

# REPUBLIC OF KOREA

## National Reporting and Information on Disaster Reduction for the World Conference on Disaster Reduction

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## **Component 1. Political Commitment and Institutional Aspects**

### **1-1. National Policy, Strategy and Legislation**

Laws related with natural disasters include the Natural Disaster Countermeasures Act, Act on Countermeasures against Agricultural and Fishery Disasters, Disaster Relief Act, etc. The Natural Disaster Countermeasures Act (enacted in 1995) prescribes control of and countermeasures against natural disasters such as torrential rain and typhoons, investigations of relevant damage, rehabilitation costs, etc.

The Act on Countermeasures against Agricultural and Fishery Disasters (also enacted in 1995) stipulates measures concerning prevention of and countermeasures against disasters affecting agriculture and fishery such as damage from disease, harmful pests and drought. The Disaster Relief Act (enacted in 1962) provides for relief of victims of natural disasters or calamities, etc.

From June 1, 2004 the Disaster and Safety Management Basic Law is enacted designating disaster management competent organizations based on the disaster definition, identifying the Central Safety Management Committee, establishing rapid information dissemination system, and enhancing disaster-related research functions.

### **1-2. National Coordination Body**

The National Emergency Management Agency (NEMA) under the Ministry of Government Administration and Home Affairs (MOGAHA) manages overall measures to counter natural disasters in Korea. The agency is composed of four Bureaus, i.e., Planning and Management Bureau, Mitigation and Planning Bureau, Response and Management Bureau, and Recovery and Support Bureau. In addition to the Public Information Officer, Disaster Status Control Unit, and General Services Division, Innovation and Personnel Officer, Planning and Budget Officer, and Information and Communication Officer are working under Planning and Management Officer. Mitigation and Planning Bureau has Planning Coordination Division, Civil Defense Planning Division, Fire Administration Policy Division, Technological Disaster Management Division, and Public Cooperation Division.

Response and Management Bureau includes Response Planning Division, Fire Suppression Division, Rescue and Emergency Division, and Facilities and Equipment Division. Recovery and Support Bureau has Preparedness Division, Rehabilitation Division, Technical Support Division, and Assessment Division.

NEMA takes responsibility for practical affairs for regular period. When a disaster strikes, an ad hoc organization called CDSCH forms. The Central Disaster and Safety Countermeasures Headquarters (CDSCH) is in charge of prevention and status control of natural disasters, as well as recovery planning, and executes necessary measures related to such disasters. The Minister of the MOGAHA heads the CDSCH while Director of NEMA serves as its vice-chief. Twenty-three personnel from 21 government organizations serve on its council. Also, the Central Safety Management Committee serves the function of providing coordination and support for the CDSCH, and the Central Emergency Rescue Control Squad supports CDSCH when a massive search and rescue service is required.

Water resources and land use planning are managed by the Ministry of Construction and Transportation. Health, environment, education, and finance are managed by the Ministry of Health and Welfare, Ministry of Environment, Ministry of Education and Human Resources Development, and Ministry of Finance and Economy, respectively.

### **1-3. Risk Reduction Concepts in Development**

Disaster Impact Assessment (DIA) system aims at fundamentally eliminating potential causes of disasters inherent in various development projects in advance and ultimately protecting the life and property of the people. This program is one good example for implementing sustainable development. The disaster impact assessment system is implemented when the area of targeted development is not less than 300,000 m<sup>2</sup>. With respect to small- and medium-sized development projects (150,000 m<sup>2</sup> to less than 300,000 m<sup>2</sup> in size), each city and province has introduced a local disaster impact assessment system. To protect lives and property in downstream areas from the impact of large-scale development, facilitating disaster prevention facilities such as retention reservoir in the development area, the DIA has been introduced since 1996 and the coverage of DIA has been expanded in 2001. Currently, DIA is applicable to 24 categories in 6 fields such as urban development, industrial area development, touring attraction development, and mountain area development.

### **1-4. MDGs, PRSP, and WSSD**

N/A

## 1-5. Building Codes for Seismic Risk

There are 26 different, specific building or facility codes for seismic design. Detailed information including established date is shown in below.

Table 1. Seismic Code

Facility	Agency in Charge*	Established Date	Regulation
General Building	C & T	1988	Building Construction Act
Road	C & T	Road (1999), Bridge (1992), Tunnel (1985)	Road Act
Nuclear Power Plant	S & T	1960	Nuclear Power Act
Multi-purpose Dam	C & T	1979	Act for Dam Construction & Vicinity Area Support
Hydraulic and Heat Power Plant	C, I & E	1960	Electricity Business Act
Airport Facility	C & T	2003	Aviation Act
Railroad	R	1999	Railroad Act
Subway	C & T	2003	Urban Railway Act
High-speed Railroad	C & T	1991	Korea High-speed Railroad Corporation Act
Harbor	M & F	1999	Harbor Act
Fishery Harbor	M & F	1999	Fishery Harbor Act
Gunpowder Depot	P	Developing	Firearm and Gunpowder Act
Petroleum Plant	C, I & E	1974	Petroleum Business Act
Water Supply Facility	E	2000	Drinking Water and related Facilities Act
Agriculture Production Infrastructure	A & F	2000	Rural Area Development Act
High Pressure Gas Containment Facility	C, I & E	1998	Gas Business Act, High-pressure Gas Safety Act
Regular Dam	C & T	2000	Act for Dam Construction & Vicinity Area Support
Reservoir larger than 20 mil. tons	A & F	1982	
Pumping Station	C & T	2000	
Others such as crane, pipeline, disposal site, etc.	L, C, I & E, E	2001, 2002, 2002, etc.	Occupational Safety Act, Pipeline Safety Act, Waste Disposal Management Act, etc.

\* Ministry of, C&T: Construction and Transportation, S&T: Science and Technology, C,I&E: Commerce, Industry and Energy, R: National Railway Administration, M&F: Maritime Affairs and Fisheries, P: National Police Agency, E: Environment, A&F: Agriculture and Forestry, L: Labor

## **1-6. Annual Budget**

Budgets for disaster risk reduction are included in regular annual budget. Annual regular budget for NEMA is about \$190 million. Also, several national level projects are funded. For instance, in 2003, for mountain and river control projects such as dam development, small river creeks improvement, about \$2 billion was invested in 8 projects. 13 Projects were developed in disaster prevention and countermeasures and \$1 billion was spent. For research and development in disaster risk mitigation area \$50 million was invested in 6 projects such as establishment for the National Disaster Management System, operation of Earthquake Research Center, and modernization of meteorological observation.

## **1-7. Private Sectors, NGOs, and Academia**

For business continuity, private sectors hire disaster managers. Monthly civil defense drill mobilizes private sectors and citizens to be prepared for various natural disasters. NGOs such as Safety Active Coalition and Citizens' Alliance for Disaster Overcome actively participate in government policies and activities.

In various universities disaster management research institutes are established to find appropriate disaster countermeasures. The National Institute for Disaster Prevention hosts annual technical meetings and conferences to encourage these research institutes and NGOs to participate and discuss their thoughts and research results.

## **Component 2. Risk Identification**

### **2-1. Hazard Mapping and Assessment**

For feasibility investigation of landslide monitoring and warning system, analysis of landslide susceptibility using GIS technology is introduced. Application of GIS technology and determination of affecting factors are most important aspect of hazard mapping and assessment. Gangneung City in Gangwon Province has landslide hazard mapping. Same techniques will be applied to other areas in the near future.

Flood hazard mapping is currently under developing by the Korea Water Resources Corporation. Several case studies are reported.

### **2-2. Vulnerability and Capacity Assessment**

Korea identified 537 sites most susceptible to inundation, collapse, and

isolation by typhoons and floods, and labeled them as Disaster Prone Areas. These areas are classified and managed by type, grade, managing entity, size, etc. A total of \$1.1 billion will be invested for wide-ranging improvements for seven years from 1998 to 2004. Under this plan, \$496 million has been invested to improve 488 disaster prone areas from 1998 to 2002.

### **2-3. Risk Monitoring and Risk Mapping**

Automated high-quality alert facilities, automatic voice response service regarding the status of disasters and IT system for disaster prevention are in operation. 182 disaster vulnerable areas, which include river, mountainous valley, etc., have been selected. In stormy weather, the people in this area are not allowed to enter and warned to take shelters to reduce the casualties.

### **2-4. Loss Analysis**

Annual disaster white books are published every year including detail damage data. Human and property damages according to each disaster are compiled and analyzed in provincial and county levels.

### **2-5. Early Warning System**

Automatic warning facilities which provide sirens to the campers or hikers in mountainous valley are installed at 46 areas since automatic warning facilities are effective to reduce the number of casualties. The automatic voice warning facilities which provide disaster status to the citizens by phone and town speakers have been installed in 232 municipals with investment of \$8.6 million.

Even though the central and local governments are committed to reducing disaster losses, the government cannot do it alone. Campers and hikers do stay overnight furtively even in "designated" disaster prone areas such as flood plane and landslide area. More public education and participation are desired.

## **Component 3. Knowledge Management**

### **3-1. Disaster Risk Information Management System**

The MOGAHA (Ministry of Government Administration and Home Affairs), now its disaster management function has been transferred to NEMA, commenced the National Disaster Management System (NDMS) project in May 1995. This project is also chosen as one of the main tasks of Cyber Korea 21st Century and as one of the National Administration Reform 100 Projects. The project includes interconnection of safety management operations scattered in safety management agencies, 24 affiliated organizations and local autonomies, to link the safety management systems vertically and horizontally. The objectives of the project are to protect the lives and property of citizens and to improve the living quality of the people by preventing disasters threatening the safety of the people and nation. Those can be accomplished by responding quickly to and recovering damaged area by disasters and implementing a scientific and systematic national disaster management information system.

Until the year of 2003, \$43.3 million has been invested for the central and local governments and \$24.5 million for the emergency rescue-related area to implement the system. This system will include various up-to-date telecommunication technologies to use the wireless communication network by way of precaution against failure of the wired network. The system also plans to use the on-site disaster management system which applies the C4I (Command, Control, Communication, Computer Integration) concept, data mining using disaster cases and statistics DB, on-site analysis using GIS/GPS information and various disaster detection sensor applications.

From 1995 to 1997 a trial system, the Pilot System, was constructed to verify technically whether the disaster-related operations could be digitalized using the domestic information and communication technologies, to prepare a total technical report on related information and communication technologies. In 1998, an analysis was carried out on the responsibilities and main functions of three bureaus including the civil defense and disaster prevention bureau, provincial local autonomies and basic local autonomies, and 24 related agencies' current conditions of the information system.

After analysis on some advanced disaster prevention systems (i.e., EIS, IM200 and NEMUS) from abroad, a plan compatible with Korea's actual conditions was produced and 21 task processes including working out the measures, managing the mobilized resources, and calculating the damage were established. An information plan was worked out for design of 12 information systems including information management, statistical analysis, forecast analysis, and SOP management.

Development of a total of 3,364 applications for disaster prevention, preparedness, response, and recovery is finished in 2003.

This plan was widely supported by citizens and experts in public hearings and advisory meetings held to verify the objectivity and the suitability of the plan. The applicable ones among the opinions from experts in various sectors are as follows: componentization of main functions for reuse and co-use, object-oriented methodology which is strong in independent development and iteration, open system structure applicable in various platforms, etc.

The information technologies suitable for a long-term development (the first phase: 1996-2003, the second phase: 2004-2008) and links with different system types in the related agencies and 24 affiliated organizations are incorporated in this system. The database will be designed so that even if the communication network is cut off, systems in city/county/district can still operate, and has adopted the automatic replication function to maintain the data consistency even after network restoration. For link between systems with different environments, development of the standard linking plan has been finished. This program is distributed to the related agencies to share the related information.

The facility information system is being designed to use the approval and authentication system of the Ministry of Construction and Transportation, traffic information on the national roads and highway, local autonomies construction records and information on dangerous facilities for co-use of information related to safety management.

### **3-2. Relationship with Academy and Research Communities**

Various research projects are available to reduce disasters. Several examples and projects in 2004 for disaster policy improvement are pre-consideration policy for disaster reduction, landslide monitoring system, improvement of local disaster management plan, and etc. Through these projects and funds close relationship with academy and research communities are guaranteed. Also, various public hearings and conferences are held regularly and when specific policies are prepared.

### **3-3. Educational Program in Public School**

Even though the National Institute for Disaster Prevention has prepared several college-level lectures, there is no regular, official educational program in lower level schools.



### **3-4. Training Programs**

To cope with disasters in minimizing the loss of life and properties, each local government implements full readiness and close coordination in disaster situations. Staff members related to disaster prevention are educated during the Disaster Preparedness Period to enhance their ability to cope with natural disasters. The program included planning, managing critical situations, damage investigation method, and studying relevant laws.

In order to enhance rapid responses to disasters, exercises under computer-simulated disaster conditions, a comprehensive exercise for disaster prevention, and emergency drills specific to each region were carried out in each local districts. Exercise under computer-simulated disaster conditions is to develop the ability for managing disasters. The exercise hosted by all national and local disaster prevention headquarters is carried out. For emergency drills specific to each region, local governments carry out their own emergency drills for conditions that are specific to their own regions. For comprehensive exercise for disaster management at national level, exercises focused on strengthening the close coordination between related agencies and developing the ability in disaster situation management are provided. The training program includes life saving, emergency relief and recovery measures for lifeline facilities.

### **3-5. Traditional Wisdom**

One of the traditional systems in disaster-related practice is to exchange of services or labor. Working in turn for one another and exchanging service Korean ancestors overcame various disasters wisely. This custom is called "Phom-A-Si" and widely practiced since Yi Dynasty (1392~1910). This tradition can be developed to enhance today's volunteers' participation in disaster relief activities.

Other traditional practices are food and shelter support, rice loan system, saving rice for emergency use, etc.

### **3-6. Public Campaigns**

Following the recommendation by UN, Korea has designated May 25 as "National Disaster Prevention Day" to promote the public participation and awareness of disaster prevention. For promoting awareness of disaster preparedness, several events for the "National Disaster Prevention Day" such as inspection of disaster prevention facilities and equipment, drills, a campaign for disaster prevention, photo

display of disaster stricken areas, and a contest for disaster prevention posters were held. Especially, TV broadcasting stations were put under a obligation to send disaster preparedness program for citizens on the air. Additionally, for awareness of disaster preparedness to the people, several media such as large-scale advertising sign, sticker on disaster preparedness, educational VTR films were used.

## **Component 4. Risk Management Applications/Instruments**

### **4-1. Linking Environmental Management and Risk Reduction**

Disaster Impact Assessment (DIA) system is regulated by a combined law called as "Comprehensive Impact Assessment Act for Environment, Disaster, and Traffic." Currently, DIA is applicable to 24 categories in 6 fields such as urban development, industrial area development, touring attraction development, and mountain area development.

### **4-2. Financial Instrument**

When a disaster strikes, the Korean government provides living expenses for the displaced people and rehabilitation of public facilities. Also, recovery cost support for the damaged houses and inundated farmland based on the government guideline are provided. Sometimes, however, people demand more support, and this results in increased national financial burden. Therefore, insurance program is needed. What we expect from the insurance program is to securing stable budget and proper damage compensation, damage reduction based on the people's active participation in the disaster mitigation activities, and rapid recovery based on early insurance money.

What we did so far is feasibility studies such as case studies of flood insurance of other countries (1997), studies on the flood insurance management system and differentiation of the government support ratio (1998), development of insurance product and operation plan (1999), quantitative risk analysis of private properties (2000), and analysis of introduction effect of voluntary insurance (2001).

So far, opinions are collected from the related agencies and the necessity is agreed and gradual introduction of the insurance program through sufficient public information and agreement are required.

The Ministry of Planning and Budget is to connect and add to the current crop disaster insurance program. The Ministry of Agriculture and Forestry insists that pilot program for the green house and cattle shed should be started after the settlement of the

crop disaster insurance program. The Ministry of Maritime Affairs and Fisheries is to connect with fisheries disaster insurance program

The tentative plan for the insurance is to cover all natural disasters such as typhoon, flood, storm, etc. targeting 226 different private facilities. The compensation method is a fixed rate that is about 150% to 200% of the current government support cost. The insurance type will be a hybrid type, i.e., obligatory for the government and voluntary for the householder and the insurance rate is to be estimated based on the local governmental district (county level).

The operational main bodies are central and local governments, and numerous insurance companies. To reduce operational cost, select KLFA (Korea local finance association) will be selected as an operational main body that has an experience with similar insurance.

Before the implementation of the insurance program what we plan to do is functional decision of participation main bodies (government, insurance company, people, etc), compilation and management of insurance statistical data, and laws and regulation improvement including public relations. After the implementation, database for insurance statistical data needs to be expanded and premium rates system according to the risk needs to be improved. From 2004, various tasks such as deliberation by related Ministries and Agencies, public hearings by regional groups, securing the insurance budget, completion of the laws and regulation improvement, pilot test operation, and gradual expansion of the natural disaster insurance program are necessary.

### **4-3. Technical Measures**

To reduce the loss of life, property damage, and economic hardship caused by natural disasters, the Korean government put in practice several actions. For large-scale construction sites, such as subways, golf courses, dams, and residential development sites, Disaster Preparedness Plans are arranged and maintained, in which assigning multiple government officials to monitor large-scale construction sites and setting construction priority. Plans for repairing disaster prevention facilities including retaining walls, embankments, and reservoirs are established and inspection and repairs for the facilities are to be completed before the rainy season.

Equipment and facilities for emergency countermeasures have been secured according to the need averaged over the last ten years and local conditions. For proactive disaster prevention activities and emergency recovery during severe natural disasters, the Special Fund has been allocated in 16 cities and 232 districts since 1997. Small rivers in Korea are vulnerable to overflow. Thus, the first step of the

improvement for vulnerable small rivers is to refurbish from 2000 to 2009 at the cost of about \$3.9 billion. Since 2002, small river sites totaling 800km were refurbished at the cost of \$32 million, and \$11 million is being invested to 278km in 2002.

## **Component 5. Preparedness and Contingency Planning**

### **5-1. Contingency Plans**

The Korean government prepares various disaster prevention plans such as basic and action plans. Basic disaster prevention plan, which is a long-term plan against disasters including disaster prevention systems and relevant countermeasures, is formulated every five years. The sixth basic disaster prevention plan is currently in effect since 2002. In accordance with basic disaster prevention plans, specific action plans are formulated and implemented on a yearly basis by the government.

From February to April each year, disaster prevention training and education programs are provided to working-level government employees in charge of disaster prevention in each province, city, county and district. With the period from the beginning of March to the end of May designated as the period of preparedness against possible disasters, disaster prevention facilities are inspected and repaired at the level of each administrative unit including province, city, county and district in a precautionary measure against disasters. During the period from March to May every year, disaster prevention training including mapping and computerized exercises along with training based on regional characteristics is carried out concurrently with civil defense drills on the basis of a simulated massive natural disaster comparable to those which actually occurred in the past.

### **5-2. Emergency Funds and Storage Facilities**

Budgets for disaster risk reduction are included in regular annual budget. Annual regular budget for NEMA is about \$190 million. The central budget is about \$55 million and local supportive budget is about \$135 million. In addition to this, emergency funds, i.e., disaster recovery budget, are about \$880 million per year.

Materials, relief resources, medicine, equipment, and shelter are prepared for emergency use. Materials for flood response are sandbags, water mat, plastic bags, vinyl covers, sewage pipe, tools, and etc. The storage quantity is estimated based on the past 10 year average use. The quantity can be increased for the disaster vulnerable areas. To save storage space limited amount for emergency use is stored and other

necessary materials are procured under contract with suppliers.

Relief kit, food grains, ramen, clothing, tents, blanket, kitchenware, and other necessary items are stored in local sites. The storage quantity is also estimated based on the past 10 year average use. To prevent epidemics germicidal agent, insecticide, antiseptic, injection, and other medicine are stored in local infirmary. The quantity is based on the Epidemics Management Project Regulation by the Korea Center for Disease Control and Prevention (KCDC). Emergency equipment such as crane, excavator, dump truck, loader, tow truck, garbage truck is designated for emergency mobilization. Shelters are also designated in schools, churches, public buildings, etc.

### **5-3. Coordination**

The National Emergency Management Agency (NEMA) under the Ministry of Government Administration and Home Affairs (MOGAHA) coordinates overall measures to counter natural disasters in Korea. The agency is composed of four Bureaus, i.e., Planning and Management Bureau, Mitigation and Planning Bureau, Response and Management Bureau, and Recovery and Support Bureau.

NEMA takes responsibility for practical affairs for regular period. When a disaster strikes, an ad hoc organization called CDSCH forms. The Central Disaster and Safety Countermeasures Headquarters (CDSCH) is in charge of prevention and status control of natural disasters, as well as recovery planning, and executes necessary measures related to such disasters.

## **Component 6. Good Practices**

### **6.1 Management of Areas Prone to Disasters**

Korea identified 537 sites most susceptible to inundation, collapse, and isolation by typhoons and floods, and labeled them as Disaster Prone Areas. These areas are classified and managed by type, grade, managing entity, size, etc. A total of \$1.1 billion will be invested for wide-ranging improvements for seven years from 1998 to 2004. Under this plan, \$496 million has been invested to improve 488 disaster prone areas from 1998 to 2002.

### **6.2 Introduction of Special Disaster Area Declaration**

To cope with the disasters due to the heavy rains and the 15th typhoon RUSA in 2002, the Special Disaster Area declaration was introduced. The declaration is for the areas where an ordinary support may not be enough for the appropriate recovery and response activities. Through the comprehensive supportive ways, that is, including the administrative and financial supports, the government intends to encourage the citizen's self-supporting intention, recover the damaged infrastructures more rapidly, and stabilize the livelihood of the sufferers at the damaged area.

### **6.3 Implementation of the Disaster Impact Assessment System**

Disaster Impact Assessment (DIA) system aims at fundamentally eliminating potential causes of disasters inherent in various development projects in advance and ultimately protecting the life and property of the people. This program is one good example for implementing sustainable development. The disaster impact assessment system is implemented when the area of targeted development is not less than 300,000 m<sup>2</sup>. With respect to small- and medium-sized development projects (150,000 m<sup>2</sup> to less than 300,000 m<sup>2</sup> in size), each city and province has introduced a local disaster impact assessment system. To protect lives and properties in downstream areas from the impact of large-scale development, facilitating disaster prevention facilities such as retention reservoir in the development area, the DIA has been introduced since 1996 and the coverage of DIA has been expanded in 2001. Currently, DIA is applicable to 24 categories in 6 fields such as urban development, industrial area development, touring attraction development, and mountain area development.

## **Component 7. Priorities**

1) It is required to strengthening close cooperation in the region. It is desirable to have several practical cooperation programs and training that can yield ready-to-use outputs. Programs provided by ADPC, ADRC and other international or regional organizations need to be more actively developed and publicized.

2) Even when the government prepares perfect policies or organizations to reduce disaster losses, the government cannot do it alone without active participation of citizens. More public education and participation are desired. Programs to increase public awareness should be discussed as one of the top priorities in the WCDR.

3) Sustainable development can be defined as development that does not increase disaster potential or vulnerability. However, it is almost impossible to develop any area without disturbance. To reduce disaster factors due to development,

regulations that safeguard not only developing site but also downstream should be discussed during the WCDR. The Disaster Impact Assessment system, which is currently put in force in Korea and actually reduce disaster factors, can be a good example for implementing sustainable development.

4) Budget for disaster reduction project is sometimes considered as a simple cost, not an investment. Methodology or strategy that can change the concept and increase disaster reduction budget needs to be addressed.

## **Component Extra. International Cooperation**

Some international cooperation actions including multilateral and bilateral activities are listed below.

- UN International Strategy for Disaster Reduction National Platform (2001~ )
- Exchange of the Protocol of Intentions and Annual Plan between FEMA and MOGAHA (2000~ )
- Asian Disaster Reduction Center as a Member country (1998~ )
- Asian Disaster Preparedness Center, Executive Advisor (1998~ )
- Typhoon Committee Annual Meeting (1967~ )
- ASCE - World Congress for Disaster Reduction (2001)
- Global Disaster Information Network (GDIN) Annual Meeting (1999, 2002~ )
- Korea-Japan Disaster Prevention Council Annual Meeting (1999~ )
- ASEAN Regional Forum, PBEC, and others (1998~ )