

China's Actions for Disaster Reduction during the Period of the 12th

Five-Year Plan

General Office of China National Commission for Disaster Reduction

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Foreword

Among the countries most plagued by natural disasters, China suffers various kinds of disasters which have happened frequently in a wide scope of area and caused enormous losses. Along with increasing climate changes across the globe and its own progress in industrialization and urbanization, China is faced with increasing pressure on resources, environment and ecology. As many natural disasters take place frequently, the prevention of natural disasters has become more serious and complicated. During the 12th FYP period (2011-2015), China suffered enormous losses in terms of human lives and properties caused by exceptionally severe natural disasters including the profound summer drought in the middle and lower streams of the Yangtze River, the large-scale flood in Beijing, Tianjin and Hebei, the earthquake in Lushan County, Sichuan Province, the earthquake in Zhangxian County, Minxian County, Gansu Province, the basin-wide flood in the Songhua River of Heilongjiang Province, Typhoon Rammasun and the earthquake in Ludian County, Yunnan Province.

Always having been oriented by people's benefit, the Chinese government has secured people's life and property and provided powerful guarantee for the comprehensive and coordinated sustainable development of both economy and society by taking integrated reduction of natural disasters as an important part of public security and social governance and incorporating it into economic and social development planning, further improving laws, regulations and rules in this respect, strengthening the capability of integrated reduction of natural disasters comprehensively and dealing with all kinds of natural disasters efficiently and effectively. Moreover, it has obtained positive achievements of international exchanges and cooperation in this respect.

I. Natural Disasters in China

China is among the countries mostly affected by natural disasters. Along with increasing global climate changes and active performance of earthquakes, China also suffered sufficient numbers of disasters during the 12th FYP period, with 310 million person-times affected, more than 1,500 people dead or missing, more than 9 million person-times relocated urgently, approximately 0.7 million houses collapsed, more than 27 million hectares of crops damaged and more than 380 billion RMB of direct economic losses caused each year on average. Compared to the annual average between 2001 and 2010, China witnessed a drop of 86.7% in the annual average population dead or missing in natural disasters during the 12th FYP period, 22.6% in population relocated urgently, 75.6% in number of houses collapsed, 38.8% in area of crops affected and 13.2% in ratio of direct economic losses to GDP. On the whole, the natural disasters that China suffers have the following characteristics:

--Wide influence. Natural disasters cause damage in different degrees to all of China's provinces (autonomous regions and municipalities directly under the Central Government). More than 70% of Chinese cities and more than 50% of the Chinese population are located in areas seriously affected by earthquakes, or meteorological, geological or marine disasters.

Between 2011 and 2015, 2,800 counties (cities and districts) of 31 provinces (autonomous regions and municipalities directly under the Central Government) in China, or 97% of Chinese administrative units at county level, were affected to different extents by floods, drought, hailstorms, earthquakes, typhoons, landslides, debris flows and other natural disasters.

--Distinct regional characteristics. Along with progress in urbanization, natural disasters are posing increasingly evident impacts on urban areas in China, especially the densely-populated and economically-developed large and medium-sized cities and small and medium-sized towns in the east, plagued frequently by urban water logging and typhoon. Besides, the western region also suffers frequent natural disasters such as earthquakes, landslides, torrential floods and debris flows, due to its complicated geologic structure and active neotectonic movement. From 2011 to 2015, 71 seismic hazards above Magnitude 5 (inc. 15 above Magnitude 6 and 2 above Magnitude 7) took place in Mainland China and Yunnan, Sichuan and Gansu, situated in West China, suffered the most outstanding losses.

--Remarkable monsoon climate influence. Over two thirds national territorial area of China is threatened by flood disasters. Local or regional drought takes place almost every year. Eastern coastal areas witness the landfall of about 7 tropical cyclones each year on average and such disasters as floods and typhoon happen largely in the flood season. Between 2011 and 2015, more than 1,600 rivers in China suffered a flood exceeding the warning level and more than 100 rivers witnessed floods reaching new records; on average, approximately 100 cities above county level were flooded each year, with serious threats posed on urban safe operation and citizens' life and property; landfall intensify of tropical cyclones got enhanced apparently, with 10 violent and super typhoons (31% of total typhoons) landing on Mainland China; Typhoon Rammasun, taking place in 2014 with a wind speed of 70m/s, is the most violent one landing on China since 1949.

--Huge losses caused by floods and earthquakes. Between 2011 and 2015, flood was the most frequent, most influential and most damaging disaster in China, affecting over 80% of Chinese counties and responsible for more than 60% of the death, missing and housing collapse caused by natural disasters. Earthquake caused the most centralized casualties and property losses. Lushan Earthquake at Magnitude 7.0 that took place in Sichuan and Zhangxian Earthquake at Magnitude 6.6 that took place in Minxian County, Gansu in 2013 and Ludian Earthquake at Magnitude 6.5 that took place in Yunnan in 2014 all resulted in major casualties and property losses.

II. Construction of a Legal Framework, Institutions and Mechanisms

Related to Disaster reduction

The Chinese government has strengthened the construction of laws, regulations, policies and systems, improved the legal system for disaster management, took the improvement of disaster prevention, reduction and relief system as an important part of the construction of the public safety system and made all work more oriented to law and standardized during the 12th FYP period.

The Chinese government enhanced further the rule-of-law concept, stuck to law-based administration, implemented the *Emergency Response Law of the People's Republic of China* as well as laws and regulations regarding natural disaster relief, fight against drought, prevention and control of geological disasters, prevention of meteorological disasters, forest fire prevention and monitoring, prevention and control of wildlife epidemic diseases, revised the *Flood Control Law of the People's Republic of China*, *Marine Environment Protection Law of the People's Republic of China*, *Environmental Protection Law of the People's Republic of China* and *Work Safety Law of the People's Republic of China* and thus further improved the legal system for disaster management. It also implemented, formulated and revised the *Master State Plan for Rapid Response to Public Emergencies* as well as other plans about disaster relief, flood control and drought relief, emergency response to earthquakes, unexpected geological disasters, forest fire, agriculture, fishery, animal epidemics, fire disaster and plague of insects on grassland, marine disasters, environmental events, market supply and road traffic and made these plans increasingly more feasible and operable. On the whole, the Chinese government has conducted law-based work and administration in the prevention, reduction and relief of natural disasters, in an increasingly more scientific, normative and standard manner.

Continuously incorporating disaster reduction into central and local sustainable development strategies, the Chinese government promulgated the *National Comprehensive Plan for Disaster Prevention and Reduction (2011-2015)*, defining state strategic goals, main tasks and major projects for the integrated prevention and control of disasters. Moreover, it formulated and implemented development plans specific to disaster reduction technology and talents, weather modification, fight against drought, prevention and control of geological disasters, urban and rural construction, forest fire prevention and forest pest control, and organized and implemented in succession overall plans for post-disaster restoration and reconstruction for Lushan Earthquake and Ludian Earthquake, for which local governments developed and implemented integrated plans according to their respective situation. In addition, central and local governments promoted the implementation of disaster reduction projects as per applicable plans, strengthened infrastructure construction and improved the capacity of comprehensive disaster reduction.

The disaster management system based on centralized leadership, division of responsibilities, social participation, level-to-level administration and localized management have been improved further. Under the centralized leadership of the State Council, NCDR

China improved further its functions of undertaking overall research and comprehensive coordination for disaster reduction work. The State Flood Prevention and Drought Resistance Headquarters, the Earthquake Relief Headquarters of the State Council and the State Forest Fire Prevention Headquarters have been playing better roles in risk prevention, coordination and direction. Local governments have continued to improve the construction of integrated coordination institutions for disaster reduction and further performed responsibilities for emergency rescue, restoration and reconstruction. Provincial-level disaster reduction commissions were established in 27 provinces (autonomous regions) and disaster reduction commissions or comprehensive disaster reduction coordination institutions were established in over 90% of the cities and 82% of the counties. Military functioned fully as main forces and commandos in emergency rescue and capacity of coordinated response among government organs, among regional governments and between military and local governments continued to improve.

During the 12th FYP period, construction of the working mechanism for disaster prevention, reduction and rescue was advanced further, the mechanism for emergency linkage and information management, in which member units of National Committee for Disaster Reduction of China took part, and natural disaster relief systems composed of monitoring and early warning, material reserve, fund guarantee, restoration and reconstruction were improved, and disaster relief work conducted much more efficiently and effectively.

--Monitoring and early warning mechanism. Government organs in charge of civil affairs, water conservancy, agriculture, meteorology, forestry, earthquakes and oceans strengthened further the construction of the disaster monitoring and early warning system, improved, increased the density and further optimized the deployment of monitoring stations and networks for river floods, agricultural conditions and agricultural pests, drought and rainstorms, forest fire risks, epidemic diseases of terrestrial wildlife, rapid earthquake information report and marine observation, improved evidently the timeliness and accuracy of early warning and forecasting, provided apparently more efficient warning and forecasting service for the general public and expanded evidently the coverage, and established preliminarily monitoring and early warning systems for meteorological disasters, urban water logging, mountain flood and geological disasters, seismic hazards, ocean disasters, agricultural pests, forest fire and wildlife epidemic diseases.

--Information management mechanism. A statistical reporting system for natural disasters was established, so as the national online information submission system for natural disasters above county level and the system where county-level civil affairs departments shall report preliminarily the information of natural disasters in 2 hours, report major disasters directly and submit a report in 24 hours even if there is no updates developed. National Committee for Disaster Reduction of China built up a disaster situation consultation system engaging 15 disaster-related departments in charge of civil affairs, land and resources, water conservancy, agriculture, earthquake and meteorology, convening disaster trend meetings at regular intervals through monthly consultations, annual disaster trend forecasting consultation, annual disaster verification consultation and major disaster process consultation so as to evaluate the situation and analyze the trend of disasters. In the meantime, it continued to improve the disaster information release system in accordance with the principle of being prompt, accurate,

open and transparent, releasing the verified information promptly on the website of the Ministry of Civil Affairs or other news media and announcing periodical disaster information through compiling the *Monthly Communiqué on Natural Disasters* and the *Annual Report on Natural Disasters*.

--Emergency linkage mechanism. China's disaster emergency response follows the principle of level-to-level responsibility, oriented by local management. Upon the occurrence of a disaster, the people's government with jurisdiction over the site of the disaster launched emergency response rapidly according to emergency preparedness plans, established an emergency commanding structure and performed emergency effort, including emergency rescue, curing of casualties, settlement of victims and information reporting. National Committee for Disaster Reduction of China and its office stepped up the organization and coordination of response to severe exceptionally severe natural disasters so as to ensure the well-organized relief effort in place. Where natural disaster impacts were serious enough to meet the launching conditions of the *State Emergency Response Plan for Natural Disaster Relief*, National Committee for Disaster Reduction of China and its member units related launched emergency response promptly, and worked well according to the plan, including sending working groups to comfort victims and investigate the disaster in the disaster-hit areas, assisting to direct local governments' work in disaster relief and providing materials and funds. Over the past five years, National Committee for Disaster Reduction of China and the Ministry of Civil Affairs (MCA) launched jointly 38 state-level warnings and 158 state-level emergency responses for disaster relief, coordinately sent 181 working groups to disaster-affected areas, allotted 508,000 tents, 2,422,000 suits of cotton-padded clothes and quilts, 212,000 folding beds and other reserved materials from the central government and helped local governments to rescue 365 million person-times, thus safeguarding the victims' basic life effectively and minimizing casualties and property loss.

--Fund security mechanism. Central and local mechanisms of level-to-level bearing of life assistance funds for natural disasters were established and the fund security system for disaster prevention, reduction and rescue was improved. During the 12th FYP period, the Ministry of Finance (MOF) arranged cumulatively various kinds of funds of 233.997 billion RMB for disaster prevention, reduction and rescue from the central government, including: 50.534 billion RMB for providing living subsidy and purchasing reserved materials, 140.9 billion RMB for subsidizing disaster relief and post-disaster restoration and reconstruction, 42.545 billion RMB for subsidizing flood control and drought relief and 18 million RMB for supporting in other ways the relief of natural disasters. National Development and Reform Commission (NDRC) arranged approximately 390.0 billion RMB within the central budget, used for governance of rivers and lakes, forest fire prevention, and construction of meteorological and hydrologic infrastructure, shelters and other disaster prevention projects. Central relief allowance levels for disaster emergency rescue, temporary allowance for living difficulties caused by drought and temporary allowance for living difficulties in winter and spring were lifted further, at an average rate of 78%; 15 provinces (autonomous regions) and 699 counties were identified as high and cold areas and cold areas, whose allowance standard for restoration and reconstruction of disaster-collapsed and damaged houses was 40% higher than ordinary areas.

--Relief materials reserve mechanism. The government of China built 19 central warehouses of reserved relief materials, 8 emergency rescue centers for water supply, 350 disaster preparedness and relief centers or material depots of the Red Cross Society of China and 13 state-level emergency material reserve centers for road traffic. All provinces (autonomous regions and municipalities directly under the Central Government) and prefectures, cities and counties frequently plagued by and vulnerable to natural disasters established relief materials reserve bases at their respective levels. Relief materials reserve systems at central, provincial, municipal and county levels were set up. The Central Government provided increasingly more varieties of relief materials, including 17 brands and 3 categories of relief tents, bedding, clothing and outfits. Moreover, The government spent 1.013 billion RMB cumulatively purchasing 460,000 relief tents, 515,000 cotton-padded overcoats, 1,630,000 cotton-padded quilts and other relief materials. Its capacity of seed reserves for disaster relief reached 50 million kilograms, with solid material support provided for emergency relief. A central relief materials emergency response mechanism engaging civil administration and financial departments was established, a sound mechanism for emergency allocation, coordination and safeguard of relief materials engaging departments of civil administration, development and reform, communication and transportation and railway and military forces was built up, and a mechanism for market supply and quality guarantee of relief materials engaging departments of civil administration, commerce, quality supervision and food and drug regulation was set up. Relevant local government organs established an agreement-based reserve mechanism for relief materials in cooperation with local key enterprises and large stores through consignment storage, advance purchase and agreement-based supply, thus getting apparently more capable of supplying and guaranteeing relief materials.

--Restoration and reconstruction mechanism. Restoration and reconstruction after exceptionally severe natural disasters continued to follow the new mechanism based on overall guidance of the Central Government, engagement of local governments and wide participation of the people. Central and local governments bore their respective duties and cooperated with each other to carry forward post-disaster restoration and reconstruction. After the occurrence of exceptionally severe natural disasters, relevant departments of the State Council and governments of the provinces affected jointly assessed disaster-caused losses, identified hidden geological hazards and assessed their risks, appraised damage to housing and buildings and evaluated resource and environmental bearing capacity according to work procedures. The Central Government was responsible for formulating or directing local governments to formulate overall plans for post-disaster restoration and reconstruction. As the subject to bear responsibility for and implement post-disaster restoration and reconstruction, local governments strengthened the organizational leadership. Local governments organized reconstruction after the occurrence of exceptionally severe disasters, for which the Central Government provided proper support. In the past five years, priority was given to the overall planning and advancement of the emergency repair of water supply, road and other lifeline projects as well as the restoration and reconstruction of hospitals, schools and homes after the occurrence of Yushu Earthquake in Qinghai Province, Lushan Earthquake in Sichuan Province, Zhangxian Earthquake in Minxian County, Gansu Province, Yutian Earthquake and Pishan Earthquake in Xinjiang Autonomous Region, Kangding Earthquake in Sichuan Province, Ludian Earthquake and Jinggu Earthquake in Yunnan Province, the Nepal

Earthquake-caused damage to Tibet and Rammasun Typhoon in Hainan Province.

III. Disaster reduction Capacity Building

The Chinese government has continued to improve its comprehensive prevention of natural disasters by exerting efforts to strengthen the building of the professional teams for engineering fortification, monitoring and early warning, scientific and technological support and disaster reduction and the enhancement of basic-level integrated disaster reduction capabilities.

(I) Enhancing structural protection capacity against natural disasters

China has increased spending on key structural facilities regarding flood control, drought relief, earthquake prevention and relief, wind prevention and damp proof, desertification prevention and control and ecological construction and thereby, enhanced integrated disaster reduction capacity of local governments.

--Construction of major water conservancy projects and water projects for people's livelihood. The Chinese government speeded up implementation of governance of big rivers and lakes, started the construction of 85 major water conservancy projects, launched in an all-round way flood control and governance of Heilongjiang, Songhuajiang and Nenjiang basins, built up and started to open Stage I of east and middle routes of the South-to-North Water Diversion project, and continued to improve allocation of regional water resources in basins. It also completed reinforcement of 5,400 small dangerously weak reservoirs of Type I and 15,891 key small dangerously weak reservoirs of Type II, basically completed the reinforcement of 25,378 ordinary small dangerously weak reservoirs of Type II, implemented the reinforcement of large and medium-sized dangerously weak water gates, and treated important sections of 156 main tributaries and more than 4,500 small and medium-sized rivers. The rationally-arranged water conservancy infrastructure network with prepared functions and ancillary facilities has laid a solid foundation for controlling floods and defeating drought.

--Rural dilapidated housing rehabilitation. The Chinese government spent 144.0 billion RMB supporting dilapidated housing transformation of 17.94 million poverty-stricken rural households, thus optimizing structure of rural housing and remarkably improving building quality and safety.

--Safety improvement of primary and middle schools. The central government spent 30.0 billion RMB improving safety of buildings of primary and middle schools nationwide, thus driving local investment of over 350.0 billion RMB, rebuilding 347 million square meters of buildings of 140,000 schools, evidently improving safety of primary and middle schools nationwide and remarkably improving earthquake resistance and hazard mitigation capabilities.

--Geological disaster management. The Chinese government has input 21.0 billion RMB to prevent and control geological disasters, keep clear and relocate 466,000 households and 1,620,000 people and effectively improve 480 giant debris flow gullies and 1,780 exceptionally large-scale landslides. The Central Government spent 2.8 billion RMB, which drove local investment of 2.65 billion RMB, thus controlling potential geological hazards for

18,900 kilometers of ordinary state and provincial arterial highway; and spent 10 billion RMB on prevention and control of railway geological disasters, thus further enhancing the capability of preventing and control geological disasters.

--Ecological construction. The Chinese government continued to implement such ecological construction projects as sand source governance in Beijing and Tianjin, the Northwest-North-Northeast Shelterbelt construction and Grain for Green, completed the improvement of 10 million hectares of desertified land, and improved desertification and sandification in northern area.

--Construction of agricultural disaster defense facilities. The Chinese government built up 27 million hectares of farmland with stable high yields ensured despite drought or excessive rain, raised nationwide total power of agricultural machinery to 1.08 billion kilowatts and anti-drought water-drawing irrigation capacity to exceed 6.70 million hectares/ year, and developed a group of “informationized, digital and anti-disaster” modern fishing ports.

(II) Enhancing monitoring and warning capacity against natural disasters

China strengthened further construction of the stereoscopic monitoring system against natural disasters, improved the mechanism of monitoring, early warning and information release of all kinds of natural disasters, increased intensity of monitoring stations and networks, optimized constantly monitoring deployment and improved further monitoring and warning of natural disasters.

--Meteorological disaster monitoring and warning system. China has established 60,292 automatic meteorological stations, 2,075 automatic soil moisture observation stations, 181 weather radars of a new generation and rainstorm monitoring stations covering most towns in China. In addition, weather forecasting service was provided in 35,639 towns and district and sub-district forecasting service was provided in 36 big cities. Rainstorm warning time was shortened to 109 minutes, with a hit rate as high as 80.9%. Typhoon track forecasting error was brought down to 66 kilometers for 24-hour forecasting and 121 kilometers for 48-hour forecasting. A global climatic prediction mode system with a horizontal resolution rate of 110 kilometers was established, further improving the country’s capability of monitoring extreme climate.

--Hydrologic monitoring, warning and forecasting system. A national drought monitoring system was established preliminarily. Number of flood information stations nationwide was increased to 97,000. A flood forecasting system for major sections of big rivers was built, with flood forecasting period increased to 7 days and precision raised to over 90%. A mountain flood monitoring and warning system was built up preliminarily in 2,058 counties of 29 provinces (autonomous regions and municipalities directly under the Central Government).

--Earthquake monitoring and quick reporting system. Construction of China seismological background detection project was completed. An integrated earthquake observation system that covers mainland and sea areas was built up. Earthquake monitoring capability was basically improved to be above Magnitude 2.5 in Qinghai-Xizang Region, above Magnitude 2.0 in other mainland areas and above Magnitude 1.0 in densely populated and economically

developed areas; quick reporting of most earthquakes could be finished in 2 minutes or so and average time taken by manual formal quick reporting was shortened to around 7 minutes.

--Geological disaster monitoring and warning system. The Chinese government built 665 professional monitoring stations for debris flows, 1,973 professional monitoring stations for landslide and 240,000 mass prediction and disaster prevention systems for emergent geological disasters; 30 mine subsidence monitoring and warning areas, and 30 karst collapse monitoring and warning areas; and established and improved 10 state-level geological disaster monitoring, warning and research bases.

--Agricultural disaster monitoring and warning system. The Chinese government has built up more than 300 counties for fixed field monitoring of agricultural conditions, 500 agricultural condition base counties, 114 county-level regional stations for pest warning and control and 760 field observation sites for plant protection and emergency medical instrument depots; established fishery safety communication networks at all levels, a national animal husbandry disaster information dispatching system and animal epidemics monitoring and warning system; and improved increasingly the agricultural natural disaster risk warning system.

--Biological disaster monitoring and warning system. The Chinese government has built 1 state-level and 35 provincial-level forest pest monitoring and forecasting centers, built up 1,000 state-level central monitoring and reporting stations and 1,200 provincial-level monitoring and reporting stations, formed initially forest pest monitoring and warning systems at national, provincial, municipal and county levels, and completed networking and construction of 350 state-level, 928 provincial-level and a group of municipal-level and county-level terrestrial wildlife epidemic disease monitoring stations.

--Forest and grassland fire disaster monitoring and warning system. The Chinese government has established a fire monitoring system that integrates satellite remote sensing, aviation patrol, video monitoring, overlooking from high mountains and ground patrol, built up 36 state-level and provincial-level forest fire risk warning centers and sub-centers, 3,239 fire danger element monitoring stations and 771 combustible factor acquisition stations, been able to forecast fire probability for 24 hours and 48 hours, and improved significantly the accuracy of fire danger forecasting.

--Marine disaster monitoring and forecasting system. Another over 100 marine observation stations, including coast-based stations, offshore subsurface buoys and observation platforms, were established. A global operational oceanographic forecasting system was built up. Observation satellite HY-2 was launched. The sea satellite ground application system was improved further.

--National emergency warning information release system. The national emergency warning information release system was put into operational running, realizing real-time collection and sharing of 50 types of warning information from departments in charge of civil administration, safety supervision, food and drug regulation, agriculture, forestry, tourism, land, water conservancy, earthquake, traffic and meteorology. Hence, warning information could be released uniformly and officially through various means.

(III) Enhancing scientific and technological support capacity for preventing and

reducing natural disasters

With high attention paid to the important role of science and technology in disaster reduction, the Chinese government has formulated the *Twelfth Five-Year Plan for National Development of Science and Technology for Disaster Prevention and Reduction*, established scientific research platforms, carried forward disaster studies, strengthened commercialization and application of scientific and technological achievements and thereby, continued to strengthen scientific and technological support capability for disaster reduction.

--Enhancing construction of scientific research platforms. The Chinese government has established preliminarily a high-tech innovation platform system covering all kinds of natural disasters; built the State Key Laboratory of Earthquake Dynamics, State Key Laboratory of Disaster Weather, State Key Laboratory of Geohazard Prevention and Control and Geoenvironment Protection, State Key Laboratory of Soil Erosion and Dryland Farming on the Loess Plateau, State Key Laboratory of Earth Surface Processes and Resource Ecology, State Key Laboratory of Disaster reduction in Civil Engineering and State Key Laboratory of Information Engineering in Surveying, Mapping and Remote Sensing; the Remote Sensing Application Engineering & Technology Research Center, Semi-arid Agriculture Engineering & Technology Research Center, Wildlife Epidemics Engineering & Technology Research Center and Ocean Engineering & Technology Research Center of China; carried forward construction of national fundamental research science centers, and formed a group of high-level national research and experiment bases for disaster reduction. It also cultivated a large number of professional talents making use of bases and universities and colleges, providing powerful support for science and technology of disaster reduction.

--Advancing disaster research. The Chinese government implemented projects of research on spatial and temporal distribution characteristics, rule of occurrence and development and causing mechanism of natural disasters as well as assessment on resource and environmental carrying capacity of disaster-affected areas, through carrying out central finance-funded scientific and technological plans (programs and foundations) such as National Natural Science Foundation, National Basic Research Program, National High Technology Research and Development Program, National Scientific and Technological Support Program and Special Fund for Scientific Research of Public-welfare Industries, obtained a group of important research achievements and formulated and improved a series of national standards, industrial standards and technical specifications.

--Strengthening commercialization and application of scientific and technological achievements. China launched successfully resources satellites, HJ-C Satellite, BeiDou Navigation satellites, Polar Orbiting Meteorological Satellite FY-3C, Geosynchronous Meteorological Satellite FY-2F and FY-2G, and applied advanced technologies of GF satellites, BeiDou Navigation satellites, UAV, Big Data, Cloud Computing and Internet Plus effectively to disaster reduction. In addition, the country established preliminarily an integrated technology system for assessing losses caused by severe and exceptionally severe natural disasters, and succeeded in applying it to Lushan Earthquake, Ludian Earthquake, Nepal Violent Earthquake that affected Shigatse Prefecture in Tibet, China; established initially a mechanism for quick assessment of disasters, got able to complete pre-assessment

in 1 hour for earthquakes and 3 hours for typhoons and floods, and improved evidently the ability of providing scientific and technological support for disaster reduction.

(IV) Building professional teams for disaster reduction

The Chinese government incorporated professional teams building for disaster reduction into national professional teams building and development planning so as to support the healthy development of talent teams in this regard.

--Promulgating and implementing the *National Medium- and Long-Term Plan for the Development of Disaster Prevention and Reduction professional personnel (2010-2020)*. During the 12th FYP period, the Chinese government strengthened energetically the development of *professional personals* for scientific research of disaster reduction, engineering technology, disaster relief and administrative management, and established preliminarily professional t teams where professional personals are key forces, all kinds of emergency rescue forces are assault forces and social workers and volunteers are auxiliary forces, thus powerfully guaranteeing professional personnel for disaster reduction. By the end of 2015, China's professional personnel resources in this regard had amounted to more than 1.55 million people, including more than 1.15 million people engaged in emergency rescue or relief.

--Building professional teams for disaster reduction. The Chinese government strengthened organizational leadership, planned all resources as a whole, built and developed professional teams based on "multiple functions and combination between full-time and part-time talents, military forces and civilians, and products for peacetime use and those for wartime use". Number of disaster messengers nationwide reached above 680,000, meteorological messengers above 760,000 and monitoring personnel for mass prevention and prevention of geological disasters above 350,000. It also organized 1,389 local flood prevention and mobile emergency rescue teams and increased number of members of anti-drought service teams to 120,000; built up technical guidance teams with more than 10,000 experts for agricultural disaster reduction at all levels, and established a network system of agricultural disaster reduction with more than 360,000 members; built up 37 national health emergency response teams regarding emergency medical rescue, infectious disease prevention and control, emergency disposal of poisoning and emergency disposal of nuclear radiation, as well as 7 national mine emergency rescue teams, 14 regional mine emergency rescue teams and 47 emergency rescue teams with members from central enterprises, and formed a state-level production emergency rescue team with 12,400 members; built up 3,264 professional teams for forest fire prevention and control with more than 110,000 members and over 10,000 national professional teams for forest pest prevention and control with nearly 100,000 members; built up 80 state-level and provincial-level professional rescue teams for earthquakes with 12,000 members. In addition, it continued to strengthen professional emergency response forces from military and Armed Police. The military established 9 categories of state-level professional emergency response teams with 50,000 members and 9 categories of provincial-level professional emergency response teams with 45,000 members. The Armed Police established 2 state-level emergency rescue teams for electricity and water supply and traffic, 33 provincial-level emergency rescue teams for earthquake disasters, 12

geohazard investigation and evaluation teams and 47 emergency medical rescue teams, and constructed a reasonably-arranged professional emergency response system at a proper scale and with complete functions. Besides, 21 state-level rescue teams of the Red Cross Society of China with regard to relief, medical treatment, water supply, mass health, psychology, search and rescue and water life saving were built up.

(V) Enhancing basic-level capacity of integrated disaster reduction

During the 12th FYP period, the Chinese government strengthened basic-level integrated reduction of disasters in urban and rural areas, advanced vigorously improvement of regional and urban-rural capacity of preventing and reducing disasters by combining new countryside construction, post-disaster reconstruction and poverty alleviation, and thereby, enhanced gradually basic-level capability of integrated disaster reduction.

--Improving basic-level integrated capability of disaster reduction. Disaster messenger post was set up in all basic-level communities (villages) in both urban and rural areas. 76% of towns were covered by the national natural disaster information management system. Direct reporting of disaster information was piloted in 17,315 towns (sub-districts) in 17 provinces, and submission and processing of disaster information got substantially more efficient. Local governments built up successively a group of disaster reduction information management and service systems. The government of Zhejiang Province built up 12,784 shelters at all levels and Fujian Province 20,043, forming a full-coverage shelter network at county, township and village levels. The government of Guangxi Autonomous Region built up 5,000 meteorological warning speaker systems and 7,350 wireless warning and broadcasting systems for mountain torrent disasters.

--Building comprehensive disaster reduction demonstration areas. Centering on community risk assessment, hidden dangers identification and plan exercise, the Chinese government went deep into community-based reduction of disasters and totally established 6,551 national comprehensive disaster reduction demonstration communities, and governments of all provinces (autonomous regions and municipalities directly under the Central Government) named nearly 10,000 provincial-level comprehensive disaster reduction demonstration communities, thus facilitating construction of disaster reduction facilities, disaster relief equipments and emergency shelters at communities and enhancing in an all-round way urban and rural capabilities of comprehensive disaster reduction. The Central Government promoted proactively social forces to take part in publicity and education for disaster reduction, established a linkage mechanism where government organs, enterprises, non-governmental organizations and volunteers all take part, attached importance to the improvement of urban and rural community-based reduction of disasters, fully mobilized and gave full play to the positive role in community residents and enterprises and public institutions under due jurisdiction, and formed joint forces in this regard. Local governments carried forward community-based disaster reduction according to their respective conditions. Heilongjiang Province launched disaster reduction in 2,200 communities, comprehensively improving its community-based reduction of disasters. Shanghai established a community risk assessment practice mode with diversified participation and released the *Guidelines for Disaster Prevention and Reduction at Urban Communities*. 21 provinces (autonomous regions and

municipalities directly under the Central Government) including Beijing, Shanxi and Jilin built an incentive mechanism for establishment of comprehensive disaster reduction demonstration communities, and arranged special funds to support it. In total, the Chinese government established 800 standard meteorological disaster defense towns, built up 104 state-level health emergency response demonstration counties, 2,058 seismic safety demonstration communities and 1,337 counties with prescribed conditions for mass prediction and prevention and geohazards, and identified 6,782 earthquake prevention and disaster reduction demonstration schools at all levels.

IV. Public Participation in Disaster reduction

The Chinese government has attached great importance and supported social participation into disaster reduction, promoted the establishment of a sound disaster insurance system, publicized disaster reduction energetically and thereby, made social participation in disaster reduction more profound, extensive and powerful.

--In dealing with a group of large-scale natural disasters and public emergencies, social organizations, volunteers and social workers went to disaster-hit areas providing services of on-site search and rescue, local rescue, medical aid, hygiene and epidemic prevention, psychological comfort and material allocation and delivery; complementation with government functions got more advantageous, and a diversified disaster relief pattern based on government leadership, multi-participation, coordinated linkage, market support and joint response took initial shape. Social participation into disaster relief was incorporated into government normative system along with the successive promulgation of the *Guiding Opinions on Strengthening Voluntary Service for Disaster reduction and Relief*, the *Notice on Improving the Guidance for Donations for Disaster Relief* and the *Guiding Opinions on Supporting and Guiding Social Forces to Participate in Disaster Relief Work*. Governments at all levels supported and guided social participation in disaster relief proactively, established a coordination and service platform for social forces to participate in disaster relief and formulated and improved administrative rules and regulations on donations for disaster relief and voluntary service.

Local governments built organizations or associations of volunteers, encouraged participation of medical workers, veterans and technical personnel specializing in earthquake, geology, hydrology, meteorology and fire protection. Some communities set up teams of disaster relief volunteers and voluntary patrol teams in combination with the establishment of national integrated disaster reduction demonstration communities. With priority given to the effect of social workers in disaster reduction, efforts were made gradually to establish a pattern where government-oriented social work gets involved in disaster-affected areas. Government of Shanghai planned as a whole and coordinated professional social organizations to go deep into communities, leading community residents to identify hidden dangers, organizing exercises and holding trainings. Government of Zhejiang Province improved database of basic information of social forces, made overall plans for and coordinated resources of government organs, disaster-affected areas and social forces, and mobilized and guided social forces to participate in disaster reduction and relief orderly, by virtue of the disaster relief association of Zhejiang Province. In Jiangxi Province, social organizations and public welfare programs involved in disaster reduction and relief were covered by government support and key incentive. In Henan Province, a rescue team of the provincial disaster relief commission was established, focusing on volunteers and made up of professionals in various respects. Moreover, in Guangdong Province, disaster reduction services were incorporated into the catalog of government-purchased social services and social forces including social workers and volunteers profoundly took part in relief of severe and exceptionally severe natural disasters in and out of Guangdong Province. Government of Yunnan Province built up a rescue service platform of social organizations responsible for collecting, editing and

releasing information, connecting with media and reporting and coordinating social organizations so as to guide social forces to participate in disaster relief orderly. Government of Shenzhen City established a social work resources and services team made up of 50 social workers in order to guide professional forces to take part in disaster reduction and relief.

--Central finance structure continued to improve agricultural insurance premium subsidy policies, support development of agricultural insurance proactively, advanced disaster insurance for rural housing through pilots, promoted the establishment of a sound disaster insurance system, and had market mechanism play increasingly important role in transferring and sharing disaster risks and expanding disaster relief fund channels. During the 12th FYP period, agricultural insurance had provided 5.6 trillion RMB of risk guarantee to 944 million farmer household-times, paid 72.889 billion RMB of indemnity to 120 million disaster-hit rural household-times, and provided 4 trillion RMB of risk guarantee and paid 1.748 billion RMB of indemnity for 325 million rural houses. Catastrophe insurance was piloted in Sichuan, Yunnan, Ningbo and Shenzhen, and the first catastrophe bond targeted at earthquake risks was issued on overseas market, raising 50 million USD. Local governments continued to advance disaster insurance. Disaster insurance for residents' housing covered all counties and cities frequently affected by and vulnerable to disasters in Hebei, Hunan and Guizhou and 13 cities with subordinate districts in Jiangsu. Fujian Province realized full coverage of rural housing insurance and all of its cities with subordinate districts established public liability insurance for natural disasters. Government of Guangxi bought rural housing insurance for more than 10.5 million rural residents, where 164,000 households obtained 476 million RMB of indemnity for disaster-collapsed houses.

--Paying high attention to the advertising and guiding effect of news media, the Chinese government incorporated popularization of disaster reduction knowledge into the campaign that brings cultural, scientific and technological and hygienic knowledge to the countryside, and enhanced urban and rural residents' awareness of disaster reduction and built a favorable atmosphere that "everybody is responsible for disaster prevention and control" by carrying out all kinds of publicity activities in this regard. It also popularized extensively the knowledge about disaster prevention and control and emergency sheltering by various types of electronic displays, Internet, picture posters, blackboard newspaper and public service advertising and at the same time, improved publicity effect and public attention for disaster reduction through newspapers and periodicals, broadcasting, TV, microblog, WeChat and client side of news. In addition, the government carried out exercises of evacuation, escape and self and mutual medical aid frequently, provided the public with experimental and participatory activities free of charge for popularization and publicity of disaster reduction knowledge and thereby, improved the masses' skills of self-help and mutual assistance; it also established corresponding activity themes, formulated publicity charts, held the National Forum on Comprehensive Disaster Reduction and Sustainable Development and carried out diversified activities of publicity and education on each "National Disaster Prevention and Reduction Day". According to incomplete statistics, China has issued 160 million pieces of various publicity materials, held 45,000 trainings and lectures, 145,000 exercises and 26,000 theme publicity and education activities, with 65 million person-times receiving direct education by participating in on-site activities, during the "Publicity Week of Disaster

Prevention and Reduction” since 2011. Furthermore, the Chinese government has made the whole society more aware of disaster reduction by organizing and carrying out emergency exercises, scientific popularization and knowledge publicity, personnel trainings, knowledge contests, simulated experience and other popularization, education and publicity activities in various forms and issuing a vast number of advertising materials on each “International Day for Natural Disaster Reduction”, “National Day of Education on the Safety of Elementary and Middle School Students”, “National Fire Prevention Day”, “World Earth Day”, “National Science Popularization Day”, “National Science and Technology Week”, “World Water Day”, “China Water Week”, “World Meteorological Day” and “World Ocean Day”.

The Chinese government has built up more than 2,000 disaster reduction publicity and education training centers at all levels and of various types, including 217 national meteorological science popularization and education training centers, 369 earthquake prevention and disaster reduction science popularization and education training centers at all levels, 10 geological disaster science popularization, observation, monitoring and demonstration training centers, 23 fire protection museums, 1,231 fire protection education centers, 62 fire protection theme parks, 80 national science popularization and education bases centering on disaster reduction science popularization and education and 20 disaster reduction science popularization and education of the Red Cross system. Rich in content and operated in various forms, these bases cover a wide range and show evident effect of publicity, and serve as favorable sites for the general public to receive publicity and education regarding disaster reduction.

V. International Cooperation in Disaster reduction

During the 12th FYP period, China had wider and more pragmatic cooperation in disaster reduction with relevant international organizations, institutions and state and regional governments, with the cooperative mechanism improving increasingly.

--Participating in disaster reduction cooperation under the UN framework widely. China stepped up further its cooperative relations with UN and relevant international organizations, participating widely in disaster reduction affairs of the United Nations International Strategy for Disaster Reduction (UNISDR), United Nations Development Programme (UNDP), United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), United Nations Office for the Coordination of Humanitarian Affairs (OCHA), World Food Programme (WFP), World Meteorological Organization (WMO), Intergovernmental Panel on Climate Change (IPCC), Typhoon Committee (TC), United Nations High Commissioner for Refugees (UNHCR) and United Nations Educational, Scientific and Cultural Organization (UNESCO). The Chinese government also actively took part in the negotiation and formulation of the *Sendai Framework for Disaster Risk Reduction 2015-2030* and the formulation of *Agenda 2030*, attended the Third UN World Conference on Disaster Risk Reduction (WCDRR) and released *China National Assessment Report on Extreme Weather and Climate Events and Disaster Risk Management and Adaptation*. It also provided technical support to UN-SPIDER Beijing Office and cooperated with it to hold 5 sessions of United Nations International Conference on Space-based Technologies for Disaster Management.

--Boosting regional cooperation in disaster reduction pragmatically. China participated in regional and sub-regional cooperation in disaster reduction proactively. Based on the cooperation with framework of Asia-Pacific Economic Cooperation (APEC), China-ASEAN (10+1), East Asia Summit (EAS), Trilateral Cooperation among the People's Republic of China, Japan and the Republic of Korea, China-Russia-India Cooperation, ASEAN Regional Forum (ARF), Shanghai Cooperation Organization (SCO), Mekong River Commission (MRC) and other regional and sub-regional cooperation mechanisms, the Chinese government gave active response to disaster reduction cooperation initiatives under regional mechanism frameworks and carried out pragmatic cooperation in disaster reduction. It also held or attended Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR), SCO Member States Leaders' Conference on Emergency Disaster Relief, APEC Senior Disaster Management Officials Forum (SDMOF), China-Japan-Korea Ministerial Conference on Disaster Management, SCO Member States Joint Disaster Relief Exercise, ASEAN Regional Forum Disaster Relief Exercise (AFR DIREX) and other important conferences and activities in this regard. Besides, China provided 50 million RMB economic and technical assistance to China-ASEAN disaster prevention and relief cooperation; carried forward scientific communication and technical cooperation proactively, introduced and absorbed advanced technologies and strengthened emergency disaster relief exercise cooperation with surrounding countries.

--Providing humanitarian aid proactively. In response to severe and exceptionally severe natural disasters and humanitarian crises, China provided for many times disaster relief

capital and material aid to countries in Asia, Africa, Latin America and South Pacific, sent rescue teams and medical teams to disaster-hit countries and supported disaster relief and post-disaster reconstruction of relevant countries. It also took emergent actions in dozens of disaster events such as grain shortage in some African countries, earthquake in Nepal and Iran, hurricane in Vanuatu and Cuba, flood in Pakistan, Myanmar, Serbia and Chile and debris flow in Tajikistan and provided to them plenty of materials and technical assistance. When Horn of Africa and Sahel Region encountered continuous severe drought in 2011 and 2012, China provided emergency food aid for three times, worth of 440 million RMB in total, to Ethiopia, Kenya, Djibouti, Somalia and other countries in the Horn of Africa and also emergency food aid worth of 70 million RMB in total to Chad, Mali, Niger and other countries in Sahel Region. From 2013 to 2014, the Red Cross Society of China sent a professional rescue team of 58 people and allotted disaster relief capital and materials worth of over 2 million RMB to the Typhoon Haiyan-affected Philippines. In April 2015, upon the occurrence of an exceptionally severe earthquake in Nepal, China sent more than 400 people for rescue, medical treatment and epidemic prevention and chemical decontamination and more than 600 officers and soldiers from the armed police and traffic departments and rescue professionals and transported about 1,300 tons of emergency rescue materials worth of 150 million RMB to Nepal, emergently repaired and maintained about 500 kilometers of road and assisted Nepal to perform comprehensive assessment on earthquake-caused losses. When Tajikistan was hit by a severe debris flow disaster in July 2015, the Chinese government provided the country with emergency humanitarian aid worth of 10 million RMB and 100,000 USD spot exchange. In October 2015, when an earthquake at Richter Magnitude 7.8 took place in Afghanistan and affected Pakistan, China provided emergency humanitarian material aid worth of 10 million RMB and 1 million USD spot exchange to Afghanistan and humanitarian material aid worth of 30 million RMB to Pakistan. In addition, China also helped recipient countries to improve emergency rescue level and disaster reduction capability through providing materials and carrying out trainings.

Concluding Remarks

During the 12th FYP period, China continued to advance its comprehensive disaster reduction undertaking and obtained evident achievements and progress under the firm leadership of the CPC Central Committee and the State Council. However, there are still weaknesses that need to be addressed urgently. For instance, comprehensive legislation is insufficient, institutions and mechanisms are to be improved further, basic-level disaster reduction capacity is to be strengthened, market role is to be enhanced and social awareness of disaster reduction is to be improved. We still have a long way to go in integrated reduction of natural disasters.

In the 13th FYP period, a decisive stage for building up a well-being society, China will stick to the focus on prevention, combination of prevention, resistance and relief, and unification of normal disaster reduction and abnormal disaster relief, under the guidance of the concept of being innovative, coordinated, green, open and shared; strive to shift attention from post-disaster assistance to pre-disaster prevention, from single-type disaster to comprehensive reduction and from loss reduction to risk mitigation; further improve institutions and mechanisms for disaster prevention, reduction and relief, raise in an all-round way the comprehensive prevention capacity for natural disasters of the whole society, and provide solid guarantee for building up a well-being society. China will also join hands with the international community to deal with challenges caused by natural disasters and make unremitting efforts to build a safer and more harmonious world.