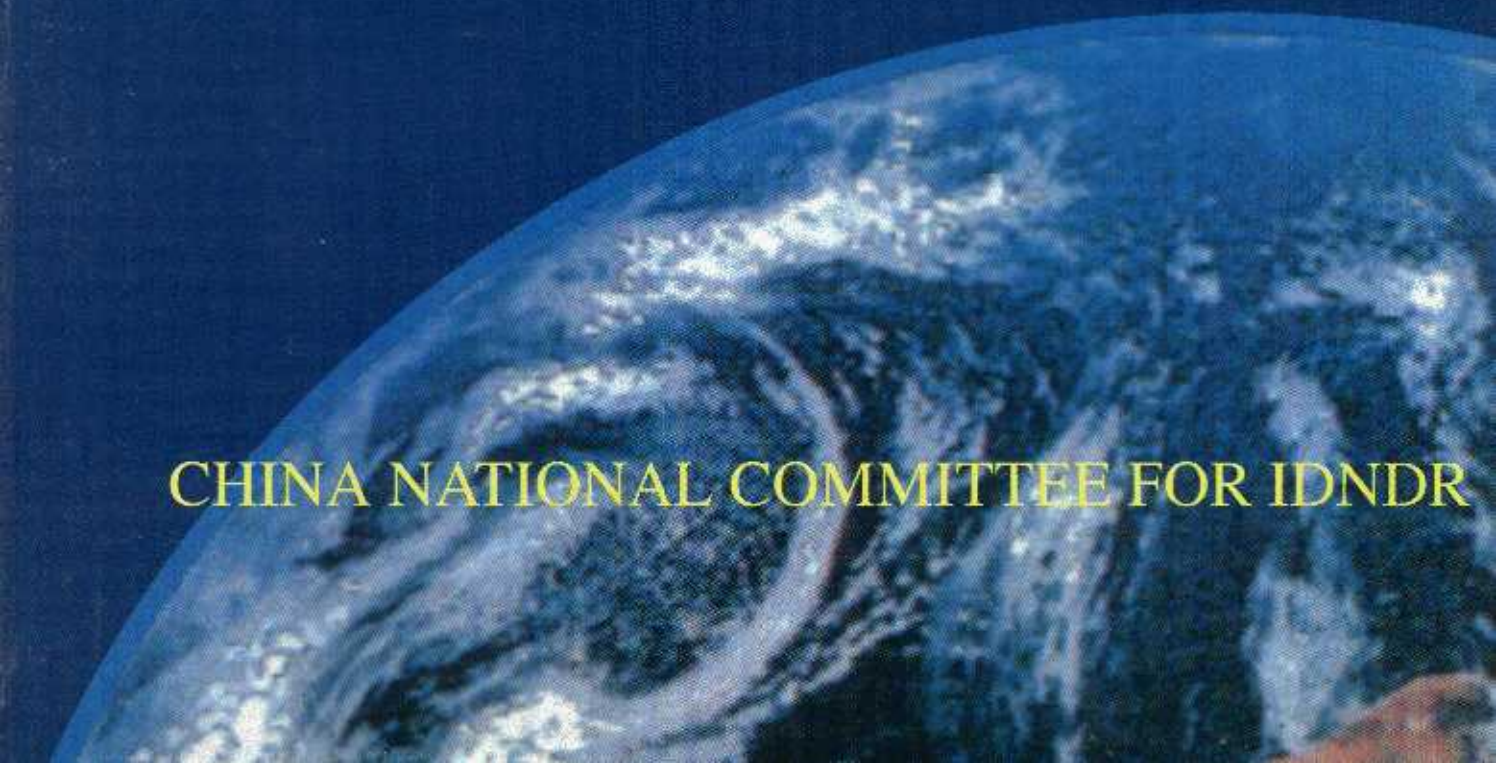
CHINA NATIONAL REPORT ON INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

Appendixes



CHINA NATIONAL COMMITTEE FOR IDNDR

Preface

In order to prepare for the 2nd World Conference on Natural Disaster Reduction, China National Committee for IDNDR organized its component units, some provinces, and research organizations to compile the Appendixes. The appendixes present brief introduction of CNCIDNDR firstly,and has chosen some special disaster reduction cases with respect to main disasters in China.These cases reflect the disaster reduction efforts in China from a wide variety of perspectives. The appendixes also briefly introduce some non-governmental and research organizations and their contribution to disaster reduction in China.

All appendixes are as follwing:

Appendix One namely Brief Introduction of China IDNDR, briefly describes China IDNDR's structure, responsibility, function and major activities.

Appendix Two mainly presents 26 disaster reduction cases all over the country. The contents include: disaster damages; disaster relief , donation and achievements in disaster reduction, special cases for disaster reduction on flood and waterlogging, drought, typhoon, storm surge, earthquake, geological hazards, forest fire, etc; scientific systems such as disaster monitoring, early warning, assessment; researches on disaster law and comprehensive disaster reduction etc.

Appendix Three briefly introduces some non-governmental organizations and scientific and technological organizations devoting their efforts to the cause of disaster reduction in China. These organizations have done many valuable works and become more and more influential in disaster reduction and mitigation.

Here we appreciate the generous support and help from all component units, provinces and municipalities and non-governmental organizations for providing many valuable materials and photos Especially, we thank the experts from China Academy of Sciences for their arduous work in writing, editing, and publishing the appendixes. Without their hard work, we cannot publish the appendixes timely.

Office of China National Committee for IDNDR

June 1999

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China National Report on International Decade for Natural Disaster Reduction

Appendix One

Brief Introduction of CNCIDNDR

Brief Introduction of CNCIDNDR

State Councilor and Chairman of CNCIDNDR . Simayi . Aimaiti. Minister of Civil Affairs and Vice-Chairman of CNCIDNDR. Duojicairang, at the 8th Plenary Commissioner Conference

China National Committee for IDNDR (hereinafter referred to as CNCIDNDR) is an inter-ministerial coordinating organization set up in April 1989 by the Chinese Government. CNCIDNDR consists of 28 units from Commissions, Ministries and Administrations under the State Council, the Headquarters of the General Staff of the People's Liberation Army, science and technology organizations as well as non-governmental organizations. The aims and tasks of CNCIDNDR are to institute "National Disaster Reduction Plan of People's Republic of China", guidelines and policies as well as activity plans, to organize and coordinate important national and local disaster reduction activities, and to propel international exchange and cooperation. Vice-Premier Tian Jiyun, State Councilors, Luo Gan, Li Guixian ,have assumed the chairmanship of CNCIDNDR successively. Its incumbent chairman is State Councilor. Simayi . Aimaiti.

Board members of CNCIDNDR

Chairman: Simayi . Aimaiti

Vice-Chairmen:

Duojicairang (Minister of Civil Affairs)

Xu Rongkai (Vice-Secretary-General of State Council)

Wang Guangya (Minister-Assistant of Foreign affairs)

Hao Jianxiu (Vice-Director of State Planning and Development Commission)

Shi Wanpeng (Vice-Director of State Economy and Trade Commission)

Deng Nan (Vice-Minister of Science and Technology)

Fan Baojun (Vice-Minister of Civil Affairs)

Gao Hucheng (Minister-Assistant of Foreign Economic Relations and Trade)

Secretary-General: Fan Baojun

Director of Office: Li Bengong

The leading cadres from component units assume commissioner. A plenary conference is held in which chairman, vice-chairmen, commissioners attend to discuss and solve important issues with respect to national disaster reduction policies and actions per year. The department directors from component units assume liaison-officer, whose task is to coordinate the disaster reduction activities of component units and to exchange information. The section chiefs from component units assume coordinator, whose task is to carry out the decisions of the commissioner conference. Office and Experts Group are established under the CNCIDNDR. The office in MCA is the administrative agency responsible for daily routine matters of the Committee The Experts Group is a consultative body drawing upon prominent experts on various relevant subject matters, who offer disaster reduction advises and are involved in evaluation and judgement of scientific and technical projects and engineering works relating to disaster reduction, and in program formulation and important policy-making on disaster reduction.

The Structure of CNCIDNDR

Major Activities of CNCIDNDR in the Decade

During the international decade for natural disaster reduction, the Chinese Government has attained great achievements in disaster reduction. China National Committee for IDNDR has instituted national disaster reduction plan, launched large-scale engineering projects construction, enhanced the civic awareness of disaster reduction through various kinds of propaganda activities and propelled the development of science and technology in the field of disaster reduction. During the course of several important disaster reduction activities, China has established its mass synthetic disaster reduction setup.

- In March 1989, CNCIDNDR was set up by State Council. On April 21st, the 1st Plenary Commissioner Conference of CNCIDNDR was held, declaring the founding of CNCIDNDR and initiating the natural disaster reduction decade in China. Since then, CNCIDNDR and its component units, various mass media and NGOs have actively participated in the cause of disaster reduction.

- On February 12th 1990, Vice-Premier Tian Jiyun delivered a television speech entitled "Act to carry out Activities of the Decade for Natural Disaster Reduction in China", further propelling the publicity activities across the country. In his speech, Vice-Premier Tian Jiyun pointed out that CNDIDNR should mobilize all the society to participate in the disaster reduction activities. In October 1990, CNCIDNDR presented that disaster reduction should be embodied in the national economic developing plan, the input of disaster reduction should be increased, and synthetic coordination in disaster reduction should be reinforced.

- In 1991, a serious flood occurred in Eastern China. Delegated by Chinese Government, CNCIDNDR appealed to the international community for disaster relief and organized large-scale donation activities.

- In 1992, on the basis of summarizing the great achievements in the fight against flood in 1991, CNCIDNDR determined to reinforce the comprehensive management of disaster reduction and to execute disaster reduction projects and that it was very important to establish China Disaster Reduction Center.

- In June 1993, CNCIDNDR, Ministry of Civil Affairs and UNDP jointly organized "International Conference on Disaster Management in China". President Jiang Zemin pointed out in his congratulation letter to the conference that "we will go on adhering to the principle of combining economic construction with disaster reduction, to integrate disaster reduction into the comprehensive plan for national economy and social development." In December, the 4th Plenary Commissioner Conference discussed and proposed the measures to implement President Jiang Zemin's direction.

• In 1994, Chinese Government Delegation participated in the 1994 World Conference on Natural Disaster Reduction in Yokohama, publicizing the " National Report of the People's Republic of China on Natural Disaster Reduction" which systematically summarized the disaster reduction in China. In October, the 5th Plenary Commissioner Conference suggested that " National Disaster Reduction Plan of the People's Republic of China" should be instituted.

• In November 1995, the 6th Plenary Commissioner Conference proposed the principles and major contents of " National Disaster Reduction Plan". CNCIDNDR began to organize the institution of the plan.

• In 1996, CNCIDNDR completed the draft of " National Disaster Reduction Plan" and set about collecting amendment suggestions.

• In March 1997, the 7th Plenary Commissioner Conference passed the " National Disaster Reduction Plan" and discussed the issue of how to carry out the plan.

• In April 1998, State Council approved the " National Disaster Reduction Plan of the People's Republic of China", pointing out that the plan would be the basic principle for the disaster reduction in China. In October, the 8th Plenary Commissioner Conference summarized the experience in fight against the disasters, especially the experience against the serious flooding disaster in 1998. This conference also clarified the tasks of CNCIDNDR were to further improve the disaster reduction, to coordinate the relation between development and disaster reduction, to reinforce construction of disaster reduction projects, and to propel the implement of " National Disaster Reduction Plan of People's Republic of China".

• In 1999, CNCIDNDR set about propelling the establishment of China Disaster Reduction Center and Satellite System for Disaster Reduction. CNCIDNDR is now organizing the preparation work for the 2nd World Conference on Natural Disaster Reduction. CNCIDNDR will devote its efforts into the cause of disaster reduction for China and the all world.

Minister of Civil Affairs and Vice-Chairman of CNCIDNDR, Duojicairang , and Diretor of CDRCAS, Prof.Wang Angsheng ,were awarded 1998 UN Susakawa Disaster Prevention Award

Delegate-Chief of Chinese Government, Pan Baojun in the First World Conference on Disaster Reduction

Major Works of China Decade for Natural Disaster Reduction

Since its foundation, CNCIDNDR has devoted great efforts to disaster reduction work for China:

- Has made far-ranging, large-scale, multi-level and enduring propaganda for international decade for disaster reduction and greatly enhanced the civic consciousness of disaster reduction;
- Has promoted the coordination and connection among component units and enhanced the level of synthetic disaster reduction management;
- Instituted the "Natural Disaster Reduction Plan of the People's Republic of China", clarifying the guidelines, aims, tasks, measures and important actions;
- Has enhanced the scientific and technological level and propelled its application in the field of disaster reduction. Through developing satellite and airplane remote sensing, GIS and GPS technology, CNCIDNDR has greatly improved the level of disaster monitoring, early-warning and disaster assessment.
- Has prepared for the establishment of "China Disaster Reduction Center" and the synthetic information system for disaster reduction, which will greatly improve our ability for information sharing and assistant decision-making;
- Has taken a wide range of disaster reduction activities, such as to organize disaster relief and donation after large disasters, to initiate disaster reduction performance and poverty relief projects, has summarized the experience and compiled national report on the work of disaster reduction in China; Has organized a series of disaster reduction training and education;
- Has propelled international exchange and cooperation with other countries and international organizations; has participated in various international conferences, introducing disaster experiences and achievement in China, understanding new development in the field of disaster reduction, learning the advanced experience and technology, has widely developed bilateral and multilateral cooperations with other countries.

International Workshop on China Natural Disaster Reduction Plan and Priority Projects

Experts Group of CNCIDNDR

Science and Technology Consultant

Chen Fangyun Academician of Chinese Academy of Science

Chen Shupeng Academician of Chinese Academy of Science

Ma Zhongjin Academician of Chinese Academy of Science

Xie Lili Academician of Chinese Academy of Engineering

Liu Yanhua Professor , Science and Technology Commissioner of IDNDR

Experts Group on China Disaster Reduction Center

Head	Wang Aangsheng	Professor
Deputy Head	Shi Peijun	Professor
	Zhu Hanqiang	Professor
Member	Wang Jizhi	Professor
	Cheng Xiaotao	Professor
	Zhang Guomin	Professor
	Liang Bijun	Professor
	Yang Qinye	Professor
	Liu Dingsheng	Professor
	Wu Shaohong	Asso.-Professor
	Lu Denghuai	Senior Engineer
	Gao Jianguo	Asso-Professor

Experts Group on Disaster Reduction by Satellite Remote Sensing Technology

Head	Gong Huixing	Academician of Chinese Academy of Engineering
Deputy Head	Pan Xize	Professor
	Wang Yanguang	Professor
Member	Jiang Jingshan	Professor
	Li Chuanrong	Professor
	Yan Shouyong	Professor
	Li Lingzhi	Professor
	Fang Zhongyi	Professor
	Ge Chenghui	Professor
	Li Jishun	Professor
	Wan Qing	Asso.-Professor
	Hu Ruzhong	Professor

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.

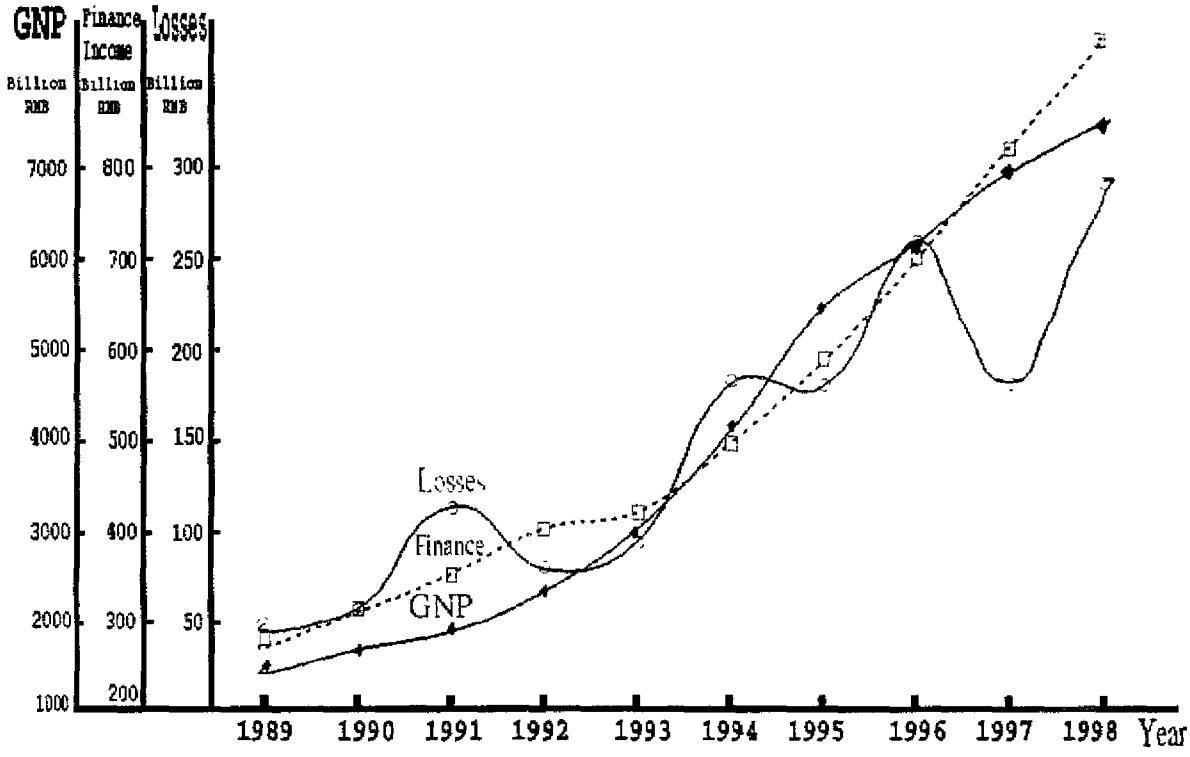


Figure 1. Economic Losses Caused by Natural Disasters ,GNP and Revenue from 1989 to 1998

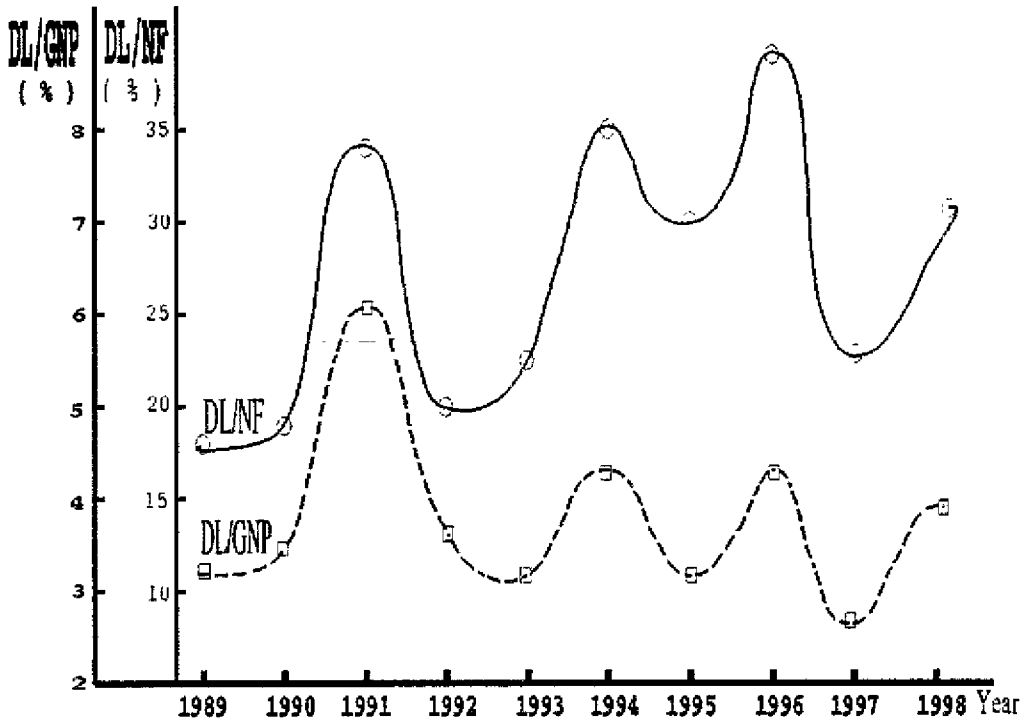


Figure 2. The Percentage of Economic Losses Caused by Natural Disasters to GNP and to Revenue from 1989 to 1998

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.

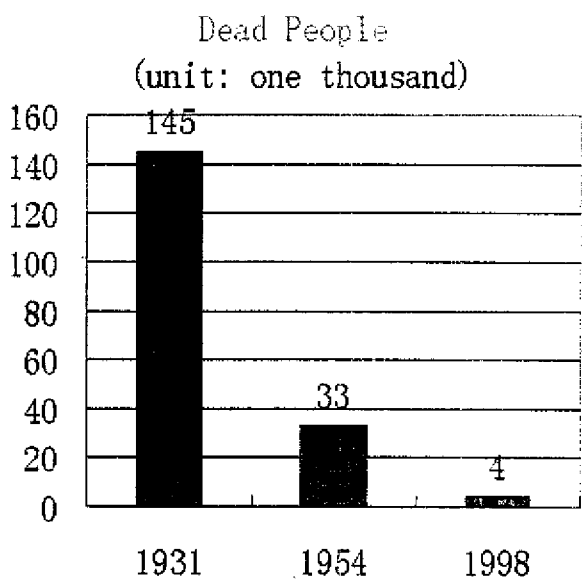


Figure 1. Deaths in floods in 1931,1954 and 1998

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.

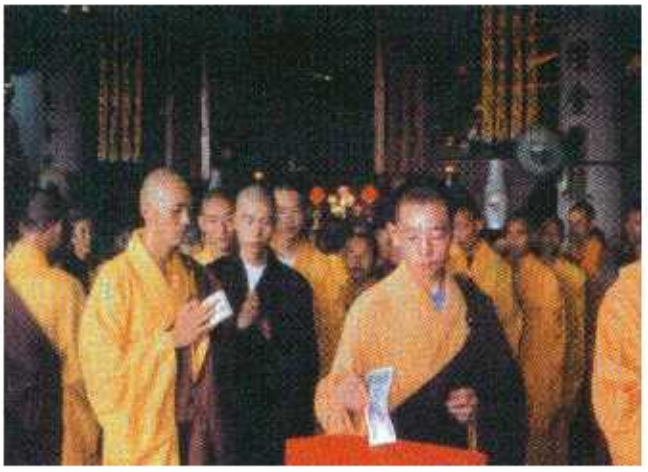
During the flood control and disaster relief, Ministry of Civil Affairs, China Charity Association, Red Cross Society of China and local bureaus of Civil Affairs received donation funds of 3.515 billion yuan RMB, and 3.744 billion yuan RMB worth of donation materials, the total value of which amounted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



Monks are donating

2. The Ministry of Civil Affairs and the local bureaus under it organized the work carefully and made thorough propaganda.

During the process of the donation, the Ministry informed the public of the way to donate by all means It also reported the reception and allocation to the public, with the cooperation of mass media that traced the whereabouts of the donations and made series of reports.

3. All departments concerned worked in close coordination and non-governmental institutions and societies took an active participation.

Officials from the customs, diplomacy, Hong Kong and Macao Affairs Office, railways, communications, banks, post offices and telecommunications, etc, took special measures to simplify the procedures, give top priority to the most urgent and special work Mass media reported the condition in disaster areas and the reception and allocation of donations timely, and their propaganda enhanced the donation work.

4. An appeal for aids was made to the international society.

An expert team for disaster assessment from the UN was invited to the disaster areas to make on site investigation They got the first-hand information about Chinese people's great courage and strength in combating natural disasters, about our government's tremendous achievements in disaster relief, and about the system of donation reception and allocation that ensured exclusive utilization of all the relief funds and materials on the affected people. They also communicated the information broadly to the international societies, thus in turn, laying a solid ground for attracting foreign donations.

Disaster Relief Donation in 1991

Ministry of Civil Affairs

Donation during a charity show

In the wake of severe flood in the East China in 1991, the Chinese government made timely and resolute decisions to appeal for urgent assistance from abroad and launch disaster relief donation domestically. From July to November, 1991, 2.3 billion yuan RMB were collected (including 610 million yuan RMB worth of materials), which is equivalent to 2.3 times of donation in a normal year. The governments at different levels vigorously organized and mobilized the donation activity and took a leading role. People from all walks of life and from all ethnic groups were active in contribution, carrying forward the Chinese nation's traditional virtue of mutual help. People of Chinese origin all over the world showed and reinforced great fraternity and strengthened the cohesion and unity of the whole Chinese nation. International assistance was also increased dramatically.

Reviewing the process of donation for 1991 disaster relief, we found that:

1. Appealing for aids from abroad and mobilizing donations at home is very important to the reform and socialization of disaster relief and they are of great significance to quicker and better solution to the problems in disaster areas. Many foreign non-governmental organizations, enterprises and associations enhanced contact and cooperation with China through donation.

2. Better collaboration among different government agencies is the key for a better relief and donation work. For example, a series of special policies and measures were made concerning the donations' initiative, reception, administration, allocation, utilization and personnel beyond the geographic border. All these policies and measures guaranteed the smooth transportation of donations to the affected people.

Appealing to international communities for assistance

3. Open procedures and strict disciplines are important for the whole affairs of donation reception and administration. To ensure the success of the donation work, the Ministry of Civil Affairs together with all departments concerned, formulated detailed procedures with regard to donation reception and allocation before appealing for assistance. During the process of the donation activity, all the related departments ranging from foreign stationed agencies to domestic institutions, performed their functions strictly according to the relative regulations. The Ministry of Civil Affairs and its local bureaus, who were in charge of donation reception, persisted in writing out receipt and gratitude letters immediately after they received the donation. To every lot of donation, they would inform the affected people of the donator and concrete amount and inform the donators of the whereabouts of the donations in return. The allocation of donations was publicized by the mass media to the public, accepting supervision and auditing by society and the departments responsible.

The Ministry of Civil Affairs, conforming to the State Council's requirement, insisted in using the donations in emergency relief, transformation, arrangement of the affected people's life and rebuilding of their homeland. Following the principle of timely allocation and main point superiority, it allocated most of the domestic donations to Anhui, Jiangsu, Hubei, Zhejiang and Guizhou which were most seriously affected, and allocated most of the foreign donations to Anhui, Jiangsu, Henan, and Zhejiang.

The donation work was carried out under strict discipline and high degree of openness. Donations were allocated promptly with key points being emphasized. All these brought about immense economic and social benefits.

Prevention and Control of Geological Hazards within Three-Gorge Reservoir Area

Ministry of Land and Resources

Geological hazard control project(a)

In the Three-Gorge Reservoir area, there are high mountains and steep slopes with complex geological conditions and serious geological hazards such as collapses, landslides and debris flows. To date 1,500 rockfalls, landslides and deformable bodies have been ascertained, with total volume of 3.5 Ga cubic metres and more than 90 debris flow trenches.

The Chinese government pays special attention to prevent and control of the geological hazards in Three Gorges Reservoir area. Since the beginning of the 10-year hazard reduction, investments of 400 million yuan RMB have been made successively for more than 10 geological hazard control projects in Hubei, Chongqing etc., and all these have achieved significant social and economic benefits. Lianziya dangerous rock mass and Huanglashi sliding mass control projects are the most representative ones and so far also are the largest geological hazard prevention and control projects in China.

Lianziya dangerous rock mass and Huanglashi sliding mass are two large-scale hazardous masses with the lowest stability at the key positions in Three-Gorge of the Yangtze River. They directly threaten the safety of shipping in Yangtze River and residents in towns nearby and impair economic construction in the upper reach regions. Through hard efforts for 6 years, the essential parts of the projects have been completed.

Lianziya dangerous rock mass, 25 km from Three-Gorge reservoir dame (Sandouping), is a separate rock mass cut by 58 wide and long fissures. It occurs in a steep limestone slope bottomed by a 2-4 m-thick coal bed on the right bank of Yangtze River and is formed by the excavation of coal and the unloading of the steep wall. The rock body has a total volume of 3.15 million cubic metres.

To counter possible deformation damage by the dangerous rock mass, the following measures have

Geological hazard control project(b)

been taken· supporting the mined-out coal zone, preventing its slide, reinforcing the overlying hazardous rock body by anchoring, surficial water drainage, holding back blocks from falling into the river, monitoring rock deformation. Most parts of the above projects have been completed. Monitoring data show that deformation trend of the dangerous rock mass has been brought under effective control.

Huanglashi sliding mass is a group of composite sliding masses with multiple types, levels and stages of activity and consisting of sandstone and mudstone with intercalated marl, with total volume of 40 million cubic metres. Dashiban landslide in the west shows the lowest stability with the volume of 4 million cubic metres.

Because the main reason inducting deformation damage is infiltration of rainwater, preventive measures dominated by drainage (surface and underground) were taken. So far 15 surface drainage channels with total length of 7 thousand metres and an underground drainage adout 340m in length have been built, playing a good role in stabilizing landsides.

The two projects mentioned above have provided a case study and accumulated experiences for prevention and control of geological hazards both in Three-Gorge reservoir area and in the whole country. Accordingly, the Ministry of Land and Resources is implementing and planning implementing new monitoring, prevention and control projects, so as to further strengthen prevention and control of the geological hazards within Three-Gorge reservoir area.

Prediction and Prewarning for Storm Surge: A Case Study

State Oceanic Administration

Houses ruined by typhoon

Typhoon 9711, generated at 08:00, August 10, 1997, in the east of Guam, landed at 21:30, August 18 on Zhejiang Province with a wind force of over scale 12 and an air pressure of 960 hbar at its center. After landing, the typhoon turned toward the north, and entered Jiangsu Province, then entered Shandong Province and the Bohai Sea. It decayed at 21:00, August 21 in Liaoning Province. As a result of the simultaneous occurrence of strong wind, spring tide and heavy rain, the landing of Typhoon 9711 at the coastal area of the eastern China caused unprecedented disaster, which affected a large area seriously. Observations at the coastal stations during the storm surge indicated that the high tides measured at 28 stations exceeded the local warning limits and the high tides at 13 stations broke the historical records.

Forecasting of the storm surge caused by Typhoon 9711

A prediction of the storm surges to be caused by typhoons in 1997 was made in early year. It was that the impact of tidal disasters would extend further toward the north in 1997 than in the previous years. On the basis of the analysis of historical data, experts concluded that there would be less typhoons in 1997, but the probability of typhoon's impact on the coastal area of the eastern China would be higher. This prediction was made to the public to raise the public's awareness of coastal disasters and to call for precautionary measures against the disasters. When Typhoon 9711 entered the area identified as an area of importance for typhoon forecasting and warning, the marine environmental forecasting stations and centers concerned enhanced their consultation and gave full play to their expertise to provide parameters for typhoon forecast. They used storm surge numerical forecasting models to calculate the path of the typhoon, and issued a forecast of the extraordinary storm surge with a lead-time of 36hours.

Heavy rain brought about by typhoon

Application of the warnings of the storm surge caused by Typhoon 9711

The timely and accurate warnings of Typhoon 9711 provided important information for the local authorities and the public to prevent and mitigate the impacts of the storm surge caused by this typhoon. As a result of the measures taken by the authorities at various levels based on the warnings from the forecasting institutions, the casualties in the impacted coastal areas were minimized. The total casulties are about 200, which is a rarely low figure in the history of storm surge disaster mitigation in China.

Measures or factors which played important role in the storm surge disaster prevention and reduction

1. The highly efficient and advanced ocean observing system provided a large amount of accurate data for the forecasting institutions when and after the typhoon was formed.

2. The marine environmental forecasting and warning system provided accurate warnings of the typhoon-caused storm surge, which helped the local authorities understand the forthcoming threats of the disastrous storm surge and and take precautionary measures in disaster reduction and mitigation.

3. The authorities at various levels paid great attention to coastal disasters. Prior to the approaching of the storm surge, arrangements were made to enhance patrol of dikes, dams and coastal defence works so as to ensure their safety. Army, police and civilians were organized to form contingency teams against disasters. People in the areas affected by storm surge disaster were timely evacuated. Consequently, the losses were minimized.

4. Dikes and dams of high standards were built. Along the coastal line of 18,000 km, defence works with a total length of around 13,000 km have been built since 1950, among which 5757 km are of high standard. These defence works have displayed their enormous economic and social benefits.

Hazard Reduction with Mass Monitoring and Prevention in Changyang, Hubei Province

Ministry of Land and Resources

Propaganda activities

Changyang County is located in a mountainous area, where mountains are high, slopes steep, valleys incised. Neotectonism appeared frequently, and geological hazards such as rockfall avalanches and landsides often occurred. There are 283 places prone to geological hazards which threaten 2,895 households of 15,748 farmers, 720 ha cultivated land and 628 ha forests. The county therefore carried out the mass monitoring and prevention activities of the all people's hazard reduction.

In 1992, investigation of the status quo of geological hazards was completed throughout the county. A report on prevention and control plan of the geological hazards in Changyang County was compiled. Short, middle and long term objectives of the prevention as well as control and main measures which are required to achieve these objectives were decided. First, secondary and ordinary areas where the prevention and control will be made were divided. Relatively concrete proposals were made for prevention and control of serious geological hazards in 7 major spots. In 1998, a draft plan for prevention and control of geological hazards in flood seasons in Changyang County was formulated.

To implement hazard reduction and prevention, teams of prevention and control of geological hazards at both county and town levels were organized in the county. In accordance with the principle that "who is threatened by geological hazards is obligated to monitor", one or two people are appointed as compulsory monitors for each geological hazard spot, who are responsible for monitoring deformation in the spot. So far, four levels of responsibility including country, town, village and monitor levels have formed a monitoring network of geological hazards with 258 measuring points and 260 full-time and compulsory monitors. In recent years, more than 3,500 monitoring data have been collected.

Changyang County also broadcasts records and lectures on popular scientific knowledges about prevention and control of geological hazards with the aid of television and radio stations, posts and slogans in the streets and villages and spreads propaganda of relevant knowledges among the masses for more than 120 times, with 18 thousand of people being educated. In recent years, seven training courses in prevention and control of Geological hazards have been held, in which totally some 150 cardres and compulsory monitors from the county and towns were trained and attended lectures on the popular scientific knowledges and monitoring methods of geological hazards. These activities heightened the masses' consciousness of hazard prevention and improved their ability to prevent geological hazards. The broad masses of the people can invitiatively avoid inducing geological hazards and give the alarm promptly whenever finding a dangerous sign of geological hazards, thus winning the time for guarding against occurrence of the hazards and reducing the resultant damage.

Because emergency investigation of geological hazards is a key link in prevention and control of the hazards, an emergency investigation team consisting of specialists was organized. In recent years, the team has made emergency investigations in 110 places, presented 110 reports on the emergency investigations. Because of its proposals safty of more than 4800 people was safegarded and the hazard damage cost was reduced by 65 million yuan RMB. In 1997 situation of geological hazards became worse in Xizhai Village of Yazikou Town, and a sliding mass started to slide down 3 months later. Because the local government promptly organized migration before the event according to the proposal from the emergency investigation team, no injury and death occurred, and property damage was also minimized.

In the past 3 years, the county has raised nearly 1 million yuan RMB through various channels for control of the hazards; instructed those responsible parties to invest more than 4 million yuan RMB according to the principle that "who causes the hazards controls them"; and taken measures that the mass go to work, the society offers financial assistance and taxes are reduced or remitted to carry out local control of the hazard. The practicl has achieved good results and recognized by the society.

Promoting Dry Land Farming Techniques in Arid Areas

Ministry of Agriculture

Micro-scale project for water conservancy

China is a water deficit country with per capita water availability of only about 2,400 m^3, 1/4 of the world average. The annual national average precipitation is around 650 mm which is also below the world average. Dryland makes up 50% of the 95 million ha of total farmland. The northern arid areas have less than 450 mm of annual rainfall in average. Drought would attack these areas in nine out of every ten years. In spite of some 1,000 mm of annual precipitation, the tropical and sub-tropical rain-fed areas in the South still suffer from serious drought during the critical growing stage when the crops need water The water shortage poses as a major constraint to the final yield. In the past ten years, more than 20 million ha of crops suffered from drought annually, causing 10 to 25 million tons of grain losses

Given water scarcity, poor soil, water & soil erosion and extensive farming in arid areas, the Chinese government has always attached great importance to agricultural development in these areas. The government has regarded the development of dryland farming as the strategic means to alleviate water shortage and promote the sustainable development of agriculture and rural economy. The dryland farming techniques adopted by various localities are mainly as follows:

* Building up terraces and embanked field of various types and carrying out watershed management in order to thicken active soil layer and reduce water loss and soil erosion by soil improvement and water retention as the key measures. By doing so we can increase grain production capacity by over 4 million tons.

* Leaving crop straws and residue in the field to improve soil structure and fertility, retain water in the field and readjust soil moisture.

* Mulching by plastic film could remarkably improve the ecological conditions of farmland in arid areas and increase production. Currently, the total acreage of farmland using plastic film for mulching is close to 7.33 million ha, increasing crop yield by over 3 kg per hectare for every millimeter of rainfall.

* In the North, mulching by crop straws and stalks could not only prevent evaporation but also help raise soil temperature, improve fertility and as a result increase grain yield by 20%. Techniques such as minimum tillage, zero tillage as well as hole and furrow sowing of wheat adopted in recent years have all contributed to retain soil moisture and improve use of water.

* The implementation of the Seed Project can increase grain yield by over 10% through developing, introducing and utilization of improved seeds with strong resistance to drought and popularizing crops featuring water saving, drought resistance, cold resistance and high yield.

* Mechanized farming has the advantages of saving labor, time, cost and increasing yield. In 1994, Shanxi Province adopted mechanized farming for about 143,000 ha of dryland, which achieved an average yield of 5475 kg per ha for the autumn crop despite of the serious drought the province suffered in that year, up by 13% to 19% over the previous year.

* New types of drought-resistant agents, water retention agents, evaporation suppressant, soil regulator and crop growth regulator can be used to increase yield. For instance, seeds treated with water retention agent can raise yield by 0.1 kg for every millimeter of rainfall. Wheat seeds treated with Drought-Resistant Agent No. 1 may produce 20% more in yield.

The Ministry of Agriculture (MOA) has prepared the National Development Program for Water-Saving Dryland Farming and many local governments have also worked out their own development programs suited to the local conditions, laying a good foundation for integrated economic development in arid areas.

While improving efficient use of rainfall, the local governments have taken positive support measures through farming system reform and water-saving irrigation to form a technical system with water saving as the core element and other agronomic measures as supplementary ones. All these measures have brought significant results in saving water and raising yield.

Many provinces and municipalities have listed dryland farming development on their government agenda. MOA has set up 68 demonstration bases for water-saving dryland farming in major arid areas of the country. Step by step, we have gained successful experience in establishing a dryland farming technical system by combining engineering measures with non-engineering measures.

Forest Fire in Inner Mongolia in 1998

State Forestry Bureau

People were fighting the forest fire

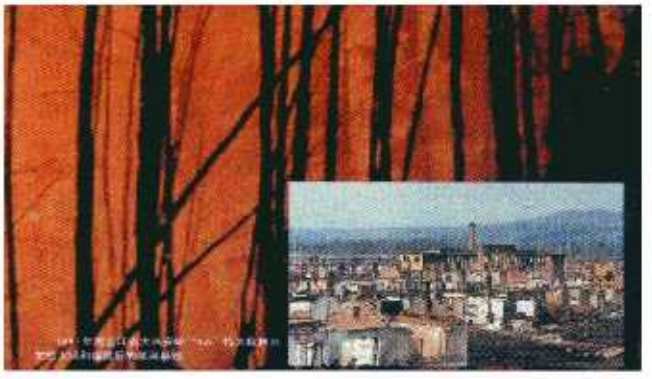
At 13:50, May 13th, 1998, a forest fire caused by lightning broke out in Arshan Forest Bureau, Inner Mongolia. Over 12,000 hectares were burned in which 6,750 hectares were forested land. Difficulties were confronted in following aspects when fighting the fire: the harsh climate, the varied topography and the over fuel loading.

Senior officers from State Forestry Administration and Inner Mongolia Autonomous Region Government directed the fire-fighting on the spot. On May 22, 1998, the fire was completely suppressed after nine-day fighting conducted by soldiers, police and local people through integrated approach of air-tanker, artificial rainfall and ground suppression of forest police, soldiers, forest fire fighting crew and forest workers. More than 6,000 crews were involved in which 2,750 are forest police, 300 soldiers, 3,500 forest workers and forest fire fighting crew and over 4,000 logistic staff. A large number of equipment were mustered, among which there were 12 helicopters, 3 crafts for artificial rainfall, 4 cruisers, 1,138 vehicles, 1,205 pneumatic extinguishers, 300 fire pump and 218 radio transmitters.

Great importance has been attached to forest fire prevention by the Chinese government and remarkable results have been achieved since 1988 in following aspects:

1. Intensification of fire prevention infrastructure

So far a complete set of command centres and working bodies for forest fire prevention have been set up in whole China with more than 2,900 forest fire command centres over county level, over 3,000 working bodies, over 13,000 check points for fire management, over 7,000 watch towers, over 700,000 kilometer fire-break established, and a set of equipment for communication, transportation and fire suppression disposed. Four regiments of forest police on active service, eighteen aerial surveillance



Forest and towns after fire

plane airstrips were found, and over 9,300 professional or semi-professional fire fighting teams. 146,000 voluntary fire fighting teams were formed. An integrated system for computerized forest fire danger prediction and forecast, monitoring, forest fire tracing and positioning, geographic and resource information, decision-making auxiliary and communication information, etc. has been set up in command centres of various levels. At present, 29 provinces(autonomous region and municipality) and 137 key fire prevention region have got on the internet.

2. Enhancement of forest fire prevention

First, forest fire prevention has been shifted from sole responsibility of forestry sector to the present status of shared responsibility of relevant departments and the whole society under unified leadership of various governments.

Second, the principle for fire suppression has been changed from involving the mass in passive fire fighting to active fighting based on the policy of prevention first and active suppression. The management of fire origin and the enhancement of fire prevention consciousness of the people is applied in prevention, and the approach of early fight by professional teams is applied in suppression.

Third, the method of pure administrative management is changed over to integrated management combining administrative, economic and legislative methods.

3. Implementation of preventive measures

During fire season, mountains in key forest regions are closed from idlers and from using fire; focus is be put on resorts; vehicles entering forest are equipped with fire prevention device; train is cleaned in designated place; fire planes should be set around residential area, working area, warehouse and oil depot. Ecological barriers have been widely established in forest regions in southern China to prevent the fire from further expansion.

Synthetic Scientific System of Serious Atmospheric-Hydrosphere Disaster Reduction

The Center of Disaster Reduction, Chinese Academy of Sciences

As a demonstrating project of " China Disaster Reduction Center ", Synthetic Scientific System of Serious Atmospheric-Hydrosphere Disaster Reduction (SSSSAHDR) was established. Prof. Wang Ang-Sheng led more than 20 Institutes and Universities, more than 200 scientists and engineers to finish the system which will reduce mainly Typhoon, Heavy Rain and Flood Disasters. The System obtained economic benefit about 200 million USS from disaster reduction about 5 years, thus became a famous important system in disaster reduction.

SSSSAHDR consists of six parts, i.e. Forecast-Warning Service System, Disaster Information System, Synthetic Database, Assessment System, Countermeasure System and Six provinces demonstrating Systems.

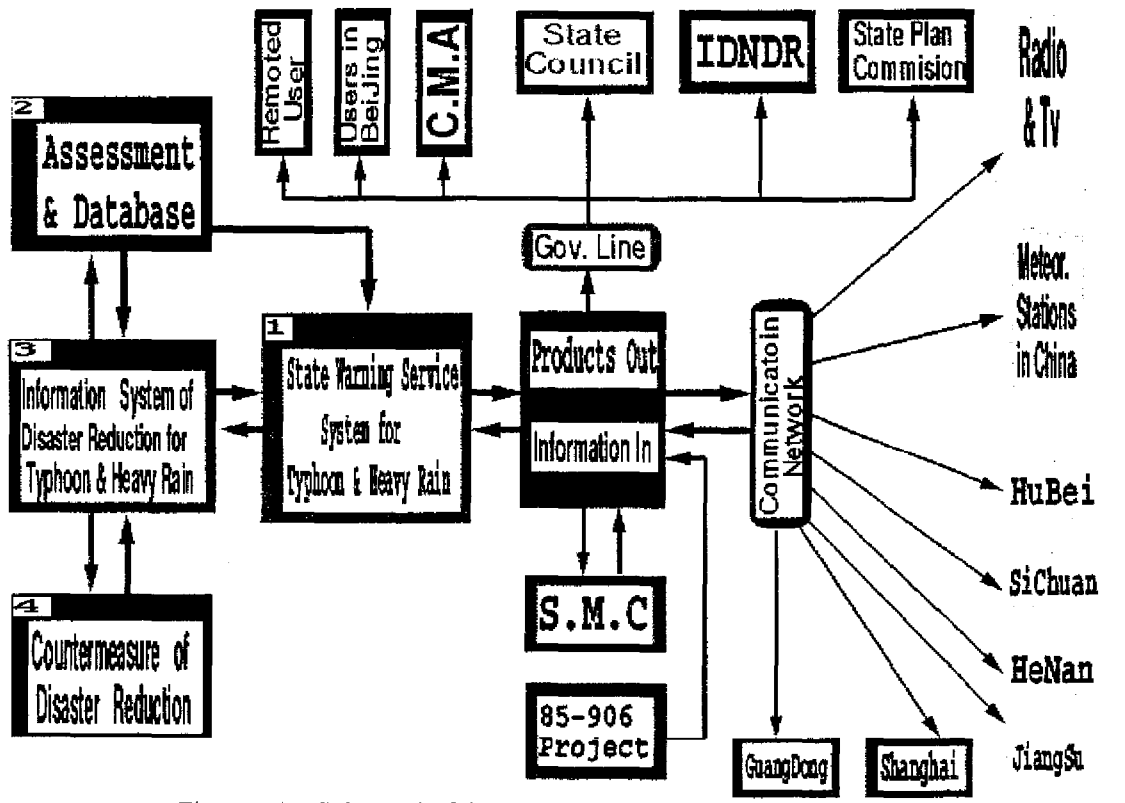


Fig. 1 The Schematic Diagram of SSSSAHDR.

The characteristics of the system are as following:

This system's nucleus is to hold the serious disaster day by day;

The system operates continually by real-time (from June 1 to Sept. 15, every year);

Forecast and Assess serious disaster (where, when, losses etc.) early 1-3 days;

Collect all kinds of disaster information by real-time;

It has synthetic database of which the characteristics are real-time information database and economic-social database etc.;

It has six local demonstrating systems in Hubei, Sichuan, Henan, Jiangshu, Guangdong province and Shanghai city.

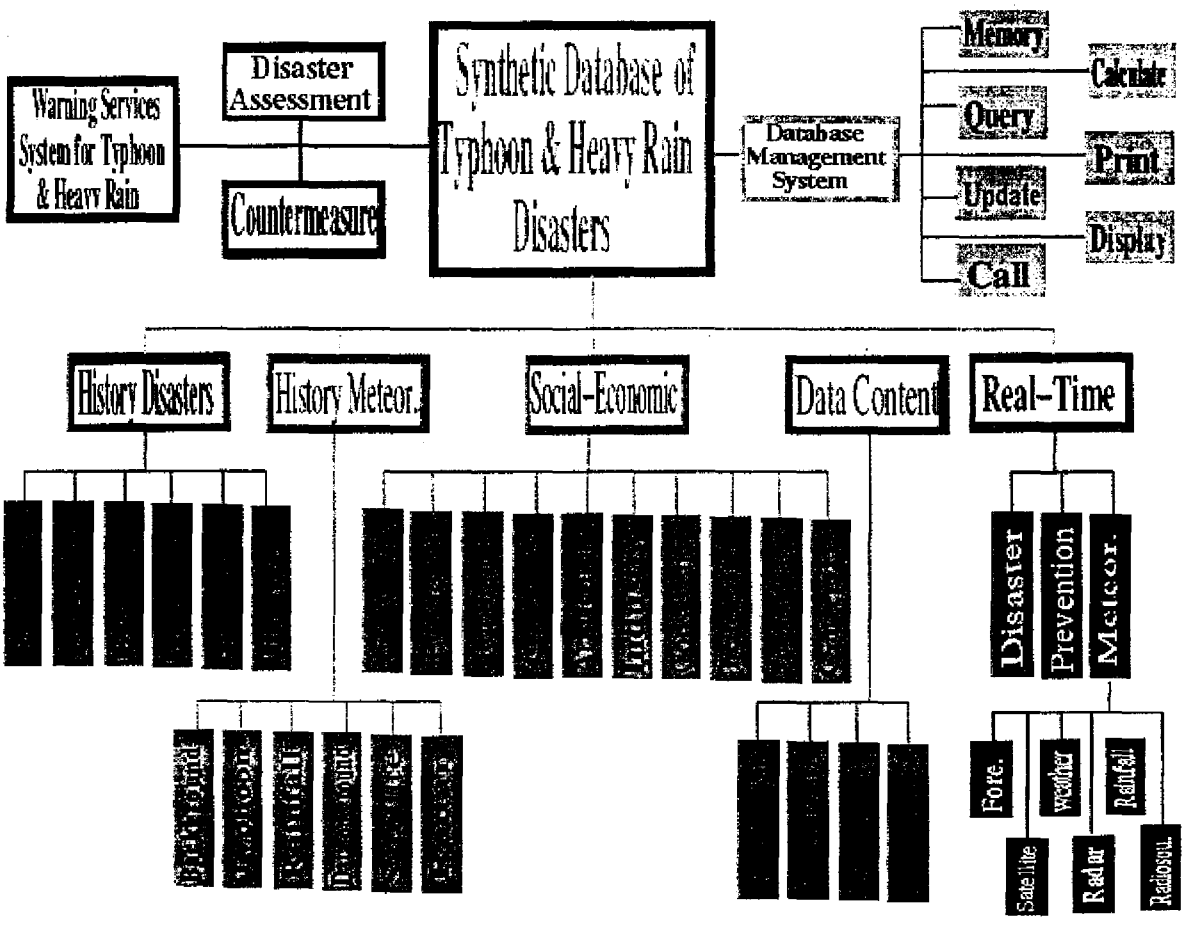


Fig. 2 The Schematic Diagram of Synthetic Database of SSSSAHDR.

Multi-Satellite Based Fast Response Technology for Flood Calamity

China Remote Sensing Satellite Ground Station

Since its foundation and coming into operation, China Remote Sensing Satellite Ground Station, has received and processed a huge amount of satellite images, corresponding to the needs of the national department of disaster reduction. To remedy the deficiency of simply using airborne SAR image, we developed the technologies such as ante-flood image data fusion processing of the TM and airborne SAR, and post-flood information about the seriousness of the flood extracting from the TM data. Because it is expensive to obtain airborne image data, hard for airplanes to work during bad weathers, and the post-processing of the SAR image is considerably complicated, we concentrate our research on replacing airborne SAR with satellite-carried SAR. Systems have been set up successively to receive and process the SAR data acquired by ERS JERS and Radarsat. The time for periodical observation of specified regions has been shortened from 16 days before middle 1990's to 10 days in 1996, and further to about 3 days in 1998. For the Radarsat, which has multi working mode at above middle-latitude area, one scene of ScanSAR image with frame width of 500*500 km is acquired in less than 3 days, and 300*300 km in less than 6 days. During the flooding period of July and August 1998, we recevied from Radarsat 13 SAR images of which 7 scenes cover the area, 6 scenes the area of Nen Jiang River and Song Hua Jiang River. All of these satellites have covered a total area of 5 million square kilometer, fulfilling the task of monitoring the flooding situation within the large area of South and North China dynamically and frequently.

The Radarsat not only can accomplish all-weather and full-time work, but also has distinctive boundaries between land and water in its images. The feature is particularly advantageous in flood monitoring and cannot be matched by other RS methods. But it cannot be distinguished between the original area and the newly flooded region, because they are all dark color on this kind of image. To further the past successful research work, the staff of RSGS optimized the image fusion model of TM and SAR and set up non-redundancy triangle controlled geometrical mosaic method with high precision.

This practice has not only guaranteed the precision of fusion images, accelerated the speed of fusion processing, but also made the fusion image more clear, with more color level. And by different color filling, it can be easily distinguished between aquiferous area (including flooded area

original clear and muddy water surface hydrated soil), non-flooded region with ordinarily growing vegetation, and city residence. These vivid and intuitionistic images presenting flooding situation were promptly sent to the state agencies, national flood-rescuing headquarters, provincial headquarters of other relevant departments. helping the government fully understand and analyze the flooding situation and developing trends, and providing significant information for scientific policy making. Furthermore, these images play an important role in detailed assessment after floods, in analyzing thoroughly the factors that cause the disaster, and in scientifically making reconstruction plan.

With the development of remote sensing technologies, especially the successful launch and operation of Radarsat, we have the reason to expect setting up a multi-satellite operation system for quick response to flood situation, centered by satellite-carried SAR. Besides real-time or near-real-time flood situation monitoring, fast assessment of disaster loss, providing information for flood salvation,further R&D should also reinforce this system on the function of flood forecasting. By putting into previous status, the forecast of rainfall and hydrological effect, and how serious the flood will be, preventive methods could be taken to greatly enhance the possibility of defeating floods and reducing losses.

Satellite image representing the flood situation at the middle part of Yang Zi River in 1998.This image is acquired by digital mosaic and fusion processing of 2 sets of images, one is Radarsat SAR image when the Yang Zi River flood reached its peak, and the other is 12 scenes of TM before flood. All kinds of regions are represented by different colors: **Dark blue:** original water bodies **Red:** flooded area. **Green:** non-flooded region with ordinarily growing vegetation **Pink:** internal flooded area without surface water body but hydrated soil

A Multi-Media Intergrated Forecasting and Pre-Warning System for Disaster Reduction

The Center of Disaster Reduction,Chinese Academy of Sciences

China Academia Sinica National Meteorological Center

Flood 98 is one of the catastrophes in this century. Its cause is the most important thing to research. Based on the newest IT technology, a 3-D high resolution forecasting and warning integrated platform on line system, which is a hyper-media network version for AFDOS (Analyzing Forecasting and Data-processing Operation System), has been built to monitor and research the weather systems and disaster condition during the time of flooding of Yangtze River and Songhua Riverin 1998. All the data and graphics on the AFDOS can be shown and connected with Internet in real time.

The multi-medium numerical platform system can follow and record all kinds of synoptic-scale and meso-scale weather systems including the ones whose life cycles are over a week or a month. It finds out up to 30 weather systems during floods of Yangtze River and Songhua River in 1998.

Based on the newly IT technology, the platform system can monitor and investigate the "catastrophe" and growing parts of the weather systems just like the technology of B-Super waves in the medicine. And it splits their frequencies and filters their waves by the method; so it can investigate the convective bubbles of quite a few hours life cycle over the Tibetan Plateau.

To recognize multi-scale weather system, in this study, we give a smooth Laplace operator of Gauss smooth function. It can be used to recognize a satellite image of meso-scale system development, movement and regeneration. (See Fig.1)

Those convective bubbles developing and moving are driven by large-scale circulation over the plateau. The source of water vapor is from the Bay of Bengal, south of the Plateau. It discovers three to four days life cycle eastward waves in low atmosphere layer over this area when analyzing the flow fields. (See Fig.2)

In the south of the wide area from Yangtze River to Tibetan Plateau, a strong westward waves can be seen under a eastward waves over the Bay of Bengal. This indicates that this kind of upper-lower wind shear has relations with the meso-scale rain system growing.

From new version of AFDOS platform system we can see that there is always a wave action at the low-level air in the Bay of Bengal, then rainstorm weather systems grew over the Plateau and then move to Sichuan Basin 2 to 3 days before the rainstorm weather and flood peak in Yangtze River. So the wave action can be something a index for monitoring and forecasting the flooding and it's peak increasing.

The AFDOS system not only can be used as a real-time warning and monitoring system in numerical and physics but also can show all kinds of data which contains in visual way. So it is a very useful tool to monitor, analyze, forecast and warn the disastrous weather like those in flood in 1998,deal with large flood, strong rainstorm and reduce disaster. (Analyzing Forecasting Data-processing Operational System see Fig.3).

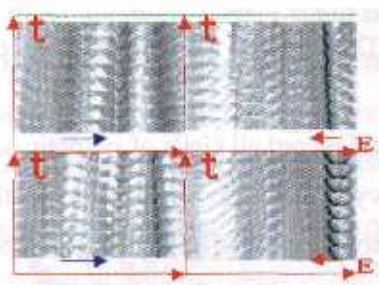


Fig.1 The Hovmoller diagram it shows meso scale systems move to the east for 30 & 27N (left in Fig) and to the west for 20 & 23N(right in Fig) during July 23 17-24h,1998

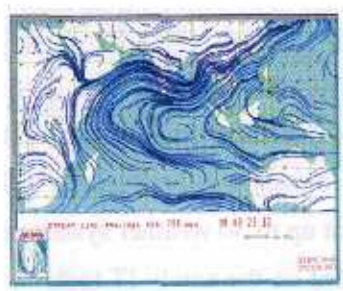


Fig.2 Stream-line analysis July 23 1200 GMT in 1998

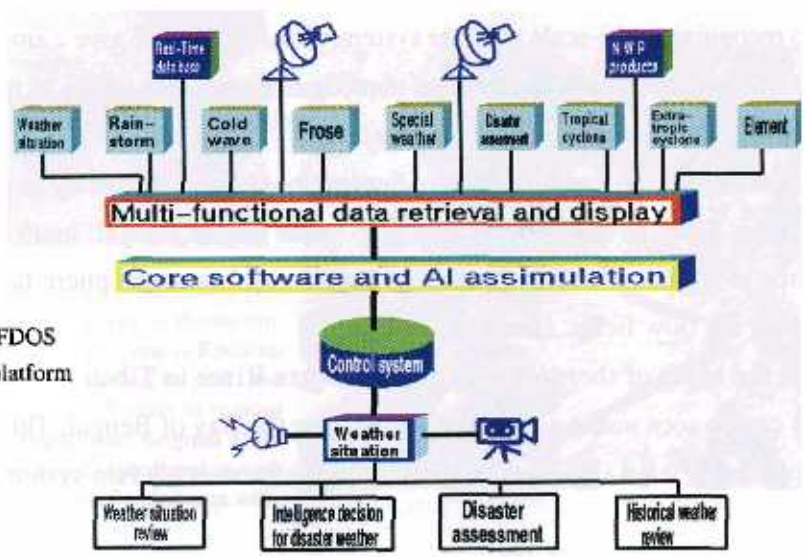


Fig.3 The structure of AFDOS software a multi-media platform

Earthquake Prediction in China

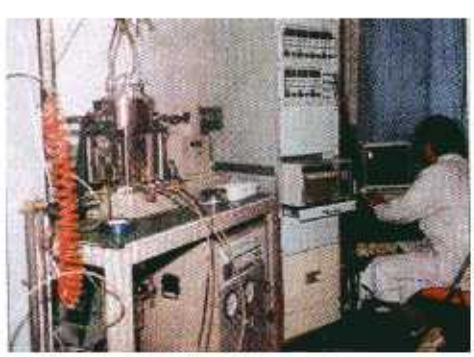
China Seismological Bureau

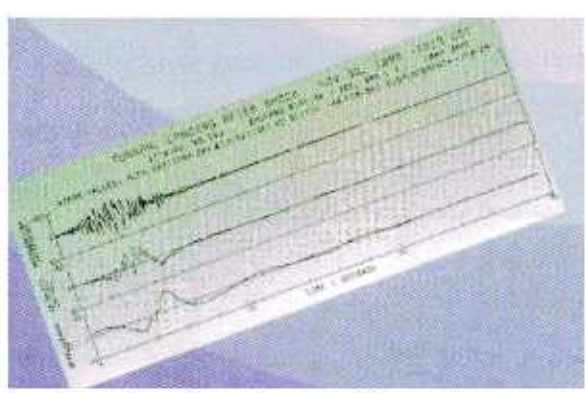
China has experienced 5 active periods of earthquakes in this century. During the 4th period of 1966-1976, the great earthquake of Xingtai in 1966 was the starting point, and the earthquake prediction work of China has developed gradually since then. In this decade, 14 strong shocks, with magnitude greater than 7.0, occurred in China, 12 of which occurred in densely populated areas such as north part of North China, Sichuan and Yunnan Provinces. Through these events, we have accumulated a large number of data for the earthquake monitoring and prediction.

Since early 1990's, a great scale of earthquake observation system, consisting of more than 400 seismic stations, 20 regional telemetry nets, and more than 1,700 earthquake precursor observation items, has been established in China. In addition, the general length of measurement line reaches 150 thousand kilometers for mobile gravity, geomagnetism and deformation observation. The system has not only provided very precious first-hand data for earthquake research, but also established solid foundation for the practice and theory development of the earthquake prediction.

Since the earthquakes of Gengma, Yunnan Province, with Ms 7.6 and Ms 7.2, and occurred in November 1988, China has entered into the 5th active period in which large earthquakes with magnitude greater than 7.0 occurred frequently, and earthquakes with magnitude of 6.0 often occurred in densely populated areas. Though no successful predictions of short-term and eminent have been made for most of earthquakes, a few did with practical effect of disaster reduction.

Prediction Laboratory





Record of Earthquake

In the beginning of 1995, the State Seismological Bureau considered the Southwestern Yunnan as the emphatic dangerous area with earthquake at magnitude of Ms 6.0-Ms 7.0 in the coming 1-3 years. An Ms 5.5 earthquake occurred at Menglian, Yunnan Province, on June 30, 1995. Based on the abnormality of aftershock sequence attenuation of the Ms 5.5 earthquakes, and combining various criterion, the seismological field working group of the Seismological Bureau of Yunnan Province made clear prediction on July 10, 1998 that there was still danger of occurring strong earthquake in coming 3 days. A large earthquake with Ms 7 3 occurred in this area on July 12, 1995. Comparatively successful prediction in three stages of "mid-term, short-term and eminent", has been realized.

For Jiashi series earthquake in 1997, the opinion of imminent prediction "there is still having earthquake with magnitude of 5.0-6.0 in Jiashi in one week" was clearly put forward on April 5, 1997. When the Ms 6.4 and Ms 6 3 earthquakes occurred in Jiashi, Xinjiang, on April 6, 1997, only causing 23 people injured, 100 beasts died.

On the 1998 annual consultation of earthquake tendency of China Seismological Bureau held at the beginning of 1998, the prediction was made that there is the possibility of occurring Ms 6.0-Ms 7.0 earthquake in northwestern areas on border of Yunnan Province and Sichuan Province.

After Ninglang earthquake with Ms 4.7 occurred on October 23,1998, based on earthquake sequence data and periphery precursor data and abnormalities from 6 macroscopic earthquakes observation site, Seismological Bureau of Ninglang County put forward eminent prediction opinion, and the government has adopted immediately strong shockproof measures for reducing natural disasters There were no casualties when Ninglang Ms 5 2 earthquakes occurred on October 27, 1998.

For Ninglang Ms 6.2 earthquake occurred on November 19, 1998, the epicenter was just located in the Lanniqing village and there were 2 people died and more than 20 people severely injured in this village.Because urgent and reducing natural disasters steps had been adopted effectively,losses in life and property were greatly reduced.

These successful predictions greatly contributed to reducing the losses caused by the earthquake.

Rebuilding Our Homeland

China Seismological Bureau

On Feb 3, 1996, an astonished, large earthquake occurred in Lijiang, Yunnan Province. The life and property of the people suffered heavy losses.

The private houses, hospitals, schools and the urban infrastructure were all seriously damaged. 309 were dead, 4,070 seriously injured, 320,000 homeless. The direct economic losses exceeded 40 hundred million yuan RMB. On April 10, 1996, the 23rd routine meeting of the government of Yunnan Province approved the "Rehabilitation Programme of Lijiang Earthquake Disaster Area", initiating the whole reconstruction work. In three years, 22.44 hundred million yuan RMB have been invested in rebuilding or restoring private houses, schools, hospitals and clinics and other public facilities and infrastructures. After the reconstruction, the Dayan old city, Lijiang, Heqing and Zhongdian recovered its vigor from the strike.

The major methods of work and experiences in reconstruction during the three years are as follows:

1. The Leaders at All Levels of the Government Paid Great Attention to the Reconstruction Work

After the Lijiang earthquake, the Central Committee of Chinese Communist Party and the State Council showed great concern about the reconstruction work. Leaders of all departments and at all levels went to inspect the site and express sympathy for the people of the disaster area. They not only guided the reconstruction work, but also supported it with large amount of funds and materials.

Promotion on earthquake resistance

2. Realizing that the Planning According with the Actual Situation Were Important for the Reconstruction

Based on the opinions from all sides and the actual situations of Lijiang earthquake disaster area, the provincial government worked out the "Reconstruction Program for the Lijiang Earthquake Disaster Area". The provincial government also put forward that the basic policy for reconstruction was to rebuild the homeland through self-reliance, arduous work with supports from all sides and that the principle for reconstruction was to integrate the reconstruction and poverty relief, to develop the economy of the multi-ethics area including the tourism, to ensure the critical work. The reconstruction of the disaster area was going on smoothly. Meanwhile, the local economy was developing, and much progress was made. For example, the industry total output value raised 8.8%, the agriculture total output value raised 5.6%, the local financial revenue raised 62.7% in the Lijiang area in 1997.

3. Clearing the Responsibility and Tasks

In order to strengthen the leadership of the reconstruction for the Lijiang earthquake disaster area, the headquarters for the provincial anti-earthquake, providing disaster relief and rehabilitation was set up by the provincial government. The relative organizations of the prefecture, counties, villages and towns were also set up. The coordinate network, consisting of experts, engineers in the headquarters at all levels, extended from the higher levels to the lower levels.

In order to ensure the reconstruction work going on smoothly, the provincial government pointed out that the leaders at the prefectures and counties were responsible for the reconstruction work and the heads of the important projects were responsible for the project

4. Strengthening Management

The headquarters of the provincial reconstruction formulated a series of rules and regulations, including the methods for administering donations, managing rebuilding funds, supervising and auditing the reconstruction funds, etc According to the provincial regulations, the prefectures, autonomous prefectures and counties made specific methods respectively From the beginning, all of the reconstruction work is carrying out strictly according to these regulations

RADIUS Project in Zigong, Sichuan Province

China Seismological Bureau

Zigong is a moderate industrial city that faces the risk of strong earthquake . On the average, an earthquake will strike the city every ten to twenty years with intensity of VI-VII.

In Feb., 1998, Zigong was listed as one of the nine cities that participated the programme of case study of "Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disaster" (RADIUS) by IDNDR. The goals of RADIUS projects are as follows:

1. In the nine selected cities worldwide, to develop scenario of earthquake destruction and plan of risk management;

2. Developing practical tools of earthquake risk assessment suitable for all cities worldwide that face the risk of earthquakes;

3. Instructing the people of the whole world to understand the comparative study of earthquake risk in cities;

4. Enhanced information exchange in earthquake risk in cities.

The main progress achieved by now is as follows:

1. Completed the collection and ordering of basic material. More than one thousand personnel are trained, and more than twenty thousand buildings and structures in 29 square kilometers of the urban area of Zigong city are investigated.

Villages ruined by earthquake

2. Completed the seismic hazard analysis, seismic zoning of seismic intensity and ground motion parameter, and the study of scenario earthquakes in Zigong, Sichuan Province.

3. The vulnerability analysis of all kinds of buildings, structures and life lines and earthquake risk assessment in Zigong have been completed.

4. Based on the above-mentioned progress, according to the requirement of RADIUS projects, designed investigation forms ofearthquake scenes and distributed them to related organizations and people of all works of life in Zigong On Oct.14-15, 1998, a symposium on earthquake scenes participated by officials from the secretariat of IDNDR, international group of experts, China Seismological Bureau, Seismological Bureau of Sichuan Province, the municipal government of Zigong city, and officials and experts from associated organizations, was held. The dynamic scenes for the first several seconds, the first several minutes, the first hour, the first night, the first week and the first month after the strike of an earthquake have been established

5. Completed preliminarily the study of earthquake countermeasures in Zigong required by project 95-06, including the comprehensive countermeasures mainly for the municipal government of Zigong city and countermeasures for various departments and organizations.

6. Currently is preparing the plan for dynamic action on the basis of the finished countermeasure study and dynamic scenes. A symposium on the plan for earthquake action (dynamic countermeasures) in Zigong, Sichuan Province will be held in the last ten-day of May of this year, and officials of IDNDR and international group of experts will be presented in the symposium. The plan for earthquake action (dynamic countermeasures) will be discussed, enriched and improved.

7. Have finished the framework of the software system for information management in earthquake disaster prevention and reduction and for decision-support in earthquake emergency response. Most of the subsystems and the demonstration system of information management have been finished preliminarily.

It is expected that all the basic tasks will have been finished by the end of the June 1999. In October 1999, the system designed for the use of government, experts and the public respectively will be submitted.

Forecasting and Pre-Warning Platform System for Typhoon and Rainstorm

China National Meteorological Center

Typhoon and rainstorm is the most destructive weather. China is one of the most serious typhoon stricken countries in the world and also a summer monsoon area where rainstorm occurs frequently. In recent years loss of life has mostly decreased through improved warning and preparedness measures, economic losses are increasing alarmingly as the value of assets at risk increases at developed countries.

The statistic results based on the data from 9-developing countries show that a rising trend in damage occurred both in deaths and direct economic losses. The recent studies shows that indirect economic losses are growing up as much as a power series. So, it is very important to emphasize on forecasting and warning for typhoon and rainstorm weather. Firstly, the limited data sources and experience can usually make the forecasting to be accentuated over, thus making the construction and others go to undue expense.In fact, this is also a kind of economic losses. Secondly, lack of forecast will bring remarkable losses both in death and economy. So, it is very necessary to create a forecasting and warning system to reduce typhoon and rainstorm disaster.This system will provide an operational function to give warning and forecasting of typhoon rainstorm as earlier as we can and to turn the losses by those nature disaster weather as less as we could.

In order to suit the needs for forecasting of typhoon and rainstorm weather, based on NWP (Numerical Weather Prediction) system of NMC, a platform system is designed. The core software, modem graphics and image, multi-medium and AI-decision technique of Disaster Reducing System of Typhoon and Rainstorm (DRSTR) is designed in NMC of China.The system plays a very important role for reducing disaster economic losses in prevention of '98 Yangtze River flooding in China.

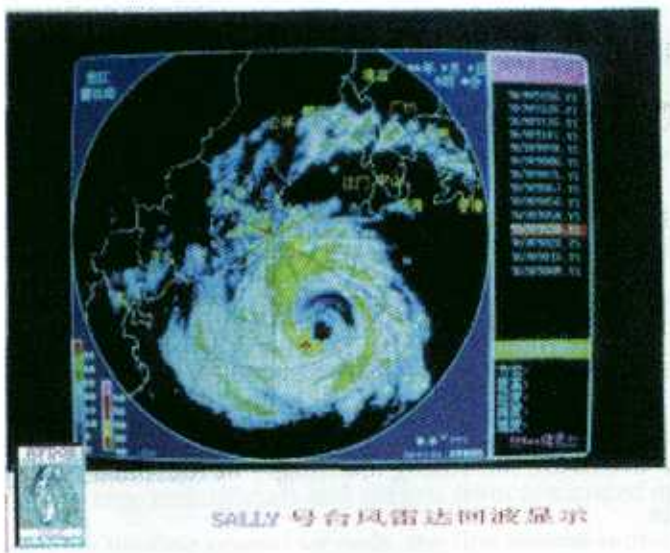


Fig.1 To monitor the typhoon 9615 disaster weather by using new version of the system

Fig.2 Boats was destroyed by typhoon 9615 (Sally)

Fighting Disaster,Developing Economy
-Experiences of Disaster Reduction in Guangyuan Area,Sichuan Province

Working Group on Natural Disaster of Three Commissions

Guangyuan area has a population of 3 million-including 2.52 million farmers and has a territory of 16.300 km² among which 1.886 ha were cultivated land. The Eco-environment and climate of Guangyuan region is very complicated. The severe hazards such as flood, drought, hail, agricultural diseases and insect pests, landslide and debris-flow take place nearly every year In general, the yearly disaster-hit crops can amount to 133,000 ha, and about one million people suffer drinking-water shortage. Meanwhile, the yearly direct-economic losses triggered by disasters of 1990s can exceed one billion yuan RMB.

In recent years, the authorities of Guangyuan area have found out a good society-developing way, which includes such kinds of interrelated aspects as building up micro-projects for water conservancy, reducing natural disasters, developing garden-style Agriculture and promoting sustainable development. The main disaster-reduction experiences are as follows.

(a)
Micro-scale projects for water conservancy

Establishing disaster-management system, strengthening government's responsibility for disaster-reduction

In Guangyuan area, the comprehensive institutions for disaster-reduction have been established, and the management core of disaster-reduction system has been formed. The disaster-rescue offices at different levels have been set up to take charge of disaster-reduction work, including the responsibilities of organizing, coordinating, instructing, and so on. Meanwhile, the principle of emphasizing the disaster-reduction and the economy-construction equally and simultaneously has been persisted in also. The principles include regulating the Agricultural structure, improving the basic establishment, carrying out the scientific disaster-reduction, paying equal attention to both the economic and the ecological benefits. Up to now, 100,000 micro-pools for disaster-prevention have been built up

Building up disaster reduction engineering, promoting disaster-resistance capability of agriculture

Taking water as the core, land as the basis, forestry as the defense and roads as the forerunners, the basic infrastructures for agriculture have been carried on energetically. A total of 4.57 billion labors and 7.59 billion yuan RMB have been put into the construction. Through these years' hardwork, Guangyuan has constructed one-middle sized reservoir, 48 small-sized reservoirs, 4,230 mountainous pools, 21,205 micro-projects for water conservancy, 14,000 drinking-oriented works for people and livestock, 4,190 km seepage-proof stone trench, 560 km flood-control dyke as well as 11600 ha irrigated land. At the same time, 4,277 mountainous pools have been reconstructed, 121 km^2 water and soil erosion land been harnessed and 31,000 ha irrigated land been ameliorated. As the result, the drinking-water shortage of 1.02 million people and 0.8 million livestock has been overcome.

Carrying out disaster reduction, developing garden-style agriculture

Micro-projects for water-conservancy are key factor for the success of the courtyard-style economy, and the whole set of water-conservancy projects with small, middle-size, or macro size are the basis for that of the garden-style economy. Nowadays, the newly afforeted land in Guangyuan reached 330,000 ha and the percentage of forest cover is already reaching 37% compared with 23% of 1985s.

Practicing scientific disaster reduction methods, generalizing vigorously the applicable techniques aiming at increasing production and preventing disasters

Originating disaster-insurance system in countryside, establishing the social system for safeguarding against disasters.

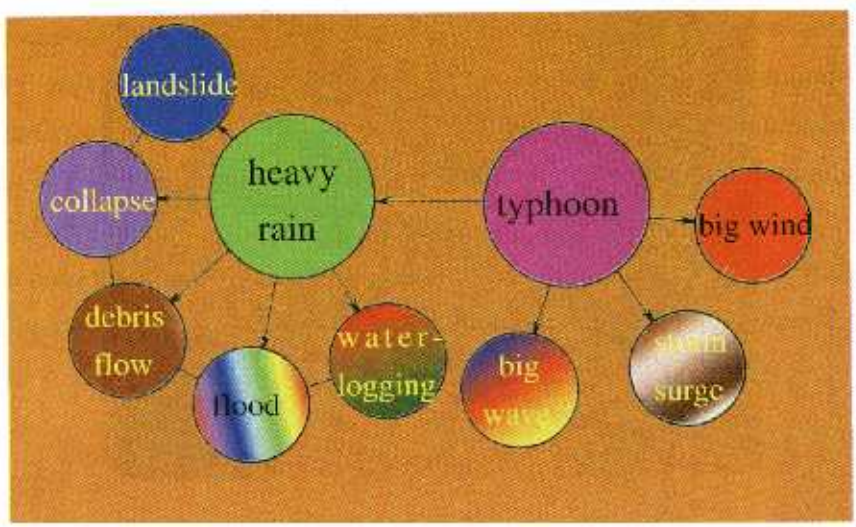
Predicting Catastrophic Disasters and Disaster Chains

Special Committee for Predicting Natural Disasters In Geophysical Union of China

The Special committee for Predicting Natural Disasters In Geophysical Union of China involves geophysicits, meteorologists, hydrological scientists, seismologists, geologists and astronomers. The academic group was established preliminarily in 1988, and formally founded in 1992. The basic objects of the predicting study are great earthquake, serious drought, big flood, typhoon etc, and the chains between the above mentioned catastrophic disasters.

Study on predicting disaster chains

In 1990, the specialist of our committee predicted successfully the big earthquake(M_s=7.5) occurred in north Burma on Jan 5, 1991, according to the drought and earthquake relations, earthquake regulation, and external causes. In the light of study achivment that serious flood often occurred in Yangtze River and Zhu River in one year ofter an earthquake(M_s .GE. 7.0) in Yunnan- Barma area, our special committee predicted the catastrophic flood taken place in the reaches of Huai River and Yangtze River in the summer of 1991, Furthermore, we also predicted the No. 9711 violent typhoon invading Jiangsu province and Zhejiang province in August, 1997 .



The relations among typhoon,rainstorm and other disasters

The prediction of catastrophic disasters

The most important disaster predictions of the special committee for predicting Natural Disasters are the prediction of the earthquake (M_S=7.4) took place in American in 1992, the short tterm prediction of earthquake (M_S.GE.6.0) took place in Jiashi in 1996, the prediction of serions drought in north China in 1997, and the prediction of catastrophic flood took place in Yangtze River. Zhu River and Min River.

In 21st century, the Special Committee for Predicting Natural Disasters in Geoohysical Union, as a ungovermental academic group, will make thorough research in the following aspects:

1. Make deep going to synthetic researches, especially penetrate into the causal predicting theory and index on the research of predicting catastrophic disaster and disaster chains. Of course, the statistic prediction also need further study, but should be based on the physical causality.

2. Improve the synthetic level of prediction opinions from all of the disciplines.

3. It is planned to make important over important research on the disaster prediction in big cities and in densely populated areas as important over important.

Numerical Prediction for Storm Surge

Ocean University of Qingdao

China has a long coastline and vast coastal areas. It is one of the countries that suffers greatly from storm surge attacks. Based on the statistics made by the State Oceanic Administration, every year the economical losses caused by storm surges are about several billions yuan RMB.

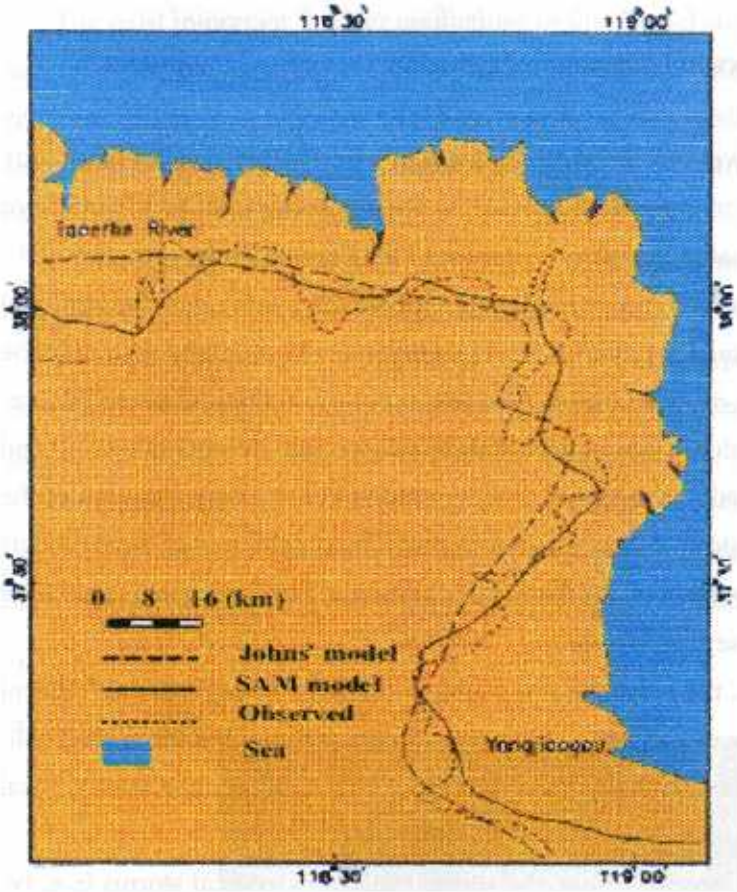
The numerical forecasting of storm surges is a useful tool for the marine development and navigation. Ocean University of Qingdao has done works on the research and development of the methods for numerical forecasting of storm surges. The first set of the numerical model of forecasting storm surges (for the whole Chinese Coastal areas except that along Guangdong and Guangxi Provinces) was established. On the basis of these models the second generation of the numerical models for forecasting storm surges was developed. The capabilities of these models were enhanced with a great improvement on the forecasting accuracy. The forecasting areas were also expanded to the whole Chinese coastal seas.

In the first generation models, the ultra-shallow water storm surge theory and the "current separating method" were adapted with the turbulent energy closure scheme. For the second generation models, the nonlinear interactions between storm surge, river discharge and astronomical tides were taken into account, and a nonlinear model was adopted.

There are two kinds of storm surge in China: the surges caused by tropical storms (e.g. typhoon surge) and wind surges in the Bohai Sea. These two kinds of surges are caused by different factors and their mechanism are not the same. Therefore, two kinds of numerical forecasting models were developed. Based on the existing models of typhoon wind field, new models of typhoon wind field were designed, which are suitable for the numerical forecasting of storm surges in the Chinese coastal seas.

The two generations of numerical models of forecasting storm surges have already been used in the forecasting of the typhoon surges and wind surges in the Bohai Sea, and good results have been achieved.

MODEL OF STORM SURGE FLOODING



Withering Process of Red Tide Disaster

Ocean University of Qingdao

More and more red tides appeared following the marine environmental pollution attraction and global climate worsening every year. The ranges of tides are continuously increasing; they badly damage the ecological balance and lead to tremendous losses on the aquatic products industry and aquaculture. China has long coastline. A lot of anpower, materials and scientific research have been spent on the prevention and control of red tides.

There had been dozens of times red tides with different degrees from the south to north sea areas from mid 1997 to late of 1998. This high frequency is rarely seen before.

In August 1997,a red tide occured in Jiaozhou Bay(Qingdao). The brown water mass of about 6 km^2 was transported from inside to the outside of the Jiaozhou Bay There was over 95% Skeletonema costatum among them and the cell tenacity was over 106 Cell/ml. The main reason of this red tide was typhoon and the subsequent rainstorm on August 19. The quantity of C and N greatly increased (the increasing rate is more than ten times than usual) because the turbulent water mass and rainstorm helped transport much nutrient into the sea surface water of the Jiaozhou Bay Moreover, continuous sunny days, high temperature and low salinity also provided favorable condition for the red tide. So many hanging culture coops weakened the current movement and heavily reduced the self-purification capacity of the sea, leading the accumulation of red tide components.

In order to describe the quantity relationship between germination, growth and withering process of the red tide with its environment, numerical number simulation and automobile carburetor float track are combined during the red tide research. A water exchange model with biological and chemical parameters was used to study the effect of water exchange in the biological and chemical fields.

Another part of the study is on the mechanisms of propagation induction period, logarithmic growth period, regular growth period and withering period of the alga species by the artificial culture in the lab. A physical, chemical and biological model of the growth of the living things in the red tide was developed by adding the exuberant plankton with the nutrient, chemical mechanism, biosynthesis of trace mental elements in Chlorophyll. The model was then used to study transportation and assimilation of C and N, et al.

The geo-biological behavior of carbon is the key element in the growth process of red tide. Limits of geo-biological behavior and change of carbon morphology in different red tide growth period were determined after study on the relationship of the pattern of carbon morphology and biology activity based on the in situ tracking, monitoring and batch culturing in the lab.

Furthermore, researches on other relevant fields have been conducted. These fields include the relationship between the red tide collection and tides, the relationship between physical collection field caused by wind-driven flow with red tide, the contrast between water quality and dynamic feature, the relationship between phyplankton and environment, inorganic algaecide selection and application and the toxicity of red tide biology.

Red Tide Sampling

Public Education on Disaster Reduction

Fujian Provincial Natural Disaster Reduction Research Committee

FPNDDRC is a comprehensive organization with multiple-discipline and cross -sectors. It is composed of high level specialists and leaders from various government departments and sectors such as meteorology, seismology, hydrology, environmental protection, geology, oceanography, agriculture, forestry, fire extinction, insurance, etc.. Since its foundation in August, 1989, we have made effective efforts not only in supplying comprehensive consultant service for the provincial government and its agencies, but also in carrying out extensive propaganda on disaster prevention and reduction.

I. Launching Public Education and Consultant Activities In Various Forms

Since 1990, various propaganda activities of disaster reduction have been held each year, according to the special subject of the International Disaster Reduction Day. The main forms of the activities include: news announcement of disaster reduction; consultant service in large scale offered by various fields of specialists: volunteer health care service given by hospitals for the disaster reduction, lectures on disaster reduction were given by high rank specialist in universities and colleges, seminars according to the special subject of each year were held and lots of papers were published in a collection , or by monographs,TV programs or radios; the provincial governors were invited to give speeches calling for much more attention to the disaster reduction; interviews on the special issues of disaster reduction were held by the media.

II. Publishing Various Kinds of Booklets and Articles for the Popularization of Knowledge of Disaster Reduction

FPNDRRC has paid great attention to the popularization of scientific knowledge on disaster reduction, resulting in a great amount of booklets and articles published, which include " 300 Questions on Disaster Reduction";, "dsaster Reduction and Development", "Handbook of Disaster Reduction ",etc. More than 500 articles for popularization of disaster reduction written by members of our committee have been published by various media.

III. Deepening Comprehensive Research of Multi-disasters for Improvement of the Decision Making and Comprehensive Ability of Disaster Reduction

Since the setup of our committee, every year we will hold a meeting, gathering specialists and leaders from various fields such as climate, earthquake, water resource, environmental protection, geology and oceanography to discuss and research the inter relations of different disasters and forecasting of the happening trend. The reports including comprehensive analysis, forecast and countermeasures were sent to the provincial government and its agencies to help minimize possible loss of the disasters.

IV. Carrying Out Scientific Investigations to Solve the Practical Problems

Our committee have organized and sent several groups to make scientific investigations on different topics such as "Hot island effect of urbanization", " Building of coastal protection forestry belt" ,etc. When Sangmin City suffered a very serious disaster of stormy rains and flood in May of 1994, we were invited to organize a special group to have a scientific investigation to the sites, finding out the causes of the disaster and discuss the countermeasures together with the local cadres of counties , townships and villages for disaster reduction. Meanwhile we integrated the investigation with the popularization of the knowledge of disaster reduction, the practice warmly welcomed by the local communities.

V. Strengthening International Cooperation on Disaster Reduction

Since 1991, several international seminars on such topics as " Disaster Reduction and Development", "Urbanization & Disaster", " Water Resource & Sustainable Development" and " Comprehensive Research & Management of Disaster Reduction" have been held.

Promotion activities

Comprehensive Hazard Mitigation in Baoji City

Baoji City is situated at the middle-west part of Shaanxi Province. It covers the area of 18,172 km^2 with the population of 3.6 millions. Baoji City suffers natural hazards such as drought, flood, hail, hurricane, earthquakes, landslide, debris flow, insect and pest, etc.

Baoji is the first National demonstration region of development and comprehensive hazard mitigation approved by State Science and Technology Committee in 1993. UN has given the honor of "International demonstration region of hazard mitigation and management" to Baoji in 1998. The progresses of comprehensive hazard mitigation in Baoji City during the decade are mainly following three respects:

1. Establishing the management institutions of comprehensive hazard mitigation and improving the recognition of comprehensive hazard mitigation

Based on the practice of comprehensive hazard mitigation, Baoji has formed the principle and method for construction of the system engineering of comprehensive hazard mitigation.

Baoji IDNDR Committee, Hazard Prevention Committee, Comprehensive Hazard Mitigation Center and Foundation Committee of Hazard Mitigation and Prevention, established at the beginning of IDNDR, take the tasks of organization, coordination, propaganda, scientific research, people training and financial support of comprehensive hazard mitigation. Similar institutions, leader group of comprehensive hazard mitigation of lower level governments were established also. Now, responsibility system has been built up in every unit with three roles put into effect: leader, department and the person in duty of comprehensive hazard mitigation. The working net is extending to cover all villages and workshops.

2. Improving the comprehensive hazard mitigation of communities, setting up the system engineering of comprehensive hazard mitigation

The program of comprehensive hazard mitigation has been set up, which is fit for the national economic and social development plan. Some urgent projects have been carefully selected and included in the national and provincial program of priority projects of sustainable development.

The activities of setting up "Demonstration enterprise of development and comprehensive hazard mitigation", "Demonstration village of development and comprehensive hazard mitigation" and "Demonstration basement of development and comprehensive hazard mitigation" have got good results. A comprehensive information system and practical warning system was set up, coping with the 10 main hazards such as drought, flood, hail, hurricane, earthquakes, landslide etc. The emergency measure system, an interdisciplinary system being built, has the power to enjoy various monitoring measures, communication instruments, and information.

3. Strengthening the scientific research and popular science education, and developmenting " Hazard prevention culture"

Baoji has accomplished more than 30 comprehensive hazard mitigation projects such as the sub-projects of the program of " Tools of Risk Assessment for Prediction of Earthquake Hazard in City Areas" and " The Global Activity Program of the Hazard Mitigation by the Combination of Hazard Science and Public Administration". Supported by the projects of UN, a piezoelectricity-magnet stress monitoring system has been set up. Progress has been made in the field of such us disaster monitoring and prediction in Baoji and neighbor Region, comprehensive hazard mitigation and administration, the instrument for surveying the coupling of ground and atmosphere. "The Symposium of the Prediction of Yearly Hazard Tendency and Comprehensive Hazard Mitigation " and the " Conference of Exchange of Techniques of Comprehensive Hazard Mitigation" will be held at the beginning of every year to help government leaders make decision with respect to hazard mitigation. Meteorological Bureau has opened a channel on hazard mitigation in radio broadcasting. Art and Science College of Baoji has opened the course of "Administration of hazards" and established a key Laboratory of "Hazard Monitoring and Mechanics Analogue". Baoji IDNDR has also made great efforts to enhance the civic awareness on comprehensive disaster mitigation.

Workshop on comprehensive hazard mitigation

Hail suppression

A Virtual -Reality Accident/Calamity System for Large Enterprises

Sinopec Jinling Petrochemical Corporation

According to the characteristics of accidents/calamities in petrochemical industry, Sinopec Jinling Petrochemical Corp. (referred to as JPC hereinafter), making use of the computer multi-media technology, builds a hypothetical system of accident/calamity by inputting pictures, wordings, sounds and images. The system has been applied and disseminated in some petrochemical enterprises nationwide since 1995.

The system is set up on the multi-media-functioned personal computer, developed and researched with OLE function in Windows.

1. System Properties:

As an accident or calamity happens, the system can provide promptly the decision-makers with basic information such as the accidental spot situation, fire control establishment, emergency measures etc. The decision-makers then can make correct judgement and direct all the departments to act according to what the system shows, and enable operators to take their own positions quickly.

The system allows enterprise leaders to organize and direct "computer maneuvers" among the grassroots management without interrupting normal production. It promotes the emergency reaction ability of directors at different levels, makes known fairly well of the use of emergency squad

and disaster relief materials so that they can face the music. The grassroots management can also organize staff and workers in their own departments to exercise, and clarify duty and responsibility of each person in case an accident occurs and therefore promote their skills of fire fighting and life saving. In this way, an enterprise can improve its overall ability to resist accident/calamity.

The system also makes it possible to revise the hypothetical conditions often to follow the speedy development of enterprises. At the same time, the system can modify and perfect the hypothetical conditions continuously by absorbing experience of dealing with accident/calamity from domestic and abroad units of the same kind. It speeds up the information feedback and saves a large number of manpower and time. Therefore it is very helpful to accident/calamity relief work of an enterprise.

Its design combined with actual production, the system satisfies well the demand of management, trying to merge professional knowledge of HSE management with IT, and makes simple and convenient with quick responses the operations of search, handle, drawing, input and so on.

2. Main components of the system

Enterprise description-multimedia database

This database includes data such as the dates of: construction and start-up; phased construction, expansion and start-up; the sizes of: occupied area (plant and resident sections); total construction area (industrial and civil), and layout of plants and resident buildings The other information such as geographical positions and characteristics, topographic features, natural conditions; railway and highway transportation, communications system are also included.

Accident/calamity resistance ability-multimedia database (current situation of enterprise calamity resistance)

This database collects the information such as professional fire teams and allocations; supplies of medical emergency equipment, apparatus, and medicines, reserves of living materials for emergency use and insurance and damages claim etc..

Accident directions-multimedia database

This database provides emergency telephone; accident/calamity direction headquarters, responsibility of accident/calamity direction headquarters, emergency squad and reserve force: etc..

Hypothetical accident/calamity-multimedia database safety supervision and fire fighting-multimedia database

Safety supervision system fire control emergency facilities fire and explosion emergency measures fire fighting plan

China National Report on International Decade for Natural Disaster Reduction

Appendix Three

NGOs and R&D Institutes in China

China Charity Federation

Donation Promotion

Founded in April 1994, China Charity Federation (CCF) is a non-governmental and nonprofit charity organization. Its mission is to help unfortunate individuals and groups of people in the society and to conduct various kinds of social relief relief work.

In 1998, severe disasters in Zhangbei-Shangyi area of Hebei Province and the basins of Yangtze River, Songhuajiang River and Nenjing River. In the same year, a strong earthquake happened in Zhangbei-Shangyi area of Hebei Province. 700,000 people suddenly became homeless. CCF appealed to the society and initiated the "98 first salvation action", which got great support from the society and some overseas charity organizations. Donation including cash, food and construction materials collected by CCF were quickly distributed to the quake-stricken area for restoring production and rebuilding the ruined houses and other welfare facilities.

In summer of 1998, severe floods swept the basins of Yangtze, Songhuajiang and Nenjiang rivers. CCF initiated the campaign of "98 Flood Relief Emergency Action", mobilizing our affiliate charity organizations in provinces to provide aid to sufferance. CCF , jointly with the National Federation of Commerce and Industry, All-China Entrepreneurs Association and All-China Individual Laborers Association appealed to their members for contributions. The National Federation of Commerce and Industrial had collected 850 million yuan RMB; All-China Entrepreneurs Association 800 million yuan RMB; and All-China Individual Laborers Association-nearly 700 million yuan RMB.

CCF had also developed its fundraising activities from routine solicitation to nationwide and worldwide media promotion. For example, CCF with China Central Television and other organizations sponsored a telethon called "Millions of People, All Having One Heart" to start a large-scale solicitation for donations to help the flood victims in August, 1998. Thereafter, two more benefit performances were organized together with Chinese People's Political Conference, the National Federation of Commerce and Industry and the central committees of the democratic parties with theme of "People in the Same Boat Help Each Other, Rebuilding Our Homeland" to collect money for flood relief.

The 1998 Flood Relief Emergency Action of CCF attracted attention of millions of people at home and overseas. Untill the end of 1998, CCF had raised a total of 627 million yuan RMB (365 million yuan in cash). Up-to-date 297 million yuan RMB of cash and 265 million yuan RMB worth relief materials had been allocated to ten provinces.

The CCF's major role in disaster relief is to raise fund and execute the disaster aid. To raise more money and to quickly and efficiently distribute to disaster victims are two important goals for our work. We also monitor the distribution process to make sure that contributions really reach the disaster victims. As always, to win the trust of both the donors and recipients, we stick to the principle of fairness, accountability and openess in our work, and guarantee that no single penny is lost or misused.

Donation

China Red Cross Society

Rec Cross Society of China(RCSC) is a social relief and aid organization engaging in humanitarian work. Its mission is "to make preparations for disaster relief during natural calamities and emergencies, to offer relief and assistance to the sick, the injured and other victims".

The main tasks of RCSC are as follows:

- Making real-time disaster assessment and conducting relief activities based on the assessment.
- Sending medical teams to the disaster regions and providing epidemic prevention and treatment services to reduce mortality and prevent epidemic break;
- Carrying out legal fund-raising activities according to law;
- Managing donations from both domestic and international societies and helping the government move the victims to safer places;
- Special training for the victims to strengthen their self-rescue ability;
- Evaluating the relief work and reporting the necessary information;

To fulfill these tasks, RCSC established a nationwide Disaster Preparedness (DP) network and basic infrastructure

RCSC at all levels have carried out massive relief activities. From 1991 to 1998, RCSC had totally raised about 2 billion yuan RMB in cash and other kinds of relief materials. More than 100,000 medical teams were sent. About 50 million people benefited from RCSC's activities.

Distribute Relief Materials

Distribute Medicine

To improve disaster response capacity, RCSC drew up its own DP Preparedness work plan. Seven regional DP centers have been set up nationalwide. Some local DP centers with functions such as relief funds and material raising, manufacturing, warehousing, transporting and training were also setup.

RCSC will enlarge its humanitarian relief scope, combine the Red Cross community philanthropy relief projects with the handling of the hard issues of the rural and urban areas, and help government and the mass conquer the difficulties.

China Association for Natural Disaster Relief (CANDR)

Buliding Agriculture Infrastructure

Chna Association for Natural Disaster Relief (CANDR) is made up of relevant departments being engaged in natural disaster reduction. The aims of CANDR are to help Chinese government develop disaster relief and reduction, to help the poor and needy as well as to organize social donations.

CANDR's main tasks are to undertake the routine work of accepting, managing and allocating donations in kind and cash for natural disaster and social relief, to develop programs for natural disaster reduction, to organize the production, storage and transportation of disaster relief materials and donated goods, to conduct research on disaster reduction, and to make various international cooperation on natural disaster reduction.

CANDR organizes disaster relief works from general public at home and abroad. During the 1991's flood in the Yangtze River and Huai River valleys, the 1997 earthquake in Zhangbei county of Hebei Province and the heavy 1998's flood in the valleys of the Yangtze River, Songhua River and Nen River, domestic and international donations in cash totaled 600 million yuan RMB. Material donations amounted to more than 200,000 pieces. CANDR has implemented over 200 projects for natural disaster reduction.

Disaster Reduction Engineering Work

In recent years, CANDR has conducted the following projects:

1. Improving the subsistence environment of some natural disaster victims.

CANDR has implemented a project to build new villages in Sichuan, Shanxi, Yunnan and Jiangxi. Those villagers, who inhabited in low-lying land and areas prone to drought, earthquake, landslides and mud-rock flows, have moved to places with better environment of production and subsistence.

2. Undergoing disaster reduction engineering works.

Supported by different levels of governments, CANDR has conducted engineering works for sandstorm control and water-drinking in provinces/autonomous regions such as Ninxia, Guizhou, Hebei and Gansu. The project of enclosing and controlling desert in Zhangbei county of Hebei Province has slowed down desert expansion. The water diversion works completed in Dingxi area of Gansu province has fundamentally solved the water-drinking problem for local people.

3. Developing planting and aquiculture projects.

CANDR has helped farmers in south China such as Guangxi and Guizhou provinces to plant banana and citrus trees; and helped farmers in the northwest and northeast of China to raise cows and sheep. The poverty-struck households are provided with various support to develop planting and aquiculture. They also receive scientific and technical guidance in preventing plant diseases and insect pests, and assistance to go to market.

People's Insurance Company of China (PICC)

Staff of PICC are Surveying the Disaster Damage

The People's Insurance Company of China (PICC), the largest property and casualty insurer in China, provides a wide range of insurances and services except life insurance. Insurance compensation has played an increasingly important role in China's economic and social development in the last 10 years. PICC has paid indemnities up to 12 billion yuan RMB for damages caused by flood disasters in the 1990s. This huge amount of indemnity serves an crucial role in reviving production, rebuilding houses as well as maintaining the political, economic and social stabilization in the country.

PICC lays great emphasis on risk management and focuses on disaster/loss prevention through designing disaster prevention plan, carrying on the research of risk based on modern techniques so as to control risk occurrence and take proper counter measures for minimizing losses.

During the past decade, PICC has actively supported a number of public campaigns such as "Protection of Students' Safety Campaign" in 1993, "For Your Happiness" – a feature telefilm made in 1996, "Public Campaign of Fire Safety for National Youth" in 1998. In addition, PICC helped to publish the "Disaster Management Manual". PICC's participating in all these activities aims to educate citizens with disaster prevention/alleviation to remove the hidden peril of disaster and raise the whole society's capability to prevent and alleviate disaster.

PICC works together with academic and research institutions on multiple programs to explore the measures against disaster. The programs include "Study on Flooding in Huai River Valley and the Measures", "Research on Insurance Technology Against Disaster in Rural Area", etc. The "Regionalization of China Natural Disaster and Insurance" was conducted by PICC and the working

Compensating Victims

group from the State Planning Commission, State Science & Technology Commission and State Economy & Trade Commission. The work has achieved useful and practical results, which enable us to further understand the nature and mechnanism of natural disaster and improve the protection measures.

PICC has worked out a set of measures on non-engineering disaster alleviation.

- Increasing communication with meteorological, hydrological and flood-control agencies to exchange relevant information promptly;
- Establishing an in-house flood-control coordination network across or within the province;
- Implementing scientific management and seting up practical flood-control plan, maps of risks for flooding and waterlogging prevention;
- Making flood inspection and supervising the preparation works of insured companies;
- Working out plan for emergency, exercising rescue and relief work, determining the consequential losses scientifically and settling claims promptly;
- Drawing on the expenses of disaster prevention rationally to increase the capability of disaster prevention and loss prevention.

Through all above measures, PICC has successfully prevented some 800,000 tons of insured goods from the extraordinary flooding damage in 1998, saving insured property valued at 7.6 billion yuan RMB.

Research Center for Disaster Reduction of Ministry of Water Resources

The Ministry of Water Resources of China established the Research Center for Disaster Reduction (RCDR) in 1990. During the past decade, REDR has conducted a lot of researche projects on the basic theories of flood risk management and flood risk analysis techniques.

During IDNDR, RCDR edited and published a "Handbook of Flood Prevention and Mitigation for the Whole People". This handbook provides rudimentary knowledge and the initial results of flood risk research in China since 1980's. RCDR introduced to China advanced theories and methods of risk assessment and its application experiences from western countries by translating technical books and articals on natural hazards risk assessment and disaster mitigation countermeasures.

A flood simulation model with non-structural irregular grids has been developed by RCDR The model took advantages of both Finite Volume Method and Finite Difference Method to help hydrology, dynamics of silt sedimentation and flood control works. With the function of imaging display and operator-computer communication, results of flooding and silting processes can be shown on screen and the operator is now able to inquire the information during the calculation and to deal with the sudden accidents such as levee break. It has been used in the fields of flood predicting and forecasting, flood risk analysis, flood damage assessment, flood control planning and flood fighting decision support systems. RCDR combine flood numerical simulation, database and GIS to set up a flood risk information management system.

RCDR helped the Office of State Flood Control and Drought Relief Headquarters organizing the Flood Risk Map-making activities. RCDR was in charge of editing "A Guideline for Making Flood Risk Map" and "A Guideline for Flood Damage Investigation and Assessment". A lot of research work on historical features, variation trends of flood disasters have been done Results, such as the "Tentative Research on Flood Prevention and Hazard Reduction Strategies in 21st Century", "On the Historical Features of Flood Disasters in China", etc. have been published.

Computer technologies has been enhanced in the field of information management of historical flood hazards. There are historical records of flood and drought disasters for the past 2,000 years Combining the historical records and mathematical methods, a new way for regional flood risk assessment has been brought out. Several projects, such as "Quantization of Historical Flood Records and the Regional Flood Risk Analysis", "On the Chronicle of Ancient Natural Disasters and Abnormal Phenomena in China", "Theoretic Approach on the Historical Model and Its Research Methods" have been completed.

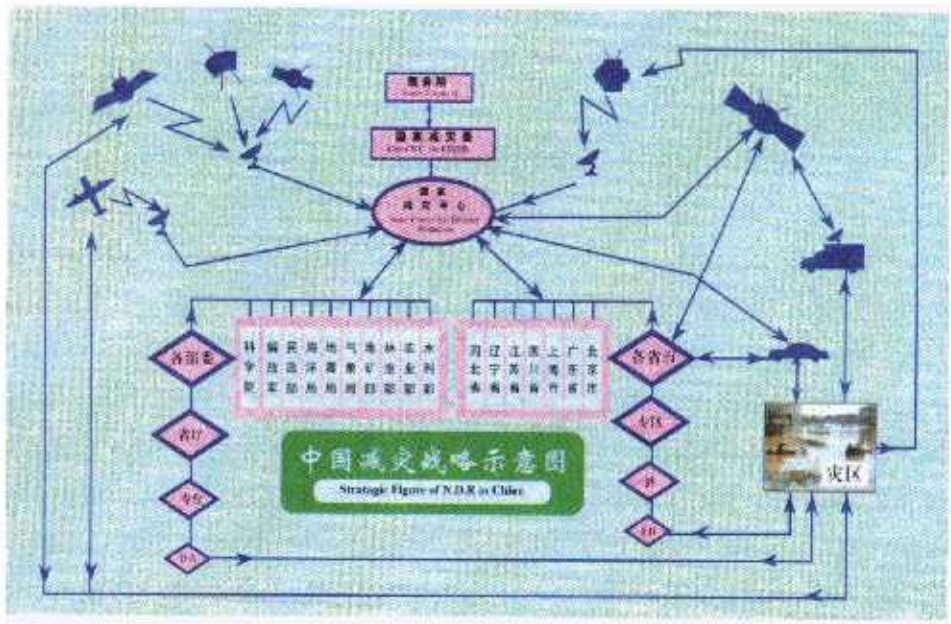
Remote Sensing Technology Application Center of Ministry of Water Resources

The Remote Sensing Technology Application Center of the Ministry of Water Resources was setup in 1980. The flood disaster monitoring is its main task. Since 1985, flood monitoring and assessment by means of remote sensing have been widely carried out in the Songhuajiang, Nenjiang, Liaohe, Haihe, Huanghe, Changjiang, Pearl River Basins, Taihu Lake and its surrounding area where floods occurred frequently, especially the flood occurred on Liaohe River in 1987, flood on Huaihe River in 1991, flood on West River, branch of the Pearl River in 1994, flood on the Changjiang River and the Nenjiang River in 1998. Because traffic and communication are usually difficult to get through during flood seasons, remote sensing can play an important role that other measures are not able to do. It can provide latest information of inundated area to decision makers on time. With the accumulation of data, it plays an important role to study regularity of flood occurrence, to work out flood prevention planning and operation alternative of flood diversion basins, and to reconstruction destroyed water projects due to flood.

To monitor floods, information from different sources, i e data from high resolution and low resolution, and from visible, infrared and microwave sensors, are combined A three-step procedure is conducted. At first, it is based on dynamic and low resolution observations from meteorological satellites. It is used as prewarning for whole country and forecasting precipitation together with the observations on ground surface. Secondly, middle resolutions observations from spaceborne SAR can be obtained in 48 or 72 hours and are used for monitoring the area with serious flood disaster. Finally, high resolution observations from a real-time transmission system of airborne SAR is used for monitoring the destroyed areas.

The application of remote sensing has now been developed from purely monitoring to the combination of monitoring and assessment. For flood disaster assessment, the first stage is the initial disaster assessment compeleted in 48 hours after obtaining remote sensing data. The results are the image after processing, the inundated area, inundated cultivated land area and resident area of each county, thematic maps, as well as analysis report. The second stage is on the basis of all data obtained during flood season. A report on flood disaster monitoring for the whole country is then written for each county in China.

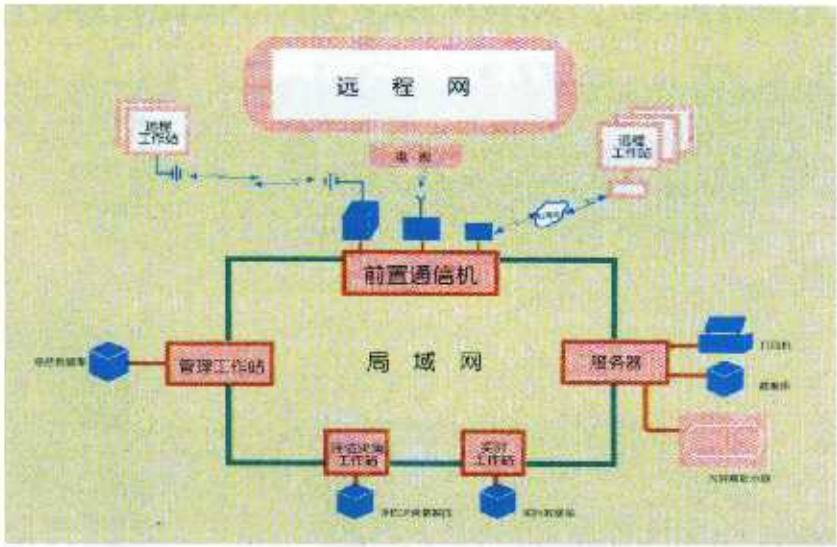
The Center for Disaster Reduction Chinese Academy of Sciences



China Disaster Reduction Center

The Center for Disaster Reduction, Chinese Academy of Sciences is an union of scientific and technological research of over forty Institutes which are engaged in the study of disaster reduction for long time. The Center engages specially the study of science-technology and strategy on disaster prevention and reduction, and to promote modern disaster reduction in China and all World.

CDRCAS consists of over forty Institutes, for example Institute of Atmospheric Physics, Institute of Remote Sensing Applications, Institute of Geography, China Satellite Remote Sensing Ground Station, Institute of Geology, Chengdu Institute of Mountain Disaster and Environment, Institute of Oceanology in Qingdao, Institute of Zoology, Institute of Biophysics, The University of Science and Technology of China, Institute of Systems Science and so on. The Center have eight Academicians, more than one hundred professors, and more than thousand scientists and engineers on the disaster prevention and reduction. The Center is one of the largest and actual most strengthening union on disaster prevention and reduction in China and all World The Center established Academic Committee of CDRCAS, Nanjing Branch Center, North-Western Branch Center, Marine Branch Center, Branch Center for Man-made Disaster and Biological Professional Committee of CDRCAS etc. The Director of this Center is Prof. Wang Ang-Sheng, who awarded world award— UN Disaster Prevention Award and he is the Director of Experts Group of China National Committee for IDNDR.



Synthetic Information System of Disaster Reduction

The aims and tasks of CDRCAS are that by making full use of the advantages of disaster prevention and reduction in CAS such as long history, multiple subjects, rich advanced technology, strong research theory, and comprehensive coordination etc. actively partaking in the synthetic, ahead, high scientific and technological tasks of China government and UN system and other union; and contribute our efforts to disaster prevention and reduction for China and all World.

During the recent many years, The Center presented strategic suggestion on modern disaster prevention and reduction for china government; promoted to establish " China Center of Disaster Reduction"; actively partook and finished " National Report of the People's Republic of China on Natural Disaster Reduction ", "China Plan on Disaster Reduction" and " China Decade Report on Disaster Reduction" etc; to organize and finish "Atmospheric-Hydrosphere Synthetic Scientific System on Disaster Reduction", "Remote Sensing System on Disaster Reduction " etc. important scientific and technological programs; to cooperate with UN IDNDR, UNDP and World Bank etc., to study basic theory on Disaster Reduction; to present new suggestion of " China Modern Setup of Disaster Prevention and Reduction" and so on. The Center made himself contribution for China and all World. So, as the represent of the Center, Prof. Wang Ang-Sheng, the Director, awarded UN Disaster Prevention Award in 1998.

The Center of Disaster Reduction of Chinese Academy of Sciences is willing to cooperate sincerely with all countries in the world, all organizations and all union, and contribute our efforts to disaster prevention and reduction for China and all World.

China Association for Science and Technology

China association for science and technology (CAST) is a mass organization for scientists and engineers, comprising 163 national scientific and engineering societies and associations at all levels. Over the past decade, CAST has organized specialists and scholars to conduct an comprehensive investigation on mechanisms and characteristics of all kinds of disasters in China and their interactive relations, as well as the countermeasures and measures for the disaster relief and prevention.

The CAST hosted three national-wide academic conferences for the natural disaster relief in 1990.1992 and 1998. Specialists and scholars discussed on issues such as the monitoring, predicting and evaluating of disasters, measures for disaster prevention and rescue, legislation, etc. They reached a common cognition that all kinds of natural disasters do not happen independently but in the form of a Disaster Chain effect among the underground, the surface and the air. They also concluded that the further research of the interaction among all the spheres of the earth and the interactive mechanism among various disasters should be paid more attention in the future disaster science research.

In 1991, a severe flood calamity occurred in Jianghuai region. CAST successively organized 16 national associations to make on-the-spot investigations of the damage caused by waterlogging in the Huai river and the Tai lake valley, bringing up ten strategic countermeasures for disaster relief in Jianghuai region.

Workshop on Disaster Reduction

Magazines and Book on Disaster

In 1992, CAST and Yellow River Water Conservancy Committee jointly organized an investigation on disaster relief and prevention in the downstream of the Yellow River In the report, CAST suggested that the harnessing of the Yellow River should be turned from simple disaster prevention to the comprehensive measures including the combination of eliminating disaster with building water conservancy projects, the combination of disaster preventing with the development and utilization of the River

The CAST has organized related national and local associations to develop the prediction and analysis work against disasters in air-water sphere, earth sphere and biology sphere as well as fire disasters Since 1994, CAST has organized some associations to launch research on the prevention and cure of the plant diseases and insect pests (PDIPs) in agriculture, forest, livestock and fishery. A "Green Book for the Prevention and Cure of the PDIPs" has been published every year since then.

In 1999, CAST organized 17 national societies to summarize the disaster situations in 1998, and to predict and analyse the time, location and strength of several main disasters that may happen in China this year. Corresponding suggestions, countermeasures for the prevention have been presented, based on "which, a White Book for Natural Disaster Relief" has been written.

In each year, the green book and the white book are presented respectively to relevant departments of the central government and local governments at all levels, not only providing proposals for them in decision-making, but also guiding the local agriculture production, disaster prevention and relief work.

China Association for Disaster Prevention

To Understand Natural Disaster Games and Plays for You and Your Friends

Established in November 1987, China Association for Disaster Prevention (CADP) is a non-governmental organization that devotes itself to natural disaster reduction.

The CADP mainly involves in comprehensive research on disaster reduction and enhancement of citizens' awareness by uniting the Chinese scientists and disaster managers, and combining its effort with national and local disaster reduction strategy and the theme of the IDNDR.

The main tasks of the association are:(1) Organizing academic research activity on disaster reduction; (2) Scientific consultation and service on disaster reduction. (3) Education and training on disaster reduction, as well as disaster reduction knowledge dissemination and nhancement of citizens' awareness; (4) Joining the IDNDR and other international activities related to disaster reduction. (5) Recommendation on disaster reduction to the government and other responsible departments

Considering the characteristics of natural disaster and its reduction in China, the CADP has organized a number of workshops related to comprehensive research on disaster reduction, and has published a lot of books and booklets, e.g. "Disaster Reduction and Development in China Coastal Region", " Disaster History in China ", "Study for Important Disaster Reduction Problems in China", "Business Disaster Reduction in China", "Handbook on prevention Disaster for Students", "Knowledge on Fire Prevention" etc.

Major achievements of CADP are:

* "Brief Report on Disaster Prevention"(monthly), "Journal of Natural Disasters"(quarterly) and "China Disaster Reduction Press"(weekly) were published;

* In 1996, The CADP help CNC IDNDR organize "Seminar on Disaster Reduction and Urban Development". A lecture on urbanization and disaster was held in Beijing. A video entitled "For Your Happiness" was madet and shown on TV.

* For enhancing students' awareness of disaster reduction, the CADP has been engaged in education on disaster reduction for the safety of teenagers. In 1993, " Handbook on Disaster Prevention for Students" was published.

* In 1996, the CADP distribute 12,000 "Learning about Natural Disasters-Games and Projects for You and Your Friends". A special children program on disaster reduction was shown on CCTV on October 11, 1996 (the IDNDR Day). In 1998, "Publicity and Education on Fire Prevention to Chinese Teenagers" was organized.

* Introducing main international conferences on the IDNDR, translating a lot of documents and materials related to the IDNDR into Chinese.

* In 1996, the CADP translated "Learning about Natural Disasters-Games and Projects for You and Your Friends". TheChinese teenagers were organized to attend the international painting and composition contest sponsored by the UN IDNDR Secretariat.

* The IDNDR Newsletter "Stop Disasters" was translated into Chinese.

Promoting Activity on IDNDR Day

China Association of Geological Hazards Research

China Association of Geological Hazards Research (CAGHR) is an academic association on geological hazards. It has four executive offices, responsible for academic affair, liaison, propaganda and youth. There are eight professional committees including land surface deformation, technical methods, geological remote sensing, marine geological hazards, geological hazard economy, urban geological hazards, prevention and control of geological hazards and prevention and control of collapse hazards committees. Local research associations have been established in the provinces where geological hazards occur frequently, such as Sichuan and Yunnan provinces and Chongqing City.

CAGHR has organized conferences and seminars covering many fields such as the national prevention and control strategy of geological hazards, land surface deformation, marine geological hazards, exploration techniques of geological hazards and geological hazard economy, facilitating the shape and development of geological hazard science. For example, the " Beijing International Seminar on Prevention and Control of Geological Hazards" sponsored by CAGHR greatly improving knowledge of the prevention and control technology of geological hazards in our country and intensifying international cooperation.

To dedicate to IDNDR, CAGRE and China Geology News jointly edited a book entitled "To Make China More Glorious" with articles on geological environmental protection, prevention and control of geological hazards.

Field Survey

Landslide

To enhance the knowledge and information exchanges among scientists and engineers who engage in geological enviornmental protection, provention and control of geological hazards. CAGHR edits and publishs "Chinese Journal of Prevention and Control of Geological Hazards". This journal has published 42 volumes since 1990.

CAGHR is also working hard on the cooperation with foreign academic organizations, scientists and technical personnel.For example, agreements on the periodical exchange were signed with the Japanese Sand-defense Association and the library of Tokyo University, etc.

CAGHR has helped the government in writing laws and regulations such as "Proposal for Project Establishment of Prevention and Control of Geological Hazards in China", "The National Program for Prevention and Control Plan of Geological Hazards" (1990-2000), "Regulations Regarding Prevention and Control of Geological Hazards", and "Regulations Regarding Monitoring and Management of Geological Environment".

Moreover, CAGHR held many training courses in Beijing, Dongchuan City of Yunnan Province, Leshan City of Sichuan Province, and Yichang City of Hubei Province to strength local technical personnels' ability to prevent and control geological hazards.

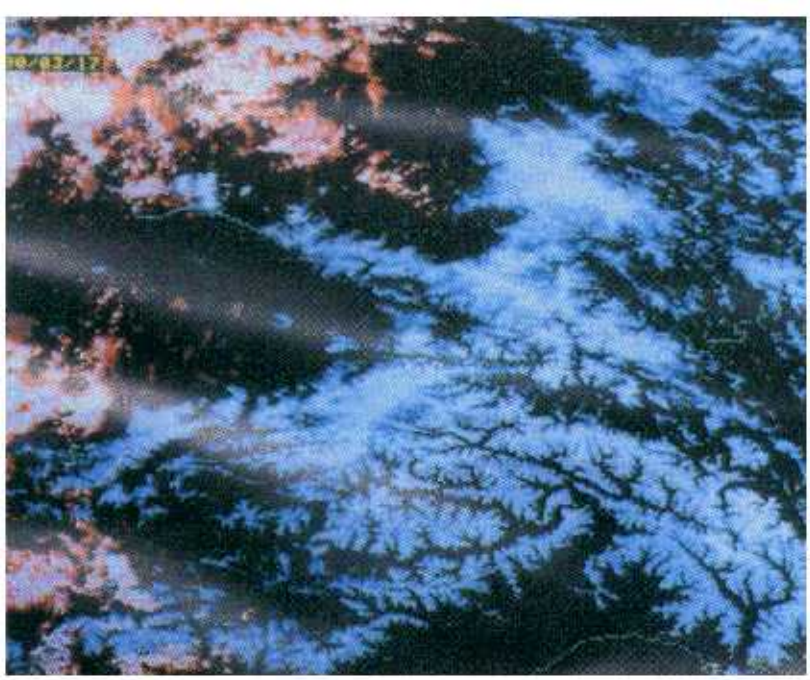
China Association of Remote Sensing Application (CARSA)

China Association of Remote Sensing Application (CARSA) has over 130 unit members and 100 individual members. It is consisted of secretariat, specialist committee, specialist committee in disaster relief, environmental remote sensing branch association, specialist committee of national resources, and GIS application committee. The main objective of the organization is to facilitate the application and development of remote sensing information technology in the country. Currently, CARSA is involving many operational and research projects. For example,

- Predicting short-term earthquake with meteorological satellite images;
- Applying remote sensing technology in comprehensive survey of the ecological environment as well as the geological disasters;
- Monitoring desertization and assessing disasters with meteorological satellite;
- Studying the shell stability of Beijing, Tianjing and Tangshan region based on observations from Chinese Resource Satellite;
- Conducting researches on predicting fog, typhoon and oceanic storm tides .
- Analyzing the formation and mechanism of the mudrock flow in Qixinpan, Sichuan Province.
- Monitoring of dust storm in the hinterland of the Takelamagan desert in Xinjiang province.
- Surveying of landslide and stability in the bank of the Yangtze river within Anhui province.
- Transfering remote sensing disaster relief knowledge to all levels of governmental administrator.

Moreover, many international cooperative projects were also sponsored by CARSA. For example, a project on the monitoring and management of self-burning in Ruqigou coal field in Ningxia province, was jointly developed by CARSA and EARS of Canada in June, 1996. China National Desertification Monitary Center and SCOT company also carried out cooperation in the research of monitoring of desertization with vegetation channel data of SPOT 4 satellite in March, 1998.

Remote Sensing on Forest Fire Monitoring



Remote Sensing on Blizzard Monitoring

Chinese Society for Urban Studies (CSUS)

Chinese Society for Urban Studies is a national academic institute on urban studies, which aims at harmonious social, economic, and environmental development. It provides consultation service to governmental decision-makers on urban affairs based on the cooperation of researcher and practitioner across China. Its main tasks are as following:

- Giving suggestions druing the practice of urban development;
- Organizing academic conferences to vitalize thoughts and creations from important projects;
- Compiling books, periodicals, and other printed materials;
- Sponsoring lectures to raise the awareness of urban development theory, technology and latest research findings from foreign countries;
- Enhancing multilateral relationships with foreign academic organizations to foster information and personnel exchange and international cooperation;
- Providing technological consultation service for city governments around China.

CSUS has 8 sub-institutes, 100 local branches, and 3 regional liaison centers in China. CSUS oriented activities with multi-disciplinary and comprehensive features mainly covered urbanization, city infrastructure, urban ecology and environment, relic preservation, migrating population control in metropolises, solid waste disposal, car and city development, and regional development strategy etc

CSUS has carried out a series of activities to deal with the important theme and put forth suggestions for governmental decision-making reference. A special column was set in the magazine URBAN STUDIES to stipulate the awareness of precaution and prevention during city disaster mitigation. All of these contribute much to city safety practice and the development of safety theory

The highly urbanized areas along Huai River and Yangtze River and between them were hit by heavy flood in 1991. CSUS headed a damage investigation of cities and mitigation measures taken after collaborated with several national societies. The finial report is got much attention from all level government agencies. It stressed that well developed city infrastructure be the crux of measures to strengthen the capability of city prevention.

In 1994, China Association of Science and Technology (CAST) organized the '94 International Symposium of Coastal City Mitigation in Asia and Pacific Region". In the conference, CSUS specialists originated the concept of city disaster comprehensive prevention by emphasizing the integration of disaster prevention planning into city physical planning and implement them spontaneously. Furthermore, the magazine URBAN STUDIES established the column, Urban Disaster Comprehensive Prevention, to promote the concept. This concept was again raised in the 33rd World Planning Congress.

Fire fighting

During the 3rd Conference of Natural Disaster Mitigation held in 1998, CSUS co-hosted with other national societies a specialist forum on city disaster comprehensive prevention. The specialists pointed out that city gets heaviest damage once disaster come and be the center of comprehensive mitigation. Prevention measures taken with city construction and development is the core of comprehensive action.

At the beginning of 1999, several national academic associations cosponsored the 1999 Symposium on Natural Disaster Reduction. In the conference, CSUS specialists pointed out that a well developed system of city disaster comprehensive prevention including agent, law, emergency regime, volunteers, command system, and action plan etc. is a must for China.

Working Group on Natural Disaster of Three Commissions

Cooperation on Disaster Regionalization

The Working Group on Natural Disasters of Three Commissions is sponsored jointly by former State Science and Technology Commission, State Planning Commission and State Economy and Trade Commission. It mainly focus on investigating and researching the disaster conditions, features, developing relevant public laws and making countermeasures for catastrophic events such as earthquake, flood as well as the meteorological, geological, agricultural, forestry and marine hazards endangered China

The working group helped the national government establish the standardized criterion for disaster assessment, to formulate the unified and synthetic plan for disaster preparedness and to make laws for disaster-reduction.

From 1991, the group has hold comprehensive meetings on the yearly developing tendency of natural disasters in China continuously, providing the nation with yearly general developing tendency of natural disasters of China.

The comprehensive study and assessment of the losses and social effects resulted from various natural disasters has been conducted. At the same time, the books such as Research on the Major Disaster-reduction Problems of China, Disaster Management and so on, plenty of scientific papers, and lots of popular-science materials on disasters have been finished.

In 1990, the Group put forward the idea that the disaster-reduction enterprise is a complicated system which includes disaster-monitoring, disaster-forecast and warning, disaster-prevention, disaster-resistance, disaster-rescue, as well as disaster-reconstruction and rehabilitation. The Group has published plenty of scientific books and papers on social disaster-reductionn, inspection of heavy flood disaster of Yangtze River in 1998, disaster-reduction countermeasures for 21st century of China and problems, requirements and countermeasures of the post-flood reconstruction of China

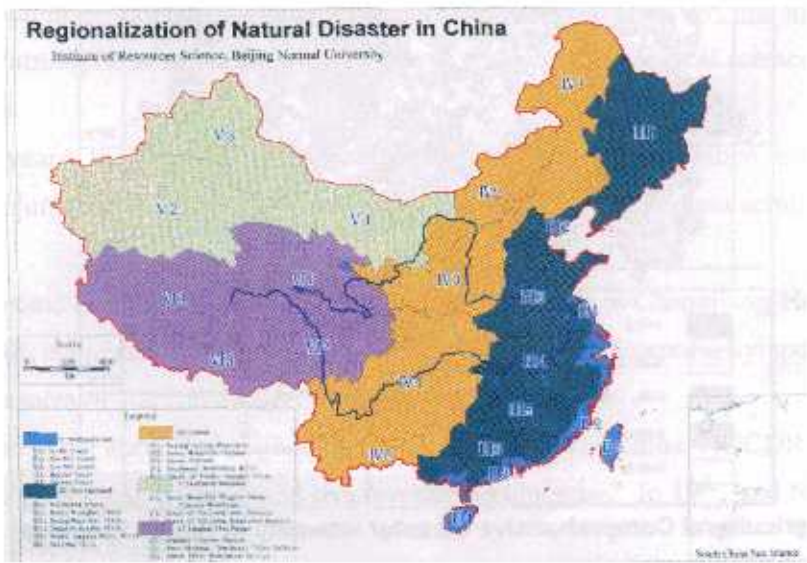
The Group has studied the feedback mechanism by viewing population, environment and disasters as a whole system, through which the disaster reduction aspect has been considered, in pursuing the social and economic sustainable development.

In a book, " Research on the Major Disaster-reduction Problems of China", the Group brought forward the new idea of disaster-science system firstly in 1992 In 1998, the Group accomplished a book series of "Chinese Disaster Study".

To provide a good service for society is the goal of the Group. The reach this goal, the group has conducted many consultation works. For example, it has provided services to the national decision-makers about disaster-reduction, accomplished "Natural Disaster and its Insurance Regionalization" for People's Insurance Company of China, promoted energetically the construction of disaster-reduction demonstrative regions in Guangyuan area of Sichuan province and in Baoji area of Shanxi province and carried out the various activities to promote the disaster and the disaster-reduction knowledge.

Exchange

Open Research Laboratory of Environmental Changes and Natural Disasters of Ministry of Education

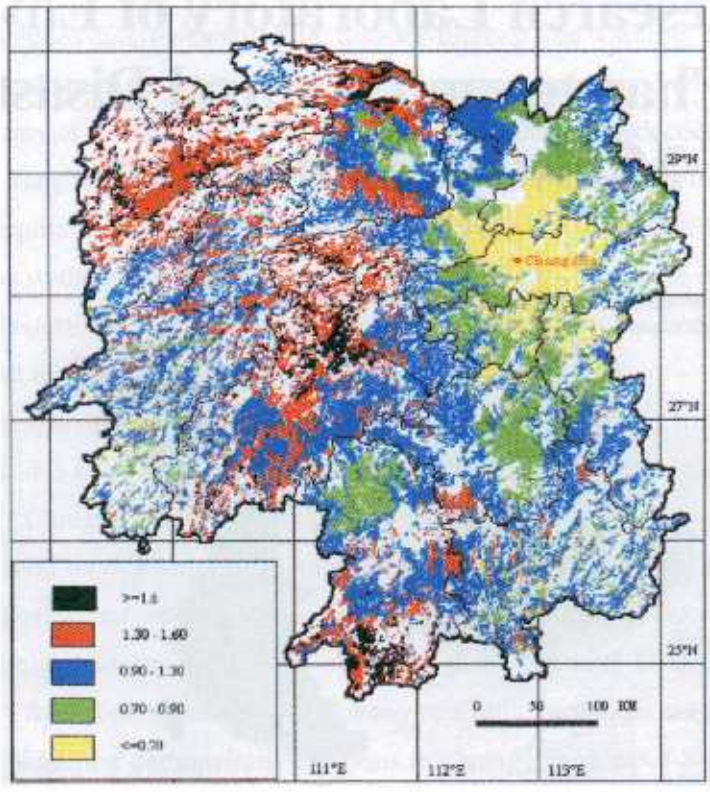


Open Research Laboratory of Environmental Changes and Natural Disasters of Ministry of State Education of China (ORLECND) is located in Beijing Normal University and managed by Department of Science and Technology. It is sponsored by the Ministry of Education of China. It was founded by the former National Education Committee of China in 1994, based on the "Research Section of Paleogeography of Cenozoic " founded by Professor Zhou Tingru in 1963 and the "Research Section of Natural Disasters" founded by the former Department of Geography of Beijing Normal University.

The main objective of the ORLECND is to understand the global change and its impacts on the formation, the development and the regionalization of natural disaster in China, the risk evaluation model of natural disaster, the insurance technology of natural disaster, etc. From 1989 to 1998, the ORLECND completed 27 research projects. The most important achievements are:

* Establishing scientific definition on the system of local nature disaster and conducting research on the regionalization of natural disaster in China;

* Editing the first copy of "Attlas of Natural Disaster in China" in 1993;



Agricultural Comprehensive Disaster Intensity in Hunan Province

* Mapping integrated regionalization of natural disasters in China (Figure 1). The whole country is divided into 6 regions and 26 sub-regions on the basis of the regionalization. It shows that the differences of natural disasters between west and east are larger than those between south and north.

* Defining the concept of "the basic unit of regional nature disaster". On the basis of this concept, established the regionalization system of the natural disaster "from bottom to top " and "from top to bottom". Based on this theory, natural disaster regionalization of Hunan and Inner Mongolia has been finished.

* Finishing the "National MIS of Natural Disaster for Ministry of Civil Affairs", "Insurance MIS of nature disaster of agriculture for Hunan Province" (Figure 2).

* Developing the regional risk assessment models for agriculture disaster. Based on the model, mapped the regional risk of agriculture disaster supported by the incorporation of method of information diffusion, space statistics and analysis, and GIS.

* Assessing the food production risk of natural disaster in China. Finishing Chinese integrated regionalization of agriculture disaster by combining the methods of "from top to bottom" and "from bottom to top".

Center for Disaster Research of Nanjing University (NUCDR)

The Center for disaster Research, Nanjing University is a multi disciplinary reseach institute which does research on natural disasters. The center consists of professors and experts from the departments of atmospheric sciences, earth sciences, geography, biological sciences and environmental sciences.

In last ten years, the center not only paid attention to the basic science research, but also emphasized on fulfilling needs of the society and goverments. Some main achievements are as follows.

- To understand causes and effects of the catastrophic floods in Changjiang-Huaihe river area in 1991, NUCDR, cooperating with other institutes, held "National Scientific Symposium on causes and countermeasures of Natural disasters" in Nanjing University.
- To prevent some abruptly happened geological disasters in China, NUCDR held "National sympostium on geological disasters and its prevention techniques" in 1991 and NUCDR experts provided many effective methods.
- Completed the project "The causes and countermeasures for Natural disasters symposium on disaster reduction and development strategies for coastal areas" in Yan tai, 1991.
- In 1992, NUCDR organized a group of ten experts to survey hazard environment and rock stratum stability of the back-yantai mountains. The scientific conclusions and evaluation were used for harbor development and construction of nuclear power station in Jiangsu Province.

Village in Flood

Laboratory for Reginal Disaster Reduction

• NUCDR investigated on drought climate and water deficiency in Guangxi area, and did artificial precipitation test, designed expert system of artificial precipition, and trained technicians to master artificial precipitation techniques and cloud-physics study for Guangxi Meteorological Bureau.

• NUCDR carried out "study on erosion disaster coastal belt and its prevention techniques" and "study on the storm surges over south China sea".

• NUCDR scientists did researches on biological pollution and disasters in river, lake and sea.

• The "Study on causes and Laws of catastrophic flood in Changjing-Huaihe area, and disaster forecasting and prevention techniques", collaborated with Institute of Atmospheric Sciences, Chinese Academy of Sciences(CAS) awarded with first grade prize of Science and technology progress of CAS in 1996. The "study on typhoon rainstorm severe meatier observation, forestry techniques and typhoon climate" won the first grade prize of Science and technology progress of CAMS in 1996. Both of these two were honored with National key project achievement prize by State Planning Commission, State Science and Technology Commission and the Ministry of Finance.

• NUCDR published "water environment on the earth", "Natural Disasters", "Atlas of water vapor climatology in China", "Atlas of Drought climate in Guangxi", and seven special issues on natural disasters study in the Journal of Nanjing University.

• NUCDR also conducted many international cooperative works with Center for Disaster Research, Oxford University, UK and experts of disasters reduction at Washington University USA in controlling radon pollution in eastern USA.

Tongji University

International Workshop on City Disaster Prevention

Tongji University is a comprehensive institution. Urban Planning, Geotechnique Engineering, Structural Engineering and Inorganic Non-metal Materials are among state key specialties in China and the studies in the field of earthquake engineering and wind engineering earn a good reputation. Over years, reserachers in Tongji University have devoted themselves to the research in earthquake resistance and disaster prevention and wind resistance for large-scale projects, catastrophic sliding prevention and flood prevention project, etc. Since 1989, the research projects undertaken by Tongji University fellowship on disaster mitigation account for 168 and total funds amount to thirty million yuan (RMB). The published papers numbered over 950. We participated in compose of 8 books on disaster mitigation. We were awarded 4 items of the Prize of the Advancement of Science and Technology as well as the Prize of Natural Science by the Chinese Academy of Sciences, among which the "Shanghai Nanpu Bridge" win the First Prize of the Advancement of Science and Technology by the Chinese Academy.

1. High quality data acquisition and analysis in research

1.1 The measurement has been carried out more than 20 years in Yunnan and Shandong Provinces as well as Shanghai.

1.2 The wind resistance tests for almost all domestic long-span bridges and super high-rise buildings and the complex of high-rise buildings were carried out in Tongji University.

1.3 The earthquake-resistance design test for many domestic well-known projects were completed on the multi-degree-freedom shaking table.

1.4 The velocity of strong wind on the old Shanghai TV Tower was successfully measured, and the precious data of the wind velocity field as well as the structural vibration have been acquired.

2. Devoting and serving to society

2.1 Tongji University participated in or was responsible for formulation of all state and Shanghai Municipality seismic design code and/or regulations and wind resistance design regulation.

2.2 We participated in the assessment and identification of earthquake resistance and disaster prevention plan for tens cities and large scale enterprises in China.

2.3 We have successively trained several hundred managers engaged in earthquake disaster management for Ministry of Construction and several batches of managers who are responsible for environmental protection for State General Bureau of Environmental Protection.

2.4 We have actively undertaken disaster mitigation study of large-scale projects, such as landslides of Three Georges of Yangtze River, aseismic research on ship lift for Three Georges, wind resistance study on Shanghai Yangpu Bridge, etc..

Morover, a new disaster prevention and relief research institution, named by Shanghai Institute for Disaster Prevention and Relief(SIDPR), was established in 1989. The institute is a scientific research institution directed by Shanghai Science and Technology Commission as well as Shanghai Construction Commission for professional work. Since its establishement, SIDPR has undertaken several major research projects assigned by Shanghai Municipality, such as pre-feasibility study on the Establishment of Disaster Prevention and Management Center of Pudong New Area, Shanghai, the project 8-8B of the Priority Programme for China's Agenda 21. Entrusted by Shanghai Earthquake Resistance Office, SIDPR is in charge of function enforcement of administration for Shanghai engineering earthquake resistance qualification. The institute also conducted works for both domestic and international insurance companies on business of risk consulting.

Dalian University of Technology

Disaster protection and mitigation research of Dalian University of Technology mainly focus on two aspects. One is anti-seismic disaster protection research on major structures and lifeline engineering. The other is major drainage basin and reservoir scheduling research. Anti-seismic disaster protection research started in 1957. Flood control and beneficial scheduling research on reservoirs began in 1980, and great progresses in the fields of decision making theory and software design on automatic scheduling of reservoir flood took place recent years.

The main achievements on disaster protection and mitigation in Dalian University of Technology consist of the following:

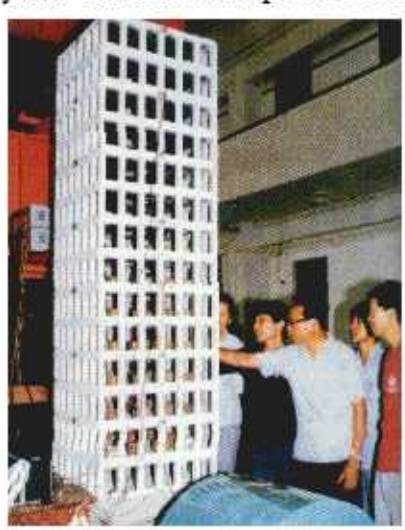
1. Strong earthquake destructive theory and experiment technology on major project

Research achievements on the aspects of structural anti-seismic theory and experiment technology of major projects are remarkable in Dalian University of Technology. Award of National Science and Technology Conference was obtained in 1978. Seismic safety analyses and model tests on Longyangxia Dam, Lijiaxia Dam, Laxiwa Dam and Fengman Dam were finished sequentially. Main achievements are summarized as the following:

(1) Simulation technology of dynamic model destructive test on concrete dam is proposed. Model materials with the property of simulation are developed. Similarity conversion relationship between prototype and model is put forward.

(2) Concrete dynamic destructive mechanism of dam and the relationship between destructive process and seismic intensity, duration, frequency are researched, and virtual crack model is developed.

(3) The opinion that seismic destruction of high dam should be solved by the means of vibration control was proposed firstly. Vibration control theory and vibration absorption technology are abounded.



(4) New achievements are obtained in the research of response, deformation and stability failure mechanism on earth-rock dam and concrete-faced rockfill dam under the load of earthquake. Energy analysis method of seismic liquefaction on sand soil and practical engineering method to assess anti-seismic capacity on earth-rock dam are put forward.

2. New technology on joint time-frequency seismic analysis

New fruits of Adaptive Gaussian Basis Function and Orthogonal-Like Gabor expansion in the field of signal analysis in 1990s are utilized in Dalian University of Technology. Joint time-frequency non-stationary seismic input model is created and new technology is developed. New results are gained at the aspects of strong earthquake response and destructive characteristic of structures under the excitation of time-frequency non-stationary seismic input model.

3. Research on geotechnical seismic engineering

Dynamic non-linear constitutional relationship of soil, anti-seismic analysis method of dynamic stability analysis theory of earth-rock dam, slope and foundation are researched deeply and systematically. Influential achievements are gained,as follows:

(1) Limit equilibrium analysis method of non-homogeneous earthen structure and foundation stability is created and developed on the base of variation method and mathematical optimization technology.

(2) Non-linear simulated computing method on dynamic geotechnical engineering analysis is developed.

(3) Computing methos and program system of static, dynamic and stable analysis on plaster dam of electric power system is exploited.

4. High-rise structure optimized design basing on reliability and function

Structural anti-seismic optimization theory and model of high-rise building is created on the base of structural reliability theory and structural optimization theory, and the thought of function design.

5. Flood control and beneficial decision making scheduling research on reservoir

Distinguished researches include the followings. Fuzzy hydrology and water resources fuzzy set analysis theory, flood control and fuzzy optimization theory are created. Persistent utilization and economic coordinated developing model of water resources in Dalian city provides an scientific decision making tool for government and national long-range economic development. Flood control and scheduling fuzzy optimization model of reservoir group at the center of Three-Gorge of Yangtze River provides an important method for prospective real-time scheduling of Three-Gorge Dam.More than ten real-time flood scheduling making decision systems including Dahuofang Reservoir, Qinghe Reservoir, Chaihe Reservoir, Tanghe Reservoir and Baishan-Fengman Reservoir Group were sequentially finished during twenty years. Those played important contributions to flood control of downstream industrial cities.

Beijing Disaster Reduction Association

Since 1994, Beijing Disaster Reduction Association (BDRA) has organized academic seminars, helped the government work out disaster reduction plans and programs, conducted disaster consultation and expert proposals, and developed popular science and propagation on disaster reduction. The main activities are as follows:

- BDRA organized experts to work out "Program and Outline on the Disaster Reduction in Beijing" and "Natural Disaster Reduction" in "the 9th 5-Year Plan Program in 2010 of Beijing's Science & Technology Development"
- In 1996, BDRA and the city's Economic Commission, Flood-control Office and Yanhua Company jointly organized conference on Danger Removal and Reinforcement of Tube Bridge 1 across the Yongding River".
- It held 3 large annual academic meetings respectively entitled "Disaster Reduction in the Capital and the Strategy in a Century", "Next Century Continuing Development and Comprehensive Disaster Reduction in Beijing" and "Comprehensive Disaster Reduction and Continuing Development in Cities".
- Organized special seminars and workshops such as "Analysis and Countermeasures to Natural Disasters in Agriculture in Beijing Area", "Important Disaster Trend and Countermeasures in Beijing Area", analyzing concrete problems and hidden dangers existing in production and management and raising practical proposals.

Beijing in Development

• BDRA joined in "Legislation Workshop on Beijing's Continuing Development" and arried out "China's Agenda for 21-th Century".

• Comducted "Study to A Cancer of Lung Causing Substance-Radon Concentration in Beijing's Environmental Monitoring", "Study to Beijing's Fire Monitoring and Early Warning System" and "Study to Water in South China Supply to North China and Droughts in Mid-China".

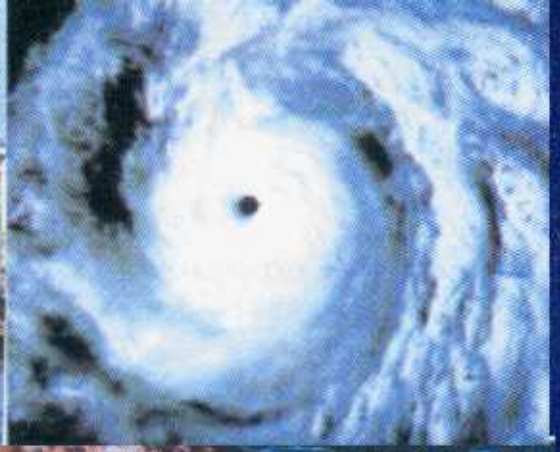
• BDRA jointly organized the first "Summit for China's Safety and Disaster Reduction in the 21-th Century and Continuing Development Strategy" with China's Disaster Control Association and China Economic Time under the State Council's Development Center.

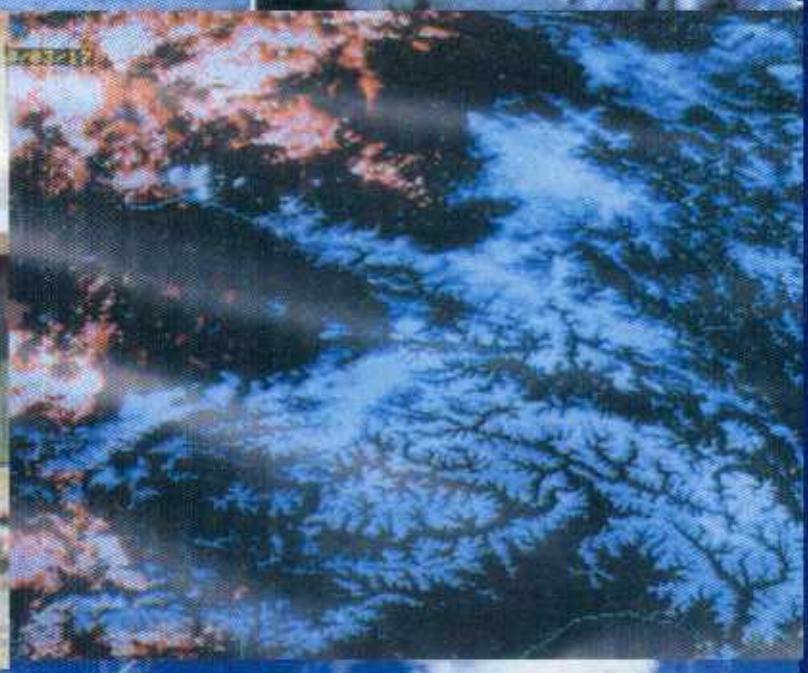
BDRA organized many papers for the academic workshop "Afforestation of the Capital in the 21-th Century", the annual academic meeting of the Fire Fighting Association and the magazine "City, Earthquake Control and Disaster Reduction".

BDRA has also published many papers, such as "Duty Heavier Than Tai Mountain-Scientific Management Guide for Disaster Reduction", "Disasters in China's Citie's and Their Control Countermeasures", "Principle on Disasters in Cities", "Strategy on Safety and Disaster Reduction of China in the 21-th Century" and compiled Encyclopedic Knowledge on Self Rescue and Protection for Teenagers".

BDRA lanched promoting and education activities, including seminars, exhibition and discussion. For example, in 1997, it produced 100 exhibition boards for "Popular Science Mobile Exhibition for Disasters in Cities" which were welcome by people in the city and its suburbs. BDRA has organized lectures for about 20 times. Over 4,000 persons listened to the report.

Promotion of Disaster Reduction



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