China National Report on International Decade for Natural Disaster Reduction

Appendix Two

Case Studies on Disaster Reduction in China

Great Losses Caused by Natural Disaster in China

Disaster and Social Relief Department of Ministry of Civil Affairs

The Center of Disaster Reduction,Chinese Academy of Sciences

In China, natural disasters have caused great losses to lives and properties. In 1990s, the average annual direct economic losses caused by natural disasters were tantamount to between 3% and 6% of GNP. Natural disasters have become the major factors hampering the sustainable development of economy and society.

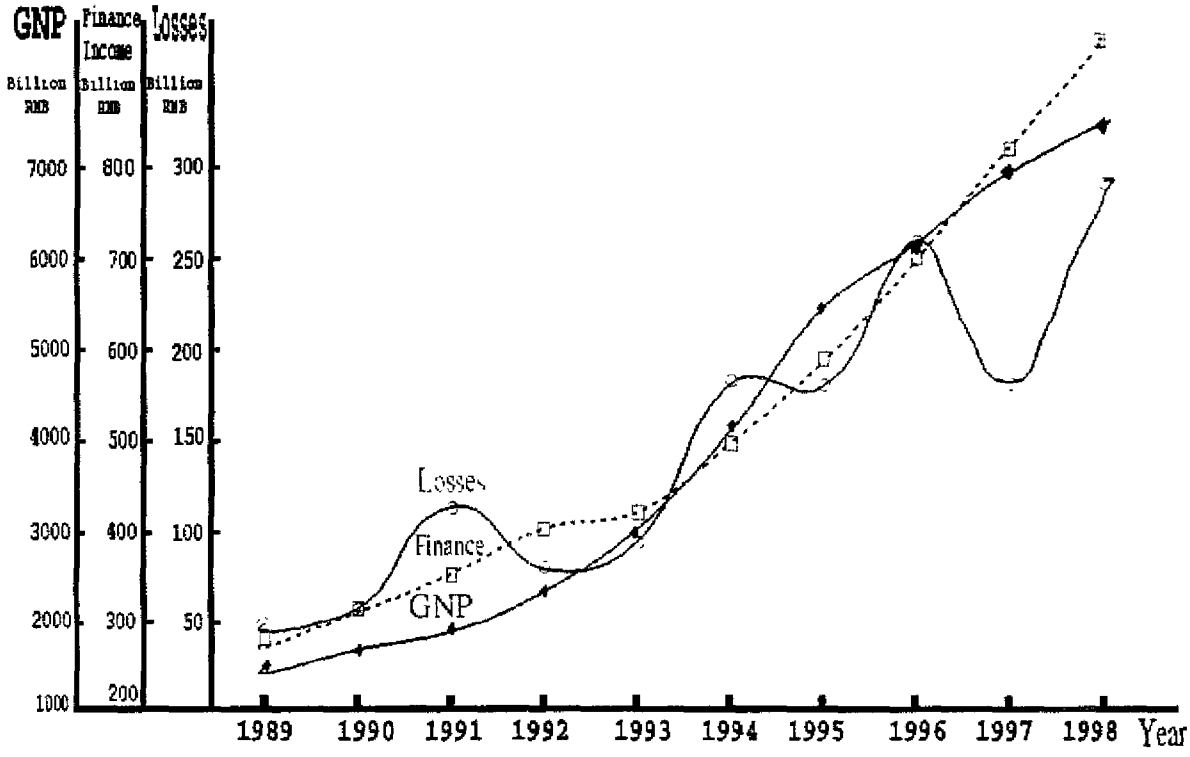

Figure 1. Economic Losses Caused by Natural Disasters ,GNP and Revenue from 1989 to 1998

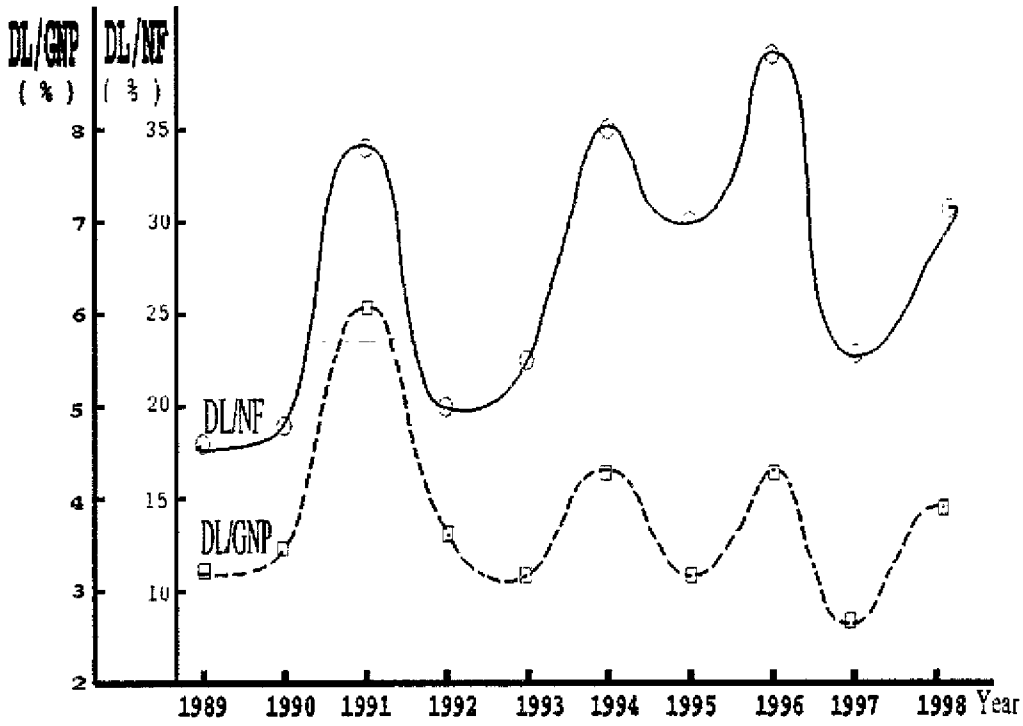

Figure 2. The Percentage of Economic Losses Caused by Natural Disasters to GNP and to Revenue from 1989 to 1998

Economic Losses of Natural Disasters in China

Year	G N P	Losses/GNP (%)	Finance	Losses/Finance(%)	Direct Losses
1989	1567.7	3.3	292.0	18.0	52.5
1990	1740.0	3.5	324.5	19.0	61.6
1991	2000.0	6.1	358.2	34.0	121.6
1992	2400.0	3.6	418.9	20.0	85.4
1993	3138.0	3.2	442.1	22.5	99.3
1994	4380.0	4.3	518.2	36.2	187.6
1995	5773.3	3.2	618.8	30.1	186.3
1996	6770.0	4.3	736.7	39.1	288.2
1997	7477.2	2.6	861.0	22.6	194.4
1998	7974.3	3.8	985.3	30.5	300.7
Average	4322.1	3.8	555.6	27.2	157.8

(Unit:Billion Yuan RMB)

Table 1. Direct Economic Losses Caused by Natural Disasters from 1989 to 1998

Glorious Achievements in Flood Fighting in China

Office of China National Committee for INDDR

The Center of Disaster Reduction,Chinese Academy of Sciences

China has constructed large amount of civil engineering projects for disaster reduction for many years. The mechanism for disaster reduction. "unified decision, division and coordination, rigorous organization, mass participation, science and technology forerunning, prevention as primary principle, eliminating the harmful and promoting the beneficial, guaranteeing development", is embodied activities in flood fighting activities . China has attained great achievements in fighting floods.

Flood Fighting in 1998

Flood in 1954

Flood in 1931

Overall watershed type floods, floods in 1931,1954 and 1998 have different results. Flood in 1931 overwhelmed a large number of cities, towns and villages in middle and lower reaches in Yangtze river, and deprived the lives of 145,000 people. Flood in 1954 broke more than 60 levees, and 33,000 people lost their lives. Flood in 1998 broke only one levee in Jiujiang City along the mainstream of Yangtze River. The breach was block up successfully in 5 days. 4,150 people lost their lives in the serious floods.

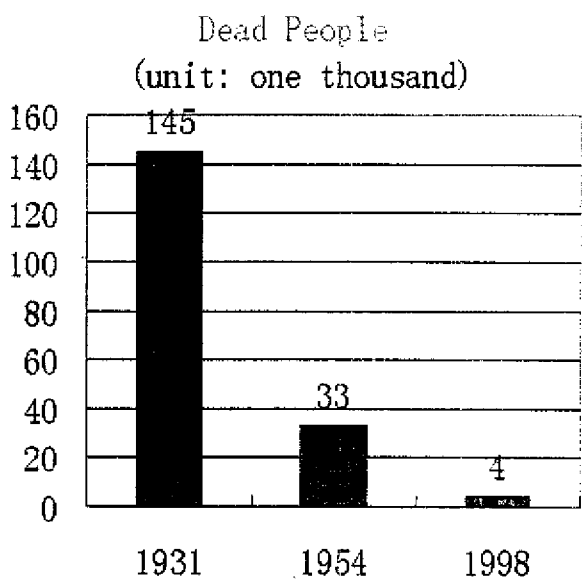

Figure 1. Deaths in floods in 1931,1954 and 1998

Great Floods in 1998

Ministry of Water Resources

Villages overwhelmed by flood

In 1998, big floods occurred in several major river basins in China, including the Yangtze, the Songhua, the Pearl and the Ming, etc. The floods in Yangtze, Songhua, Pearl and Ming are ranked as the second, the first, the second and the first biggest floods of overall watersheds for the respective river basins in this century.

1. Flood Damage

In 1998, there were total 29 provinces and autonomous regions suffered from flood damage in different degrees. The floods caused great losses. 22.29 million ha of farming land was stricken by the floods, and 13.78 million ha of farm land was damaged. The flood also deprived the lives of 4,150 persons, and damaged 6.85 million of houses. The direct economic losses amounted to 255.1 billions yuan RMB. Although the floods in 1998 are the same type of watershed jus as those occurred in 1931 and 1954, damage caused by the floods is much smaller than that in 1931 and 1954 owing to strong leadership, right decisions, efficient disaster reduction network, great support from the whole country and application of hi-tech in all stages of disaster mitigation.

2. Flood proventing and fighting

The State Flood Control and Drought Relief Headquarter had made a prediction before the flood season that a big watershed flooding might occur throughout the Yangtze River basin according to the weather forecast from national meteorological service. Works on protection and fighting against the possible floods were then started. Flood prevention regulation schemes for major rivers were modified and floods protecting preliminary schemes were carried out. Many critical projects, river sections, reservoirs were checked and enhanced. Flood fighting contingents were organized and materials were stored. All these laid a good foundation for conquering the floods. Provinces in Yangtze river basin made fully preparedness to against the most severe flood.

Cities inundated by flood

Unified instruction and correct strategic decision. The Central Government and the State Council guided the flood fighting in 1998 directly. In the flood fighting policy, ensuring safe running of Yangtze River levee, safeguarding important cities and people's life are clearly specified. A significant strategic decision was to dispatch army forces in large scale into flood fighting. The Chinese government leaders, Jiang Zemin, Li Peng, Zhu Rongji, Li Reihuan, Hu Jintao, Wei Jianxing and Li Lanqing directed the flood fighting at site several times.

Army-civilian defending to flood in full sail. During the 1998 floods, flood stages in many reaches (the total length of more than 300 km) of the main levees of Yangtze and Songhua rivers exceeded designed level. Sub-dikes were added urgently on the top of the levees to keep the flood in check. There were more than 9,000 sites on main levees of the Yangtze River where different kinds of dangerous situations occurred. And, there were more than 6,000 dangerous sites on Songhua levees. The army and armed police devoted over 360,000 personnels into the flood fighting. Number of people directly involved into the flood fighting all over the country was more than 8 million, 6.7 million in the Yangtze River basin and 1.1 million in the Northeastern region at its peak.

Making concerted effort of all the people in fighting against the floods. Every part of the country did its best on flood-fighting related works. Funds and materials for flood fighting were allotted without any delay. 278 designated trains for flood-fighting and disaster relief were arranged to convey troops of more than 120,000 and to delivery disaster relief materials of more than 50,000 wagons. More than 1,000 times airflights were arranged to carry disaster relief materials and facilities of more than 560 tons. Electric power supplies were ensured for flood fighting. Public security in flooded areas were enhanced. The flood regime and flood-fighting situation were report in time and all-round to lift the fighting spirit of soldiers and civilians. The state flood fighting headquarter urgently transferred large amount of emergency materials with total value of more than 494 millions yuan RMB. Emergency materials from local regions were more than 13 billions yuan RMB.

Director Conference of Flood Control Headquarters of Yangtze River

People from the whole country and foreign governments, international organizations, foreign enterprises donated money and relief material to assist people in disaster areas.

Scientifical regulation and fighting against the flood. There were 763 reservoirs at middle or large scale in five provinces and cities including Hunan, Hubei, Jiangxi, Sichuan and Chongqing which were employed in the flood retarding and peak flat-topping operation. The total flood retarding volume reached 34 billions m^3. All over the country, there were 1335 reservoirs in all engaged in the flood peak flat-topping in 1998, having retarded flood volume of 53.2 billions m^3, relieved flood struck farm land area of 2.28 million hectares and disaster struck population of 27.37 million, protected 200 cities from inundation.

Flood Control Headquarters at all levels got holding of flood situation timely and made corresponding thoroughly investigation. Flood regulating suggestions were put forward on time. As thebasis for the flood regulation, meteorological departments provided weather forecast timely everyday. The State Flood Control Headquarter and the Ministry of Water Resources sent more than 30 expert working groups to the flood-fighting frontline to give instruction. There were more than 50,000 engineering technicians among flood-fighting crew in Yangtze river basin.Under their correct direction the effective measures to flood fighting were followed, turning large amount of projects out of danger. Technological measures as computer global network, meteorological satellite communication, hydrological auto-survey and prediction, satellite remote sensing and GPS were also widely used.

Fighting flood upon law. Strictly execute the law. At emergency moment of the flooding in 1998, provinces of Jiangxi, Hunan, Hubei, Jiangsu, Anhui and Helongjiang successively announced the entering emergency status against the flood according to the Flood Protection Act. Flood Control Headquarters at all levels requisitioned urgent needs of flood fight items such as construction materials,

Directing the combat against flood

vehicles.They also punished severly those who negelected their duty at flood protection.

Implement disaster relief and health epidemic prevention timely. Disaster stuck people received well installation. Ensure their basic live requirement of food, clothes, living and medical treatment. Goods used in winter in disaster struck areas were well arranged too.No big plague occurred after the big flood. Epidemic situation of infections was in a stable tendency. Major infection was effectively controlled.

3. Re-construction after the flooding and river regulation

The State increases the investment to river engineering construction after 1998 floods. General arrangement of works of re-construction, river regulation and river conservancy projects have been allocated. The major points in this policy are:

Closing logging in mountain areas for tree planting, giving cultivated land back to recover forests, strengthening the conservation of soil and water, and improving the ecological environment. Emphasis is placed in the regions where badly ecological environment deterioration occurred in watersheds of the Yangtze and Yellow rivers.

Leveling dikes between main levees to enlarge floodway, giving parts of the reclaimed land to lakes, and building new towns for resettlement and the security facilities in flood detention areas.

Heightening and consolidating levees. The main levees of major rivers like Yangtze, and Yellow River as well as main coastal levees should be constructed to reach standard requirement within five years.

Expediting the construction of river control projects. Speeding up the construction of reservoirs, and the under-constructed projects of Three-gorge and Xiaolangdi. Exerting their flood-control function as early as possible.

Enhancing the control to big river regime, caving bank and the cleaning of deposition.

Advancing the modern flood-control technique, and increasing the investment to scientific research and technology.

Great Drought in 1997

Ministry of Water Resources

Drought in China

1. Introduction

In 1997, China was stricken by the most severe drought in the nation's history. The drought spread across 29 provinces and autonomous regions with different degrees, especially on the northern areas of the Yangtze River.

* 33.51 million hectares farmland were affected by drought, among them 3.96 million hectares lost the harvest of more than 80%, causing crop yields reduction of 47.6 billion kg.

* During the severe period, 16.8 million people and 8.5 million livestock were temporarily short of drinking water.

* The Yellow River depleted its flow in down stream 13 times for totally 226 days in the year with the dry riverbed of more than 700 km long. Both the length and the duration of dry riverbed broke the records in history

2. Measures to drought relief in 1997

Chinese government has paid much attention to drought relief. Since the founding of the P. R. China, the central government has invested more than 230 billion yuan RMB in water conservancy construction, building 85,000 reservoirs, 3.35 million conveyance electromechanical wells and 5580 irrigation regions with each area of more than 600 ha. The effective irrigation areas have increased from 16 million hectares in early 1950s to 52 million hectares at present, which improve the capacity of Chinese agriculture greatly against the natural disasters.

Major measures to drought relief in 1997 were as follows:

* 360,000 government officials at all levels and technicians were organized to the forefronts of drought relief to solve the existent problems for peasants in drought defying.

* People from the whole country donated cash and goods enthusiastically to support drought-defying activities and helped the victims tide over the difficulties.

* During the emergency period, 130 million labors took part in the drought defying activities, 2.82

Shrivelled crops due to water shortage

million electromechanical wells, 7.6 million lift irrigation devices with power of 45 7 million kw and 120.000 motor tank cars were applied for fighting against the drought.

* It took 12.3 billion yuan RMB in drought defying, as well as 760.000 tons of oil and 7.1 billion kwh power to irrigate near 50 million hectares farmland and retrieved crop losses of about 59 billion kg

3. Countermeasures of drought relief in China

The 1997 drought reveals again that the water conservancy facilities for agriculture in China are still very weak and vulnerable against the natural disasters. In order to thoroughly free from water-shortage in the development of our agriculture and economics, what we must do are as follows:

* Strengthening water resource engineering construction to improve water supply capacities.
* Strengthening the maintenance, regeneration and completion for existed water resources projects.
* Carrying on water saving activities to form a water-saving society.
* Strengthening soil and moisture conservation and water environment protection.
* Intensifying the coordinate management and dispatch of water resource to exert the best efficiency in drought relief.
* Carrying on the construction of drought forecasting and monitoring system, as well as the drought-relief information management system to improve the management levels of drought relief.

Great Floods in 1991

Ministry of Water Resources

A boy lost his home

From late May to early July in 1991, continuous rainstorms occurred in Huai river and Tai Lake basins in China. The flood in Huai River Basin is ranked only after that of 1954. In Tai Lake basin, it is the highest water stage of 4.79m ever recorded. Heavy losses of industrial, mining and township enterprises occurred in surrounding regions. In Songhua River, two major floods occurred along the main stream that listed the third and the second largest floods since 1949.

The major countermeasures of flood control in 1991 were as follows:

1. Cutting off the flood peaks by storing flood in the reservoirs: massive peak flows had been retarded in 15 large reservoirs in the upper reach of the Huai River Basin up to 3 8 billion m^3 in all, cutting off 70%-90% of peak flows for related tributaries.

2. Dividing floods to floodway districts and detention basins: 3 detention basins and 14 floodway districts in the middle reach of the Huai River Basin had been utilized to store the peak flows up to 4 billion m^3 which accounted for 19% of flood discharge from June 15 to July 14.

3. Discharging flood flow in advance from Hongze Lake to fully utilize its pondage action: the Sanhe Gate had been opened twice completely to release the flood. Together with other offtakes, the maximum mean water discharge was up to 10,074 m^3/s.

4. Lowering the flood stage by opening the release gate: the Taipu Gate had been opened more than two months Adding other release gates around the eastern Tai Lake, the flood flow had been released more than 1 billion m^3 and the water stage in Tai Lake was lowered for more than 20cm.

Discussing Countermeasures for Flood Fighting

5. Mitigating waterlogging by pumping surface pounding against time: 7.4 billion m^3 of surface pounding had been pumped into the sea and the Yangtze River via drainage works, thus reduced the waterlogging damage obviously.

6. Removing such barriers as polders and enclosing dikes blocking water along the lower reaches of rivers and lakes.

Because of these strategies, the water stages in Huai River and Tai Lake Basins were controlled. None of major flood control works in the basins was failed. The Huaibei Embankment that protects 667,000 hectares of arable land and 6 million people were saved. The Embankments around the Hongze Lake and along the Inner Canal were kept in safety, protecting 2 billion hectares of arable land and 80 million people.

However, the Huai River and Tai Lake Basins suffered severe damages because several flood-way districts and detention basins were put into operation, According to the statistics, the floods in 1991 affected 24.59 million hectares of farmland, destroyed 4.98 million houses, and brought 77.9 billion yuan RMB of direct economic losses.

After the floods, the State Council made a 30-training-work plan for Huai River and Tai Lake basins The major objective of the plan is to control flood. By the end of 1998, 19 training works in Huai River basins have been carried out, constructing and reinforcing levees of 2,078 km, dredging the river channels of 430 million m^3, building structures of 1,002, and completing investment of 10.175 billion yuan RMB. The condition of flood control has been improved obviously by comprehensive regulating in Huai River Basin contrast to the situation of 1991. There were 11 major regulating projects conducted in the Tai Lake Basin with total investment of 9.6 billion yuan RMB, and concrete of 1.3 million m^3. After several years of construction, the major flood-relief channels in the Tai Lake Basin are unblocked basically. In the meantime, the conditions of flood and waterlogging control, water environment, and navigation condition have been improved preliminarily.

Disaster Relief Donation in 1998

Ministry of Civil Affairs

Enterprises were actively donating

In the summer of 1998, severe floods hit the basins of Yangtze River, Songhua River, and Nen River. After the hazard, the people of all ethnic groups of the nation, residents in the Hong Kong, compatriots in Macao, Taiwan and oversea showed great concern and contributed generously to the disaster areas. The leaders, governments, social organizations from many countries and their embassies in China, the relevant UN agencies and international organizations, foreign-invested enterprises in China and foreign friends also rendered their generous assistance.

During the flood control and disaster relief, Ministry of Civil Affairs, China Charity Association, Red Cross Society of China and local bureaus of Civil Affairs received donation funds of 3.515 billion yuan RMB, and 3.744 billion yuan RMB worth of donation materials, the total value of which amounted to 7.3 billion yuan RMB.

Most of the donations were used to arrange life for the affected people and help them rebuild their homeland, and a small part was used in emergency transformation, epidemic prevention and medical care in stricken areas. These donations played a decisive role in helping the affected people survive the hazards, rebuild their homeland, enhance vigor and defeat the disasters.

The great achievement in the relief and donation work in 1998 was due to the following factors.

1. The State Council took the disasters seriously and provided correct leadership, and the government at different levels made thoughtful arrangements as well.

The fight against the flood was directly led and commanded by the State Council. On August 23, 1998, the State Council dispatched "the Emergent Circular about Energizing the Administration of Disaster Relief and Donation Work", clearly defining the extent of authority in donation organization and the principles of the donations' utilization and allocation