots levels. At the central level, while enhancing capacity of UNCCD implementing agency to improve management levels in programming, project management and decision making, more attention should be paid to improve coordination among member ministries of CCICCD. At the provincial level, attention should be paid to strengthening institutions and improve management capacity. At the grassroots level, essential facilities and instrument (traffic and communication tools) should be put in place to improve management capacity.

Firstly, leadership both in government and CCICCD and their coordination capacity should be enhanced. A perfected institutional system for desertification management from central government to grassroots should be established. All the member units related to desertification combating should cooperate and coordinate closely to promote desertification combating.

Secondly, obligations for local government should be clarified. Central government should allocate to provinces fund, tasks and aims together with responsibility, power and benefits. Target responsibility systems should be established to realize green management. Green GDP could be used in leaders examinations.

Thirdly, by means of modern media such as TV, radio broadcasting, newspapers and posters, different types of education and propaganda should be carried out to raise public awareness and understanding of the importance so as to mobilize the whole society to participate in combating desertification.

Priority 2. To perfect laws and regulations, enhance law popularization, improve law implementing environment, and strengthen law execution

Legal construction in combating desertification should be advanced, including drawing of bylaws under the Law on Combating Desertification; the law implementing system construction (substantiate law implementing force, improve law implementing environment, improve law implementing level and increase law implementing degrees) and to enhance law popularization

and education.

New policies and regulations for combating desertification should be issued after systemic studies. For example, land ownership rights, land use rights and management rights should be separated in desertification regions. Different economic components are encouraged in some situations to buy land use rights. Use rights of land used in ecological construction could be allowed to be inherited and transferred.

Priority 3. To enhance the program and project management to heighten benefits

National ecological programs should be planned as integrated, interregional and inter-governmental. Consolidated national desertification combating program should be encouraged. Meanwhile, attention should be paid to enhance projects management. Modern project management ideas including project planning, assessment, auditing, inspecting and approval should be popularized to enhance quality control and improve project benefits.

At the same time, different models and demonstration plots or zones of advanced standards, high economic benefits, combined with national programs, and consolidated with local economic development should be established in different regions. They can be used as windows and popularized domestically and internationally to accelerate social and economic development.

Priority 4. To enhance human resources training

Human resources are the important tools in combating desertification. Effective training activities in different types, by different means and for different personnel (manager, technician and grassroots) should be carried out. At the central government managerial level (member units of CCICCD), coordination as well as desertification awareness should be raised. Attention should be paid to enhance and improve project management capacity. Different technical training should also be carried out to popularize and extend advanced techniques. At the grassroots level, attention should be paid to raise awareness. Special training should be carried out for leaders of the key regions to raise their awareness and enhance management capacity. Modern media such as TV, radio broadcasting, posters and newspapers can also be used to extend and popularize modern techniques to mobilize farmers to participate in combating desertification.

Combined with national desertification monitoring, training activities in remote sensing, use of GIS and GPS, networks and forecasting should be carried out to train technicians for desertification monitoring.

Priority 5. To enhance information sharing

Taking the Desertification Information Network of China as a cut-in point, contact and exchange with international desertification related organizations should be enhanced. Meanwhile, domestic information sharing should be accelerated to provide information resources for different personnel. Trial sites of establishment of information exchange and sharing mechanism at provincial and county level should be carried out to explore information exchange, updating and sharing mechanisms. National on-site monitoring stations can be used to establish scientific research information exchange and sharing mechanisms.

Priority 6. To enhance scientific support capacity

National key research should be enhanced to solve the key techniques in combating desertification, National scientific and technology special research for combating desertification

should be attend to basic theory and results extension so as to provide support to combat desertification. At same time, technical service and extension system should be perfected to extend and popularize advanced techniques and research results. Attention should also be paid to establish scientific support system and the functions of the National Senior Experts Consultant Group in Combating Desertification should be exerted further.

Priority 7. To enhance capacity in desertification monitoring

Combined with national desertification monitoring, attention should be paid to studies of monitoring indicator systems, monitoring methods and techniques. Human resources for desertification monitoring should be trained to improve monitoring technical levels. Research for desertification monitoring should put emphasis to networking techniques, 3S (RS, GIS, GPS), assessment indicator systems, expert systems, sandstorm warning and forecasting techniques. New and advanced equipment should be in place and kept updated to improve monitoring capacity. Attention should also be paid to international cooperation and exchange.

Priority 8. To enhance international cooperation

International cooperation in the field of combating desertification should focus on (1) demonstration constructions in sandy desertification control. Tested and demonstration bases can be established by international cooperation projects in different regions to extend advanced technologies domestically and internationally to improve technical content in combating desertification; (2) cooperation in the field of desertification monitoring capacity building should be carried out as a basis of present desertification monitoring by means of advanced techniques and instruments; (3) joint research should focus on applied research to solve the representative problems in given regions as well as technical extension; (4) training and technical extension. It is suggested that training and technical extension should be one of the aiding items and it can be implemented in different regions based on local conditions; and (5) public awareness raising and propaganda, which can emphasize laws popularization and human activities and desertification combating. It is also suggested that public awareness raising can be as one of items in international cooperation in combating desertification.

Priority 9. To improve negotiation capacity

Negotiation capacity should be emphasized to improve negotiator operation level and skills. Studies in techniques, policy and mechanisms related to UNCCD should be carried out. International cooperation and exchange should be implemented to learn UN convention from negotiation experiences. Exchanges among member units of CCICCD and overseas training should be carried out. GEF should support developing countries in negotiator training in combating desertification and aid more delegates to participate UNCCD activities. GEF should provide special aid to the Secretariat of CCICCD in capacity building for implementation of UNCCD in China.

References cited (omitted)