

Chapter One History and Present Status of Natural Disaster Reduction Activities in China

Section 1 Brief History of Natural Disaster Reduction in China

China, a country with a vast territory and a huge population, has been plagued by nearly all kinds of natural disasters except volcanic eruptions. In a certain sense, therefore, the history of the Chinese Nation is a history of combating natural disasters. And in the course of history, China has created great water conservancy engineering projects of very long standing, such as the Dujiangyan Water Diversion and Irrigation Project of Sichuan Province and the Sea Dike of Zhejiang Province, and has accumulated rich experience in disaster reduction.

Since the founding of the People's Republic of China in 1949, while going all out for economic construction, the Communist Party of China and the Chinese Government have led the Chinese people to exert their efforts in mitigating natural disasters, and have allocated huge financial and manpower resources for this purpose.

In the early period following the founding of the People's Republic, with the Ministry of Water Conservancy and Ministry of Interior as the core, the Chinese government set up the Central Commission on Natural Disaster Relief to take direct charge of the management of natural disasters. And, in the light of the prevailing conditions of frequent floods and droughts, the Commission formulated the disaster relief policy of "Self-help through production; practising economy to tide over starvation, expanding mutual help, providing work as a form of relief and supplemented by the necessary relief funds"; and gigantic projects were implemented to harness the historically flood-causing big rivers, such as the Yangtze River (Changjiang River), Yellow River (Huanghe River), Huaihe River and Haihe River.

After tiding over the economic recovery period (1950-52) during which successive severe natural disasters had occurred, the Chinese Government initiated natural disaster reduction activities across the country, including massive afforestation drive and large scale efforts to

prevent and control crop and forest diseases and insect pests. In the mean time, the Government set up the Central Meteorological Administration (currently called China Meteorological Administration), State Oceanic Administration and State Seismological Bureau, to meet the demands of disaster management in China. In the 1970s, the Chinese Government further set up relevant departments and professional and research institutions to deal with the mitigation of natural disasters in the fields of flood, drought, meteorological, oceanological, seismic, geological disasters, as well as agricultural and forest disasters. The capability of preventing and mitigation natural disasters was thereby further improved.

Since the advent of the 1980s, China has persisted in her guiding principles of reforms and opening up. With the progress in socio-economic development, the nation's awareness of the damaging harm of natural hazards has been raise extensively. And the existing different types of disaster reduction systems have been gradually modernized. Satellite technology, remote sensing technology, modern communication, computer system, artificial intelligence and various up-to-date monitoring and forecasting equipment have been increasingly used in disasters monitoring, forecast, prevention and rescue, thus providing China with an initial capability to apply modern science and technology to mitigate natural disasters.

Since 1989, China's disaster reduction has entered a new stage. The Central Government and a number of local governments have established comprehensive disaster reduction organizations to conduct researches into policy measures on disaster reduction, to expand disaster reduction management and planning, to enhance cooperation with international community, and to further strengthen publicity and education in disaster prevention and mitigation. Meanwhile a large number of disaster reduction projects have been screened, formulated and implemented and activities relating to natural disaster reduction are being progressively incorporated into the nation's overall programme of socio-economic development.

Section 2 China National Committee for the IDNDR

1. Establishment, Composition and Function

China National Committee for the IDNDR (hereinafter referred to as CNCIDNDR) was set up in April, 1989 by the Chinese Government in response to the UN Resolution 42/169. The

Committee is an inter-ministerial coordination organization, chaired successively by Vice-Premier Tain Jiyun, State Councillors Luo Gan and Li Guixian. CNCIDNDR committee members are leading cadres from 27 Ministries, Commissions and Administrations under the State Council as well as from the Headquarters of the General Staff of the People's Liberation Army. The component units of the Committee are the following:

- Ministry of Foreign Affairs,
- State Planning Commission,
- State Economy and Trade Commission,
- State Education Commission,
- State Science and Technology Commission,
- Ministry of Public Security,
- Ministry of Civil Affairs,
- Ministry of Finance,
- Ministry of Geological and Mineral Resources,
- Ministry of Construction,
- Ministry of Railways,
- Ministry of Communications,
- Ministry of Posts and Telecommunications,
- Ministry of Water Conservancy,
- Ministry of Agriculture,
- Ministry of Forestry,
- Ministry of Interior Trade,
- Ministry of Foreign Economic Relations and Trade,
- Ministry of Broadcasting, Film and Television,
- Ministry of Public Health,
- Chinese Academy of Sciences,
- China Meteorological Administration,
- State Oceanic Administration,
- State Seismological Bureau,
- The China Red Cross Society,
- The National Natural Sciences Foundation of China,
- The People's Insurance Corporation of China,
- The Headquarters of the General Staff of People's Liberation Army.

Office of the National Committee along with the Experts Committee under the CNCIDNDR

has been designated to take charge of the organizational work relating to disaster reduction national activities, scientific research, technical training, information exchange and risk assessment, general public education and to assist in, and provide data for, Government decision-making with respect to disaster reduction.

2. Major Activities Undertaken

(1) Publicity

Beginning with the television speech by Vice-Premier Tain Jiyun, entitled "Go all out, to unfold activities of the Decade for Natural Disaster Reduction in China" delivered on February 12, 1990, CNCIDNDR has persisted in extensive publicity of IDNDR. This includes:

— Having conducted annually, around the IDNDR Day, extensive publicity activities, centring around the annual theme on disaster reduction, to carry out various kinds of mass-participating activities and, for this purpose, making a good use of relevant artistic forms and of the mass media, including broadcasting, TV programmes and press reports.

— Having founded and circulated over 10 kinds of newspapers and journals on disaster reduction, for disseminating knowledge of disaster mitigation and reduction and for promoting scientific research in this regard, with some of these journals having been sent abroad for exchanges with other countries.

— Having organized various kinds of disaster relief and disaster reduction activities with the participation of people from various circles, mass organizations and relevant departments, with a view to further enhancing the people's disaster reduction awareness.

(2) Organizing Disaster Reduction Undertakings

Having drafted the "Framework for IDNDR in China", CNCIDNDR has, on the basis of the adopted Framework, been engaged in the following undertakings:

— Coordinating and organizing the study, discussion and identification of the national and local disaster reduction strategy and measures and related major problems, with the

participation of the relevant Ministries and Commissions and part of the Provincial(or Municipal) Governments.

— Organizing and coordinating scientific research institutions, universities and colleges, academic societies in holding disaster-related seminars and workshops and putting forward recommendations on natural disaster reduction.

— Giving guidance to the establishment of IDNDR subcommittees in relevant Ministries and some provinces/municipalities, or designating the appropriate existing unit to take charge of disaster reduction matters concurrently at the corresponding level.

— Supporting, assisting and joining relevant regions and departments in their disaster reduction activities.

(3) Practice in Disaster Reduction

— Having taken an active part in China's 1991 Severe Flooding relief operations when eastern China suffered exceptionally severe floods, and in this connection having made urgent appeals to the international community for disaster-relief assistance to the stricken areas and organized domestic donations.

— Having sponsored in 1993, jointly with the art circle of Hong Kong, Charity Shows for Poverty Alleviation in disaster-stricken areas, lasting six months thereby helping raise funds exclusively for disaster reduction and related poverty alleviation.

(4) International Cooperation

— Having coordinated and organized relevant academic exchanges and negotiations on disaster reduction cooperative projects with relevant UN agencies, international organizations and friendly countries. Since 1990, 21 international seminars, workshops and conferences on disaster reduction have been held in China.

Section 3 China's Policy, Institutional Systems on Disaster Reduction and the Achievements Scored

1. China's Policy on Natural Disaster Reduction

Viewing disaster reduction as an important aspect of promoting social progress and economic development, China has incorporated disaster reduction into the overall national socio-economic development programme.

On disaster reduction, the guiding principle formulated by the Chinese government is "Give top priority to disaster prevention and integrate this with disaster-combating and relief operations".

China's major policy measures on disaster reduction are: Accelerating the establishment and strengthening of monitoring and forecast systems on natural hazards, improving the quality of monitoring and forecast, stepping up construction of disaster reduction engineering projects, and integrating these with economic development so as to raise the nation's overall capability of disaster prevention; After occurrence of disasters, mobilizing all the necessary forces and resources to minimize loss in life and property to guarantee the livelihood of disaster-stricken people and to mitigate the disaster effects; Further improving the related work, including improvement of relevant laws and regulations on disaster reduction, and strengthening publicity and education to raise the awareness of the whole nation; Giving full play to the role of science and technology in disaster reduction.

2. China's Institutional Systems for Natural Disaster Reduction

In natural disaster reduction, China integrates the unified policy decisions by the central government with co-ordinated and concerted implementation by the relevant departments according to their respective fields of competence. The institutional systems are as follows:

(1) The national comprehensive coordination organization:

— China National Committee for the IDNDR, composed of 28 departments.

(2) The national comprehensive coordination organization for specific types of natural disasters:

— Headquarters for National Flood Prevention and Drought Control.

(3) Comprehensive coordination organizations at local levels:

— The Local Government or local IDNDR Committees.

(4) The local comprehensive coordination organization for specific types of natural disasters:

— The local Headquarters for Flood Prevention and Drought Control.

— The local Headquarters for Forest Fire Prevention.

(5) Scientific research institutions, universities and colleges, relevant NGOs.

3. China's Main Achievements in Natural Disaster Reduction

In the course of economic development, the Chinese Government has allocated the necessary financial resources to disaster reduction. According to preliminary statistics, China has since 1949 put 300 billion *yuan* through various channels into disaster reduction, whereby the economic benefits gained amount to double that of the financial input, and the social benefits have also been remarkable.

— Regarding the construction of disaster reduction engineering projects. Over 40 years, China has cumulatively built over 100 billion *yuan*'s worth of fixed assets in facilities relating to flood prevention, drought combating and water conservancy. Moreover, the nation has completed reinforcement projects against earthquake in 14 main railways, 90 key power plants, 6 major petroleum pipelines, 20 large oil refineries, some super-large ethylene projects, key iron and steel plants, and large-scale reservoirs. Furthermore, China has intensified efforts at afforestation and construction of shelter forests, so that the forest coverage has been raised from 8.6% in the 1960s to the current 13.92% level. In addition, in the last ten years, 1.5 hundred million *ha* of land areas affected by pests and other ecological disasters have been brought under control annually, and in recent years, disaster prevention bases have been built up in the nation's pastoral areas or grazing land.

— Regarding establishment of monitoring and early warning systems. So far, China has set up a meteorological monitoring and forecast network consisting of more than 2600 weather stations, a hydrological monitoring system encompassing 8000 precipitation and water level

monitoring stations, a pre-seismic observatory network comprising over 1000 stations, a monitoring and forecast system consisting of 3000 plant disease and insect pests monitoring stations, a predicting and early-warning system on grassland insect pests and rodent, encompassing 240 stations, a monitoring and early-warning network on marine and coastal disasters consisting of 280 ocean-watch and tidal stations, in addition to the forest and grassland fire monitoring systems and geological disaster surveying and warning systems, etc. And telephones, radio communication networks, television and local radio networks have been extensively used in the timely transmission of disaster-related information.

— Regarding organization of disaster relief operations. In an average year (i.e. in the absence of severe natural disasters), the Central Government annually allocates 1.4 billion *yuan* and more than 1.5 million tons of grains as well as a considerable amount of materials and daily necessities for disaster relief operation; and these are duly distributed, thereby satisfying the basic needs of disaster stricken people. In addition, natural disaster insurance has also been expanded.

— Regarding rescue operations. With the establishment of national networks for epidemic disease prevention and medical rescue, emergency medical treatment has been given to a great number of the sick and the injured. As a result, epidemic diseases have been controlled or eliminated in the seriously hit disaster areas, particularly in the aftermath of disastrous floods.

— Regarding relevant science and technology. China has strengthened disaster reduction through the application of relevant science and technology. To date, over 100 specialized institutions have been set up and are engaged in disaster reduction research across the country. And the State has allocated an additional input of one hundred million *yuan* for the scientific and technological research on disaster reduction in the 8th Five-Year Plan period (1991-95).

— Regarding publicity. Extensive publicity and education in disaster reduction has been conducted, and legislation relating to disaster reduction has also been strengthened.

Chapter Two China's Major Natural Hazards and Risk Assessment

China is one of the few countries where natural hazards strike frequently and cause heavy damage. Flood, drought, typhoon, storm-surge, earthquake, landslide, mud-rock flow, pests and other ecological disasters, forest-fire, etc. frequently affect large areas of the country, bringing enormous damage to human life and property.

Section 1 Summary Account of Natural Hazards in China

1. The Features of Natural Hazards in China

The main features of natural hazards in China are as follows:

— Large Variety. A country vast in territory and complex in climatic and geographical conditions, China suffers mainly from such kinds of natural hazards as drought, flood, typhoon, earthquake, hails, freezing spells, snow storm, forest fire, plant diseases and insect pests, landslide, cave breakdown, mud-rock flow, sandstorm, storm surge, sea wave, sea ice and red tide, etc. Among these hazards, drought, flood, typhoon and earthquake are most destructive.

— High Frequency. Since 1949 when the People's Republic of China was founded, on an average drought has occurred 7.5 times each year, flood 5.8 times, typhoon (including tropical storm) 6.9 times, freezing spells 2.5 times--all being relatively high in frequency. Over the past 44 years, China has suffered more than 50 earthquakes of force 7 or greater magnitude on Richter's Scale, including three force 8 earthquakes. Major storm surges strike China's coastal areas 7 times a year on average. Cases of landslide, cave breakdown and mud-rock flow occur more than 100 times annually. Major plant diseases and pests strike once every three or four years. Each year 8 million *ha* of forest suffer insect pests or disease infections. And 20 million *ha* of grassland are affected by insect pests and rodents. Thus, China is one of those countries in the world where natural disasters strike rather frequently.

— Regional and Seasonal Features. Drought tends to occur mainly the Northwest Loess Plateau and North China Plain in spring and autumn. Flood and waterlogging mainly occur in the seven big river valleys in summer. Typhoon and storm-surges strike mainly the southeastern coastal regions, and earthquakes occur mainly in southwestern, northwestern and northern China. Forest and grassland fires mainly in the forest and pastoral areas of northeastern, southwestern, northwestern and northern China in the dry season of winter and spring.

— Serious damage. Natural disasters have brought heavy economic losses, human injuries and deaths to the nation's stricken areas.

2. Serious Damage Done by Natural Hazards

Natural disasters cause heavy losses to life and property in China and have become important factors hampering the sustainable development of China's economy. In an average year since 1949, natural disasters would result in wracking 40 million *ha* of farm crops, causing a loss of 20 million tons of grain, destroying 3 million houses, affecting 200 million people--with 3 million people in need of resettlement and a death toll of thousands of people--and bringing a direct economic loss of several billion *yuan*. Damage would be even heavier in major disaster years or when catastrophic hazards occurred.

In the last 4 years, the direct economic losses caused by natural hazards were:

1989	52.5 billion <i>yuan</i>
1990	61.6 billion <i>yuan</i>
1991	121.6 billion <i>yuan</i>
1992	85.4 billion <i>yuan</i>

On an average, China's losses caused by natural disasters accounted for nearly a quarter of the global total (of about US\$ 50 billion annually) in the early 1990's.

Section 2 Major Natural Hazards in China

1. Atmospherical and Hydrospherical Disasters

— Flood and Waterlogging. These are China's biggest natural hazards in terms of occurrence frequency and the losses caused. From 1951 to 1990, China annually experienced an average 5.9 times of floods and waterlogging, with maximal 10 times and minimal 3 times in one year. In terms of occurrence frequency, rainstorms and floods are very high in the southeastern coastal areas, the Yangtze River and Huaihe River valleys, the Dongting Lake area and Poyang Lake area --in these areas, rainstorms and flooding occurred 15-32 times over the past 40 years. Since 1949, on an average the flood-affected areas totalled 7.95 million *ha* annually, of which 4.41 million *ha* suffered severe damage. From 1989 to 1992, the annual average flood-affected areas totalled 14.76 million *ha*, of which 7.33 million *ha* was severely flooded and 1.67 million *ha* was rendered yieldless; and these floods caused a death toll of 3000-4000 people and the destruction of over 2 million housing units. In 1991, 18 provinces/autonomous regions/municipalities in China were hit by natural disasters in varying degrees, with the lower Yangtze River valley & Huaihe River valley and the Taihu Lake area suffering from severe floods and waterlogging rarely recorded in history. And these disasters damaged 24.6 million *ha* of crops, claimed the deaths of 5113 and destroyed 4.98 million housing units, causing a total direct economic loss of 77.9 billion *yuan*.

— Drought. From 1951 to 1990, on an average, China experienced 7.5 times of drought annually, with maximal 10-11 times and minimal 3 times in an individual year. In the agricultural areas of eastern China encompassing the Yellow River and Huaihe River, Haihe River valleys, higher frequency of drought was recorded, where 30-40 times of droughts occurred in 40 years. Since 1949 on an average, 20.7 million *ha* of land was hit by drought annually, of which 7.89 million *ha* was severely affected. From 1989 to 1992, 26.37 million *ha* was affected by drought on an average each year, of which, 12.67 million *ha* was severely affected.

— Typhoon and Storm Surge. From 1949 to 1992, 7 typhoons (including tropical storms) landed in China in an average year, with a maximum of 12 and a minimum of 3 within a year. Typhoons landed mainly on the coastal areas of southeastern China, where 89% of the total were recorded, and the coastal areas of Guangdong, Hainan, Fujian, and Zhejiang Provinces were the worst affected. From 1989 to 1992, a total of 33 typhoons landed in

China, causing on average an annual typhoon stricken area of 3.07 million *ha*, damaging 189000 housing units, killing about 450 people, thus causing an annual direct economic loss of over 8 billion *yuan* on an average.

Storm surge is the most destructive marine/coastal hazard for China. One storm surge (one in Shanghai in 1696, and the other one in Guangzhou in 1862) claimed over 1 hundred thousand deaths. Many typhoons that had brought severe damage are caused by storm surge. In 1992, a catastrophic storm surge caused 200 deaths and an economic loss of 9.6 billion *yuan* in the affected coastal areas. Between 1949 and 1992, China experienced 13 times of catastrophic storm surge; in addition, 84 times of storm surge also caused severe economic losses and casualty.

— Other Disasters. Windstorms, hails, snowstorms, freezing spells, sea wave and sea ice, coastal erosion, etc. are also serious natural hazards for China.

2. Seismic and Geological Disasters

— Earthquakes. From 1949 to 1992, earthquakes had killed 277000, injured and disabled 836000 people in China, damaged over 11.393 million housing units, and caused a direct economic loss of tens of billion *yuan*. According to statistics, deaths from earthquakes totalled 610000 people in China since the beginning of this century, accounting for 50% of the global deaths from earthquakes.

On July 28, 1976, an earthquake with a magnitude of 7.8 on the Richter's Scale hit Tangshan municipality of Hebei Province, killing 242000 people and badly injuring and disabling 164000 causing a direct economic loss of over 10 billion *yuan*. That severe earthquake destroyed the whole of Tangshan, a key city in northern China and, moreover, damaged 1/3 of the buildings in Tianjin. Besides, major earthquakes that occurred in China from 1966 to 1992, included the following: the 1966 Xingtai earthquake, measuring 7.2 on the Richter's Scale; the 1970 Tanghai earthquake in Yunnan Province, with a Magnitude of 7.5; the 1975 Haicheng earthquake in Liaoning Province, with a Magnitude of 7.3; the 1988 Langcang-Gengma earthquake in Yunnan Province measuring 7.6 on the Richter's Scale.

The characteristics of seismic disaster in China are that the western part of China is liable to be struck by stronger quakes than those striking the eastern part (in terms of magnitude),

however the economic losses and casualties brought by earthquakes to the eastern part are much heavier than those to the western part of China.

— Geological and Geomorphological Disasters. There are 410000 places in China suffering from geological disasters such as cave breakdown, landslide, mud-rock flows, and a total area of 1500 square kilometres is affected by subsidence of various kinds. Since the 1980s on the average, the decertified land annually expands by 2100 square kilometres, and the area of soil erosion exceeds 1.8 million square kilometres, affecting 24 provinces. In the past decade such disasters as cave breakdown, landslide and mud-rock flows on average took a death toll of 900 people each year, and caused a direct economic loss of 3.6 billion *yuan*.

3. Biological Disasters

— The crops biological disasters in China can be classified into 1400 kinds, among these, 770 are caused by pests, 550 by plant diseases, 60 by weeds and 20 by rodent. From 1989 to 1992, these various biological disasters damaged 47 million tons of grain and 1.26 million tons of cotton.

— Grassland rodent and insect pests affect more than 20 million *ha*, causing degradation of grassland and adversely affecting the quantity and quality of the forage grass.

— Forest diseases and insect pests in China are of 8000 kinds, of which 200 kinds cause severe damage frequently. Since the 1980s, these diseases and pests annually affected some 8 million *ha* of forest areas (11 million *ha* in 1989), causing a direct economic loss of 2 billion *yuan*, greatly surpassing the losses caused by forest fires.

— About 200 kinds of epidemic diseases affect the breeding of aquatic products like fish, shrimps, lobsters, algae, crabs and artificially-bred frogs. From 1990 to 1992, these diseases caused an annual economic loss of around one billion *yuan*.

4. Forest and Grassland Fires

— China is one of the countries whose forest fires are most frequent and are causing heavy losses. Since 1950, an annual average of 16000 forest fires has occurred in China, affecting 985000 *ha* of forest areas, causing an annual direct economic loss of over 1 billion *yuan*, and

a death toll of 105 people. The 1987 extraordinary Daxinganling Forest fires were most damaging, having affected an area of 1.33 million *ha* and having damaged 870000 *ha* of forests, caused the deaths of 213 persons, and burned into ashes 80.25 million cubic metres of stocked timber, thus causing a total direct economic loss of over 2 billion *yuan*.

— In China, fires pose a threat to 2 hundred million *ha* of grasslands, of which, nearly one hundred million *ha* are frequently afflicted. Since 1949, 50 thousand fires of varying magnitude have stricken the pastoral areas and grazingland, killing 430 people and causing a total economic loss of over 30 billion *yuan*.

Section 3 Risk Assessment of Natural Hazards in China

The risk level in China is related not only to the hazard-formative factors, but also to the land use structure, regional economic levels and the disaster combating capability in various regions.

1. The Structure of Land Use and Natural Hazard Risks

— China is a populous country with meagre land resources, with her usable land largely taken up by agriculture and forestry, and her levels of industrialization and urbanization being as yet relatively low. According to statistics, of the 9.6 million square kilometres of China's total land area, *n*-land accounts for 13.1%, vegetable-garden 0.8%, forests 21.6%, pastures in current use 27.5%, water areas 3.8%, human settlement and industrial-utilized land 2.2%, land utilized for communication facilities 0.8%, the unused land (with difficult terrain features) 30.2%. The nation's per capita land is 0.97 *ha*, per capita farmland is 0.09 *ha*, and per capita construction land is only 0.002 *ha*.

— At the macro level, China's structure of land use has determined the disaster composition of China, namely, in terms of scope, the bulk of farmland and pastures are the main areas threatened by natural hazards. In the event of a disaster, therefore, peasants and herdsmen are affected the most, and in case of a destructive disaster, thousands upon thousands of households would be adversely affected. However, in terms of losses, those caused by disasters in urban areas would usually be much heavier. The nation's structure of land use therefore determines that China should not only strengthen key engineering projects against

natural hazards in the urban and industrial areas, but also should attach importance to the improvement of the disaster combating capability in the rural and pasture areas.

2. Regional Differentiation in Risk Levels

Fig.1 indicates the centre locations of various major natural hazards in China, such as flood and waterlogging, drought, typhoon, storm surge, earthquake, landslide, mud-rock flow, plant diseases and insect pests, forest fires. And from this one can see the overall distribution pattern of China's hazards affected areas.

As hazard-formative factors and regional economy share distinctive difference between the coastal areas and inland areas, as well as between the southern and northern areas, the risk levels of natural hazards also vary accordingly. A division line drawn from Heilongjiang Province down to Yunnan Province would serve as a demarcation line, to the east of which is China's eastern part; and to its west, the western part--with a transitional zone along both sides of this line:

— The eastern part is prone to various kinds of hazards with strong intensity and high frequency. In this part of the country urbanization and industrialization are growing rapidly and economy is relatively more developed. The GNP per capita in 1992 reach 2852 *yuan*. Therefore, this part is the high risk region, where the risk levels listed in a descending order are: northern China, the coastal areas, the lower Yangtze River valley and Huaihe River valley, and finally northeastern China. Take the year 1992 for example, the direct economic losses caused by all kinds of natural hazards in this part accounted for 48% of the nation's total in the same year.

— The middle part, or the transitional zone along both sides of the above-mentioned line, is situated between the eastern and western parts of China, where the types, intensity and frequency of natural hazards are all at the intermediate levels. In recent years, as a result of the enhanced construction of energy resource bases, the economy development in this part has been accelerated and the GNP per capita has reached 1609 *yuan*. This region has great potentials for further economy development, and it is a region with intermediate disaster risks. Here, the risk levels listed in descending order are: the farmland and pastures areas adjacent to northern China, southwestern China, the areas bordering the Provinces of Hunan, Guizhou, Guangxi and Sichuan. In this part of China, in the year 1992 the direct economic

losses caused by natural hazards accounted for 34% of the nation's total in the same year.

— The western part. This is a vast region characterized by higher altitude, frigid weather, arid land, high mountains and plateau and large stretches of deserts, with a rather fragile ecological environment, and wide-spread natural hazards. Constrained by the physical conditions and historical reasons, the overall economic level in this region is relatively low, except for the river valleys and the oasis areas where population is dense and economy has developed more rapidly. The GNP per capita of this region is 1391 *yuan*. Therefore this is a low-risk region. Within this region, the risk levels listed in descending order are: the river valley in the northwestern areas and the oasis areas to the southern of the mountains, the valley areas in southern Tibet Autonomous Region of China, Inner Mongolia and Northern Tibet Plateau of China. In the year 1992, in this vast region the losses caused by natural hazards accounted for 18% of the nation's total in the same year.