Issue-specific Guidelines for Disaster Reduction

November 2007

Japan International Cooperation Agency

Preface

Natural disasters, such as strong winds, floods, landslides, earthquakes and forest fires, constitute serious threats to life, the natural environment, infrastructure, and property, and cause great damage in people's lives. Once lost, life can never be recovered and a considerable amount of time and costs are required to reconstruct the natural environment or infrastructure.

Historically, Japan has achieved economic development while strengthening preventive measures against disasters and overcoming difficulties imposed by various natural disasters. In recent years, the world has frequently experienced natural disasters, and many people have been affected. In particular, once disaster strikes developing countries, which tend to be highly vulnerable against natural disasters, the development of those countries will be extensively hindered and the livelihood of the already poor and vulnerable people will be unduly impaired due to the enormous human and economic toll.

With experience in disaster reduction in Japan as a backdrop, the Japan International Cooperation Agency (hereinafter referred to as JICA) has actively been taking part in international cooperation in the field of disaster reduction. The ODA Charter (revised in 2003) has identified "disaster reduction" as a new priority issue. The Initiative for Disaster Reduction through ODA was announced at the United Nations World Conference on Disaster Reduction held in Kobe, Hyogo prefecture in January 2005. The Initiative demonstrates Japan's basic policies and specific approaches to international cooperation for disaster reduction. In response to these developments, more effective and efficient international cooperation in the field of disaster reduction will be increasingly required within the framework of ODA.

The issue-specific guidelines for disaster reduction by JICA is compiled to provide an overview of disasters and of assistance projects in the field of disaster reduction as well as their approaches and methods, and to present policies and essential points of cooperation by JICA. These issue-specific guidelines are expected to be used by the relevant people of JICA to share the basic framework, information and knowledge on disaster reduction and as a referential document for JICA to plan/design projects as well as to evaluate and implement projects.

Furthermore, by disclosing these guidelines to the public through, for example, the JICA Knowledge Site, we hope that a wide range of people will be able to gain understanding of JICA's basic concepts on disaster reduction.

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How to Read the Tables of Development Issues

In these guidelines, development strategy goals are set forth in relation to issues in the field of disaster reduction, the tables of development issues by each goal, in which each development strategy goal is divided into sub goals, are developed as shown below, and general approaches to issues are exhaustively organized and presented at the beginning of the document[1]. These tables are designed to give a sort of bird's eye view of the overall image of the structure of issues in the field of disaster reduction in a cross-sectoral manner and to examine the policies, directions and contents of cooperation towards solving problems.

[Table of Development Issues (excerpt)]

Development Strategy Goal 1: Building Disaster-Resilient Communities/Societies

Medium-term goal	Sub-goal of medium-term goal	Example of project activity
1-1 Understanding of disaster risks	Understanding of disaster risks	△ Analysis/evaluation of disaster experience △ Collection of geologic, meteorological and hydrological data △ Survey of the history of disasters in the concerned area
	Sharing among regions and communities (compilation of disaster prevention maps, etc.)	◎ Formulation of hazard maps/disaster prevention maps and information sharing

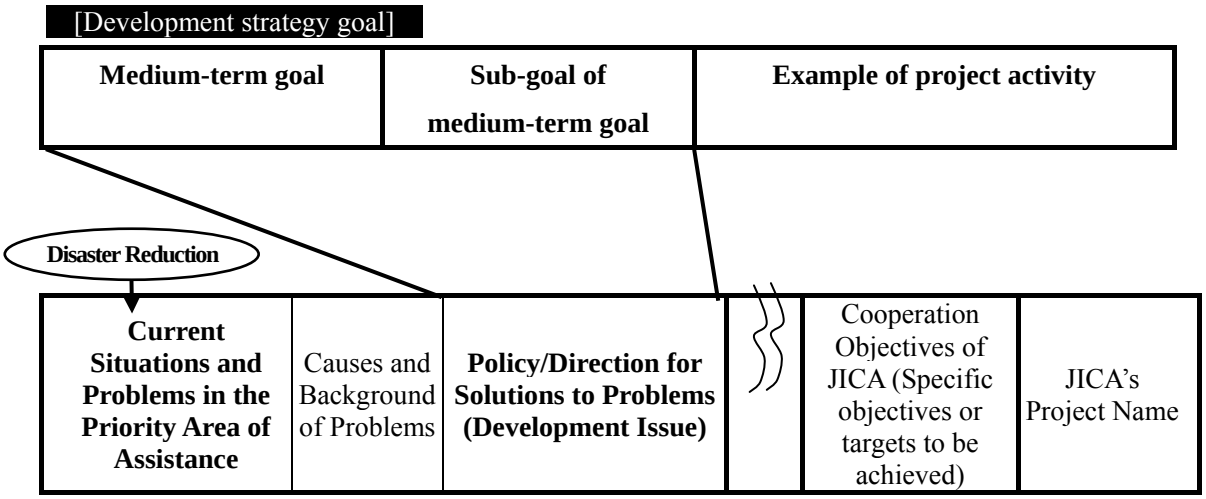
"Medium-term Goal" and "Sub-goals of Medium-term Goal" are the breakdowns of those development-strategy goals.

Furthermore, with respect to the relationship between the tables of development issues and the Country-specific Project Implementation Plans, it is necessary to consider individual cases since the scope and scale of the addressed issues are different according to the recipient country/region. However, the premise is that, in the table, "development issue (=disaster reduction)" is equivalent to "priority area for assistance" of the development issue matrix in the Country-specific Project Implementation Plan and that "Development strategy goal," "Medium-term goal" and "Sub-goals of medium-term goal" in the tables correspond to the "Policy/Direction to Solve Problems (Development Issues)" of the development issue matrix in the Country-specific Implementation Plan.

1 In reality, causal relationships between the issues are not directly related like the table shows. Instead, various elements are intertwined. This table is meant to use a particular interpretation to present an overall picture of issues in an understandable manner based on the conceptual schematization of the issues.

[Correspondence between the table of development issues and the development issue matrix in the Country-specific Implementation Plan]

＜Table of Development Issues＞



[The development issue matrix in the Country-specific Implementation Plan]

Disaster Reduction: Entire Table of Development Issues

Disaster cycle	Development strategy goal		Medium-term goal	Sub-goal of medium-term goal	Example of project activity
Prevention (mitigation/ preparedness)	1	Building disaster-resilient communities and societies	Understanding of disaster risks (development of disaster prevention maps)	Understanding of disaster risks	△ Analysis/evaluation of disaster experience △ Collection of geologic, meteorological and hydrological data △ Survey of the history of disasters in the concerned area
					△ Survey on distribution of buildings, building strength and demographic distribution △ Understanding of disaster=reduction capacity of target community and society (survey on people, property, administration, organization)
					◎ Study on estimated and acceptable level of hazard risk ◎ Formulation of disaster scenario (hydraulic model experiment/numerical simulation)
				Sharing among regions and communities (development of disaster prevention maps, etc.)	◎ Formulation of hazard maps/disaster-prevention maps and information sharing
			Improvement of coping capacity of communities and societies	Development of laws/ formulation of plans	○ Development of the Disaster Measures Basic Law ○ Formulation of the Basic Plan for Disaster Reduction (national level) ○ Setting of various disaster-reduction standards ○ Formulation of regional plans for disaster reduction (local level) ◎ Feedback of results of evacuation drills on plans ○ Designation of dangerous areas × Financial preparation
				Establishment and strengthening of disaster-reduction systems	△ Clarification of roles among administrative organizations/departments. Development of coordination systems (mechanisms, manuals and guidelines) ◎ Establishment of disaster-management center △ Development of government-business-university partnership ○ Promotion of disaster-reduction research ◎ Development of administrators, engineers and researchers engaged in disaster reduction and disaster response
				Improvement of mitigation capacity through hardware measures	[Aseismic Measures] ◎ Aseismic reinforcement of public buildings (hospitals, schools, city offices, etc.) △ Aseismic reinforcement of houses ◎ Aseismic reinforcement of infrastructures (bridges, port facilities, lifelines, etc.) × Aseismic strengthening of industrial facilities
					[Anti-Tsunami Measures] ○ Building of banks and breakwaters ○ Reinforcement of existing banks and breakwaters △ Construction of floodgates
					[Anti-Flood Measures] △ Promotion of forestation in watershed areas △ Development of rainwater drainage facilities ◎ Repair of rivers and streams ◎ Embankment measures △ Development of flood-control basins and regulating reservoirs △ Development of forestry and grassland to reduce the flow of water ◎ Building and expansion of flood-control dams ○ Recovery of capacity of existing dams through dredging of sediment
					[Measures against Sediment Disasters] △ Planting treatment in intermountain and hilly areas ◎ Development of mudslide-control dams, hillside works, longitudinal dikes, flow channels, etc. △ Development of sediment-control areas ○ Hillside terracing
					[Measures against Volcanic Disasters] ○ Development of sediment-control facilities, including sediment-control dams, longitudinal dikes, and sediment-control areas
					[Measure against Storm Surge Disasters] ○ Development of dams, embankments, piers, wave suppressers ○ Littoral nourishment
				Establishment of forecast/warning	◎ Development of equipment for observation, forecast/warning and prediction systems

				/evacuation systems	(Development of personnel engaged in operation, maintenance and management) ◎ Development of disaster information systems and information-transmission systems that reach people in need ○ Development of evacuation facilities (parks, shelters, evacuation buildings, towers, etc.) △ Development of evacuation routes △ Distribution of hazard maps △ Implementation of evacuation drills ○ Formation of voluntary disaster-reduction organizations (development of community leaders) △ Development of disaster-reduction education and building a disaster-reduction culture
				Financial preparation	△ Securing disaster-reduction budget × Promotion of disaster insurance schemes
Emergency response	2	Emergency response that reaches affected people effectively and quickly [Protection of life]	Establishment of emergency response systems	Understanding of disaster situations and needs for emergency response	○ Survey/Understanding of the overview of disaster △ Survey/Understanding of human damage △ Survey/Understanding of physical (infrastructure) damage × Emergency safety check for buildings (for the removal of damaged houses)
				Development of emergency response systems	△ Launch of disaster headquarters (establishment of communication and decision-making systems) × Support for system development for receiving assistance from organizations of other countries, etc.
			Implementation of rescue operations	Implementation of rescue operations	× Fire-extinction activities ◎ Search activities using equipment and rescue dogs ◎ Rescue activities using digging equipment ◎ Implementation of Confined Space Medicine (CSM) × Identification of bodies and conducting cremations
				Emergency medical care	○ Setting up of field hospitals and clinics for emergency and provision of medical services △ Conducting mobile medical services × Safety confirmation of medical institutions, securing centers, doctors, nurses and medicines × Establishment of logistic transportation systems
			Assistance for affected people	Emergency (primary) evacuation	× Instructions/orders of evacuation and evaluation guidance × Designation of restricted areas
				Provision of food, drinking water and household items	○ Provision of food, drinking water and household items × Securing means and routes of transporting food, drinking water and household items × Establishment of provision systems for food, drinking water and household items
				Securing of provisional housing	× Securing/operation of emergency shelters (tents)
				Healthcare measures	× Epidemiological investigation △ Public health measures for prevention of communicable diseases (infectious diseases) (epidemic prevention, immunization, enlightenment activities, etc.) △ Measures against homeostatic diseases and lifestyle-related diseases
				Healthcare measures (including mental care)	× Implementation of counseling △ Treatment of trauma and Posttraumatic Stress Disorder (PTSD)
Recovery and reconstruction	3	Transition to and implementation of accurate recovery and reconstruction	Establishment of recovery and reconstruction systems	Understanding of the needs for recovery and reconstruction	△ Understanding of affected people (human damage) △ Assessment of housing damage △ Assessment of infrastructure damage
				Development of systems for recovery and reconstruction	× Launch of recovery and reconstruction systems (communication systems and decision-making systems)
				Formulation of recovery and reconstruction plan	× Formulation of basic policies for recovery and reconstruction
			Support for independence and rehabilitation of affected people	Recovery and reconstruction of livelihood infrastructure	△ Debris removal with heavy machinery, etc. △ Securing emergency transport route × Securing land transportation means by trucks, etc.
				Debris removal and recovery of road functions	△ Debris removal using heavy machinery, etc.
				Securing housing	△ Opening, operation and management of comps for affected people △ Repair of damaged housing × Development of land to relocate residents ○ Dissemination of low-cost seismic strengthening technology for housing × Full-fledged reconstruction of housing (permanent

					housing)
				Recovery and reconstruction of lifelines	△ Implementation of hygienic measures (disposal of human waste, garbage, etc.) ○ Securing and recovery of lifelines such as water, electricity and telecommunication
				Recovery of livelihood	× Distribution of donations for disaster victims ○ Securing employment × Credit guarantee for fund loans by micro-credit or financial institutions × Support through tax relief
				Mental care	△ Conducting mobile medical care
			Recovery and reconstruction of social functions	Recovery and reconstruction of public services	[Securing and recovery of administrative functions] × Safety confirmation and securing centers of administrative organizations × Installation of wireless communications and emergency generators × Securing administrative personnel, installation of various contact points [Securing and recovery of medical functions] △ Safety confirmation and securing medical centers × Securing doctors and nurses △ Securing medicines [Securing and recovery of educational functions] △ Safety confirmation and securing educational centers × Securing teachers and teaching materials
				Recovery and reconstruction of economic systems	× Implementation of financial preferential measures and exchange of damaged banknotes × Tax-reduction/exemption measures × Distribution of donations for disaster victims × Securing/provision of employment space, financial support × Offering business opportunities × Purchase guarantee of products × Support for securing materials and machinery × Stabilization of distribution
			Reconstruction of affected areas		○ Formulation of basic policies for community participatory recovery and reconstruction ○ Selection of designated areas for recovery and reconstruction ○ Formulation of community participatory urban plans ○ Formulation of infrastructure recovery and reconstruction plans such as community participatory road network plans ○ Formulation of community participatory land use plans △ Review of various standards and regulations (including building standards)

Performance of JICA's projects

◎	Indicates when there are more than five projects in which examples of project activities are included as a project goal → When more than 10 members are dispatched in the case of individual experts or members of JOVC.
○	Indicates when there is a project in which examples of project activities are included as a project goal
△	Indicates when examples of project activities are included as a part of a project, although they are not included as a project goal
×	Indicates the absence of any outcomes, or the dispatch of short-term experts or for planning and assessment

Outline (Summary) of Issue-specific Guidelines [Disaster Reduction]

1. Overview of Disaster Reduction

1-1 Actual conditions of disasters

The number of natural disasters has been increasing since the 1950s. Behind this trend lie several factors: change in socioeconomic conditions, including the accumulation of population and assets along with demographic growth (the population nearly doubled since 1950), increase in vulnerability to disasters due to disorderly development, and frequent occurrence of extreme natural phenomena allegedly caused by global-scale climate change.

Many of the natural disasters have occurred in countries ranked as having either medium or low human development. The casualties of natural disaster in these countries are much higher than those of countries with high human development. In addition to geographic factors, this phenomenon is influenced by an increase in population that is particular to countries of medium and low human development, a lack of response of governments, a lack of technology, and a lack of knowledge and information of people about disaster reduction.

Disasters do not only result in the loss of human lives and physical property, but also adversely affect the dignity of individuals, the basis for human life, and the outcomes of development achieved thus far, hindering the sustainable development of the society. Thus, efforts for disaster reduction are significant from the perspective of human security.

1-2 Definition of disaster reduction

When striving for disaster reduction, it is necessary to consider a cycle process called the "Disaster Management Cycle (DMC)." This cycle starts from preparation in times of peace in order to minimize damage when a disaster strikes (preparedness), moves on to the minimization of damage through speedy rescue operations immediately after a disaster strikes (response), then to the restoration to the original state and functions by repairing damages and disruptions in the post-disaster period, and ends with the creation of a disaster-resilient society by making use of experience gained in disaster management.

Based on this concept, disaster reduction is defined as follows in these guidelines.

Disaster Reduction: "To prevent (mitigate/prepare for) the occurrence of disasters, to prevent damage from spreading when a disaster happens, and to start the recovery/reconstruction process after damage has been sustained.

1-3 International assistance trends

In light of the growing human and economic loss of natural disasters despite the efforts of local communities and governments, the United Nations General Assembly designated the 1990s as the International Decade for Natural Disaster Reduction (IDNDR) in 1987, in an effort to reduce the loss of lives, property damage and economic and social disruption caused by natural disasters through international cooperative works.

The UN World Conference on Natural Disaster Reduction was held in Yokohama in 1994, midway through the decade. The Yokohama Strategy adopted at the Conference clearly specifies that "building disaster-resilient communities" and "disaster reduction through precautionary measures" are essential to achieving sustainable economic development. Furthermore, the Action Plan in the Yokohama Strategy advocates the promotion of priorities for disaster reduction in the least developed countries and small-island developing States.

Some achievements have been made during the period of the IDNDR, such as enhancement of disaster-reduction cooperation at the regional level. In order to anchor these achievements, the International Strategy for Disaster Reduction (ISDR) was adopted at the United Nations General Assembly in 1999. Two objectives listed in the ISDR are the "shift from disaster response to disaster reduction" and "building disaster-resilient communities."

In September 2002, at the World Summit on Sustainable Development (Johannesburg Summit), the Johannesburg Declaration on Sustainable Development was adopted. It identifies natural disasters as a serious threat to sustainable development of mankind, indicating the importance of disaster reduction for sustainable development.

In January 2005, the United Nations World Conference on Disaster Reduction was held in Hyogo with the aim of formulating new disaster-reduction policies for the 21st century and of reducing damage caused by disasters. The Hyogo Declaration, which was adopted at the Conference, clearly stipulates the relationship between development and disaster reduction and points out that disasters reduce the effects of development and impede sustainable development and poverty eradication. At the same time, development without appropriate consideration to disaster risks would contribute to an increase in vulnerability to disasters.

1-4 Assistance trends in Japan

(1) Efforts of Japan

Aware of the importance of disaster reduction in development, the government of Japan declared the "enhancement of efforts for disaster reduction" to be one of the important areas, taking the opportunity for preparatory meetings for the Johannesburg Summit in September 2002. It is fair to say that such an effort has contributed to the incorporation of the view of disaster reduction into the discussions at the Johannesburg Conference and then into the Johannesburg Declaration.

The ODA Charter, revised during the following year, 2003, mentioned "disaster reduction" for the first

time in its history. It touches upon the importance of considering disaster reduction from the perspective of human security against threats and identifies disaster reduction as a priority issue along with other global-scale issues.

Furthermore, at the United Nations World Conference on Disaster Reduction convened in Hyogo in 2005, then Prime Minister Koizumi sent a message about the policies of Japan on international cooperation for disaster reduction in his "prime minister's statement," and announced the "Initiative for Disaster Reduction through ODA." In February of the same year (2005), the Japanese government formulated a medium -term policy on ODA in line with the ODA Charter, which presented the concepts and approaches of Japan and specific efforts. The policy also clearly states that Japan will move forward with efforts toward disaster reduction through ODA in relation to "poverty reduction" and "efforts for global-scale issues," which are identified as priority issues of the ODA Charter. Moreover, in April 2005, then Prime Minister Koizumi pledged that, over the following five years, Japan would provide more than $2.5 billion in aid for disaster reduction in Asia, Africa and other regions.

On the other hand, in Fiscal Year 2006, a new scheme titled "Grant Aid for Disaster Prevention and Reconstruction" was launched to provide assistance with multiple components, including repair and reconstruction of schools, medical facilities and roads, etc., in response to the changing needs in the areas affected by disaster. This was an aim to provide seamless support, covering the range from emergency relief from a disaster of a specific magnitude to full-fledged reconstruction and reconstruction assistance.

(2) International cooperation through international organizations

Japan has been promoting international cooperation for disaster reduction by providing funds to the United Nations Development Programme (UNDP), the Secretariat of the International Strategy for Disaster Reduction (ISDR), and the UN Office for the Coordination of Humanitarian Affairs (OCHA). The OCHA Asia Unit was established in February 1999 and the UN International Recovery Platform (IRP) in 2005, both in Kobe, Hyogo prefecture. The UNESCO International Center for Water Hazard and Risk Management (ICHARM) was set up in Tsukuba in March 2006. All of these organizations are actively taking initiatives in relevant areas and sharing information with concerned organizations, including the government of Japan.

(3) Regional disaster reduction in Asia

The Asian Disaster Reduction Center, which was established in Kobe, Hyogo in 1998, has developed a network and been conducting activities in cooperation with 25 member states and five advisory states with an aim for mitigating damages in Asia.

2. Approaches to Disaster Reduction

2-1 Objectives of disaster reduction

(1) Contributing to the improvement of human security

Disasters not only inhibit the development of society, but also greatly affect the survival, dignity and livelihood of each individual. Because of disasters, so many people are forced to suffer from physical and psychological pains, lose families and relatives, as well as properties and means of subsistence, and fall into miserable circumstances in a flash. Poor people, in particular, who are already in a vulnerable position against disasters, plunge into more difficult living conditions, slipping into a vicious cycle of disaster and poverty. Reduction of threat to these people and improvement of their coping capacity are extremely important from the perspective of human security, and cooperation in the field of disaster reduction would contribute to this goal.

(2) Contributing to sustainable development in developing countries

The number of disaster occurrences has been on the rise in recent years, due to the increase in disaster risks associated with climate change and urban congestion. Particularly, considerable loss has been inflicted on developing countries in terms of human and physical damage, and disasters destroy outcomes and efforts for development and have become an inhibiting factor to the sustainable development of society. Furthermore, it is said that inappropriate development without consideration for disaster reduction would generate and facilitate disasters.

Developing countries give priority to short-term economic development of the nation, despite having greater disaster risks than developed countries, and efforts for disaster reduction tend to be postponed. Reduction of disaster risks is important for the medium- and long-term development of developing countries and cooperation is also necessary for projects that incorporate the disaster-reduction viewpoints into development (policy projects).

(3) Contributing to the promotion of international cooperation in the field of disaster reduction as an advanced nation of disaster management

Various disasters repeatedly occur in many countries and regions every year, and disaster reduction is an issue common for all mankind, and is to be promoted under international cooperation by sharing experience and knowledge. Since the International Decade for Natural Disaster Reduction (IDNDR) of the 1990s, the importance of cooperation concerning disaster reduction on an international scale has been highlighted and such cooperation has been put into practice. In particular, Japan has been assuming a leading role in developing and implementing an international framework based on the abundant experience and accumulated expertise on disaster reduction, and it is necessary to continue contributing to the international community as an advanced nation of disaster management.

2-2 Effective approaches to disaster reduction

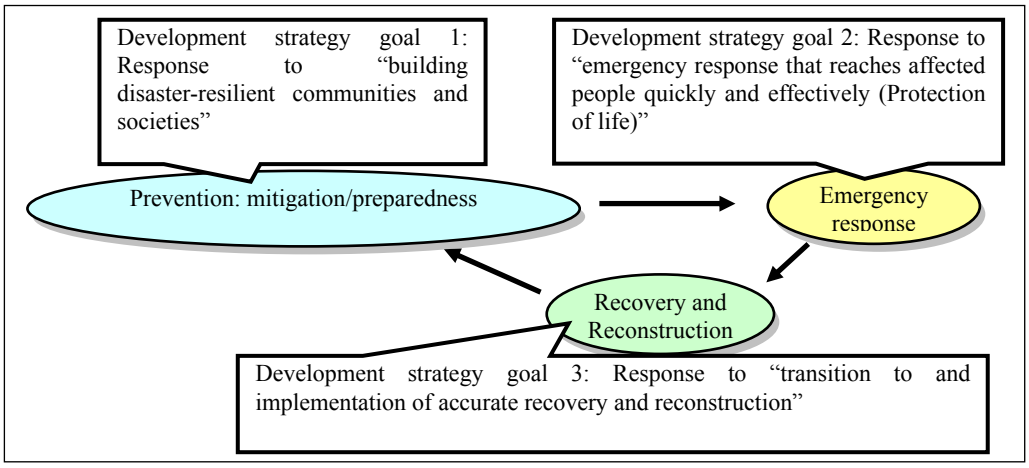
As efforts toward disaster reduction, it is necessary to have approaches that are based on the Disaster Management Cycle (DMC). Since peacetime efforts to prevent disasters are most important, efforts toward prevention are regarded as the most important goal in the DMC. Based on these concepts, the following three development strategy goals are set in order to achieve the objectives of disaster reduction.

Development strategy goal 1: "Building disaster-resilient communities and societies"

(Prevention: mitigation/preparedness)

Development strategy goal 2: Emergency response that reaches affected people quickly and effectively (Protection of life)

Development strategy goal 3: Transition to and implementation of accurate recovery and reconstruction (Recovery/Reconstruction)



Development strategy goal 1: "Building disaster-resilient communities and societies"

For disaster reduction, peacetime efforts are important to building disaster-resilient communities and societies and to preventing disasters. In order to build disaster-resilient communities and societies, it is necessary to reduce disaster risks in the relevant community/society. In order to reduce disaster risks, it is necessary to deepen understanding of disasters and to improve coping capacity.

The first step to that end would be the accurate understanding of disaster risks. The following specific actions against various disaster risks are required: development of legal schemes and systems, measures for software such as human resources development, and hardware measures for improving various disaster-coping capacities of hardware, such as installation of structures, and preparatory economic measures to respond to considerable demand for funds that arise after a disaster occurs.

In order to effectively implement preventive measures against disasters at the phase of prevention in the disaster cycle, it is important to combine these measures with equal weights.

Development strategy goal 1 identifies the necessary efforts at the phase of prevention.

Development strategy goal 2: Emergency response that reaches affected people quickly and effectively (Protection of life)

Disasters cannot be fully controlled even if preventive measures are taken. Thus, efforts to save lives quickly and effectively after the occurrence of a disaster would be necessary. In order to prevent secondary disasters, it is essential to establish emergency response systems, to conduct rescue operations, and to urgently provide assistance to disaster victims.

Development strategy goal 2 identifies under what systems the needs of the victims are assessed to better provide emergency assistance at the phase of emergency response.

Development strategy goal 3: Transition to and implementation of accurate recovery and reconstruction

In order to help disaster victims leave chaotic conditions behind and return to their normal lives, it is necessary to recover social and lifeline infrastructures, such as housing, water and sewage, electricity, gas, road, and medical and educational facilities, and to provide support that contributes to the reconstruction of livelihood so that disaster victims can lead independent lives. Furthermore, since serious emotional and mental health issues are commonly faced by disaster victims, measures for mental care would be necessary on medium- and long-term bases. In order to implement activities in these various fields, accurately meeting the needs of the affected areas, it is vital to develop a system that allows information sharing, a proper decision-making process on the formulation of recovery/reconstruction plans, and implementation of cross-sectoral projects.

Development strategy goal 3 identifies under what systems recovery and reconstruction activities need to be implemented, while seeking the method of needs assessment, and what measures should be implemented to reconstruct the living conditions of disaster victims.

3. Cooperation Policies of JICA

Considering the necessity of efforts for prevention, JICA identifies development strategy goal 1 “building disaster-resilient communities and societies” as the priority goal. However, preparation alone cannot fully prevent disasters. Therefore, in addition to cooperation in the prevention phase, cooperation in the response phase and in the recovery/reconstruction phase will be implemented to save lives and to recover living conditions during the post-disaster period.

As a commitment towards achieving development strategy goal 1 (building disaster-resilient communities and societies), two points are stressed: “efforts for strengthening coping capacity with focus on communities,” and “reflecting the view of disaster reduction on development.” Particular emphasis is placed on the following activities: “capacity development of organizations concerned with disaster reduction (competent

agencies (including local governments), research institutions and NGOs), with particular emphasis on the enhancement of disaster-reduction capacity of communities (community disaster reduction)," "understanding of disaster risks by using disaster-prevention maps and enlightenment through disaster-reduction education", "developing forecast/warning/evacuation systems," "hardware measures in coordination with other measures," and "development, dissemination and enlightening activities of legal systems (the Building Standards Law, etc.) and of plans (local disaster reduction plan, etc.).

As a commitment towards achieving development strategy goal 2 (emergency response that reaches affected people quickly and effectively (Protection of life)), two points are stressed: "efforts for incessant emergency assistance" and "support for healthcare measures for disaster victims." Particular emphasis is placed on the following activities: "speedy implementation of needs-assessment surveys that is consistent with international emergency operations," "speedy dispatch of relief and medical teams," "speedier provision of supplies" and "implementation of mental care measures."

As a commitment towards achieving development strategy goal 3 (transition to and implementation of accurate recovery and reconstruction), two points are stressed: "sustained support for disaster victims" and "support for building disaster-resilient communities and societies in the phase of recovery/reconstruction." Particular emphasis is placed on the following activities: "**speedy implementation of needs-assessment surveys for recovery/reconstruction,**" "recovery/reconstruction of lifelines and public facilities," "reconstruction of the affected areas through community participation," "recovery of living circumstances (livelihood)" and "implementation of mental care measures for disaster victims in a medium- and long run."

Issue-specific Guidelines [Disaster Reduction]
Contents

Chapter 1　Overview of Disaster Reduction

The overview of the issues and assistance trends are summarized in this chapter to provide a basis for consideration of issue-specific guidelines in the field of disaster reduction.

Actual conditions of disasters

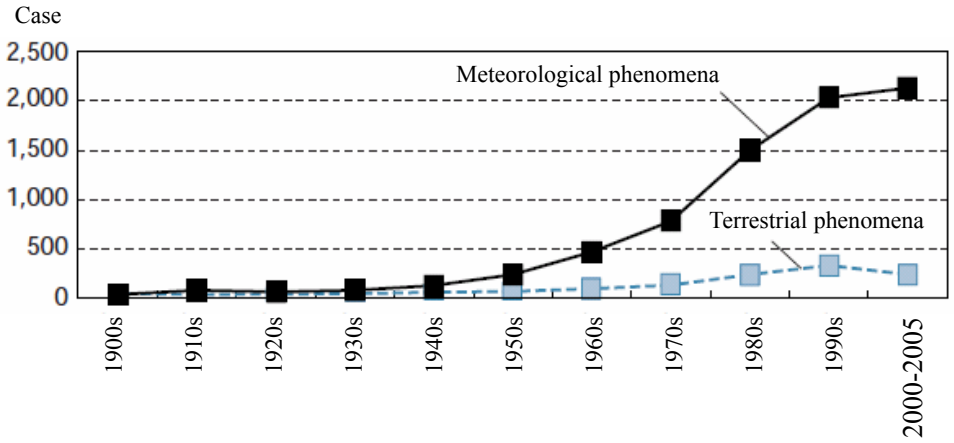
1-1 Actual conditions of disasters

1-1-1 Increasing trend of natural disasters

Natural disasters occur frequently and damage is becoming ever more serious.

Natural disasters have been increasing in recent years. The data of the International Strategy for Disaster Reduction (ISDR) indicates that natural disasters have been on the rise since the 1950s. (See the figure below.)

Behind this trend lie several factors: change in socioeconomic conditions, including the accumulation of assets along with population increase (nearly doubled from 1950), increase in vulnerability to disasters caused by disorderly development, and frequent occurrence of extreme meteorological and terrestrial phenomena alleged to be brought on by global-scale climate change.

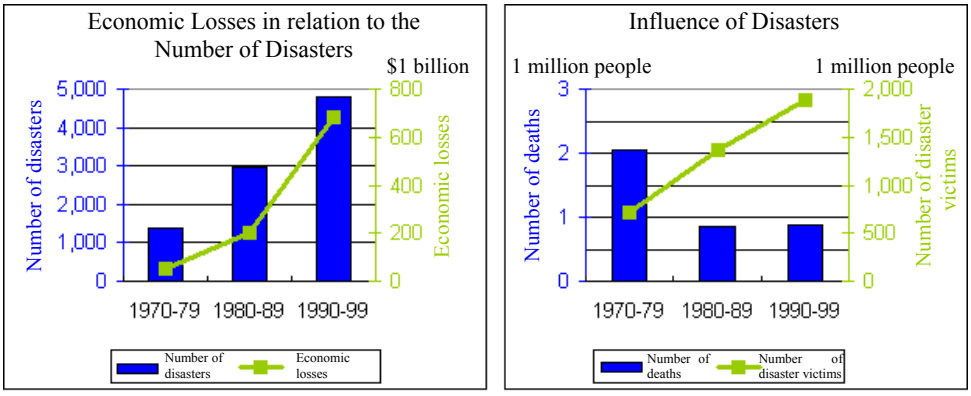


(Source: EMDAT UNISDRHP)

Figure 1-1 Number of Natural Disasters During the Period Between 1900 and 2005

Although the number of deaths has been on the decline in recent years, thanks to the measures taken against natural disasters, the number of occurrences of natural disasters, the amount of economic losses and the number of disaster victims have been consistently increasing along with the accumulation of population and assets, which evidences that social vulnerability against natural disaster has become all

the more serious. (See Figure 1-2 on the next page.)



(Source: Website of the UN World Conference of Disaster Reduction)

Figure 1-2 Amount of Economic Losses and Number of Disaster Victims Caused by Natural Disasters During the Period Between 1970 and 1999

1-1-2 Disasters impeding development of developing countries

Many natural disasters occur in countries ranked as having either medium or low human development[2] (Figure 1-3). The casualties of natural disasters in these countries are much higher than those of countries with high human development (Figure 1-4[3]). There is a report that 95% of deaths caused by natural disasters in 1998 were in developing countries[4].

Influencing factors to this condition include geographic factors, population increase, lack of coping capacity of governments, lack of technology, and lack of public knowledge and information about disaster reduction.

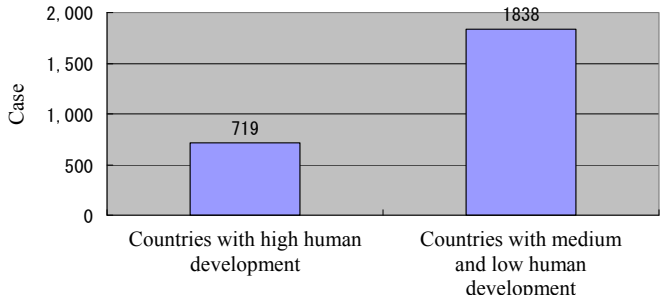


Figure 1-3 Number of Occurrences of Natural Disasters (1991-2000)

[2] Classification based on the "human development index (HDI)" introduced by the United Nations Development Programmes with the aim of measuring a country's development level, focusing on various dimensions of human development (particularly healthcare and education).
[3] IFRC (2001) in GTZ (2002)
[4] CEPAL/BID, un tema del dessrrollo: La Republic de le vulnerabilidad frente a los Desastres, LC/MEX/L. 428, no loc 2000

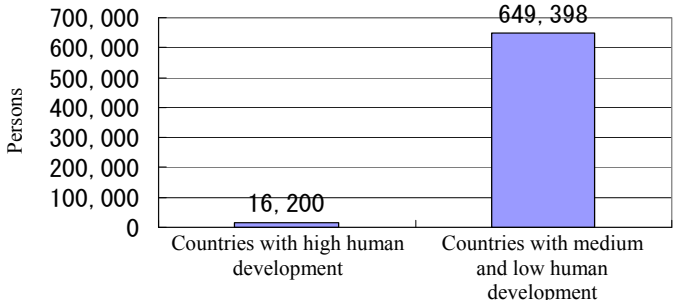


Figure 1-4 Number of Deaths from Natural Disasters (1991-2000)

Natural disasters can be a serious impeding factor to the development of developing countries. For instance, the damage incurred on the Maldivian economy due to the Tsunami disaster in 2004 accounts for more than 60% of the country's GDP. Even if people survived a disaster, they could lose jobs and homes, and their livelihood might slip into a more vulnerable condition. In short, disasters not only result in the loss of human lives and physical property, but also adversely affect the survival, dignity and livelihood of individuals, particularly the poor, and gravely affect the outcomes of development achieved thus far, hindering sustainable development of the society. Thus, efforts for disaster reduction are significant from the perspective of human security.

Definition of disaster reduction and Disaster Management Cycle (DMC)

"The magnitude of disaster risks" is determined by "hazard" and "coping capacity." A condition of low "coping capacity" = a condition of high "vulnerability."

1-2 Definition of disaster reduction and Disaster Management Cycle (DMC)

There are two types of disasters: natural disaster and human-induced disaster. Only natural disasters caused by earthquakes, tsunamis, wind, water, sediment and volcanoes are addressed in these guidelines. Now, the question is what disaster risks are.

"The magnitude of disaster risks" (the magnitude of damage) is thought to be determined by **"hazard"** (the magnitude of natural force that causes disaster) and **"coping capacity[5]"** (the adaptability of communities or societies through changes and resilience so that the communities or societies that are potentially exposed to hazards can achieve or maintain the stage where functions and structures are able to tolerate the hazards).

For example, the height of waves or river water level is a "hazard" and the embankment- or flood-protection activity is the "coping capacity." The occurrence of a disaster depends on the magnitude of a "hazard" and "coping

[5] Coping capacity is defined by how much social systems can improve the ability to learn from the lessons gained from the disasters of the past for better protection in the future and to enhance risk-mitigation measures or how individuals are prepared for future disasters (UN/ISDR Geneva 2004).

capacity." If a "hazard" is smaller than its "coping capacity," a disaster can be prevented. On the contrary, if a "hazard" is larger than its "coping capacity," a disaster situation occurs. When the "coping capacity" is smaller than a "hazard," the condition can be considered to be one of high vulnerability.

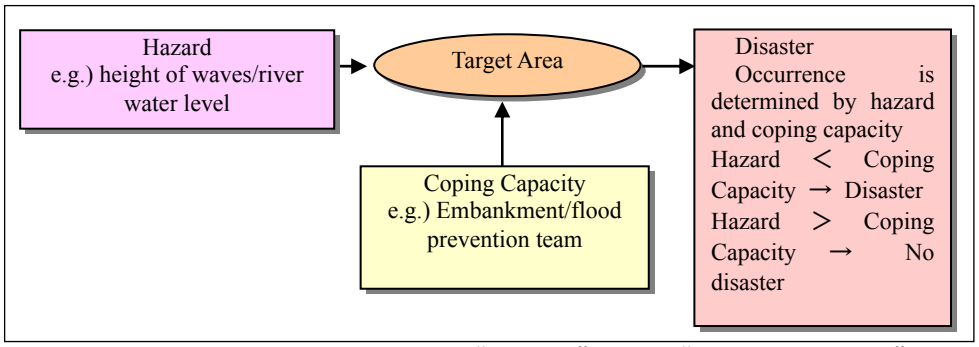


Figure 1-5 Relationship Between "Hazard" and "Coping Capacity"

(Source: Compiled based on JICA (2003) and Hyogo Framework for Action (2005))

From the above, it is necessary to deepen understanding about a "hazard" and to improve "coping capacity" in order to prevent disasters. With respect to "coping capacity," the emphasis has traditionally been placed on the development of hardware, as seen in the promotion of the construction of dams and embankments as anti-flood measures. However, the importance of software aspects has been more recognized in recent years, such as the coping capacity of communities. The significance of software aspects have also been recognized in Japan since the Great Hanshin-Awaji Earthquake.

Then, what efforts are necessary to deepen the understanding of a "hazard" and to improve "coping capacity"? Activities, such as life-saving activities immediately following a disaster, "**response**[5]," and various activities ranging from the rescue of survivors to reconstruction of livelihood, "**recovery**[6]/**reconstruction**[7]," are generally considered to fall under "efforts." However, "response" and "recovery/reconstruction" do not sufficiently improve coping capacity against future disasters, and thus, **prevention** (precautionary response), including "**mitigation**[8]" to prevent the damage itself and

[5] "Response" mainly refers to activities meant to save lives immediately following the occurrence of a disaster. Examples: search and rescue, fire extinction/flood protection, emergency medical care, transportation/admission to medical institutions, etc. ("Disaster Reduction and Development," JICA 2003).

[6] "Recovery" is to restore the original state or functions by repairing damages and disruptions. Examples: physical repair or reconstruction of damaged facilities and buildings, such as roads, bridges, water and sewage pipes, electric transmission facilities, housing, as well as maintenance of livelihood and economic activities ("Disaster Reduction and Development," JICA 2003).

[7] "Reconstruction" is not only efforts to restore the original state in the cities and areas that have been greatly damaged by a disaster, but also efforts to make a full-fledged review of a comprehensive structure of the area, including urban structures, housing forms and socioeconomic factors, thus creating a new urban area and region.

[8] "Mitigation" is the addressing of the force (hazard) that brings about a disaster to prevent damages and can be regarded as "resistance" against disasters. Example: to raise embankment heights and to improve rivers ("Disaster Reduction and Development," JICA 2003).

"**preparednesss[9], "** would be important for disaster reduction.

From this perspective, **"disaster reduction" in these guidelines is defined as "prevention (mitigate/prepare for) of the occurrence of disasters, to prevent the spread of damage when a disaster happens, and to start the recovery/reconstruction process after damage has been sustained."** In order to strengthen a disaster-reduction system, it is desirable to have "disaster reduction" projects move in a cycle from prevention (precautionary response) through response immediately after the occurrence of a disaster, to post-disaster response of recovery/reconstruction, and back to further prevention (precautionary response)[10]. Such a cycle is called a "Disaster Management Cycle (DMC)".

"Disaster reduction" is "to prevent (mitigate/prepare for) the occurrence of disasters, to prevent the spread of damage when a disaster happens, and to start the recovery/reconstruction process when damage has been sustained."

Three Phases of Disaster Management Cycle
Prevention
(Mitigation/preparedness)
↓
Response
↓
Recovery/reconstruction
↓
Prevention

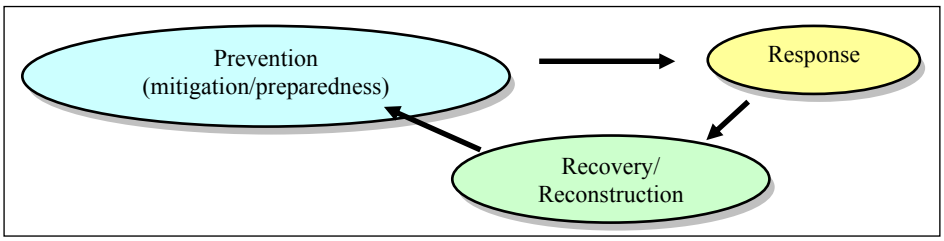


Figure 1-6 Disaster Management Cycle (Source: Compiled based on JICA (2005))

In setting up three development strategy goals, mentioned in Chapter 2 of this document, they are classified into **three phases corresponding to the Disaster Management Cycle**, with the aim of creating a virtuous circle of a disaster-reduction system in developing countries through cooperation in the field of disaster reduction.

1-3 International assistance trends

International efforts for disaster reduction

1-3-1 International efforts for disaster reduction

Clarification of "the shift from response after a disaster to precautionary prevention" and "enhancement of the coping capacity of communities"

International cooperation efforts for disaster reduction have traditionally focused on "response immediately after a disaster." However, since the 1990s, the trend has been shifted to (1) response emphasizing prevention (precautionary response). Furthermore, in such efforts, there have been shifts to (2) emphasis on the perspective of prevention in relation to development and to (3) capacity enhancement of communities from measures for infrastructures and structures. The following are the major efforts since after the 1990s. (See the table below.)

[9] "Preparedness" is preparation to minimize the damage even if a disaster occurs. Example: wireless communication systems, weather information systems, development of water pumps ("Disaster Reduction and Development," JICA 2003).
[10] JICA (2003)

Table 1-1 Transition of international efforts for disaster reduction

	International efforts for disaster reduction	(Reference) Major efforts of Japan
1987	Endorsement of the 1990s as the International Decade for Natural Disaster Reduction at the United Nations General Assembly	
1990-1999	International Decade for Natural Disaster Reduction (IDNDR)	Establishment of the Asian Disaster Reduction Center (ADRC) in Kobe, Hyogo in 1998
(1994)	Adoption of Yokohama Strategy at UN World Conference on Disaster Reduction (Yokohama)	
(1999)	Adoption of the International Strategy for Disaster Reduction (ISDR), which advocates a "shift from response after a disaster to emphasis of 'prevention' of a disaster" and "building disaster-resilient communities"	
2000	Establishment of the Secretariat and Task Force of the ISDR	
2002	Issuance of Living with Risk by the ISDR Secretariat, stressing the importance of incorporating the view of disaster risk reduction into sustainable development	
	Adoption of "Johannesburg Declaration on Sustainable Development" and "Johannesburg Plan of Implementation" at the World Summit on Sustainable Development (WSSD)	
2003	Holding of region-specific and theme-specific conferences throughout the work to deepen discussions based on the Living with Risk (Holing of sessions on water damage at the 3rd World Water Forum (2003))	Revision of ODA Charter
2004		
2005	Adoption of Hyogo Declaration and Hyogo Framework for Action 2005-2015 at the UN World Conference on Disaster Reduction	Announcement of Initiative for Disaster Reduction at the World Conference on Disaster Reduction
		Announcement of Medium-term Policy for ODA
		Announcement of assistance at the Asia-Africa Summit

1990s
International Decade for Natural Disaster Reduction
1994
Yokohama Strategy at the UN World Conference on Disaster Reduction (Yokohama)

In light of growing human and economic losses from natural disasters, despite efforts of local communities and governments, the United Nations General Assembly designated **the 1990s as the International Decade for Natural Disaster Reduction (IDNDR)** in 1987, in an effort to reduce the loss of life, property damage and economic and social disruption caused by natural disasters through international cooperative works.

The UN World Conference on Natural Disaster Reduction was held in **Yokohama** in **1994**, midway through the decade. The **Yokohama Strategy** adopted at the Conference clearly specifies that "building disaster-resilient communities" and "disaster reduction through precautionary measures" are essential to achieving sustainable economic development. Furthermore, the Action Plan in the Yokohama Strategy advocates the promotion of priorities for disaster reduction in **the least developing countries** and small and remote island countries.

The International Strategy for Disaster Reduction (ISDR) was adopted to anchor the efforts made under the International Decade for Natural Disaster Reduction in the 1990s.

Some achievements have been made during the period of the IDNDR of the 1990s, such as enhancement of disaster-reduction cooperation at the regional level. In order to anchor these achievements, the **International Strategy for Disaster Reduction** (ISDR) was adopted at the United Nations General Assembly in 1999.

" Shift from disaster response to disaster reduction" and "building disaster-resilient communities" are listed as objectives in the ISDR. The outline of activities includes "dissemination/enlightenment activities of disaster risks" and "promotion of participation of local residents in building disaster-resilient communities."

In **July 2002**, the Secretariat of the UN **International Strategy for Disaster Reduction (ISDR)** announced "Living with Risk," which highlights the importance of incorporating the perspective of disaster risk reduction into sustainable development projects.

Disaster reduction was explicitly acknowledged in the Johannesburg Declaration of the World Summit on Sustainable Development (Johannesburg Summit) in September 2002.

In September 2002, at the World Summit on Sustainable Development (Johannesburg Summit), the **Johannesburg Declaration** on Sustainable Development was adopted. It lists natural disasters among the serious threats to sustainable development of mankind, along with other threats such as chronic hunger, armed conflicts and HIV/AIDS, and announced a fight against these threats. This indicates the importance of disaster reduction for sustainable development.

Hyogo Declaration and Hyogo Framework for Action at the UN World Conference on Disaster Reduction

1-3-2 Hyogo Declaration and the Hyogo Framework for Action at the UN World Conference on Disaster Reduction (WCDR)

In **January 2005, the United Nations World Conference on Disaster Reduction was held in Hyogo** with the aim of formulating new disaster-reduction policies for the 21st century and to reduce damage caused by disasters, based on the review of the Yokohama Strategy and Action Plan (UN World Conference on Disaster Reduction).

The Hyogo Declaration at the UN World Conference on Disaster Reduction (2005) mentioned the importance of international cooperation for disaster reduction for progress towards sustainable development.

The **Hyogo Declaration,** which was adopted at the Conference, clearly stipulates the relationship between development and disaster reduction. In other words, it points out that **disasters undermine the effectiveness of development and impede sustainable development and poverty eradication,** and at the same time, **development without appropriate consideration to disaster risks would contribute to an increase in vulnerability to disasters.** Taking a step further than the Johannesburg Declaration, the Hyogo Declaration strongly appeals with the importance of cooperation for disaster reduction for progress towards sustainable development.

Furthermore, the Hyogo Declaration mentions the necessity for self-help efforts of a country by affirming that "all states have the primary responsibility to protect people and property from hazards" and also clarifies **the significance of international cooperation for disaster reduction** by stating that "there is a need to enhance the capacity of disaster-prone developing countries, in particular, the least developed countries and small island developing States."

The Hyogo Framework for Action, which was organized as specific actions of the Hyogo Declaration, lists three strategic goals and five priorities for action.

Strategy Goals

a. The more effective integration of disaster risk considerations into sustainable development policies, planning and programming at all levels, with a special emphasis on disaster prevention, mitigation, preparedness and vulnerability reduction;
b. The development and strengthening of institutions, mechanisms and capacities at all levels, **in particular at the community level**, that can systematically contribute to building **resilience to hazards**;
c. The systematic incorporation of risk-reduction approaches into the design and implementation of emergency preparedness, response and recovery programs in the reconstruction of affected **communities**.

Priorities for Action

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
2. Identify, assess and monitor disaster risks and enhance early warning.
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
4. Reduce the underlying risk factors.
5. Strengthen disaster preparedness for effective response at all levels.

Assistance trends of Japan

1-4 Assistance trends of Japan

Japan has been making various efforts toward international cooperation in the field of disaster reduction, as shown in the table below. Major actions are described in the following sections.

Table 1-2 Courses of international cooperation of Japan in the field of disaster reduction

	(Reference) Major international efforts for disaster reduction	Major related efforts made by Japan
1990-1999	International Decade for Natural Disaster Reduction (IDNDR)	Establishment of Asian Disaster Reduction Center (ADRC) (Kobe, Hyogo) 1999
(1994)	Adoption of Yokohama Strategy at UN World Conference on Disaster Reduction (Yokohama)	
(1999)	Adoption of action policies for ISDR at the UN General Assembly	Establishment of United Nations Office for the Coordination of Humanitarian Affairs (OCHOA) in 1999

2002	Issuance of Living with Risk by the ISDR Secretariat, stressing the importance of incorporating the view of disaster risk reduction into sustainable development World Summit on Sustainable Development (WSSD)	
2003		Revision of ODA Charter, listing "disaster reduction" as one of the issues to be urgently addressed by the international community
2005	Adoption of Hyogo Declaration and Hyogo Framework for Action 2005-2015 at the UN World Conference on Disaster Reduction	(January) Prime Minister's Statement by then Prime Minister Koizumi at the UN World Conference on Disaster Reduction, which includes the Initiative for Disaster Reduction through ODA
		(February) Clarification of efforts for disaster reduction through ODA in the newly compiled "Medium-term Policies for ODA"
		(April) Announcement by then Prime Minister Koizumi at the Asia-Africa Summit (Indonesia), pledging that over the following five years Japan would provide more than $2.5 billion in aid for disaster reduction in Asia, Africa and other regions
2006		Establishment of the International Center for Water Hazard and Risk Management (ICHARM)
		Establishment of Grant Aid for Disaster Reduction and Reconstruction Assistance from FY2006
2007		JICA, jointly with Hyogo Prefecture, plans to establish the International Disaster Prevention Training Center

Revised ODA Charter 2003
First mention of "disaster reduction"

(1) Major efforts of Japan

With an awareness of the importance of disaster reduction in development, the government of Japan recommended "enhancement of efforts for disaster reduction" as one of the important areas, taking advantage of the preparatory meetings for the World Summit on Sustainable Development (a.k.a. Johannesburg Summit) in 2002. It is fair to say that such an effort has contributed to the incorporation of the view of disaster reduction into the discussions at the Johannesburg Conference and then into the Johannesburg Declaration.

UN World Conference on Disaster Reduction 2005
Message in the form of the Prime Minister's Statement on the Japan's concepts of cooperation on disaster reduction

The ODA Charter, revised the following year, 2003, mentioned "disaster reduction" for the first time in its history. Specifically, the "**Basic Policies**" touch upon the importance of considering disaster reduction from the perspective of human security against threats, and it advocates that measures for disaster reduction should be strengthened as a **priority issue** under international cooperation along with other global-scale issues. Furthermore, at the **United Nations World Conference on Disaster Reduction that** convened in Hyogo in **2005**, then Prime Minister Koizumi sent a message about the policies of Japan on international cooperation for disaster reduction in the prime minister's statement with emphasis on the following six points.

Prime Minister's Statement
(1) Importance of implementation and following up on the outcomes of the WCDR
(2) Initiative for disaster reduction through ODA
(3) Strengthening regional cooperation in disaster reduction through the Asian Disaster Reduction Center
(4) Promoting partnership projects at the international level
(5) Creating portfolios for disaster reduction
(6) Enhancing cooperation for disaster reduction at the United Nations – Effective follow-up on the outcomes of the WCDR

In his statement, then Prime Minister Koizumi announced the Initiative for Disaster Reduction through Official Development Assistance (ODA)[11] as basic policies and specific efforts for Japan' cooperation for disaster reduction.

[Basic Policies]
(1) Raising the priority of disaster reduction
(2) Perspective of human security
(3) Gender perspective
(4) Importance of assistance regarding software
(5) Mobilization of Japan's experience, expertise and technology
(6) Mobilization and dissemination of locally available and suitable technology
(7) Promoting partnerships with various stakeholders

[Cooperation corresponding to each phase of disaster]
Based on the basic policies mentioned above, Japan will make efforts to implement cooperation projects for disaster reduction in a coherent manner. Such projects will correspond to specific phases of disaster as follows:
(1) Integration of disaster prevention into development policies
(2) Rapid and appropriate assistance in the immediate aftermath of disaster
(3) Cooperation that extends from reconstruction to sustainable development

[Specific Efforts]
(1) Institution building
(2) Human resources development
(3) Development of social and economic infrastructure
(4) Assistance for the reconstruction of livelihoods

[11] At the UN-WCDR, the following four pillars were presented as JICA's cooperation policies (**JICA's efforts for Disaster Reduction**) , based on the Initiative for Disaster Reduction through ODA: (1) efforts for social and economic development incorporating the perspective of disaster reduction, (2) assistance for understanding of disaster risks, (3) support for formulation of comprehensive plans for disaster reduction, and (4) assistance from the perspective of human security through enlightenment and dissemination activities for the public.

2005
Clarification in the "Medium-term Policy on ODA" about the commitment to disaster reduction

In February 2005, the Japanese government newly formulated the "**Medium-term Policy on ODA**" in line with the ODA Charter, which presented the concepts and approaches of Japan and specific efforts. The policy also clearly states that Japan will proceed with efforts for disaster reduction through ODA in relation to "poverty reduction" and "efforts for global-scale issues," which are identified as priority issues in the ODA Charter.

Moreover, in April 2005, then Prime Minister Koizumi pledged, at the Asia Africa Summit, that over the following five years Japan would provide more than $2.5 billion in aid for disaster reduction in Asia, Africa and other regions.

In Fiscal Year 2006, a new scheme titled "**Grant Aid for Disaster Prevention and Reconstruction**" was launched. Its main objective is to realize a seamless assistance from emergency relief to full-scale recovery and reconstruction assistance, which is to provide assistance for multiple components, including repair and reconstruction of schools, medical facilities and roads in response to the changing needs in disaster-stricken areas.

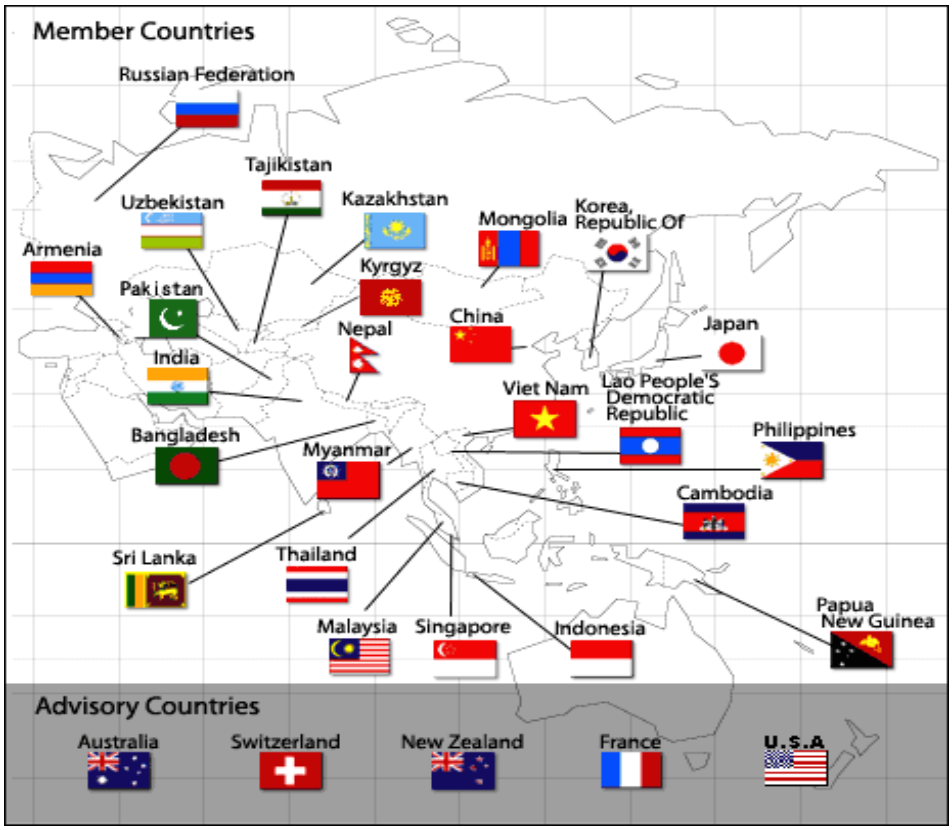
(2) International cooperation through international organizations

Japan has been promoting international cooperation for disaster reduction through the provision of funds to the United Nations Development Programme (UNDP), the Secretariat of the International Strategy for Disaster Reduction (ISDR), and the UN Office for the Coordination of Humanitarian Affairs (OCHA). The OCHA Asia Unit was established in February 1999 and the UN International Recovery Platform (IRP) in 2005, both in Kobe, Hyogo prefecture. The UNESCO International Center for Water Hazard and Risk Management (ICHARM) was set up in Tsukuba in March 2006. All of these organizations are actively taking initiatives in relevant areas and sharing information with related organizations, including the government of Japan.

(3) Regional disaster reduction in Asia

The Asian Disaster Reduction Center (ADRC), which was established in Kobe, Hyogo in 1998, has developed a network and been conducting the following activities in cooperation with **25 member States** and f**ive advisory States,** with the aim for mitigating damage in Asia:

(1) Sharing of information pertaining to disaster reduction
・ADRC International Meeting (member States)
・Provision of information pertaining to disasters and disaster reduction
・Establishment and utilization of internationally standardized disaster codes
(2) Human resources development
・Implementation of seminars for disaster reduction administrators (jointly with JICA)
・Inviting researchers
・Implementation of joint programs with member States
(3) Improvement of coping capacity of communities
・Development and dissemination of tools that encourage participation of the public and communities
・Enlightenment and dissemination of awareness of disaster prevention, development of tools to improve coping capacity
・Support for the Asian Disaster Reduction and Response Network (NGO)
(4) Cooperation with international organizations



(Source: Website of the Asian Disaster Reduction Center)

Figure 1-7 ADR's 25 member states and 5 advisory states

Chapter 2 Approaches to Disaster Reduction

This chapter describes principles of approaches to disaster reduction (in addition to JICA's projects) and methods of approach.

2-1 Principles of cooperation and methods of approach to disaster prevention

Principles of cooperation in the area of disaster reduction

Cooperation is necessary to reduce disaster risks threatening human security, including survival, dignity and livelihood.

2-1-1 Principles of cooperation in the area of disaster reduction

(1) Contributing to improvement of human security

Disasters not only inhibit the development of society, but also greatly affect the survival, dignity and livelihood of each individual. Disasters force so many people to suffer from physical and psychological pain, lose their loved ones, as well as properties and means of subsistence, and fall into miserable circumstances in a flash. In particular, poor people, who are already vulnerable to disasters, plunge into more difficult living conditions, slipping into a vicious cycle of disaster and poverty. From the perspective of human security, it is extremely important to reduce the threat to these people and improve their coping capacity; cooperation in the field of disaster reduction would contribute to this goal.

Risk-management methods and community empowerment based on the concept of human security are considered to be effective approaches to disaster prevention.

Cooperation is necessary to reduce disaster risks, which nullify the outcomes of development and impede sustainable development of society.

(2) Contributing to sustainable development of developing countries

The number of disaster occurrences has been on the rise in recent years, due to the increase in disaster risks associated with climate change and increase in the size of urban areas or urban congestion. Considerable loss has been inflicted particularly on developing countries in terms of human and physical damage; **disasters nullify the outcomes and efforts for development and have become an inhibiting factor to the sustainable development of society** (a typical example of "downside risk," which is an issue of human security). Furthermore, it has been pointed out that inappropriate development without consideration for disaster reduction would generate and facilitate disasters.

As mentioned in Chapter 1, developing countries are inclined to assign limited financial resources to investment in basic services (e.g., education and healthcare) and short-term economic development, despite having greater disaster risks than developed countries. As a result, they tend to postpone efforts toward disaster reduction. Reduction of disaster risks is important for the medium- and long-term development of developing countries and cooperation is **necessary for projects**

that incorporate disaster-reduction viewpoints into development (policy projects).

Disaster reduction is a common global issue. It is necessary to share experience and expertise and provide assistance within an international framework against disaster reduction.

(3) Contributing to the promotion of international cooperation in the field of disaster reduction as an advanced nation of disaster management

Various disasters repeatedly occur in many countries and regions every year, and **disaster reduction, a common issue for all mankind, is to be promoted under international cooperation by sharing experience and expertise.** Since the International Decade for Natural Disaster Reduction (IDNDR) of the 1990s, the importance of cooperation concerning disaster reduction on an international scale has been highlighted, and such cooperation has been put into practice. In particular, Japan has been assuming a leading role in developing and implementing an international framework based on abundant experience and accumulated expertise on disaster reduction, and it is necessary to continue contributing to the international community as an advanced nation of disaster management.

Methods of approach

2-1-2 Methods of approach

(1) Points to consider for the implementation of effective approaches

In order to take effective approaches to disaster reduction, it is necessary to consider the following points based on the characteristics of disaster-reduction measures and the lessons that JICA has learned thus far.

Disaster reduction requires a comprehensive perspective based on the Disaster-management Cycle, encompassing prevention, response, and recovery/reconstruction.

① Disaster-management Cycle

As described in Chapter 1, in the field of disaster reduction, it is desirable to have "disaster reduction" projects move in a virtuous cycle from prevention (precautionary response) through response immediately after the occurrence of a disaster, to post-disaster response of recovery/reconstruction, and back to further prevention (precautionary response). Therefore, it is necessary to have a comprehensive perspective based on the Disaster-management Cycle. Of utmost important in this process is the effort for prevention. Still, response and recovery/reconstruction efforts are also necessary since it is difficult to prognosticate the location, scale and timing of a disaster and it is impossible to control disasters completely.

In disaster reduction, it is necessary to consider the impact on living conditions of people: the impact causing damage to physical properties and livelihood, in addition to human lives.

② Diversity of issues regarding disaster reduction

Natural disasters not only take away human lives, but also inflict damage on physical properties, such as housing, transportation and educational and medical facilities, as well as to means of living, thus imposing various impacts on people. Furthermore, due to the recent change in the environment, such as climate change, issues that had not previously existed or had not been serious have now emerged (aggravation of coastal erosion, etc. caused by a rise in tide level). In the efforts for disaster reduction, **it is necessary to have multidimensional perspectives and take a comprehensive approach that encompasses a range of sectors.**

In disaster reduction, it is necessary to enhance the capacity of "self-help," "mutual help" and "public help."

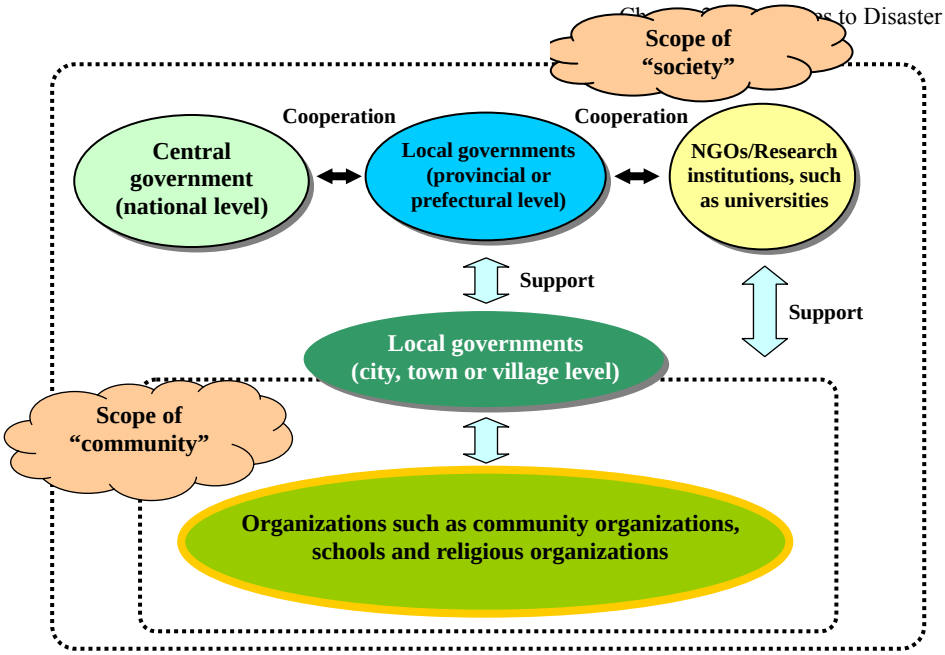
③ Tasks of various stakeholders and their partnership (self-help, mutual help, public help)

Since disasters may, at times, impose a great impact on the nation at large, in addition to individuals and communities, various stakeholders of society are involved, such as administrative bodies (central and local governments), NGOs and communities. In order to reduce damage caused by disasters, each of the following elements is important: "self-help" (each individual protects him/herself), "mutual help" (individuals in the community help each other), and "public help" (provided by the government). For example, at the time of the Great Hanshin-Awaji Earthquake, it is known that many victims were rescued by their family members or people in the community.

When it is difficult to take measures for disaster reduction, particularly in developing countries, foreign aid is essential to assist "self-help," "mutual help" and "public help." JICA's cooperation needs to be based on the concept that a synergistic effect is generated when "self-help," "mutual help" and "public help" interrelate with and complement each other.

In these guidelines, the status of each stakeholder in society and the scope of "society" and "community[6]" are positioned as illustrated below.

[6] The scope that "community" indicates is not a uniform criterion, but it varies. In these guidelines, "community" includes not only organizations at the resident level, but also part of peripheral administrative organizations. However, from an international viewpoint, there are cases where the term "community" includes the prefectures, the country and even neighboring countries.



(Source: Compiled based on JICA (2006))

Figure 2-1 Positions of Each Stakeholder, "Society" and "Sommunity" in These Guidelines

Basic policies for effective approaches

(2) Basic policies for effective approaches

The development strategy goals are set forth in these guidelines based on the following three basic policies:

a. Setting up development strategy goals at each phase of prevention, response and recovery/reconstruction in line with the Disaster-management Cycle (DMC) to **improve overall coping capacity.**

b. From the viewpoint of disaster risk management, **disaster prevention** incorporating mitigation and preparedness **is important** and "**building disaster-resilient communities/societies**" is identified as **the most important development strategy goal.**

c. Since it is necessary to understand various issues in order to generate effects in the field of disaster reduction, important **factors are comprehensively shown in a schematic table, including those outside the scope of the feasible projects of JICA.**

Development strategy goals

2-1-3 Development strategy goals

In order to achieve the goals of disaster reduction, the following three development strategy goals are established based on the basic policies.

Development strategy goal 1: "Building disaster-resilient communities and societies"

(Prevention: mitigation/preparedness)

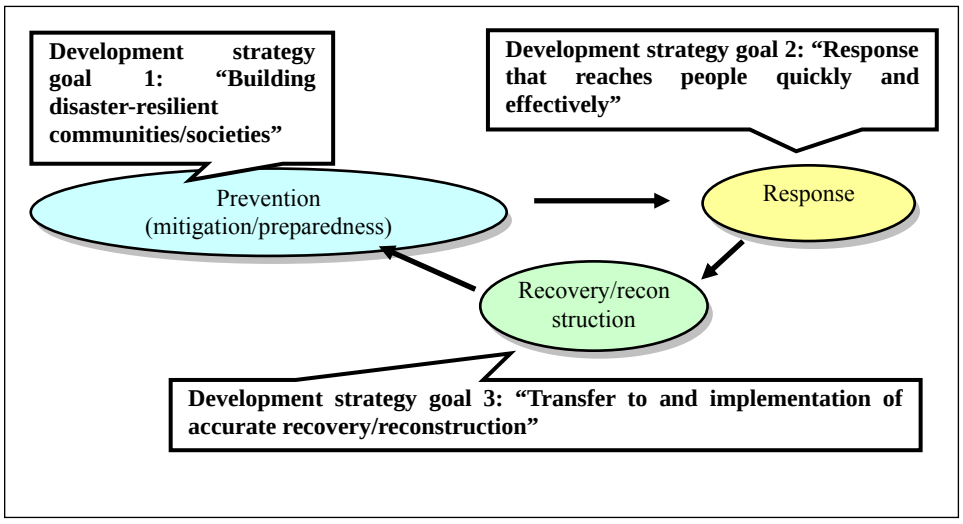
Development strategy goal 2: "Response that reaches affected people quickly and effectively [protection of life]"

(Response)

Development strategy goal 3: "Transition to and implementation of accurate recovery/reconstruction"

(recovery/reconstruction)

The relationship between "development strategy goal" － "medium-term goal" － "sub-goal of medium-term goal" in the tables correspond to the breakdown relationships: namely, "large issue" － "medium issue" － "small issue". Development strategy goals were set forth first. Then, the tables were formed by breaking down the goals accordingly.



(Source: Compiled based on JICA (2005))

Figure 2-2 Relationships Between DMC and Development Strategy Goals

2-2 Effective Approaches to Disaster Reduction

Development strategy goal 1: Building disaster-resilient communities/societies

Development strategy goal 1: Building disaster-resilient communities/societies

It is necessary to reduce the disaster risks of communities and societies to make them disaster-resilient. Then, the reduction of risks of the communities and societies require understanding about hazards and improvement of "coping capacity."

The first step towards this is to gain an accurate grasp of disaster risks. Specific actions against disaster risks include the improvement of coping capacity in various areas **(development of legal systems and framework, software measures such as human resources development and hardware measures such as installation of constructions)** and to **establish systems for financial preparation in advance to respond to considerable demand for funds that follows a disaster.**

It is important to combine hardware measures and software measures in a well-balanced manner in order to build disaster-resilient communities/societies.

In order to conduct effective disaster-reduction measures at the prevention phase of the disaster cycle, it is **important to combine these actions in a balanced fashion**. What particularly calls for attention here is the fact that disasters cannot be fully controlled no matter how well preventive measures are taken. Therefore, it is necessary to encourage discussions by concerned communities and societies about the extent of tolerable damage.

Medium-term goal 1-1: Understanding of disaster risks (development of disaster-prevention maps)

(1) Understanding disaster risks

The starting point of building disaster-resilient communities is to accurately understand disaster risks

It is first necessary to study and analyze the possibility of the occurrence of a natural disaster in the concerned community/society in order **to understand disaster risks.** In areas with a history of disaster, the experience is analyzed and evaluated, and various data on geology, soil, meteorology and hydrology are collected and analyzed. In the areas with no recent history of a disaster, it is still necessary to grasp what sort of natural disaster the relevant community is prone to experience (or have experienced).

To develop disaster-prevention maps and to share disaster risks among regions and communities

It is essential to study and analyze hazards, to review distribution of population and buildings and their strength in the concerned community as well as existing disaster-prevention organizations and systems in the community/society, and to evaluate coping capacity against hazards.

Based on the results of the studies and analyses on hazards and the coping capacity of the region, it is necessary to predict the human, physical and economic

impact of a disaster[7].

(2) Sharing with regions/communities (development of disaster-prevention maps, etc.)

The results of studies on disaster risks need to be shared among the residents and communities in the concerned area so that they can be utilized widely as materials for considering disaster-reduction measures. Also, it is necessary for administrative bodies in the concerned area to share information on disaster risks for effective consideration for preventive measures against disasters. Specifically, the following actions are necessary: to compile the study results on disaster risks into a hazard map or disaster-prevention map[8], to share understandable disaster-reduction information among local residents and communities, to implement activities of voluntary disaster-reduction organizations as stipulated in the Medium-term Goal 1-2, and to hold discussions between local governments and residents/communities about disaster-reduction measures.

In order to share information on disaster risks with regions and communities, implementation of disaster-reduction education centered on schools is effective. When conducting disaster-reduction education, it is necessary to provide information not only on disaster risks, but also on the mechanisms of disasters, preparation of individuals, and response methods to disasters.

JICA's efforts

In the field of disaster reduction, many of the development study projects by JICA are committed to the development of hazard maps and disaster-prevention maps, with emphasis on understanding disaster risks. These projects carry out studies to identify disaster risks of the country or city, and the results (in the form of disaster-prevention map, etc.) are used for enlightenment activities for the general public and for disaster reduction of the target country. At the same time, the methods for risk assessment are transferred. The development studies focusing on understanding and sharing disaster risks contribute to the understanding of urgency and priorities of the measures.

[7] To predict the possible scale of the next disaster (magnitude/seismic intensity in the case of an earthquake, precipitation in the case of flood, etc.) based on the history of disasters. Then, possible damage of the disaster is predicted by taking into consideration the local conditions (geographic features, geologic conditions, population, etc.) and coping capacity (aseismic capacity of buildings and structures in the case of earthquake, and disaster-preventive structures such as embankments, in the case of flood).

[8] In these guidelines, "hazard map" refers to the map indicating the scope of assumed hazards and "disaster-prevention map" refers to the one that includes information pertaining to coping capacity, such as evacuation areas, evacuation routes, observation stations, siren speakers and flood-proof storage facilities, in addition to the scope of assumed hazards.

Medium-term goal 1-2: Improvement of coping capacity of communities/societies

It is important to improve coping capacity at the community level, including community-led voluntary disaster-reduction organizations and disaster-reduction education, etc.

It is necessary to improve coping capacity of society through active dialogue and cooperation between governments and communities.

Improvement of community-initiated coping capacity is essential for improving the coping capacity of a society. Forecast/warning systems that do not send messages to the community, disaster-prevention maps that cannot be understood by people, and damages to buildings and constructions because of a lack of people's understanding do not act as effective disaster-reduction measures.

As a tool to improve the coping capacity of a community, there is a **voluntary disaster-reduction organization**. The voluntary disaster-reduction organization is the body that conducts disaster-reduction drills in peacetime, and carries out initial rescue activities, group evacuations, food–and-water provisions at the evacuation sites, etc. Therefore, it plays a significant role in both pre- and post-disaster periods.

Teaching children basic knowledge on disaster prevention and responses at the time of a disaster through school education is effective in terms of dissemination to homes and communities and passing down knowledge to the next generation.

The question of how much the government can invest in measures against disasters that may or may not occur in the future depends greatly on the understanding of communities, in addition to the understanding of the government about the importance of disaster reduction. In order to deepen understanding about disaster reduction, it is necessary to improve the coping capacity of the society through **active and continuous dialogues and cooperation between the government and the community.**

(1) Development of legal systems and formulation of plans

There may be various preventive measures against disasters. It is still important **to develop legal systems (including various technical standards)** so that these measures can be solidly implemented. It is also important to prepare basic disaster-reduction plans that stipulate the nation's activity policies against disasters, and local disaster-reduction plans that state specific activities in the local areas for prevention, response and recovery/reconstruction, in order to effectively promote disaster reduction[9]. In the communities and societies where disaster risks can be predicted to some extent, measures are generally developed to incorporate enhancement of disaster-reduction functions against specific disasters

[9] The following are laws concerning disaster reduction in Japan:
・Basic laws (the Disaster Countermeasures Basic Act, the Large-Scale Earthquake Countermeasures Special Act, etc.)
・Disaster reduction (the River Law, the Sea Coast Law, the Erosion-Control Law, the Building Standard Law, the Meteorological Service Law, etc.)
・Response (the Fire Service Law, the Law of Flood Control, the Disaster Relief Act, etc.)
・Recovery/reconstruction, fiscal and financial measures (the Act Concerning Support for Reconstructing Livelihood of Disaster Victims, the Government Housing Loan Corporation Law, etc.)

in the urban development plans and local development plans.

Such development of legal systems and formulation of plans are, in principle, led by the government, but consideration to the improvement of coping capacity of communities should be included. In particular, after the occurrence of a large-scale disaster, proactive efforts are necessary as a good opportunity for building communities/societies with more resilience to disaster by correcting the shortcomings of the current legal systems and plans.

Moreover, there are issues of whether laws are properly observed and whether plans are appropriately implemented at the field level. Some countries are equipped with fully developed laws and disaster-reduction plans, but in reality, many have been faced with problems such as unlawful constructions and living in restricted areas. Development of legal systems and plans concerning disaster reduction should be promoted with due and constant consideration to a thorough dissemination of information through enlightenment activities and to ensuing effectiveness through development and capacity enhancement of related laws and organizations.

(2) Establishment/enhancement of disaster-reduction systems

1) Improvement of administrative capacity/development of research systems

In order to promote preventive measures and conduct response activities quickly and effectively, it is necessary to clearly define the roles and responsibilities of administrative departments or organizations, budgetary measures and cooperation systems. Since handling of cross-administration information and coordination of various special organizations are necessary when conducting disaster-reduction projects, it is, in some cases, effective to set up a disaster-management center that assumes these roles in an integrated manner.

Disasters cannot be handled by the government alone; thus, it is desirable to establish a **government-industry-academia collaboration system** in advance. This should not only be stipulated in laws; instead, the scope of activities and responsibilities of each stakeholder should be specifically laid out in manuals and guidelines. It is also effective to confirm the adequacy of the current disaster-reduction systems.

Meanwhile, various technologies and research studies regarding disaster reduction are advancing rapidly and it is important to quickly reflect the most advanced research results on the actual disaster-reduction measures. To do this, it is necessary to promote academic research on disaster reduction in various areas, including science, engineering, and social science.

2) Human resources development

Human resources development is of great importance to promote measures effectively and efficiently. Various stakeholders are involved in disaster reduction, ranging from the leader of a country, to technical officers at national and local government levels, researchers in various academic areas, engineers in private sector, and communities (including NGOs). Thus, it requires the education, enlightenment and development of expertise and skills in every area and at every level.

[Box 1]: Disaster-reduction Capacity Development of Top-level Administrators (Turkey)

On August 17, 1999 an M7.4 earthquake struck Izmit, the Kocaeli province (north-western region) of Turkey. Another earthquake (M7.2) occurred in Duzuce province (north-western region) on November 12, 1999. These two earthquakes claimed approximately 180,000 lives. Since the damage was more extensive than expected, the administrative agencies were not able to accurately cope at the time of the disaster. Learning from this experience, the government of Turkey has started making various efforts for improvement of coping capacity and strengthening of disaster-reduction systems of the government. In cooperation with the Ministry of the Interior, which controls local administration and public order, JICA has been committed to the capacity development of administrative officers of Turkey since 2001.

From 2001 to 2002, major human resources who would play a central role in disaster-reduction administrations in Turkey were sent to Hyogo prefecture for the country-specific special training titled “Disaster Countermeasures / Reconstruction from Earthquake Disaster” to learn about measures for recovery/reconstruction from the Great Hanshin-Awaji Earthquake. As a result of the training, after being convinced that disaster-reduction awareness training for top-level administrative officials is very effective in Turkey, the trainees who returned took the initiative to develop their own training curriculum in cooperation with JICA officers. The technical cooperation project titled “Training Project in Disaster Management” was implemented from 2003 to 2004 (253 officers received training, accounting for 1/3 of incumbent vice-governors and provincial mayors during these two years), which is followed by the “Disaster Mitigation Project” implemented from 2005 to 2007 (390 officers received training by 2006, including city mayors and chief officers for city planning). These are some of the comments from the training participants: “I have always thought disaster reduction was important, but had few opportunities to gain practical and systematic knowledge. The training was quite useful.” “I have now recognized the necessity of taking initiative in implementing projects instead of leaving the work (such as development of disaster-prevention maps) to chief officers of

each section of the city. I will start working on this as soon as I return." Also, some participants have asked trainers to hold study sessions, hoping for continuous efforts for disaster-reduction enlightenment activities. It is clear that the enlightenment activities and development of human resources are in progress.

(3) Improvement of resilience through hardware measures

Although it is difficult to prevent the occurrence of meteorological or terrestrial phenomena, damage can be reduced through hardware measures (structures). Different hardware measures are required according to the disasters, for instance, building embankments to prevent flooding and reinforcing buildings to stand up to earthquakes. In order to take effective measures, it is necessary to understand the characteristics of each disaster and to have clear ideas about what needs protection against the disaster. Please refer to the issue charts and Annex 5 for specific hardware measures against major disasters.

When considering hardware measures, one must remember that **these measures can mitigate damages to some extent but cannot prevent disasters from happening.** In the event of meteorological and terrestrial phenomena that exceed coping capacity, disasters are inevitable. Thus, software measures are necessary to minimize the extent of damage. In order to strengthen the preparedness for disasters, it is necessary to discuss how to combine hardware and software measures in such a way as to suit the local conditions.

When implementing hardware measures, consistent maintenance and management systems are necessary to maintain the functions. Thus, it is importance to make efforts for maintenance and management in cooperation with communities, in addition to developing human resources and securing budgets.

(4) Development of forecast/warning, and evacuation systems

In order to protect oneself from disasters, the first and foremost priority is to evacuate to a place where safety is guaranteed.

Protecting oneself from disasters requires **quick evacuation (safety assurance) and getting accurate information on the disaster in a timely manner**. On the administrative side, the tasks are to send disaster forecast/warning messages by accurately predicting disasters, to provide disaster-related information to the public and communities quickly and accurately, and to evacuate all people to safe areas. On the public and community side, it is important to obtain accurate information quickly and to evacuate to safe areas. **Development and establishment of "forecast/warning + evacuation systems"** are vital to do all of these things.

In the previous discussions about forecast/warning/evacuations systems, provision of accurate disaster forecast/warning messages tended to be considered a major role for the administration. However, since sending forecast/warning messages alone cannot save people's lives, it is necessary to come up with

measures to ensure safety at the “self-help” and “mutual help” levels. Thus includes creating a method for sending accurate disaster information to the public/communities quickly and method for calling for evacuation, as well as development of evacuation areas. Therefore, in these guidelines, the term “forecast/warning/evacuation systems” is used to clarify the starting and ending points.

In particular, in areas where information and communications networks have yet to be fully developed, there is a risk of delayed responses, such as for evacuation, when simply waiting for disaster information from the government. In these places, it is necessary to develop a system that allows communities to conduct monitoring, leading to early forecast/warning and evacuation.

1) Development of forecast/warning systems

In order to send accurate disaster information quickly, it is necessary to develop observation equipment and obtain information pertaining to meteorological and terrestrial conditions, for example, ombrometers and wire sensors for sediment disasters, and seismographs and tide gauges for tsunamis. Since natural disasters cannot be predicted, it is necessary to develop monitoring systems and equipment that cover nights, weekends and holidays.

Disaster information obtained from observation needs to be sent quickly from the observatory to administrative organizations and communities. TV and radio broadcasts, cellular phones, community wireless systems, emergency alert sirens, etc. are all possible means to disseminate disaster information to the public/communities. Since appropriate means of information transmission differ depending on the types of disasters or communities, it is necessary to fully understand the characteristics of the community in question.

2) Development of evacuation systems

Even if the forecast/warning systems are developed and disaster information is shared by the public/communities, mitigation of human damage cannot be achieved if the public/communities have not prepared for appropriate evacuation. Thus, it is necessary to raise public awareness about disasters in cooperation between communities and the government on a daily basis. Specific activities include raising awareness of disaster risks in the relevant region by using such tools as disaster-prevention maps, and implementing disaster-reduction drills (evacuation drills, disaster simulation drills, town patrolling, etc.). Through these activities, government and public/communities need to discuss facilities such as evacuation routes and shelters, and evacuation systems.

Financial preparedness is necessary to develop a framework to mobilize funds in advance, in order to respond to a huge demand for funds that arises after damages and losses are incurred.

(5) Financial preparation

A considerable amount of funds is necessary to smoothly implement response and recovery/reconstruction projects following the occurrence of a disaster. To do this, as mentioned in the section "(1) Development of legal systems and formulation of plans," it is necessary to determine various policies at the time of formulating basic plans for disaster reduction at the national level and local disaster-reduction plans of each local government. Such policies include procedures and a method of budget preparation to smoothly allocate and release funds required for response-and-recovery and reconstruction works.

Disaster insurance plays an important role in recovering the livelihood of disaster victims and the businesses of enterprises. It is therefore desirable to conduct enlightenment activities on disaster insurance when still in the preparation phase.

JICA's efforts

JICA has been implementing many cooperation projects for damage mitigation in association with structures and buildings. Projects that are based on the plans and project plans formulated in the process of development studies have been implemented by grant aid or yen loans. There are cases where these projects have reduced disasters and the effectiveness of assistance has been proven.

Since it is difficult to provide infallible protection from damages through measures for buildings, the focus of cooperation is being shifted to cooperation in software development. In development studies, cooperation for improving the coping capacity of communities/societies has been implemented: for instance, formulation of disaster-reduction plans for general natural disasters or specific disasters, development of disaster-reduction systems of the central and local governments, formulation of plans for prevention, response, recovery/reconstruction and designation of dangerous areas. Furthermore, focus is being shifted to cooperation in software through the implementation of technical cooperation projects and development studies and the dispatch of experts and volunteers, aiming at setting up voluntary disaster-reduction organizations, developing evacuation routes, conducting evacuation drills, and upgrading and establishing forecast/warning systems and evaluation systems through the development of early forecast/warning systems.

Development strategy goal 1: Building disaster-resilient communities/societies

Medium-term Goal 1-1 Understanding of disaster risks

Sub-goal of medium-term goal	Example of project activity	Case No.	JICA project
Understanding of disaster risks	△ Analysis/evaluation of disaster experience △ Collection of geologic, meteorological and hydrological data △ Survey of the history of disasters in concerned areas △ Survey on distribution of buildings, building strength and demographic distribution △ Understanding of disaster-reduction capacity of target community and society (survey on people, property, administration, organization) ◎ Study on estimated and acceptable level of hazard risk ◎ Formulation of disaster scenario (hydraulic model experiment/numerical simulation)	1,2,3,4,10,13, 15,18,21,22,23, 2424,27,32,34, 35,38	● Survey on disaster history and technology transfer of the analysis method (DS) ● Collection of geologic, meteorological and hydrological data and technology transfer of analysis method (DS) ● Inventory survey of natural and social conditions (DS) ● Transfer of technology concerning seismic evaluation (TCP) ● Assessment of coping capacity of community and society (TCP/DS) ● Formulation of disaster scenario and assessment-predicted disaster (DS)
Sharing with regions and communities (development of disaster-prevention maps, etc.)	◎ Formulation of hazard maps (micro-zoning) and risk maps (consideration of predicted disaster)	1,2,3,4,23,32, 35,38	● Study on micro-zoning (DS) ● Transfer of technology concerning formulation of hazard maps/disaster-reduction maps (TCP/DS)

Medium-term goal 1-2 Improvement of coping capacity of communities/societies

Sub-goal of medium-term goal	Example of project activity	Case No.	JICA project
Development of legal systems and formulation of plans	○ Development of the Disaster Measures Basic Law ○ Formulation of the Basic Plan for Disaster Reduction (national level) ◎ Setting of various disaster-reduction standards ◎ Formulation of regional plans for disaster reduction (local level) ◎ Feedback of results of evacuation drills on plans ○ Designation of danger zones × Financial preparation	1,2,3,5,7,8,9, 10,15,16,17,21, 23,24,2,5,32,36 37,39,41	● Formulation of national disaster-reduction plan/local disaster-reduction plan (DS) ● Formulation of basic plan for disaster-reduction measures (DS) ● Formulation/review of earthquake-resistant building standards (TCP)
Establishment and enhancement of disaster-reduction systems	△ Clarification of roles among administrative organizations/departments, Development of coordination systems (mechanisms, manuals and guidelines) ◎ Establishment of disaster-management center △ Development of government-business-university partnership ○ Promotion of disaster-reduction research ◎ Development of administrators, engineers and researchers engaged in disaster reduction and disaster response	6,10,20,22,26, 28,33,34,35,36, 37,39,40,41	● Support for establishment of disaster-reduction center (DS) ● Promotion of disaster-reduction technology research (TCP/Training) ● Implementation of training to develop human resources engaged in disaster prevention (TCP, Training, FOCV/SV) ● Development of volunteers in communities (TCP/Expert)
Improvement of resilience through hardware measures	[Aseismic Measures] ○ Aseismic reinforcement of public buildings (hospitals, schools, city offices, etc.) ○ Aseismic reinforcement of houses ◎ Aseismic reinforcement of infrastructures (bridges, port facilities, lifelines, etc.) × Aseismic strengthening of industrial facilities	10,11,12,14	● Formulation for plans for anti-seismic reinforcement (TCP) ● Dissemination of low-cost anti-seismic construction method (TCP) ● Promotion of anti-seismic infrastructure and monitoring of anti-seismic construction (DS/Expert)
	[Anti-tsunami Measures] ○ Building of banks and breakwaters ○ Reinforcement of existing banks and breakwaters △ Construction of floodgates	37.56.57	● Formulation of development plans for seaports and revetments (DS/Training) ● Repair of embankments and revetments (Experts)
	[Anti-flood Measures] △ Promotion of forestation in watershed areas △ Development of rainwater drainage facilities ◎ Repair of rivers and streams ◎ Embankment measures △ Development of flood-control basins and regulating reservoirs △ Development of forestry and grassland to reduce the flow of water ◎ Building and expansion of flood-control dams ○ Recovery of capacity of existing dams through dredging of sediment	5,7,8,9,15	● Formulation of flood-control plans (DS) ● Repair of rivers, installation of revetments and embankments (TCP, DS, Grant)
	[Measures against Sediment Disasters] △ Planting treatment in intermountain and hilly areas ◎ Development of mudslide-control dams, hillside works, longitudinal dikes, flow channels, etc. △ Development of sediment-control areas ○ Hillside terracing	3,6,15,31	● Formulation of plans for measures against sediment disasters (DS) ● Development of mud-slide control dams, training walls, protection walls (TCP, Grant, Training)
	[Measures against Volcanic Disasters] ○ Development of sediment-control facilities, including sediment-control dams, longitudinal dikes, and sediment-control areas	6,7,22	● Formulation of plans for measures for volcanoes (DS) ● Technology transfer for mud-control dams/training walls (TCP)
	[Measures against Strom Surge Disasters] ○ Development of dams, embankments, piers, wave suppressers ○ Littoral nourishment	16	● Formulation of plans for measures against coastal erosion (DS)
Development of forecast/warning and evacuation systems	◎ Development of equipment for observation, forecast/warning and prediction systems (Development of personnel engaged in operation, maintenance and management ◎ Development of disaster-information systems and information-transmission systems that reach people in need ○ Development of evacuation facilities (parks, shelters, evacuation buildings, towers, etc.) △ Development of evacuation routes △ Distribution of hazard maps △ Implementation of evacuation drills ○ Formation of voluntary disaster-reduction organizations (development of community leaders) △ Development of disaster-reduction education and building a disaster-reduction culture	5,21,27,30,31,32, 34,37,38	● Formulation of plans for monitoring and forecast/warning systems (DS) ● Improvement of monitoring and analyzing ability (TCP, Expert, Training, JOCV/SV) ● Installation of monitoring equipment (TCP, DS, Grant) ● Implementation of community disaster-reduction activities (TCP, DS) ● Dissemination of disaster-reduction education (TCP, DS, Grant, Expert)
Financial preparation	△ Securing disaster-reduction budget × Promotion of disaster insurance schemes		

*Refer to Annex 1 for case numbers

◎ Indicates when there are more than five projects in which examples of project activities are included as a project goal → When more than 10 members are dispatched in the case of individual experts or members of the JOVC.

○ Indicates when there is a project in which examples of project activities are included as a project goal
△ Indicates when examples of project activities are included as a part of a project, although they are not included as a project goal
× Indicates cases without any outcomes, or cases in which short-term experts are dispatched for planning and assessment

TCP: Technical cooperation project DS: Development study Expert: Expert dispatch Grant: Grand aid cooperation
ST: Study team dispatch Rescue team: Emergency rescue team Training: Acceptance of trainees
JOCV/SV: Japan Overseas Cooperation Volunteer/Senior Volunteer

Development strategy goal 2: Emergency response that reaches affected people quickly and effectively

Development strategy goal 2: Emergency response that reaches affected people quickly and effectively (Protection of life)

Unlike the development strategy goal 1, which prepares for the occurrence of a disaster, an emergency response aims to save people's lives quickly and effectively after a disaster strikes.

Medium-term goal 2-1 Establishment of response systems

(1) Understanding of disaster situations and needs for response

It is not easy to promptly grasp disaster situations and the need for immediate response after a disaster, being faced with a confusion of information. However, it is extremely important to **understand disaster situations and the needs for response** in order to launch effective and efficient rescue operations and to deploy subsequent assistance for recovery and reconstruction.

Information is obtained from the websites of UNOCHA and other organizations, offices of other donors, and disaster countermeasure offices in the affected countries. Field studies (needs assessment for response) are also conducted to understand human and physical damages and to understand the needs of disaster victims. From the results of these studies, the locations of rescue or healthcare activities are determined. And at the same time, activities are taken to prevent secondary disasters, such as removal of unsafe houses, and to prevent the damage from spreading.

(2) Development of response systems

In order to implement effective and efficient relief activities immediately after a disaster occurs, it is necessary to appropriately provide limited resources to disaster victims. Thus, a disaster countermeasure office is set up mainly by the government or organization in the affected country to quickly establish communication systems and decision-making systems and to coordinate relief activities. However, it is likely that an organization in the disaster-affected areas is unable to perform full functions due to the disaster. In such cases, organizations outside the affected area or in some cases overseas organizations need to support the local disaster-countermeasure office.

Assistance comes to the affected area from within and outside the affected country. When assistance is provided from outside the country, it is necessary to pay more attention to avoid confusion over the procedures of accepting the provisions and to conduct relief activities with due consideration to the different cultures and customs. Thus, it is especially necessary to develop systems for receiving overseas assistance.

Picture 2-1 OSOCC IN IRAN
The UN OSOCC was established in Iran to coordinate assistance in the areas affected by the Bam earthquake of December 2003.

Since various kinds of information can be obtained in cooperation with the UNOCHA and the OSOCO in the affected areas, JICA overseas offices and related facilities should actively contact these organizations even if the Japan Disaster Relief Team is not dispatched.

JICA's efforts

The Secretariat of the Japan Disaster Relief Team contributes actively to the coordination of activities provided by the Japan Disaster Relief Team (JDR), which are led by the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA). Specifically, JICA trains its personnel to be qualified to participate in the United Nations Disaster Assessment and Coordination (UNDAC) team and makes financial contributions to the UNDAC as a member State. Furthermore, JICA develops materials and equipment to support the activities of the UNDAC team, and is preparing to conduct studies to understand disaster situations and needs surveys immediately after a disaster on as-needed basis, as a member of the UN team. JICA also participates in the meetings of the International Search and Rescue Advisory Group (INSARAG), which coordinates activities of rescue teams, and is engaged in developing rules of the UN rescue teams in the affected areas. When the JDR is dispatched, JICA participates in the donor meetings aiming for coordination between the local disaster-countermeasures office set up in the affected area and the On-Site Operation Coordination Center (OSOCC) established by the UNDAC team, and for the effective utilization of limited relief resources.

When a dispatch of the JDR or provision of subsistence is deemed necessary, JICA independently implements studies to grasp disaster situations and conducts needs assessment through overseas offices and news sources immediately after a disaster strikes.

Photo 2-2 Donor Meeting in Pakistan

As a response to Pakistan Earthquake of October 2005, the JDR medical team held donor meetings everyday to exchange and share information, inviting the Pakistani army, the Doctors without Borders, Save the Children, and French Red Cross, which had been implementing activities nearby.

Medium-term goal 2-2 Implementation of lifesaving operations

(1) Implementation of lifesaving and rescue operations

There is a possibility that disaster survivors are left under debris and rubble when an earthquake occurs in urban areas. The survival rate of those buried under rubble is thought to be high within the "Golden 72 hours," and therefore, it is necessary to appropriately start search-and-rescue operations within this timeline.

Search-and-rescue operations include the activities using search machines, rescue dogs and rock drills, as well as the activity called "Confined Space Medicine (CSM)," which is to provide medical treatment to survivors under rubble concurrently with rescue activities. If the bodies of victims are recovered, the identification and cremation need to be conducted, but these activities are, in principle, to be implemented under the responsibility of the government of the affected country.

Photo 2-3 Rescue dog in Algeria 2003

Algeria Earthquake of May 2003. Rescue dogs have received special training to search for survivors in disaster-affected areas. The use of rescue dogs by overseas rescue teams is laid out in the international guidelines.

Hospitals are generally equipped with in-patient facilities, and it often takes time to prepare for overseas assignments. Therefore, overseas rescue operation teams are made up of doctors at clinics, and mobile medical care is conducted by those teams.

Transportation requires special medical knowledge and technology, and the cooperation of Japan's medical team is feasible in this area.

(2) Implementation of emergency medical care

What is necessary immediately after the launch of search-and-rescue operations is emergency medical operations aiming to save lives. The need for medical services is high immediately after an earthquake since many may be injured.

Field hospitals are set up to provide medical services as an emergency response, and in some cases, mobile medical services are offered to those who cannot come to the field hospitals. When the field hospitals cannot provide adequate care to patients, it is necessary to develop a **transportation network system** to transfer patients to other hospitals in the areas that escaped disasters. In order to recover the functions of local medical institutions concurrently with provision of medical services, securing of the base of local medical institutions, doctors and medicines is an important task.

JICA's efforts

In response to a request made by an affected country, JICA dispatches JRD rescue and medical teams immediately after a disaster strikes to conduct rescue operations and provide medical services in the affected area. Both search/rescue operations and medical services are activities that utilize Japan's experience and maintain a high level of quality.

Photo 2-4 Field Hospital in Pakistan

The photo shows a tent of a JDR medical team for the Pakistan Earthquake of February 2005. X-ray equipment and a laboratory, which enable diagnoses, are installed in the tent, and patients are frequently transported from other overseas medical teams.

Medium-term goal 2-3 Support for affected people

(1) Emergency (primary) evacuation

In order to prevent secondary disasters from happening, it is necessary to issue an evacuation order to those who remain in unsafe communities and to restrain people from going into unsafe zones by identifying dangerous areas. It is the responsibility of the government concerned to issue these evacuation and restraint orders.

The mobility of the Self-Defense Force can be used for transportation of supplies. Some Japanese NGOs have knowhow in distributing supplies.

(2) Supply of food/drinking water and provisions

A shortage of food, drinking water and daily necessities occurs in disaster-stricken areas due to the interruption of means of regular transportation and supply systems. In addition to providing food and drinking water, it is **important to urgently establish the means of transportation and distribution.** For an appropriate distribution of provisions without unfairness to the affected people, it is necessary to ensure transportation means that reach all people and to have a distribution system that does not create a sense of unfairness.

The mobility of the Self-Defense Force can be used for transportation of supplies. Some Japanese NGOs have knowhow in distributing supplies.

(3) Ensuring emergency temporary housing

When houses are collapsed or in danger of collapsing, it is necessary to leave the houses and move into temporary shelter[10], such as tents (a relief camp). In order to do so, it is necessary to provide tents and, at the same time, it is essential to decide where to pitch the tents (a relief camp) and how to manage them.

Japanese NGOs are able to manage tent camps, etc.

(4) Healthcare measures (including mental care)

Deterioration of hygienic conditions caused by disasters and spread of infectious diseases due to living in shelters with other people are some of the concerns. There is a risk of aggravation of chronic diseases due to disruption of hospital functions. Some of the patients with traumas need to receive medium- and long-term rehabilitation, but there may be a shortage of sufficient medical services due to the decline in functions of medical institutions. Moreover, some disaster victims suffer from mental distress caused by loss of family or friends.

It is difficult to take a direct approach because of the difference in cultural background and languages. Therefore, approaches through, for example, local NGOs are effective.

In order to address these issues, medium- and long-term measures for healthcare are necessary. Healthcare measures need to include mental care to alleviate Acute Stress Disorder (ASD) or Post-traumatic Stress Disorder (PTSD). Affected communities and societies need to consider and implement effective measures to ease the mental trauma of disaster victims.

JICA's efforts

JICA promptly provides living necessities other than food, such as tents, generators and blankets from storages installed in four locations around the world (Frankfort, Singapore, Miami and Johannesburg) as supplies provided by JDR. JICA also implements assistance in the area of hygiene, through a dispatch of a JDR Expert Team specializing in infectious diseases and mental care. Furthermore, JICA has a record of promptly providing mental care for children and rehabilitation support for patients with traumatic injuries.

With respect to a provision of supplies, JICA incorporates the idea of cooperating with Japanese NGOs, for example, Japan Plat-Form, and a coordination system has been established at the headquarters.

[10] During an emergency response period, priority should be given to providing a minimum level of living space by securing emergency temporary housing, such as relief camps, etc. During the period of recovery/reconstruction, it is necessary to move people to temporary or permanent housing as quickly and effectively as possible.

[Box 2] Points to Consider for Relief Assistance: Importance of utilization of existing systems

One of the points to consider when providing relief assistance is to effectively use existing resources and systems. Tragic scenes take place in the affected areas and one tends to think any help would be useful. However, utilization of existing systems in the affected areas is essential when considering a long path towards recovery and reconstruction that follows the urgent period.

For example, when there are medical institutions with a certain level of functions, if not sufficient, in terms of primary health care, the assistance, which would inhibit the functions in the subsequent phase of recovery/reconstruction, should not be provided. A provision of medical services at the same level as the pre-disaster period from overseas medical teams should be determined upon carefully considering the impact brought to the region after the medical teams leave.

After the earthquake in the Central Java, Indonesia in 2006, the UNOCHA, which is familiar with the local conditions, released a warning that the capacity of local communities/societies may not be fully utilized if the removal of debris is conducted by overseas teams; instead the works should be led by existing communities and societies.

Utilization of existing systems is applicable to some cases at the individual level. For instance, the World Health Organization presented a recommendation not to resort to easy substation with powdered milk. When mothers who are unable to breast feed their babies switch to powdered milk, it may secondarily affect the babies in the affected areas where access to safe drinking water is scarce.

Development strategy goal 2 Response that reaches affected people quickly and effectively 【protection of life】

Medium-term goal 2-1 Establishment of emergency response systems			
Sub-goal of medium-term goal	Example of project activity	Case No.	JICA project
Understanding of disaster situations and needs for emergency response	○ Survey/Understanding of the overview of disaster △ Survey/Understanding of human damage △ Survey/Understanding of physical (infrastructure) damage × Emergency safety check for buildings (for the removal of damaged houses)	44,45,46	● Needs survey for emergency relief (JDR)
Development of emergency response systems	△ Launch of disaster headquarters (establishment of communication and decision making systems) × Support for system development for receiving assistance from organizations of other countries, etc.	42	● Technology transfer to develop emergency response systems (TCP)

Medium-term goal 2-2 Implementation of rescue operations			
Sub-goal of medium-term goal	Example of project activity	Case No.	JICA project
Implementation of rescue operations	× Fire-extinction activities ◎ Search activities using equipment and rescue dogs ◎ Rescue activities using digging equipment ◎ Implementation of Confined Space Medicine (CSM) × Identification of bodies and conducting cremations	44	● Dispatch of rescue team (JRD) ● Technology transfer for response (TCP)
Emergency medical care	○ Setting up of field hospitals and clinics for emergencies and provision of medical services △ Conducting mobile medical services × Safety confirmation of medical institutions, securing centers, doctors, nurses and medicines × Establishment of logistic transportation systems	44,45,46	● Dispatch of medical team (JRD)

Medium-term goal 2-3 Assistance for affected people			
Sub-goal of medium-term goal	Example of project activity	Case No.	JICA project
Emergency (primary) evacuation	× Instructions/orders of evacuation and evaluation guidance × Designation of restricted areas		
Provision of food, drinking water and household items	○ Provision of food, drinking water and household items × Securing means and routes of transporting food, drinking water and household items × Establishment of provision systems for food, drinking water and household items	44,45,46	● Assistance of emergency supplies (JRD)
Securing of provisional housing	× Securing/operation of emergency shelters (tents)		
Healthcare measures	× Epidemiological investigation △ Public health measures for prevention of communicable diseases (infectious diseases) (epidemic prevention, immunization, enlightenment activities, etc.) △ Measures against homeostatic diseases and lifestyle-related diseases	45,46	● Dispatch of medical team (JRD)
Healthcare measures (including mental care)	× Implementation of counseling △ Treatment of trauma and Post-traumatic Stress Disorder (PTSD)	46	● Dispatch of medical team (JRD)

*Refer to Annex 1 for case numbers

◎ Indicates when there are more than five projects in which examples of project activities are included as a project goal → When more than 10 members are dispatched in the case of individual experts or members of the JOVC.

○ Indicates when there is a project in which examples of project activities are included as a project goal

△ Indicates when examples of project activities are included as a part of a project, although they are not included as a project goal

× Indicates a case without any outcomes, or a case of dispatch of short-term experts or for planning and assessment

TCP: Technical cooperation project DS: Development study Expert: Expert dispatch Grant: Grand aid cooperation
ST: Study team dispatch Rescue team: Emergency rescue team JDR: Japan Disaster Relief Team Training: Acceptance of trainees
JOCV/SV: Japan Overseas Cooperation Volunteer/Senior Volunteer

Development strategy goal 3 Transition to and implementation of accurate recovery and reconstruction

Development strategy goal 3　Transition to and implementation of accurate recovery and reconstruction

In order to help disaster victims return to normal daily life, it is necessary to recover infrastructures that support society and its livelihood. This includes housing, the water supply and sewage systems, electricity, gas, roads, and medical and educational facilities. It is also necessary to help them recover their livelihood so that they can lead independent lives. Furthermore, since many disaster victims suffer greatly from mental distress, it is necessary to implement measures for mental care in the medium- and long-run. It is necessary to develop a system where cross-sectoral projects can be implemented through information sharing and accurate decision making, in order to solidly implement activities in various fields based on the needs of the victims, amidst chaotic situations in the post-disaster period.

The development strategy goal 3 identifies under what systems recovery and reconstruction activities need to be implemented, while seeking ways to assess needs, and what measures should be implemented to reconstruct the living conditions of disaster victims.

In order to break a vicious circle, into which disaster victims are locked, and to recover the infrastructure that supports their livelihood, it is necessary to implement seamless assistance from the response phase to the recovery/reconstruction phase.

At a time of a disaster, many countries show concern and offer a variety of relief aids. However, there have been cases where cooperation has disproportionately focused on the emergency relief and it has taken much time to launch recovery /reconstruction assistance. If a smooth transition to the recovery/reconstruction phase is not achieved, the socioeconomic infrastructure that has been damaged by the disaster cannot be reconstructed and the society fails to get on a track of sustainable development, which would greatly affect people's lives. In order to help disaster victims break this negative circle and recover their livelihood, it is necessary to make efforts toward "a seamless transition from response to recovery/reconstruction."[11]

When recovery/reconstruction assistance is provided in communities and societies where disasters frequently occur and hinder development, it is necessary not only to restore the original state before the disaster, but also to assist efforts towards building disaster-resilient communities/societies by removing a vicious circle of disaster, as well as towards realization of sustainable development, in view of enhancing future functions and improving coping capacity, while seeking a balance with emergency needs.

[11] In order to achieve a smooth transition of assistance from the response phase to the recovery/reconstruction phase, Japan considers it effective to promote the Non-project Grand Aid and cooperation with NGOs.

Medium-term goal 3-1 Establishment of recovery/reconstruction systems

(1) Understanding of recovery/reconstruction needs[12]

In order to move promptly from response to effective and efficient recovery and reconstruction, it is necessary to **conduct assessment studies on damage with the purpose of understanding the needs for recovery/reconstruction.** While "the understanding of disaster situations and needs for emergency response" listed in the "medium-term goal 2-1: Establishment of emergency response systems" gives priority to speed, with the aim of preventing secondary disasters and the spread of damages, the mission of the damage-assessment studies in question is to investigate more details about damage to people, housing, lifelines and infrastructure. It may also be possible to conduct the studies concomitantly with relief activities conducted in the response phase[13].

Damage-assessment studies in relation to recovery/reconstruction should be implemented under the initiatives of the government or engineers in the disaster-stricken country. However, in reality, they are often conducted with the participation of various aid organizations. It is thus necessary to grasp the needs for recovery/reconstruction with due consideration to the socioeconomic background of the affected areas.

(2) System development for recovery/reconstruction

At the recovery/reconstruction phase, various stakeholders are involved in projects that include the central and local governments of the affected country and regions, lifeline service providers and assistance organizations from abroad. It is therefore necessary **to clarify the decision-making processes and the flow of information at the recovery/reconstruction phase, and thus to establish recovery/reconstruction systems.**

(3) Formulation of recovery/reconstruction plan

Based on the needs for recovery/reconstruction obtained from the damage-assessment study, a recovery/reconstruction plan is formulated to provide **the outline of the overall recovery/reconstruction projects, the procurement costs and methods of materials/equipment and services, and the roles of the government of affected country and of overseas donors.**

JICA's efforts

In order to help establish recovery/reconstruction systems, JICA dispatches a Needs Assessment Study Team for recovery/reconstruction nearly simultaneously with the dispatch of the JDR to understand the needs for recovery/reconstruction

[12] Damage-assessment studies in relation to recovery/reconstruction should be implemented under the initiatives of the government or engineers in the disaster-stricken country. However, in reality, they are often conducted with the participation of various aid organizations. It is thus necessary to grasp the needs for recovery/reconstruction with due consideration to the socioeconomic background of the affected areas.

[13] Taking an example of lifeline (water) in the study of "medium-term goal 2-1," studies are conducted on large-scale affected facilities such as water treatment plants and pumping facilities that greatly affect water supply networks, and temporary reconstruction works are conducted based on the results of the studies to recover the functions. On the other hand, the damage-assessment study in question here is to implement a detailed investigation of damage incurred to the overall water supply network and to formulate a recovery/reconstruction plan for the overall water supply network based on the results of the study.

and share information with the affected country and other donors, whenever necessary.

Medium-term goal 3-2　Support for independence and rehabilitation of affected people

In order to facilitate independence and rehabilitation of people suffering from physical, economic and psychological damage caused by disasters, it is necessary **to secure living facilities, such as housing,** to provide economic and psychological support and to recover social functions of the affected area as a whole.

When a disaster causes devastating damage, as in the case of the Sumatra Coast Earthquake, it is necessary to rebuild all of the affected areas, in addition to recovering and reconstructing the infrastructures that support society and its livelihood and the economic systems.

(1) Recovery/reconstruction of livelihood infrastructure

1) Debris removal and recovery of road functions

When conducting recovery/reconstruction works for the infrastructure that supports the people's livelihood, it is firstly necessary to properly remove debris and rubble that resulted from the disaster and to recover transportation functions to secure the transportation of recovery/reconstruction materials and relief supplies. Since a greater amount of debris must be treated than at the time of response, it is necessary for procurement divisions for recovery/reconstruction projects to achieve appropriate coordination among various stakeholders, including local governments, central government, aid organizations, NGOs and private construction companies, before staring the operation.　When securing a workforce, consideration should be given to providing short-term employment opportunities by hiring disaster victims to **contribute to the reconstruction of their livelihood.**

"Habitation" is the basis of the very livelihood of afflicted individuals and it is important to promptly secure housing by repairing damaged houses and installing temporary housing.

2) Securing habitation

"Habitation" is the basis of the very livelihood of afflicted individuals. Therefore, it is necessary to **arrange the minimum accommodation space** for those who have lost their houses in the disaster and to secure "habitation" quickly, by repairing damaged houses and installing temporary housing.　When securing "habitation," it is necessary to select low-risk locations in consideration to future disasters and make a decision on relocation when necessary.

Possible assistance can be directed to the affected people who would repair the repairable houses: for instance, presentation of options for low-cost and practical repair methods using local materials.　Depending on the local climate conditions

and the season of the disaster, it may be necessary to provide some equipment to live in the repaired houses: for instance, construction materials such as roof materials and nails, emergency repair materials such as tarpaulins, and heaters to keep warm.

Securing land is the most important task when installing temporary housing. Suitable land must meet the following conditions in accordance with the period of living in temporary accommodation (two years in Japan): low disaster risk, in the vicinity of the afflicted area, developed infrastructure such as water supply and sewage systems, and the presence of commercial facilities in the neighborhood. It is also necessary to formulate and design a plan based on the climate conditions and culture of the afflicted area.

3) Recovery/reconstruction of lifelines

Lifelines (water, electricity, communication networks) **are secured** in line with the situations of shelters and camps, development plans for temporary housing, and recovery/reconstruction situations of urban areas. It is necessary, particularly in shelters and camps, to secure appropriate hygienic conditions by treating human and domestic wastes, in addition to supplying water and electricity.

Efforts for early recovery of livelihood through fair distribution of donations and contributions, employment support and assisting small-scale enterprises to resume operation

(2) Recovery of circumstances

It is necessary to **fairly distribute donations and contributions,** to provide support for securing immediate living expenses, such as utilization of microcredit and credit guarantees for loans by financial institutions, to give employment support and to assist small-scale enterprises to resume operations. Since information that is necessary for business continuity and resumption (information concerning repair services and distribution routes/information pertaining to support systems) may not be fully accessible, it is desirable to install consultation booths or offer mobile consultation services. It is also necessary to provide support targeting socially and economically vulnerable groups in association with recovery/reconstruction works: for example, creating local employment by utilizing local small- and medium-sized enterprises for the recovery/reconstruction works on roads and lifelines, and conducting vocational training for those who have lost their economic basis due to disasters.

To implement mental healthcare continuously from the response phase

(3) Mental care

Mental healthcare is to **continue from the response phase** with the aim of alleviating psychological damage incurred on disaster victims. Furthermore, it is necessary to encourage proactive participation by disaster victims in recovery/reconstruction of afflicted areas to achieve psychological recovery. Care

must be taken so that mental healthcare is accessible to disaster victims even after they return to their original houses from evacuation shelters or camps.

JICA's efforts

Many of JICA's post-disaster cooperation projects concerning independence and rehabilitation place emphasis on recovery/reconstruction of the infrastructure that supports the victims' livelihood. Some efforts have been launched to disseminate low-cost anti-seismic reinforcement technology for houses in view of reconstruction of houses, in addition to recovery and reconstruction of lifelines such as water supply and sewage facilities that had been implemented following the recent large-scale earthquake disasters.

With regard to recovery of livelihood, efforts are made for community empowerment through the following activities: design/formulation of construction plan of fishing facilities, Emergency Development Study for supporting the independence of fishermen, participatory income-improvement projects through a dispatch of volunteers and planning and implementation of educational/healthcare programs.

Medium-term goal 3-3 Recovery/reconstruction of social functions

Recovery/reconstruction of public services
- Administrative functions of local governments
- Functions of medical institutions
- Functions of educational institutions

In the recovery/reconstruction phase, it is necessary to **restore social functions of the overall afflicted areas** along with the support for independence and rehabilitation of affected people. Public services such as medical and educational functions and economic systems are the bases for reconstructing the lives of the affected people, and it is necessary to carry out activities targeting both individuals and the entire afflicted area.

Recovery/reconstruction of economic systems
- Reconstruction of distribution network
- Securing cash supply
- Securing employment space
- Business brokerage
- Early recovery of market functions
- Securing materials and equipment necessary for agriculture, forestry and fishery

(1) Recovery/reconstruction of public services

It is necessary to promptly recover functions of **medical institutions and educational facilities, which provide medical and educational services to the affected people, and the functions of communities, which provide support and information for the independence of the affected people.**

It is important to ensure that medical services reach the victims by installing temporary clinics and implementing mobile medical services in the affected areas, in addition to the reconstruction of the central medical institution of the community.

Re-opening of schools can be considered a symbol of the recovery/reconstruction of the community, and would serve as psychological support for disaster victims. It is therefore desirable to reopen the schools as soon as possible, while considering the function of schools as evacuation shelters. Since school buildings are also

expected to be damaged and teachers affected, support from undamaged schools and ensuring teachers by utilizing volunteers and retired teachers may be necessary, in addition to securing teaching space like tents or terrapin hut classrooms.

(2) Recovery/reconstruction of economic systems

Support for implementation of stable economic activities is provided coincidentally with support for early resumption of economic activities. Since distribution systems play an important role for an early resumption of economic activities, reconstruction of the distribution network is an urgent issue through the recovery and reconstruction of public and private distribution centers and of infrastructure facilities such as roads, railways, ports, harbors, and airports. In terms of finance, it is necessary to understand the financial situations of affected areas immediately after a disaster strikes, and **measures for money supply**[14] must be taken in cooperation with financial institutions whenever necessary.

Furthermore, it is necessary to consider effective support measures in line with industrial structures and pre-disaster economic systems in the affected areas. Measures for small- and medium-sized enterprises include securing/provision of temporary employment space, financial assistance for the construction and operation of facilities, business brokerage and stabilization of distribution. As support for agriculture, forestry and fishery, it is necessary to guarantee purchase of products (crops, livestock, etc.) and the measures should contribute to the securing of materials and equipment (fertilizer and agricultural machinery for agriculture, ships and refrigerated facilities for fishery) required for early recovery and reconstruction of market functions and for business operation.

JICA's efforts

As seen in the cases of post-earthquake disaster measures taken in Pakistan and Indonesia, JICA implements cooperation for recovery/reconstruction of infrastructure: for example, reconstruction of educational and medical facilities through grant aid cooperation and instructions for anti-earthquake constructions through technical cooperation projects.

In the areas devastated by disasters, two-dimensional recovery/reconstruction projects for urban areas are carried out while encouraging participation of the disaster victims.

Medium-term goal 3-4 Reconstruction of affected areas

The reconstruction of the areas devastated by disasters is important for

nancial institutions to carry out withdrawals for depositors and to take measures to allow premature
s or fixed reserves for afflicted corporations and individuals.

recovering the livelihood of disaster victims and to revitalize the entire affected areas. For the reconstruction of the affected areas, it is urgent to formulate plans for urban development, land use, and recovery/reconstruction of infrastructures. In doing so, it is important to incorporate the opinions of the affected people into the plans as much as possible and to have disaster victims actively participate in the reconstruction. It is therefore necessary to form an organization so that residents of the community can cooperate with each other in the reconstruction work.

JICA's efforts

Using the results of the Needs Assessment Studies for recovery/reconstruction, JICA implements support to formulaterecovery/reconstruction plans in disaster-stricken areas in the form of the Emergency Development Study on an as-needed basis. Meanwhile, it gives consideration to the ownership of recovery/reconstruction efforts of the recipient country and trends of donor countries. JICA formulates plans for recovery/reconstruction, such as urban development plan, recovery/reconstruction plan for infrastructure, land use plan, and support for reconstruction of livelihood of the afflicted persons, in addition to basic policies. As an example of community-level support, JICA has implemented technical cooperation projects aiming at establishing local reconstruction organizations and rehabilitating communities centered on the disaster- stricken and impoverished rural areas.

Development strategy goal 3: Transition to and implementation of rapid recovery/reconstruction

Medium-term goal 3-1 Establishment of recovery and reconstruction systems			
Sub-goal of medium-term goal	Example of project activity	Case No.	JICA project
Understanding of the needs for recovery and reconstruction	△ Understanding of affected people (human damage) △ Assessment of housing damage △ Assessment of infrastructure damage	46,47,48,49 50,51	● Dispatch of needs-assessment team (ST)
Development of systems for recovery and reconstruction	× Launch of recovery and reconstruction systems (communication systems and decision-making systems)		
Formulation of recovery and reconstruction plan	× Formulation of basic policies for recovery and reconstruction		

Medium-term goal 3-2 Support for independence and rehabilitation of affected people			
Sub-goal of medium-term goal	Example of project activity	Case No.	JICA project
Recovery and reconstruction of livelihood infrastructure Debris removal and recovery of roads functions	△ Debris removal with heavy machinery, etc. △ Securing emergency transport route × Securing land transportation means by trucks, etc. △ Debris removal using heavy machinery, etc.	51,53	● Provision of temporary tents (Grant) ● Dissemination of earthquake-resilient construction technologies (TCP/ST) ● Recovery of water supply facilities and sewage systems (DS/TCP) ● Recovery of irrigation facilities (DS) ● Reconstruction of roads and bridges (DS)
Securing housing	△ Opening, operation and management of comps for affected people △ Repair of damaged housing × Development of land to relocate residents ○ Dissemination of low-cost seismic strengthening technology for housing × Full-fledged reconstruction of housing (permanent housing)		
Recovery and reconstruction of lifelines	△ Implementation of hygienic measures (disposal of human waste, garbage, etc.) ○ Securing and recovery of lifelines such as water, electricity and telecommunication		
Recovery of livelihood	× Distribution of donations for disaster victims ○ Securing employment × Credit guarantee for fund loans by micro-credit or financial institutions × Support through tax relief	56,57	● Support for independence of victims
Mental care	△ Conducting mobile medical care		

Medium-term goal 3-3 Recovery and reconstruction of social functions			
Sub-goal of medium-term goal	Example of project activity	Case No.	JICA project
Recovery and reconstruction of public services	× Safety confirmation and securing centers of administrative organizations × Installation of wireless communications and emergency generators × Securing administrative personnel, installation of various contact points [Securing and recovery of medical functions] ○ Safety confirmation and securing medical centers × Securing doctors and nurses ○ Securing medicines [Securing and recovery of educational functions] ○ Safety confirmation and securing educational centers × Securing teachers and teaching materials	52,53,54	● Reconstruction of educational and medical institutions (TCP/Grant) ● Provision of medical devices (Grant)
Recovery and reconstruction of economic systems	× Implementation of financial preferential measures and exchange of damaged banknotes × Tax reduction/exemption measures × Distribution of donations for disaster victims × Securing/provision of employment space, financial support × Offering business opportunities × Purchase guarantee of products × Support for securing materials and machinery × Stabilization of distribution		

Medium-term goal 3-4 Reconstruction of affected areas			
Sub-goal of medium-term goal	Example of project activity	Case No.	JICA project
Reconstruction of affected areas	○ Formulation of basic policies for community-participatory recovery and reconstruction ○ Selection of designated areas for recovery and reconstruction ○ Formulation of community-participatory urban plans ○ Formulation of infrastructure recovery and reconstruction plans such as community-participatory roads network plans ○ Formulation of community-participatory land use plans △ Review of various standards and regulations (including building standards)	47,51,53,55 56,57	● Formulation of recovery/reconstruction plans (TCP/DS) ● Technical cooperation for standards for earthquake-resistant constructions (TCP)

*Refer to Annex 1 for case numbers

◎ Indicates when there are more than five projects in which examples of project activities are included as a project goal → When more than 10 members are dispatched in the case of individual experts or members of JOVC.

○ Indicates when there is a project in which examples of project activities are included as a project goal
△ Indicates when examples of project activities are included as a part of a project, although they are not included as a project goal
× Indicates a case without any outcomes, or a case of dispatch of short-term experts or for planning and assessment

TCP: Technical cooperation project DS: Development study Expert: Expert dispatch Grant: Grand aid cooperation
ST: Study team dispatch Rescue team: Emergency rescue team JDR: Japan Disaster Relief Team Training: Acceptance of trainees JOCV/SV: Japan Overseas Cooperation Volunteer/Senior Volunteer

Chapter 3 Cooperation Policies of JICA

Based on Chapter 1 and Chapter 2, the cooperation policies of JICA are presented in this chapter.

3-1 High priority efforts of JICA and points to consider

3-1-1 Basic concepts concerning cooperation for disaster reduction

Cooperation for disaster reduction is highly significant in achieving human security.

Natural disasters, such as earthquakes, tsunamis, floods, landslides, volcanoes, wildfires and droughts, are global-scale issues that inflict grave damage around the world in various ways every year. Breaking a vicious cycle of disaster, which impoverishes people and impedes the development of the economy and society, is one of the most important prerequisites for realizing sustainable development and poverty reduction.

JICA is an assistance-implementing agency capable of conducting independent assistance programs at every stage: from prevention and response to recovery and reconstruction.

Disasters frequently wipe out the results of long-term efforts for development in the blink of an eye, and are major impediments to achieving internationally agreed upon goals for sustainable development and poverty reduction. Many developing countries are particularly vulnerable to disasters and suffer extremely serious human, physical and economic damage from disasters. Disasters are threats not only to development or societal growth, but also to the survival, dignity and livelihood of individuals. From the perspective of **human security**, Japan carries out **cooperation projects focusing on the principle of being free from fear** by reducing the threat and improving coping capacity, and JICA, accordingly, implements cooperation projects in line with this principle.

JICA is an assistance-implementing agency capable of conducting independent assistance programs at every stage: from prevention and response to recovery and reconstruction.

In the cooperation for disaster reduction, **it is necessary to have a comprehensive view based on the Disaster-management Cycle, covering the prevention stage, response stage and recovery/reconstruction stage, and JICA** is **capable of conducting independent assistance programs at every stage.**

JICA will lead international efforts, as a driving force of the Hyogo Action Framework and the Initiative for Disaster Reduction through ODA.

Japan has accumulated experience and knowledge on disasters, overcoming various types of natural disasters. With that **experience and knowledge of Japan** as a backdrop, JICA intends to implement effective cooperation.

With the adoption of the Hyogo Action Framework at the UN World Conference on Disaster Reduction in 2025, the international community declared that it would accelerate the efforts for disaster reduction. The government of Japan announced the **Initiative for Disaster Reduction through ODA** at the Conference and officially pledged to support the international efforts. JICA, acting as a driving force of the Initiative for Disaster Reduction through ODA, is determined to lead

the disaster-reduction efforts of the international community and to be involved in the process of setting the direction of the efforts through further enhancement of information delivery.

Priority efforts

3-1-2 Cooperation policies and priority efforts

Considering **prevention efforts most important** in disaster reduction, JICA identifies **the development strategy goal 1 "building disaster-resilient communities/societies" as the most significant goal[15].** However, since it is not possible to prevent disasters completely, JICA will actively conduct cooperation for rescue operations and recovery of livelihood at the response stage and the recovery/reconstruction stage, in addition to cooperation at the prevention stage.

The priority efforts are listed as below according to the development strategy goals. See Annex 1 Major Cooperation Activities with regard to the relationship between efforts and related projects.

(1) Building disaster-resilient communities/societies

JICA places priorities on the following policies and specific efforts towards achieving the development strategy goal 1 "building disaster-resilient communities/societies."

[Cooperation Policies]

・Efforts for enhancing coping capacity with particular focus on community

・Reflecting the perspective of disaster reduction on development

[Priority Efforts] The number in brackets indicates the medium-term goal number.

- Understanding of disaster risks using disaster-prevention maps and enlightenment through disaster-reduction education, etc. [1-1]
- Capacity development of disaster-reduction stakeholders (such as administrative agencies, research institutions and NGOs), with particular emphasis on the enhancement of coping capacity of communities (community disaster reduction) [1-2]
- Development of forecast/warning and evacuation systems [1-2]
- Hardware measures in coordination with other measures [1-2]
- Development and dissemination/enlightenment of legal systems (Building Standard Law, etc.) and plans (Local Plan for Disaster Prevention, etc.) [1-2]

[15] It can also be regarded as a goal to allow community empowerment (human security) to work effectively.

(2) Emergency response that reaches affected people quickly and effectively (Protection of life)

JICA places priorities on the following policies and specific efforts towards achieving the development strategy goal 2 “emergency response that reaches affected people quickly and effectively.”

[Cooperation Policies]

・Continuous efforts for emergency relief

・Support for healthcare measures for disaster victims

[Priority Efforts] The number in brackets indicates the medium-term goal number.

- Prompt implementation of a needs-assessment study for response measures consistent with international relief activities [2-1]
- Speedy dispatch of relief team and medical team [2-2]
- Dispatch of expert team accurately meeting the needs of the disaster-stricken areas [2-2]
- More prompt provision of supplies [2-3]
- Provision of mental healthcare [2-3]

(3) Transition to and implementation of accurate recovery/reconstruction

JICA places priorities on the following policies and specific efforts towards achieving the development strategy goal 3 “transition to and implementation of accurate recovery/ reconstruction.”

[Cooperation Policies]

・Continuous support for affected people

・Support for building disaster-resilient communities/societies at the recovery/ reconstruction stage

[Priority Efforts] The number in brackets indicates the medium-term goal number.

- Prompt implementation of needs-assessment study for recovery/reconstruction [3-1]
- Reconstruction of livelihood [3-2]
- Mid-and long-term mental care for affected people [3-2]
- Recovery/reconstruction of lifelines and public facilities [3-2] [3-3]
- Reconstruction of affected areas with the participation of communities [3-4]

Points to consider when taking actions

3-1-3 Points to consider when taking actions

The following seven points are listed as the points to consider when taking actions.

To verify and accumulate community-based assistance and to promote the establishment of a framework for more effective assistance

(1) Accumulation/verification/feedback of assistance records for communities

Cooperation for disaster reduction has traditionally focused on the administration at the national and local levels. In recent years, however, **community-based assistance that better reaches people** is drawing a great deal of attention.

JICA's projects are implemented to enhance coping capacity of communities in, for example, the Caribbean, Nepal, Indonesia and Morocco. It has been reported that support for Sri Lanka, one of the Indian tsunami disaster-affected countries, vitalized reconstruction activities, since the support was provided in such a way as to utilize local organizations. When conducting this type of support, it is extremely important to understand the actual conditions of the local community. Since ethnic conflicts were still present in Sri Lanka, a thorough study was undertaken on the relationship among residents and communities and the internal structure of the community (social capital, etc).

Because the details and magnitude of disaster risks are different in different countries/local areas/communities, it is difficult to take a uniform approach; instead, it is necessary to provide finely tuned responses in accordance with the characteristics of the community. Thus, JICA will seek cooperation with the local NGOs and members of the Japan Overseas Cooperation Volunteer and verify/accumulate experience in community assistance from various viewpoints: for example, **"What type of consideration or response to the community was effective?"** and **"From what perspective was the needs of the community assessed?"** JICA will **proceed with the establishment of a framework to utilize the results for future cooperation.**

JICA will make efforts toward activities incorporating the perspective of disaster reduction in areas other than disaster reduction, in view of building disaster-resilient communities/societies.

(2) Cross-sectoral viewpoints

As already mentioned in section 2-1-2 (2) of Chapter 2, natural disasters not only claim lives, but also cause tremendous damage to various physical properties and economic activities, including lifeline facilities of electricity, gas and water, housing, education and healthcare services. It is thus necessary to promote efforts toward disaster reduction **in accordance with disaster risks in a cross-sectoral manner**, which means an investment in disaster preparation. JICA has set up 23 fields of issues, and **conducts activities incorporating a disaster-reduction perspective in various fields**, such as urban and regional development, transportation and traffic, education, healthcare, agriculture and rural development, poverty reduction and conservation of the natural environment in

Disaster reduction belongs to the water resource/disaster reduction category among 23 issue-specific fields of JICA.

order to promote disaster-reduction measures in a cross-sectoral manner (e.g., formulation of a land-use plan with consideration to disaster risks, construction of roads and bridges with high aseismic performance, and implementation of disaster-reduction education at schools). While maintaining a cross-sectoral perspective, JICA will be committed to consistent assistance through **organic coordination of technical cooperation, a grant aid program and loan assistance.**

JICA will improve the systems to ensure a seamless transition from emergency relief at the response stage to recovery/reconstruction assistance.

(3) Support for more accurate transition from the response stage to recovery/ reconstruction stage

Developing countries are faced with budgetary constraints, having difficulty maintaining sufficient investments for recovery/reconstruction. This issue is gradually recognized internationally, but it was not until September 2006 that the World Bank and the United Nations took the initiative to establish a disaster-reduction fund to strengthen the support for recovery/reconstruction.

Following the Indian Ocean tsunami disaster, JICA established the "Fast Track System[16] " and "manpower pool system (consultants, etc.)[17] " with the aim of promptly conducting a post-disaster response, and has simplified procedures, etc. in order to rapidly carry out emergency-relief operations and recovery/reconstruction assistance. Utilizing these systems, JICA implemented a needs-assessment study for recovery/reconstruction assistance at an early stage following the earthquake disasters in Pakistan and Java island, while giving due consideration to cooperation with other donors and emergency relief teams. JICA will continue utilizing these new systems fully. JICA will also flexibly conceive ways to make continuous improvements in the existing systems with the aim for rapid, continuous and effective assistance so that the disaster-affected areas can smoothly move to the recovery/reconstruction phase.

JICA will conduct cooperation for disaster reduction with consideration to people vulnerable to disasters, such as poor people, women, elderly people, children and handicapped individuals.

(4) Consideration to people vulnerable to disasters

Areas with high vulnerability to disasters tend to have low market values and are inhabited by the poor. These areas are found in steep mountainous regions and urban slum districts, and the ownership of the land has not been identified in many cases. Thus, when conducting cooperation for disaster reduction, it is highly necessary to fully understand these social aspects. **Vulnerable people to disasters** (women, elderly people, children and handicapped people) **are prone to**

[16] "Fast track system" is a decision-making system for allowing the organization to make concerted efforts for the projects with high urgency status by designating them as Fast Track projects. This streamlines the implementation procedures. Introduced in July 2005.
[17] "Manpower Pool System (Consultants, etc.)" is a system to pool human resources in preparation for urgent provision of technologies, for example, implementation of a needs-assessment study at the time of a large-scale disaster.

serious damage. When providing cooperation for disaster reduction, including relief operations, it is necessary to give consideration to the **protection of vulnerable people to disasters and their participation in the decision-making process**

For instance, it has been reported that, in countries and regions with male-dominant societies, women have endured greater damage at times of disasters. It has also been reported that women not only became major direct victims of the tsunami disaster off the coast of Sumatra and the disaster caused by Hurricane Katrina in New Orleans, but also were victims of secondary disasters, such as lack of necessities for women or violence to women. Learning from these lessons, cooperation for disaster reduction needs to incorporate the gender perspective, including the highest possible level of participation of women, into cooperation of all stages, namely, prevention, response and recovery/reconstruction. Even at the planning stage, it is necessary to consciously include consideration for stockpiling necessities that meet the needs of both men and women and for the areas of recovery/reconstruction. At the same time, elderly people, children and handicapped people might have difficulty quickly evacuating to safe areas when a disaster occurs. Thus it is important to conceive ways to reduce damage to these vulnerable people when formulating plans and implementing projects.

JICA will conduct cooperation for disaster reduction with consideration of factors peculiar to target community/society.

(5) Consideration of factors peculiar to target community/society

Since coping capacity (particularly that of software) **depends greatly on the factors peculiar to a specific community/society (lifestyle such as religion and tradition, mutual-help system, administrative capacity, and accountability and reliability of the administration),** it is necessary to conceive ways for conducting effective cooperation in accordance with the **characteristics of the society**, when JICA provides assistance.

Furthermore, some items and equipment are not usable as emergency supplies and some land-use plans are not acceptable, no matter how effective they may be elsewhere, depending on the social characteristics. Therefore, it is necessary to conduct cooperation with sufficient understanding of the relevant background.

JICA will implement assistance in line with the local needs, while utilizing Japan's experience/expertise on disaster prevention.

(6) Utilization of Japan's experience/expertise

Japan developed the Basic Law concerning Countermeasures against Disasters two years after the Isewan Typhoon disaster in 1959, which left more than 5000 people dead or missing. As a result, countermeasures against disasters were enhanced and the number of deaths and missing by windstorms and floods declined drastically. As a result of enhancement of the aseismic performance of buildings with a revision of the Seismic Design Standards of the Building Standard Law

(1981) following the Miyagi Oki Earthquake of 1978 and an enactment of the Law concerning the Promotion of the Improvement of Earthquake-Resistant Construction (1995) in response to the damage caused by the Great Hanshin-Awaji Earthquake of 1995, no one was killed when a large-scale earthquake hit Miyagi prefecture. Thus, learning lessons from the experience of disasters, countermeasures against disasters were revised **each time a disaster hit Japan**, and Japan is making efforts to **build a disaster-resilient country and society.**

Also, following the Great Hanshin-Awaji Earthquake, residents were relocated to temporary housing without consideration to the communities, which caused the disappearance of "mutual help" among residents and communities, and solitary-deaths of elderly people in temporary housing became a serious issue. Using such experience/expertise by Japan, JICA has promoted the improvement activities of livelihood through communities by supporting Sri Lanka after the tsunami disaster of 2004.

In order to implement cooperation that meets local needs while utilizing the experience and expertise of Japan for future assistance, JICA will systematize the past experience and expertise and conduct cooperation in line with the local needs, in addition to its cooperation with local governments of Japan.

JICA will make efforts for closer cooperation with other donors.

(7) Closer cooperation with other donors

A substantial amount of funds are required for emergency response and recovery/reconstruction assistance in cooperation for disaster reduction. The assistance of one agency is limited in terms of human and economic resources, and cooperation with other donors is needed. **JICA has been making efforts toward effective assistance through cooperation with other donors ranging from assistance at the prevention stage to the response and recovery/reconstruction stages,** and in the future, JICA will make a commitment to more consistent and effective cooperation at all stages of prevention, response and recovery/reconstruction upon understanding the characteristics and constraints of each other even during peacetime.

Future issues to be addressed

3-2 Future issues to be addressed

The following two points are listed to be considered to implement more effective cooperation.

(1) Reflecting the perspective of disaster prevention on development projects

In order to promote activities that incorporate the perspective of disaster reduction in a cross-sectoral manner, when implementing development projects, it is necessary to **investigate whether there is a possibility that implementation of the project would reduce or increase disaster risks of the concerned society,** and then to **promote development projects contributing to reducing disaster risks.** Thus, it is necessary to take **the perspective of disaster reduction** not only during implementation of the project, but also at **the formulation and study stages of the project.**

(2) Response to new risks

Natural disasters on a global scale, such as abnormal meteorological phenomena entailing climate change, have been evidenced in recent years, and there is a growing concern about new disaster risks, including land erosion due to bursts of glacial lakes and the rise in sea level, as well as increasing frequency and scale of disasters.

Universities and research institutions are conducting studies on some of these new disaster risks in a cross-sectoral manner. While paying attention to the outcomes of these studies, JICA will strengthen collaboration with research institutions as appropriate and continue studies on the nature of future cooperation for more effective measures.

Annex 1 Major Cooperation Activities

Japan has significant experience in cooperation for disaster reduction, and has been implementing cooperation against various forms of disasters, such as windstorms, floods, landslides and earthquakes, by utilizing various schemes, including technical cooperation projects, development studies, grant aids, dispatches of experts and volunteers, trainee acceptance, dispatches of the Japan Disaster Relief team, and dispatches of expert teams.

Through organic coordination of these schemes at all stages of a disaster, JICA aims to implement effective and efficient projects in an effort to comprehensively enhance disaster reduction. In this section, the characteristics of each scheme are summarized, and major cooperation activities are outlined focusing on how coordination between schemes is structured, so as to serve as a reference for formulation of future projects.

Development strategy goal 1
Building disaster-resilient communities/societies

1-1 Building disaster-resilient communities/societies

1-1-1 Understanding of disaster risks (development of disaster-prevention maps)

When implementing preventive measures against natural disasters, it is necessary to accurately understand the disaster risks of all types of disasters. Formulation of hazard maps and disaster-prevention maps is included as a project objective in many of JICA's development studies, with emphasis on understanding disaster risks.

Development studies in Iran, Turkey and Algeria were carried out to identify the risks of earthquakes of a given country or city, to use the results for the anti-earthquake measures of the target country and to transfer technology for risk assessment. In the Study on Seismic Microzoning of Greater Tehran, carried out in Iran, JICA conducted consistent cooperation that connects "development study to formulate a comprehensive seismic prevention plan based on study results" with "technical cooperation project to improve coping capacity at time of disasters." Development studies with emphasis on risk assessment help determine the urgency or priority of response.

1-1-2 Improvement of coping capacity of communities/societies

In order to enhance resistance against disaster risks, measures for buildings or structures are necessary. JICA has been conducting a number of cooperation

projects with the aim of improving resistance of buildings in developing countries. In Indonesia, Honduras and the Philippines, for example, JICA conducted development studies on structural measures for flood management and implemented projects through yen loans or grant aids, in line with the development plans or projects plans formulated by the development studies. JICA also takes part in developing human resources who will be engaged in seismic constructions through dispatch of volunteers to Bhutan and Mongolia. Japan has provided assistance to comprehensively cover all aspects, from risk assessment to studies aiming for improving structural resistance and implementation of projects based on the study results. There are records of actually reducing disasters, proving the effectiveness of comprehensive assistance.

JICA makes efforts to improve resistance against disaster risks: e.g., anti-flood measures, such as river improvements through widening rivers/installing revetments and construction of water-control dams, countermeasures against landslide disasters through construction of mudslide-control dams, and anti-earthquake measures through seismic reinforcement of structures (including lifeline facilities like infrastructure and housing).

In recent years, it has been increasingly necessary to contrive measures to ensure protection against disasters that exceed the safety performance of structures. It is not possible to eliminate disasters solely through structural measures in the case of disasters like the Great Hanshin-Awaji Earthquake, Chuetsu Earthquake or frequent large-scale flood disasters. Therefore, it is necessary to provide software measures to reduce the scale of damage. To that end, it is essential to improve the coping capacity of the society, such as by establishing community organizations for disaster reduction and raising the disaster-reduction awareness and capacity of the public.

JICA implements development studies and formulates disaster-prevention plans against general disasters and earthquake disasters in countries like Columbia, Turkey and the Philippines. In these studies, support is provided to upgrade coping capacity: for instance, development of the disaster-prevention system of the central and local governments, formulation of prevention, response and recovery/reconstruction plans, and designation of unsafe areas. Also, JICA conducts development studies and dispatch of experts or volunteers aiming for establishing voluntary disaster-reduction organizations, developing evacuation routes, implementing evacuation drills, and developing forecast/warning and evacuation systems through the development of early forecast/warning systems, in an effort to improve the coping capacity in Morocco, Malaysia, Indonesia, etc.

Since Japan has yet to develop systems for economic preparation, no technical cooperation projects for economic preparation have been put into operation.

Development strategy goal 2
Response that reaches affected people quickly and effectively (protection of life)

1-2 Response that reaches affected people quickly and effectively (protection of life)

Speedy and effective assistance is extremely important for emergency relief for disaster victims and the priority issues is to save lives and ensure the minimum subsistence level. It is necessary to prepare emergency-response systems and implementation systems for the rescue of and support for affected people in order to ensure speedy and effective relief operations. In addition to dispatching Japan Disaster Relief teams, such as rescue and medical teams, JICA has undertaken cooperation projects for institutional enhancement, such as developing emergency-response systems and improving the emergency-response capacity.

1-2-1 Establishment of emergency-response systems

In order to establish emergency-response systems, JICA has dispatched study teams aiming to grasp actual disaster conditions immediately after disasters, and development of study/technical cooperation projects aiming for formulation of emergency-response plans and developing emergency-response systems. In order to prevent secondary disasters from earthquakes, JICA dispatches experts for emergency safety checks of buildings.

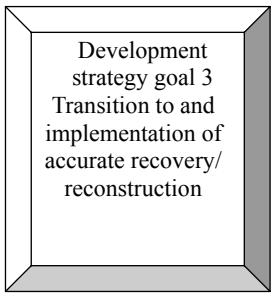
1-2-2 Rescue operations

Lifesaving and rescue activities of Japan Disaster Relief teams are an example of major cooperation for rescue operations. Mobile medical services are provided in disaster-stricken areas through grant aid.

Emergency assistance through international organizations are carried out in the form of emergency grant aid provided under the Japan International Cooperation System (JICS).

1-2-3 Support for affected people

As part of support for affected people, JICA conducts emergency relief operations, which include provision of emergency relief supplies such as food, drinking water and evacuation tents and also provides food and drinking water through international organizations such as UNICEF (United Nations Children's Fund) or WFP (World Food Programme). Also, JICA has conducted technical cooperation projects to develop emergency-response systems to help disaster victims conduct relief activities for themselves.



1-3 Transition to and implementation of accurate recovery/reconstruction

In order to achieve rapid and smooth transition from the response stage to the recovery/reconstruction stage, JICA makes efforts to promptly decide the location of the target regions and the details of recovery/reconstruction operations by dispatching the needs-assessment study teams for recovery/reconstruction assistance at nearly the same time as the Japan Disaster Relief teams are dispatched immediately after disasters. In recent years, JICA has dispatched study teams at the time of the Great Pakistan Earthquake of 2005 and the Central Java Earthquake of 2005.

The needs-assessment study for recovery/reconstruction assistance is undertaken in coordination with other aid organizations, such as the United Nations, the World Bank and the Asian Development Bank, with the purpose of effective and efficient assistance towards recovery/reconstruction.

1-3-1 Establishment of recovery/reconstruction systems

JICA conducts studies on the current conditions of disasters and the needs for recovery/reconstruction through dispatch of needs-assessment study teams to establish recovery/reconstruction systems. Based on the results of the studies, JICA supports the formulation of recovery/reconstruction plans of disaster-affected areas in the form of emergency-needs assessment on an as-needed basis, while keeping an eye on the ownership of the disaster-affected countries' recovery/reconstruction and actions of other donors (e.g., Sri Lanka and the Maldives at the time of the Earthquake off the Coast of Sumatra, and Muzaffarabad at the time of the Pakistan Earthquake). For the recovery/ reconstruction plans, JICA offers support for the formulation of urban plans, infrastructure recovery/reconstruction plans and land-use plans, in addition to basic policies, and also helps affected people regain their livelihoods.

Infrastructure refers to social capital for industrial development, such as roads, railways and dams. Recently, the term has included social capital such as hospitals and schools. Essential infrastructure for daily activities, such as water and sewage systems, electricity and gas, is sometime called "livelihood infrastructure."

1-3-2 Support for independence and rehabilitation of affected people

JICA's cooperation for independence and rehabilitation of affected people mostly focuses on the recovery/reconstruction of infrastructure. Examples include cooperation for reconstruction and seismic reinforcement of educational and medical facilities conducted after the earthquakes in Pakistan and Indonesia in recent years and cooperation for recovery of water and sewage systems following the earthquake in Iran. Also, as part of a recovery/reconstruction plan in affected areas, JICA has launched a program to determine the relocation areas through land-use plans, and to disseminate low-cost seismic reinforcement technology for housing that is suitable for reconstruction of houses in affected areas.

With empowerment, individuals and groups expand their own discretionary power and gain influence in the society. No single definition of empowerment has been widely accepted but "to have power" is the definition commonly used.

As a record of community-level assistance, there is a technical cooperation project conducted in Nicaragua, which was affected by Hurricane Mitch in 1998, with the aim of establishing local reconstruction organizations and rehabilitation of communities centered in impoverished disaster-affected rural areas, and there is an emergency development study to form plans for design and construction of community housing and design and construction of fishery facilities in Sri Lanka, which was devastated by the tsunami disasters off the coast of Sumatra in December 2004. In addition to these, JICA also dispatches volunteers for community empowerment through planning and implementation of participatory livelihood-improvement projects and education/ healthcare programs.

In the Maldives, cooperation has been implemented for the recovery of livelihood by providing care for affected people within the framework of an emergency development study: for example, development of social workers and support for independence of fishermen.

1-3-3 Recovery/reconstruction of social functions

For reconstruction/recovery of social functions, JICA has implemented recovery/ reconstruction of infrastructure, which includes rebuilding educational and medical facilities through grant aid and guidance on aseismic construction of facilities through technical cooperation projects, as provided in Pakistan and Indonesia.

1-3-4 Support in affected areas

Using the results of the needs-assessment study for recovery/reconstruction, JICA supports the formulation of recovery/reconstruction plans of disaster-affected areas in the form of emergency-needs assessment on an as-needed basis, while keeping an eye on the ownership of the disaster-affected countries' recovery/reconstruction and actions of other donors. For recovery/ reconstruction

plans, JICA provides support for the formulation of urban plans, infrastructure recovery/reconstruction plans and land-use plans in addition to basic policies, and also helps affected people rebuild their livelihoods. As a record of community-level assistance, JICA conducts technical cooperation projects, with the aim of establishing local reconstruction organizations and rehabilitation of communities centered in impoverished disaster-affected rural areas.

Annex Table: List of Selected Disaster-Reduction-Related Projects

No	Country	Project Title	Period	Type of scheme *Underlined is the type corresponding the relevant project	Medium-term Goal	Characteristics
1. Building disaster-resilient communities/societies						
1-1 Understanding of disaster risks						
1	Turkey	The Study on a Basic Plan for Disaster Prevention/Mitigation including Seismic Microzoning	2001-2002	Development Study (DS) →28 Technical Cooperation Project (TCP)	1-1 1-2	The study predicted potential disasters using a microzoning method and recommended disaster-reduction programs for both structural and non-structural measures. Structural measures include road expansion and disaster-reduction resources development, including urban structure development and re-development of roadside areas that require urgent response in order to reduce damage to buildings and infrastructure. Non-structural measures include improvements to building and disaster resources in the historic urban districts, introduction of emergency evacuation systems, and review of urban master plans and usage-specific restrictions on land. Based on the needs, technical cooperation projects, etc. are underway.
2	Iran	The Study on Microzoning of the Greater Tehran Area	1998-2000	DS →24 (DS) →41 (TCP)	1-1 1-2	The Study developed a microzoning map of the Greater Tehran Area (basic information for the formulation of earthquake disaster-reduction plan) using GIS, including databasing of natural and social conditions, ground survey, formulation of earthquake scenario, and prediction of disasters.
3	Armenia	The Study on Landslide Disaster Management	2003-2006	DS →31 Expert Dispatch(ED)	1-1 1-2	The Study formulated a national level master plan (M/S) for landslide measures, transferred technology for a landslide survey for the areas prone to landslide disasters, and implemented a priority project F/S (Feasibility Study), which is followed by the dispatch of experts for project management in a pilot village.
4	Algeria	The Study on Seismic Microzoning of the Wilaya Algers	2005-2006	DS	1-1	Focusing on the areas affected by the earthquake of May 2003, the study conducted earthquake disaster risk assessment through the formulation of a microzonation map, recommended disaster administration and transferred technology for the survey method.
1-2 Improvement of coping capacity of communities/societies						
5	Indonesia	The Study on the Flood Protection Plans in the Upper Citarum River Basin	1988	DS →Yen Loan by JBIC	1-2	Activities included formulation of a flood protection plan through river improvements in the upper river basin area where Bandon is located, river-improvement works (extension and widening of the river, making shortcuts), and development of flood-forecast and warning systems. Later, the project was implemented by funds provided by the JBIC.
6	Indonesia	The Volcanic Sabo Technical Centre the Sabo Technical Center of Indonesia	1982-1989 1992-1997	TCP	1-2	The project included formulation of a sediment-control plan against landslide disasters in volcanic regions, implementation of surveys, maintenance of equipment for hydrological experiments and radar ombrometer, etc., transfer of technology related to sediment-control project management, etc.
7	Philippines	Philippines Mount Pinatubo Western River Basin Floods and Mudslide Control Plan Survey	1996	DS →Yen Loan by JBIC	1-2	The Mudslide Control Plan was formulated (the plan includes mudslide prevention by a large-scale dam). Since a large amount of mud comes out of the Pasig river basin area, which is located in the vicinity of the survey areas, causing considerable damage, the survey target was extended to the Pasig river basin area and sediment-movement monitoring was implemented.
8	Honduras	Study on a Basic Plan for a Project for Flood and Sediment Control of Choloma River	1997-2000	DS →Grant Aid (GA)	1-2	The project implemented flood/and sediment control measures in the Choloma river area with river-improvement works (extension and widening of the river, installation of revetments) and sediment-control projects (construction of sediment-control dam/riverbed improvement works)
9	Philippines	Study on a Basic Plan for a Project for Flood Mitigation Project in Ormoc City	1997-2000	DS →GA	1-2	No flood has occurred since the completion of river improvement and sediment-control facilities. Even when sediment disaster occurred in Southern Leyte Province in the Leyte Island in December 2000, no flood occurred in Ormoc. Thus, the project was highly appreciated by the local residents.
10	Romania	Project on the Reduction of Seismic Risk for Buildings and Structures	2002-	TCP	1-2	The technology transfer project was conducted on raising awareness among local residents, for seismic test on buildings in Bucharest, formulation of a manual for seismic reinforcement, and promotion of seismic constructions.

11	Peru	Training/Dissemination of Low-cost Technology for Seismic Adobe Houses	2003-2006	TCP	1-2	This project targets the poor people who live in adobe houses and are thus highly vulnerable to earthquakes, with the objectives of increasing awareness of the importance of earthquake-resistant houses and promoting the construction of earthquake-resistant adobe houses through training and dissemination activities of construction technologies of low-cost earthquake-resistant houses using traditional material called adobe.
12	El Salvador	Enhancement of Technology for the Construction of Popular Earthquake-Resistant Housing	2003-	TCP	1-2	The project aims to promote the earthquake-resistant houses among the poor through the development of seismic test facilities and implementation systems for popular housing, the improvement of seismic testing skills of researchers and engineers, the enhancement of the capacity of earthquake-resistant housing disseminators, and the construction of model earthquake-resistant houses.
13	Ecuador	Enhancement of Volcano Monitoring Capacity	2004-	TCP	1-1 1-2	The project aims to improve the ability to collect data on volcanic activities, ability to accurately process and accumulate data, ability to analyze volcanic activities concerning eruptions, and ability to send volcanic information.
14	Turkey	Seismic Reinforcement Project for Large-Scale Bridges	2004-2006	ED (long-term)	1-2	The experts gave advice to the Ministry of Public Works and Settlement for the maintenance, management and seismic reinforcement of large-scale bridges in Istanbul.
15	Iran	Study on Flood and Debris Flow in the Caspian Coastal Area Focusing on the Flood-hit Region in Golestan Province	2004-2006	DS	1-2	The project formulated a master plan and conducted feasibility studies on flood and debris-flow measures for the Madarsoo river, in Golestan province.
16	Rumania	Study on Protection and Rehabilitation of the Southern Romanian Black Sea Shore	2005-2007	DS	1-2	The project formulated a master plan for seashore conservation against erosion of the southern Romanian Black Sea Shore, and urgently conducted feasibility studies on the two coasts
17	Tajikistan	Project on Natural Disaster Prevention in Pyanji River	2006-	DS	1-2	This project aims to improve safety and the coping capacity against floods and to reduce disasters through formulation of a comprehensive disaster-reduction plan (master plan) against floods, which frequently occur in Pyanji river, and implementation of a feasibility study on priority projects.
18	Bhutan	Seismic Investigation for Structures	2004-	Volunteer Dispatch (VD)	1-2	Together with a counterpart, the Ministry of Public Works investigates seismic resistance of buildings at 50 locations within the Capital and provides advice for measures based on the results.
19	Mongolia	Earthquake Resistance Construction	2005-	VD	1-2	Advice is provided on the improvement and development of the lesson curriculum concerning earthquake-resistant design/construction and the teaching materials and research facilities at the Infrastructure Training Center in Ulan Bator.
20	Mexico	Earthquake Disaster-prevention Project	1989-1996	TCP	1-2	Technology was transferred to Mexico's Disaster-Prevention Center (CENAPRED) to enable the center to act as a central organization in the Central and South America to conduct research and training of earthquake resistance technologies and to carry out disaster-prevention dissemination projects.
21	Morocco	Flood Forecasting System for Atlas Region	2000-2004	DS	1-2 2-1	The 1995 flood and landslide disaster in Morocco claimed 180 lives (including tourists). Following the disaster, six hydrological observatories were established in the most damaged Ourika river basin area. The project formulated a master plan for a flood-forecast and warning system to ensure further safety in the river basin.
22	Indonesia	Integrated Sediment-Related Disaster Management Project for Volcanic Areas	2001-2006	TCP	1-2	The project aims to empower the administration and residents in the volcanic regions to work together to plan and implement projects to reduce risks of sediment disaster.
23	Columbia	Study on the Disaster Prevention in the Bogota Metropolitan Area	2001-2002	DS → 32 (DS)	1-1 1-2	In order to protect lives and properties in the capital of Bogota from earthquakes, the project made a disaster estimation and formulated a development plan for development of disaster-reduction systems, aseismic reinforcement of urban facilities and buildings, development of response measures and dissemination and raising of disaster-prevention awareness.
24	Iran	Comprehensive Master Plan on Urban Seismic Disaster Prevention and Management for the Greater Tehran Areas	2002-2004	2→DS→41	1-1 1-2	The project conducted the following activities in the Greater Tehran areas with high disaster risks: development of disaster-prevention systems, formulation of framework of each phase of prevention, response, and recovery/reconstruction, and recommendation on priority projects.
25	Philippines	Study on the Plan for the Earthquake	2002-2004	DS	1-1 1-2	The project formulated a plan for earthquake disaster-prevention measures to improve

		Disaster-prevention Measures			2-1	disaster-reduction functions and protect social & economic organizations as well as government and national functions in the Manila metropolitan area.
26	Central America	Enhancement of Wide-area Disaster-reduction Systems (Individual)	2003-2006 2006-2008	ED (Long-term)	1-2 2-1	The project implements activities to strengthen the coordination ability of the Center of Coordination for the Prevention of Natural Disasters in Central America (CEPREDENAC) at the regional level and of disaster-reduction organizations of each country, which are affiliated with the CEPREDENAC, to promote collaboration of stakeholders and to enhance their implementation ability. The main objective it to establish systems for effective response to disasters by efficiently utilizing resources of other countries and sharing their knowledge and expertise on natural disasters commonly experienced in the Central American region, such as hurricanes, floods, earthquakes and volcanic eruptions.
27	Philippines	Improvement of the Earthquake- and Volcano-Monitoring Network	2004-2006	TCP	1-2 2-1	The project aims to improve monitoring capacity of earthquake and volcanic activities and to promote the development of accurate/prompt disaster information systems in the Philippines: the country located in one of the most active earthquake and volcanic zones.
28	Turkey	Earthquake Disaster Mitigation Project	2005-	1→TC	1-2	The project promotes the introduction of disaster-reduction measures in every city of the country by transferring Japan's disaster-reduction experience to the mayors.
29	Iran	Earthquake Disaster Management	2005-	Training (Country-specific)	1-2	This project implements training in Japan for central government agencies to increase disaster-reduction awareness and transfer technology for earthquake-resistant structures and Japan's experience.
30	Malaysia	Tsunami Early Warning Technology	2006	TCP	1-2 2-1 2-3	The project aims to give instructions on the operation of newly installed tsunami early warning systems and to promote implantation of evacuation drills.
31	Armenia	Development of Landslide-Prone Areas	2006	3→ED (short-term)	1-1 1-2 3-2	The project supports projects for landslide-control works, which continue to be implemented by Grant Aid for Grass-Roots Groups, in the model villages of the pilot project of the "development study." The major activity is the supervision of the "infrastructure-development works for the treatment of surface water," and advice was also provided on monitoring of landslides, which was conducted in the development study.
32	Columbia	Study on Landslide/Flood Monitoring and Early Warning Systems	2006-	DS	1-1 1-2	Targeting the capital of Bogota and the neighboring city of Soacha, the Project conducts flood and landslide monitoring, formulates a master plan for forecast and warning systems and develops experimental forecast and warning systems.
33	Thailand	Project for Enhancing Coping Capacity	2006-	TCP	1-2	The project aims for capacity enhancement of the disaster-reduction offices of Thailand (both at the national and local levels) and for improvement of disaster education.
34	Sri Lanka	Study on the Plan for the Enhancement of Disaster-Management Functions	2006-	DS	1-2 2-1 2-3	The project conducts the following four activities: 1) capacity development of disaster-reduction centers, 2) revision of master plan for anti-flood measures and formulation of action plan, 3) establishment of early warning/evacuation systems, and 4) promotion of community-based disaster reduction.
35	Thailand	Advice on Strengthening the Functions of the Disaster Management Academy	2006-	ED (long-term)	1-2 2-1 2-2 2-3	The project improves training courses of training institutions for those engaged in disaster prevention. Training covers a range of themes (e.g., emergency response, development of community volunteers, and formulation of hazard maps), for a wide range of trainees from government officers to local residents.
36	Central America	Disaster-reduction Measures Course II in Central America	2006-	Training (region-specific)	1-1 1-2 3-2	The project is implemented to enhance the problem-solving capacity for disaster reduction particularly of central and local governments so that a disaster-prevention culture and disaster management can be developed and promoted through the collaboration of various organizations (central government, local governments, research institutions and civil organizations) that are associated with disaster prevention in Central America, which is commonly faced with serious disasters, such as hurricanes, floods, earthquakes and volcanic eruptions.
37	Indian Ocean Countries	Seminar on Establishment of Early Warning Systems for Indonesian Tsunami	2005-2006	Training (region-specific)	1-2	The project was conducted to improve knowledge by inviting officers in charge of disaster-reduction departments and tsunami-monitoring departments of Indian Ocean countries that had been affected by the Indian tsunami disasters on December 26, 2004, so that they could take the initiative for tsunami

						disaster prevention and for the establishment of tsunami early alert systems.
38	Indonesia	Enhancement of Flood-Management Organization in Jakarta Metropolitan Area	2006-	TCP	1-2	The project strengthens the organizations related to flood control to mitigate flood disasters in the Jakarta metropolitan area through non-structural measures, including optimal utilization of existing facilities, review of flood hazard maps and warning criteria, and study on countermeasures against runoffs in basins.
39	Indonesia	Study on Natural Disaster Management Plan	2006-	DS	1-2	The project formulates a national disaster-reduction plan and local disaster-reduction plans in the model areas. It also conducts capacity development of disaster-reduction-related organizations at each level: central government, local governments and communities.
40	Indonesia	Volcanic Earthquake Observation	2002-	VD	1-2	The project transfers monitoring technology and analysis technology and offers advice on monitoring plans to staff members of the Volcano Bureau of the Ministry of Energy and Mineral Resources.
41	Malaysia	River Improvement	2005-	VD	1-2	The project transfers technologies related to river control, such as river environment conservation, land use in near rivers, prevention of river erosion, to the employees of the River Council and conducts related coordination.
2. Response that reaches affected people quickly and effectively (protection of life)						
2-1 Establishment of response systems						
42	Iran	Project on the Establishment of Emergency-response Plan for the First 72 Hours After an Earthquake	2006-	2→ 24→ TCP	2-1 2-2 2-3 3-1	The project aims to improve the post-earthquake response capacity of Tehran through review of the response plan of Tehran, the development of an early estimation system of damage to determine resource allocation at the time of an earthquake and the establishment of resident-level post-earthquake response systems.
43	Columbia	Post-Earthquake Inspection on Structures	2007	ED (short-term)	2-1	The project aims to improve the method for emergency safety checks and the method to develop human resources engaged in emergency safety checks to determine the safety of buildings and structures after earthquakes.
2-2 Rescue operations						
44	Indian Ocean Countries	Japan Disaster Relief (JDR) teams for the Earthquake off the Coast Sumatra/Tsunami Disasters	2004	Japan Disaster Reduction (JDR)	2-1 2-2 2-3 3-1	Emergency relief operations were conducted through dispatch of relief and medical teams and provision of emergency supplies in response to the Sumatran Earthquake and Tsunami Disaster of December 2004.
2-3 Assistance for affected people						
45	Pakistan	JDR teams for Great Pakistan Earthquake	2005	(JDR)→ Project Formulation Study (PFS)	2-1 2-2 2-3 3-1	Emergency relief operations were conducted through dispatch of relief and medical teams and provision of emergency supplies in response to the Great Pakistan Earthquake of October 2005.
46	Indonesia	JDR teams for the Central Java Earthquake	2006	JDR →PFS	2-1 2-2 2-3 3-1	Emergency relief operations were conducted through dispatch of relief and medical teams and provision of emergency supplies in response to the Central Java Earthquake of May 2006.
3. Transition to and implementation of accurate recovery/reconstruction						
3-1 Establishment of recovery/reconstruction systems						
47	Indian Ocean Countries	Needs Assessment for the Earthquake Off the Coast Sumatra/Tsunami Disasters	2005	PFS→DS/TCP/GA	3-1	Members of the research team of this project participated in the Project-Formulation Study Team. Assessment of current conditions and discussions on the feasibility of assistance were conducted in the following aspects: analysis of disaster-reduction measures and strategies, urban disaster reduction, database, water and sewage systems, social development, local promotion plan, urban plan, etc.
48	Pakistan	Needs Assessment for the Recovery/ Reconstruction from the Great Pakistan Earthquake	2005	PFS→DS/TCP/GA	3-1	The project assessed the needs for recovery/reconstruction after the Great Pakistan Earthquake of October 2005, and recommended support measures, including formulation of an urban reconstruction plan, rebuilding of schools and medical facilities, secondary risk assessment, dissemination of a low-cost aseismic method, which had led to formulation of projects.
49	Indonesia	Needs Assessment for the Recovery/ Reconstruction from the Central Java Earthquake	2006	PFS→DS/TCP/GA	3-1 3-2	The project assessed the needs for recovery/reconstruction after the Central Java Earthquake of May 2006, and recommended support measures, including rebuilding of schools and medical facilities, secondary risk assessment, dissemination of aseismic reinforcement of housing, which had led to formulation of projects.
3-2 Support for independence and rehabilitation of affected people						
50	Iran	Study for the Reconstruction from the Bam Earthquake *Implemented as part of the Comprehensive Master	2004-2005	DS	3-1 3-2	Targeting the areas affected by the Bam Earthquake of December 2003, the project implemented detailed needs-assessment studies in three areas: water supply, community reconstruction and agriculture. Based on the

		Plan Study on Urban Seismic Disaster Prevention and Management for the Greater Tehran Area				results, support for the reconstruction water supply facilities was decided, which was followed by the formulation of a medium- and long-term reconstruction plan for water supply and implementation of a reconstruction project for water supply facilities.
51	Pakistan	Guidance Project for Seismic Construction of Healthcare Institutions	2006-2007	47→TCP	1-2 3-1	The project aimed to develop the management capacity of the counterpart through the formulation of earthquake-resistant design and a construction control manual for primary healthcare facilities that were damaged by the earthquake in October 2005 and to transfer of construction technology by building a model healthcare facility.
52	Maldives	Emergency Rehabilitation and Reconstruction Support following the Major Earthquake Off the Coast of Sumatra and Tsunami in the Indian Ocean	2005-2006	46→DS	1-2 3-1 3-2	The project provided support for the formulation of reconstruction plan/policy, formulation of plans for designing and construction of community houses, and formulation of plans for designing and construction of fishing facilities in local Maldivian islands that had been devastated by tsunami disasters in December 2004.
53	Sri Lanka	Study on the Rehabilitation and Reconstruction of North-Eastern areas	2006-	46→DS	1-2 3-1 3-2	The project provided care for affected people in three provinces northeast of Sri Lanka that were devastated by tsunami disasters in December 2004, including support for the development of camping sites, support for recovery/reconstruction plan for affected areas, development of social workers and support for independence of fishermen.
54	Sri Lanka	Dispatch of Short-Term Volunteers following the Tsunami in the Indian Ocean	2005	46→VD	3-2	With the aim of alleviating the stress, nervousness, fear and fatigue of those who had been affected in the disaster-stricken areas, the project groups visited the disaster-stricken areas, including evacuation camps, and conducted various activities, such as games, puppet shows, picture-story shows and sport games.
55	Sri Lanka	Dispatch of Volunteers for Reconstruction Support following the Tsunami in the Indian Ocean	2006	46→VD	3-2	The project aimed to improve the livelihood of affected people in the tsunami-affected areas by conducting training for income improvement and by implementing programs for the introduction of microfinance while incorporating the community-empowerment method.
3-3 Recovery/reconstruction of social functions						
56	Pakistan	Outline Design Study Team on Non-Project Grant Aid for Earthquake Damage Facilities in Northern Pakistan	2006	47→GA	1-2 3-2	Targeting two northern provinces that had been damaged by the earthquake of October 2005, the project provided support for reconstruction of healthcare facilities (primary healthcare facilities, secondary healthcare facilities, central hospitals) and primary and junior high schools.
57	Indonesia	Outline Design Study Team on Reconstruction Plan for the Central Java Earthquake	2006-	48→GA	1-2 3-2	For the recovery from the Central Java Earthquake of May 2006, the project formulated outline designs with an aim for the reconstruction, functional recovery, and seismic reinforcement of schools and healthcare facilities.
3-4 Rebuilding of affected areas						
58	Nicaragua	Reduction of Vulnerability against Natural Disaster and Community-based Rural Development Project in Villanueva City	2003-	PFS→TCP	1-2 3-1 3-2	Focused on poor villages damaged by Hurricane Mitch in 1998, the project aims to reduce economic and social vulnerability to disasters through the formulation of development plans related to environmental measures and enhancement of productivity by a participatory development method, as well as through the formulation of disaster-reduction plan of each community.
59	Pakistan	Development Study on Rehabilitation and Reconstruction in Muzaffarabad	2006-2007	47→DS	1-1 1-2 3-1 3-2	The project implemented various activities for the recovery and reconstruction of Muzaffarabad, located near the epicenter of the earthquake of October 2005. The activities include formulation of a land-use plan, reconstruction plan and development of hazard maps, and implementation of priority rehabilitation projects.

Annex 2. Efforts for Disaster Reduction of Major Donors and Related Organizations

This section outlines basic policies on disaster reduction, characteristics of assistance and demonstrable cases of major international organizations, such as the United Nations (UN), the World Bank (WB), the Asian Development Bank (ADB), the United Nations Development Programme (UNDP), the United States Agency for International Development (USAID), GTZ (German Agency for Technical Cooperation) and DFID (Department for International Development). The approaches of the international organizations and donors that are not listed in this section are summarized in 2-7.

1. United Nations (UN)
(United Nations：UN)

2-1 United Nations (UN)

Conflict prevention, peace building, reform of the peace-keeping sector and legal systems, mine removal, reduction of small arms and light weapons, disarmament of former combatants, etc.

2-1-1 Basic policies concerning cooperation for disaster reduction and characteristics of assistance[18]

The United Nations Development Program (UNDP) is currently providing assistance focusing on risk management and reconstruction to prevent and mitigate disasters. The area of disaster reduction has been the core of the UNDP since 1989. The UNDP raises awareness and encourages actions to formulate basic disaster-reduction plans, measures and structures and advocates the policy of promoting disaster-reduction activities.

The Disaster Risk Index was first introduced in the 2004 UNDP report titled "Reducing Disaster Risk: A Challenge for Development," which measures and compares the relative level of physical damage, vulnerability and risk of countries to natural disasters to determine the vulnerability of countries.

The United Nations General Assembly is currently transferring management operations associated with natural disaster prevention to the UNDP from the Emergency Relief Coordinator. The UNDP Bureau for Crisis Prevention and Recovery (BCPR) has contributed significantly to the progress and development of implementing organizations that emphasize disaster-reduction activities.

The UNPD has played an active and important role in the establishment of the International Strategy for Disaster Reduction (ISDR).

Furthermore, UN organizations associated with disaster reduction include the

[18] See the website of the Ministry of Foreign Affairs, Reducing Disaster Risk: A Challenge for Development UNDP (http://www.mofa-irc.go.jp/link/link.htm)

United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), established in 1997 as an office of the UN Secretariat, and the United Nations Center for Regional Development (UNCRD), established in 1971.

Activities of UNOCHA include those related to humanitarian assistance, such as coordination of emergency humanitarian assistance and formulation of measures for humanitarian assistance and those associated with management of programs for disaster and damage reduction, such as a comprehensive regional information network and management of Relief Web, among others.

The UNCRD conducts projects from three perspectives, namely human security, the environment and disaster reduction, with the aim of realizing the concept of sustainable local development. Specific activities include training for administrative officers of developing countries, research and studies including development teaching materials with the theme of local development, provision of advice to government agencies and NGOs, and information network management.

2-1-2 Outline of major cooperation activities[19]

The UNDP conducts activities in cooperation with other organizations for effective disaster reduction. Initiatives taken by the UNDP with partners are described below.

Evaluation of reconstruction from earthquake disaster in Pakistan (October 2005 -)

The catastrophic earthquake of October 8, 2005 in Pakistan, near the northern border with India, left 74,651 people dead, 4 million[20] injured and several tens of thousands of schools, hospitals and houses destroyed. Concerned international organizations provided relief supplies and dispatched medical teams as an emergency response. Specifically, organizations such as UNICEF, WHO, UNFPA, UNHCR and WFP distributed blankets, tents, food, medical help and services. WHO and UNICEF jointly dispatched 17 medical teams and the UNDP and OCHA pledged to provide $100,000 as an initial support for relief operations.

Together with FOA, WFP and IOM, the UNDP repaired paths of 115 km, cattle ponds, water supply systems, footpaths of 23km, and irrigation drains of 50km. In cooperation with the UNHCR, the UNDP provided tents, blankets and sleeping bags to 170 camping sites where approximately 200,000 evacuees were sheltered.

Delivery of radios and information transmission for tsunami-stricken areas in Indonesia (detailed dates are unknown)

On December 26, 2004, an earthquake off the coast of Sumatra triggered a tsunami,

[19] See Relief Web (http://www.reliefweb.int/rw/dbc.nsf/doc100?OpenForm)
[20] See 2006 White Paper on Disaster Reduction

leading to the loss of an enormous amount of lives and properties. Following the tsunami, more than 1000 aftershocks have been recorded on Simeulue Island, near the earthquake epicenter, as of May 2006. Many people lived in remote villages with limited access to information, and little media information reached the local people. The damage to TV stations and newspaper companies was substantial and they were unable to function properly. In response, the UNDP delivered 35,000 radios in Ace. Radios that have been suitable for the local conditions were selected: specifically, manually operated radios, electric radios, solar powered radios, etc. The recipients were selected based on the assessment study of the UNDP. People in Simeulue found radios essential to surviving future disasters, and the provision of radios was highly appreciated.

Survey on the occurrence of landslide and flood disasters in Kirgizstan (detailed dates are unknown)

Osh and Jalalabad in Kirgizstan have experienced more than 500 phenomena associated with natural disasters such as earthquakes, landslides, and avalanche, during several years prior to May 2006. Two disasters occurred in these two areas in 2004 and 2005, claiming the lives of approximately 150 people. In response to these events, the UNDP conducted studies on natural disasters in southern Kirgizstan. Target areas of these studies are Osh and Jalalabad since these two regions are prone and most vulnerable to disasters in Central Asia.

As a result of studies, it was found that one serious issue that faces Osh is landslides, and Jalalabad should stay alert to flood risks.

2. The World Bank (WB)

2-2 The World Bank (WB)

2-2-1 Basic policies concerning cooperation for disaster reduction and characteristics of assistance[21]

・ Reconstruction and development assistance are the basic instruments.
・ There is a plan to increase investment in response and technical assistance using the good practice in Mexico as a reference.

Cooperation for disaster reduction of the World Bank (WB) aims to contribute to the ultimate goal of poverty reduction by reducing human and economic losses caused by natural and man-made disasters. The Hazard Risk Management team of the Urban Development Sector Unit plays a central role. Once a disaster occurs, a Quick Reaction Team is formed, which consists of registered staff from each Sector Unit with expertise suitable to the type of disaster.

The Natural Disaster Hotspot Study (2005) analyzes and ranks the natural disaster (earthquake, volcanic eruption, sediment disaster, flood, drought, cyclone) of countries.

[21] See Hazard Risk Management-Overview (http://worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/EXTDISMGMT/O,,contentMDK:20177859~menuPK:341023~pagePK:148956~piPK:216618~theSitePK:341015,00.html)

Reform: shift from post-disaster response to preparation

A report of an independent-assessment committee reviews disaster-reduction measures of WB taken in the past 20 years and presents the following four recommendations: 1) shift from post-disaster response to pre-disaster prevention, 2) development of flexible assistance tools, 3) incorporation of the perspective of disaster reduction into development plans and poverty-reduction strategies, and 4) promotion of cooperation among donors. Various projects are currently undertaken in line with the report. For instance, the Global Facility for Disaster Reduction and Recovery was established jointly with the ISDR to prioritize disaster reduction in the development strategies and promote fund pooling, in addition to the revision of emergency response specifications.

WB adopts approaches not only by disaster types but also by country characteristics, such as more developed countries, LICUS (low income countries under stress), and island countries. WB recently established the Caribbean Catastrophic Risk Insurance Initiative to enable small islands (a disaster may affect the entire island) to have access to the international disaster insurance market through regional cooperation.

2-2-2 Outline of major cooperation activities[22]

Major disaster-reduction-related projects funded by WB are listed below.

China: Chongging Small Cities Infrastructure Improvement Project (June 2005–June 2012)

The Chongging Small Cities Infrastructure Improvement Project aims to build infrastructure in response to the rapid growth of cities. The following five points are the major components of the projects:

- Urban water supply
- Flood protection measures (Building of flood protection embankments and extension of existing flood protection embankments)
- Road improvement and construction
- Environmental sanitation
- Institutional strengthening and training

Natural Disaster Vulnerability Reduction Project for Columbia (Phase 1) (May 2005-December 2011)

The objective of this project is to strengthen coping capacity to natural disasters. This is achieved by reducing vulnerability in municipalities to risks and by

[22] Refer to the Project Database of the WB website (http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/0,,menuPK:115635~pagePK:64020917~piPK:64021009~theSITEPK: 40941,00.htm)

managing disaster risks of the state. The major components of the projects are listed below.

- To strengthen the Disaster Risk Information System (DRIS) and the information-collection capacity of the National Disaster Prevention and Attention System (SNPAD)
- To analyze risks of municipal governments
- To strengthen SNPAD capacity by involving the Ministry of Environment and related agencies in the disaster vulnerability-reduction program
- To improve risk awareness and to support emergency response activities

Hunan Urban Development Project for China (September 2004–December 2010)

The project aims to support sustainable development among a selected set of development areas in the Changsha-Zhuzhou-Xiangtan Region. The project comprises five components.

- To develop flood protection measures and roads along the embankments
- To strengthen sewage-treatment capacity
- Construction of production factory of low-sulphur coal
- Sustainable redevelopment of scenic area
- Technical assistance for project-implementation capacity

3. Asian Development

- Discussions are underway about the shift from post-disaster assistance to pre-disaster assistance.
- ADB does not provided disaster relief.
- ADB supports disaster-reduction-related technologies.
- ADB provides loans for reconstruction.

2-3 Asian Development Bank (ADB)

2-3-1 Basic policies concerning cooperation for disaster reduction and characteristics of assistance[23]

The Asian Development Bank (ADB) was set up in December 1966 as a regional development bank that provides investments, loans and technical assistance aiming for the promotion of economic development in the Asia-Pacific area.

ADB is involved in disaster reduction and reconstruction in the areas of disaster management and emergency assistance, focusing on prediction of disaster damage, disaster prevention and reduction measures, in addition to post-disaster measures. ADB's assistance, comprising loans, grant aids, and technical cooperation, supports the implementation of development projects to improve local economy, but does not include peace-keeping or humanitarian relief operations. The areas outside the scope of ADB's assistance are covered by other international organizations, NGOs and the UN.

[23] See ADP website (http://lnweb18.worldbank.org/ESSD/ardext.nsf/18ByDocName/Projects)

2-3-2 Outline of major cooperation activities[24]

Yellow River Flood Management Sector Project for China (August 2001–December 2005)

The Yellow River has the second largest river basin in the People's Republic of China. Rich agricultural land stretches and urbanized sections are located in the river basin area, and a flood of the Yellow River leaves considerable damage. Thus, the ADB provides loans of US$ 150 million for a flood-management project in the flood-prone river basin area. There are four objectives in this project.

1) To strengthen the flood-management capacity of the government
2) To introduce embankment and a flood-control system using the most advanced technology
3) Forestation along the embankment
4) To raise the most vulnerable land

Flood Protection Project for Bangladesh (1991–)

As much as two-thirds of the land area of Bangladesh was inundated during floods that occurred in 1988 and 1998. Following these, the World Bank led other international organizations to formulate the Flood Action Plan (FAP), based on which the National Flood Protection Plan was developed.

Within the framework of the FAP, the ADB has contributed to the safety of Bangladesh through the Secondary Towns Integrated Flood Projection Project.

Infrastructure facilities were damaged by the flood of 2004. In response, the ADB, WB and the government of Bangladesh jointly conducted damage assessment and formulated the Emergency Flood Rehabilitation Project (January 2005–January 2007).

Emergency Flood Rehabilitation Project in Cambodia (December 2000–June 2004)

More than half of the land area of Cambodia was inundated during the 2000 flood, causing devastating damage to the infrastructure. The country was also damaged by a 1996 flood. Thus, the Cambodian government asked the ADB and other donors to provide emergency support for rehabilitation of infrastructure, and the ADB responded accordingly.

The project comprises five components: restoration of national transportation systems, rehabilitation of flood control and irrigation facilities, restoration of local infrastructure facilities, repair of educational and healthcare facilities, and support for monitoring organizations.

[24] Refer to project information on the ADB website (http://www.adb.org/Projects/summaries.asp), JICA's website (http://www.jica.go.jp/infosite/evaluation/index.htm) and Relief Web (http://www.reliefweb.int/rw/dbc.nsf/doc100?OpenForm)

The United States Agency for International Development (USAID)

・Assistance through ODA
・Life-saving activities, disaster reduction, and prevention of economic loss of disasters
・Prevention of conflict, humanitarian assistance

2-4 The United States Agency for International Development (USAID)

2-4-1 Basic policies concerning cooperation for disaster reduction and characteristic of assistance[25]

The Office of U.S. Foreign Disaster Assistance (OFDA) of USAID assumes promotion and coordination of relief assistance by the United States. The OFDA conducts humanitarian assistance for rescue operations, reduction of human damages reduction and reduction of social and economic impacts from emergency situations.

In addition to humanitarian assistance, the OFDA provides assistance for various natural disasters, such as earthquakes, volcanic eruptions, cyclones, floods, droughts and occurrence of communicable and infectious diseases. It also provides assistance for man-made disasters such as conflicts, terrorist attacks and industrial accidents.

In addition to emergency relief, the OFDA has provided assistance to reduce the impact of natural disasters in recent years and implements training to improve disaster management and coping capacity at the local level.

2-4-2 Outline of major cooperation activities[26]

Response to tsunami disaster in Indonesia

A major M7.7 earthquake occurred in the ocean south of Java, Indonesia at 3:19 p.m. (local time) on July 17, and a tsunami generated by the earthquake hit central and western Java. The next day, a concerned organization of Indonesia announced that the tsunami killed about 300 people and injured more than 400. The tsunami also damaged buildings, houses and fishing boats extending 175km along the coast of south Java. The greatest damage was inflicted on Pangandaran beach, the resort area of Ciamis.

USAID/OFDA immediately contributed US $50,000 to the Indonesia Red Cross, the International Federation of Red Cross and Red Crescent Societies. The money was financed through the USAID Indonesia Country Office, and used in the tsunami disaster-stricken areas. The American Embassy and the USAID Indonesia Country Office monitored the conditions of the disaster.

Response to earthquake in Pakistan

Immediately after the occurrence of an earthquake on August 8, USAID dispatched a Disaster Assistance Response Team (DART). DART investigated supplies

[25] Refer to the USAID Disaster Assistance website (http://www.usaid.gov/our_work/humanitarian_assistance/dissaster_assistance/).
[26] See the website Relief Web (http://www.reliefweb.int/rw/dbc.nsf/doc100?penForm).

required at the evacuation sites and started giving assistance using stockpiles of the OFDA. The OFDA started to deliver daily necessities to the evacuation sites by air within two days after the occurrence of the earthquake.
USAID dispatched experts to the affected areas to implement the best intervention method for the affected people.

5. The German Agency for Technical Cooperation (GTZ)

2-5 The German Agency for Technical Cooperation (GTZ)[27]

2-5-1 Basic policies concerning cooperation for disaster reduction and characteristics of assistance

・ Disaster-risk management aiming for long-term development
・Activities centered in Latin America

Interest in the relationship between development and disaster has increased since the 1990s. The GTZ has been involved in disaster-risk management representing the Ministry of Economic Assistance and other donor organizations of Germany since 1997.
The following two factors are the reasons that the GTZ has been involved in disaster risk management in developing countries.

・Natural disasters are a threat to sustainable development of society and the economy and to progress of the ecosystem.
・Development entailing long-term effects is guaranteed only when vulnerability to disasters is reduced through appropriate actions.

The GTZ conducts cooperation for disaster reduction by incorporating disaster-reduction components, such as reduction and management of disaster risks, into various projects, including education, sustainable management of agricultural resources, community development and construction of infrastructure. Other cooperation for disaster reduction includes establishment of strategic cooperation systems with both domestic and international organizations and human resources development.
Most of the activities of the GTZ for disaster reduction take place in Latin America and some cooperation is conducted in Asia and Africa. The cooperation targets mostly local governments and some cooperation targets larger areas or central governments. The GTZ specializes in the following five areas:

・Planning and implementation of contingency analysis (mapping of vulnerability

[27] See the GTZ Disaster Risk Management website (http://www.gtz.de/en/themen/uebergreifende-themen/krsisenpraevention/1817.htm).

using GIS)

・Development and implementation of risk-reduction activities concerning local organizational structures

・Planning and implementation of hazard-prediction activities

(Forecast/warning, disaster-reduction plan, enlightenment activities, assistance for organizations)

・Incorporation of comprehensive disaster-reduction plan into land-use plan

・Incorporation of disaster-reduction plan into recovery/reconstruction plan

2-5-2 Outline of major cooperation activities

Disaster risk management incorporated into regional development plan for Mozambique (January 2004–December 2009)

There are plans to incorporate community-based disaster risk management into regional development plans for Inhambane and Sfala, Minica. What is intriguing is that high precision risk analysis is incorporated into regional development plans, in addition to capacity development of communities through the joint introduction of training and priority measures.

Flood-control measures and disaster-risk management in Mekong Delta countries (Vietnam, Cambodia, Thailand, Lao PDR) (July 2004–June 2007)

Flooding of the Mekong River imposes serious concerns on the neighboring countries. The GTZ provides assistance for countermeasures against flood disasters and land-management measures to disaster-reduction organizations of the national and local governments.

Strengthening disaster- risk management capacity focusing on landslides in Sirinko, western Uganda (February 2002–December 2002)

Landslides that occur every year in the mountainous areas of Uganda result in considerable economic losses. This project conducted research on the complicated causes for landslides and formulated an implementation plan for disaster-risk management. Promotion of community awareness of disasters is included in the project objectives and the project used radio broadcasts to help residents of remote areas to evacuate.

2-6 Department for International Development (DFID)[28]

Department for International Development (DFID)

f Disasters—Helping to Achieve Sustainable Poverty Reduction in a Vulnerable World: A DFID policy paper, DFID, March 2006.

・The Conflict and Humanitarian Affairs Department is responsible for countermeasures to natural disasters and disasters caused by conflicts.
・NGOs are regarded as an important assistance channel for emergency relief.

2-6-1 Basic policies concerning cooperation for disaster reduction and characteristics of assistance

The objective of disaster risk reduction measures of the Department for International Development (DFID) is to contribute to sustainable development through reduction of disaster loads of the most vulnerable and poor conditions. The DFID has established the following three action goals.

- To incorporate risk reduction into development and humanitarian measures and plans in a desirable manner
- To assist international organizations and central and local governments with the aim to reduce risks of disaster-prone developing countries
- To reduce risks through capacity enhancement and livelihood reconstruction of the poor

2-6-2 Outline of major cooperation activities

Comprehensive Disaster-Management Programme for Bangladesh

The government of Bangladesh has been committed to the Comprehensive Disaster-Management Program since 2003 with substantial cooperation from the UNDP and DFID. The objective is to promote effective government-led disaster management and to strike a balance of necessity for effective coping capacity of risk management. This helps the government to establish a solid foundation and to achieve harmonized bilateral assistance.

Achievements of the cooperation include improving coordination among major government organizations concerning disaster risks in Bangladesh, improving the livelihood of the people living in disaster-prone areas, strengthening coping capacity for risks in local and central areas, and deepening understanding about long-term climate change.

Fostering of resilience and promotion of development and education for Cambodia

The Department of Education of the Cauca University in Columbia teaches children and university students how to prevent disasters using the game Riskland, developed by funds from the DIFD. Through this game, children will be able to think of ways to respond to threats and dangers in their living environments. Children learn not only about the environment and risk reduction, but also about how risk management is associated with their daily lives.

Effective response and preparation in Albania

In 2004, the government of Albania approved the national disaster-management plan, which is the basis for disaster management at the national level. This plan is to connect the central government with the local governments by harmonized risk management. The coordination between the central government and the local governments is managed by the state organization where information collection and monitoring are conducted, and thus responding to emergency situations in Albania. As a result, an organization that can comprehensively respond to emergency situations has been established. The DFID provided assistance through the UN in the process of implementation of this plan.

2-7 Other donors/concerned organizations

Below is the table of activities of donors and concerned organizations other than those described in the earlier section.

Table: Situations of Assistance for Natural Disaster Reduction Provided by Major Developed Countries and International Organizations[29]

	Disaster-Reduction Stage			Target area/fields	Remarks
	Prevention	Response	Recovery		
U.S.A	◎	○	○	Life-saving operations, disaster reduction, and prevention of economic damage, conflict prevention, and humanitarian assistance	The OFDA of USAID implements democratic resolution to conflicts. The emergency relief in the post-disaster period is the main activity, but recently the importance of disaster prevention has been emphasized.
U.K.	◎	◎	○	Promotion of sustainable livelihood, improvement of education and healthcare services for the poor, conservation and improvement of natural environment	The Conflict and Humanitarian Affairs Department of the DRID is responsible for the support for countermeasures against natural disasters and conflicts. NGOs are regarded as an important assistance channel for emergency relief.
Germany	◎	○	○	Good governance, participation of the poor, agricultural reform, fair trade opportunities, debt relief, enhancement of social security systems, ensuring of access to resources entailing environmental conservation, compliance with labor standards, ensuring of gender equality, security and disarmament	Highly interested in disaster reduction
France	○	◎	○	Africa	The Emergency Relief and Warning Office is the contact point for emergency relief operations for disasters and conflicts, and it is

[29] See the Study on Disaster-Reduction Projects, JICA, July 2005.

					highly interested in emergency assistance.
ISDR	◎	×	△	Calling for donors to take risk-reduction measures	Emphasis on the importance of disaster prevention/Response to environmental destruction and climate change
UNOCHA	△	◎	△	Humanitarian assistance	Conducting mainly emergency assistance following disasters. Pre-disaster measures such as promotion of countermeasures against disaster, recovery operations at the time of disasters, man-made disasters that result in refugee problems and natural disasters that threaten BHN (Basic Human Needs)
UNDP	◎	△	○	Conflict prevention and peace building, reform of security sector and legal systems, mine removal, reduction of small arms and light weapons, disarmament of soldiers	From the perspective of capacity improvement of development plan-related organizations, the UNDP provides reconstruction assistance in addition to enhancement of organizational power of the organizations concerned with disaster countermeasures and reconstruction policy after disasters
UNESCO	◎	×	△	Taking various approaches to mainly natural sciences, including environment, education and culture	Promoting disaster reduction from a scientific viewpoint with focus on natural disasters

	Disaster-Reduction Stage			Target area/fields Prevention	Remarks
	Prevention	Response	Recovery		
WMO	◎	×	△	Focus on natural disasters/ Preparation and emergency assistance in Africa, Asia, Central and South America	Main activities are against disasters related to meteorological effects. Main emergency response activities include observation and impact measurements of contamination of air or water resources, such as accidents at nuclear power stations.
UNHCR	×	◎	×	Targeting refugees of oppression or violent conflicts, No policy for natural disasters	Mainly emergency assistance in the post-disaster period; Natural and man-made disasters that may threaten BHN
WHO	○	◎	△	Activities of the PAHO are conducted in areas of regional capacity development in South America and Eastern Europe where the effectiveness is expected.	Support for the improvement of healthcare services against sudden disasters (natural disasters such as earthquake and flood), conflict and war (refugees) and slow onset (racial issues)
WB	◎	△	◎	Using the good practice in Mexico as a reference, there are plans to increase investment in response and technical cooperation, but the basis is the support for reconstruction and development.	Shit from disaster response to disaster prevention

ADB	○	×	△	Asia	Organizational shift from disaster response to disaster preparation is under consideration. No provision of disaster relief. Natural disasters (including poor harvest and environmental conservations); Technical assistance for countermeasures against disasters; Loans to reconstruction projects.
Inter-American Development Bank	◎	△	○	Capacity-building in Central and South America	Shift from disaster response to disaster prevention; Emergency response and reconstruction assistance in the post-disaster period, as well as disaster-reduction assistance
EU	◎	○	△	DIPECHO: with the aim of improving coping capacity against natural disasters, provides assistance to six regions (Central America, Andes, Caribbean, Central Asia, South Asia, South West Asia)	DIPECHO was established in response to IDNDR. Implementing support for countermeasures against disasters with particular focus on disaster prevention.
OECD	△	△	△	Disasters that may impede the economic development of the member states/ Related areas	Support for all disasters that may inhibit economic activities of member states and assistance for affected countries
IFRC	◎	◎	○	Conducts disaster relief/healthcare services/support for social projects and enhancement measures; Life-saving operations/provision of drinking water/food, healthcare services	ICRC deals with conflicts. Serving as a Secretarial of the ProVention Consortium since last year.

Examples:
◎ : cases where concentration or strengthening of assistance have been announced
○ : cases where assistance is provided
△ : cases where assistance is provided but the percentage is low
× : cases where no assistance is provided
― : unknown
Note: This table has been complied from the website information and results of interviews, and the evaluation is not based on the absolute value of the assistance.

Annex 3 Basic Check Items (Disaster Reduction)

The basic check items and indicators listed in this section are selected to better grasp the status of disaster reduction in recipient countries. The simple term "disaster reduction" comprises different stages[30], as shown in the Table of Disaster Reduction: namely, response, recovery/reconstruction, damage prevention and damage mitigation. Since different measures against various disasters, such as earthquakes, tsunamis and floods, are required, the check items also vary. In this section, check items and indicators are presented to provide basic data to measure the coping capacity of recipient countries and information on typical natural disasters.

The check items and indicators listed on the following pages are the ones to be used when disaster-prevention projects are implemented in different countries or regions. The items may not necessarily be applicable to all cases since statistical data have not been fully processed in some countries. It is still desirable to collect as much information as possible. Some information concerning each item can be obtained from the following documents. Some are also available on the website of the Emergency Disasters Date Base (EM-DAT)[31] and Relief Web of UNOCHA[32].

- "Effective Approach to Development Issues/Poverty Reduction" Japan International Cooperation Agency (September 2003)[33]
- "World Development Report 2000/20001," the World Bank (2002)
- "World Development Indicators Database 2005," the World Bank (2006)[34]

The check items established here give an overview of the current conditions of disasters and the status of disaster reduction in target countries and regions. Therefore, when implementing individual projects or when the scope of the target cooperation is narrowed down, it is necessary to consider more detailed items.

[30] The disaster-prevention process from disaster occurrence through recovery/reconstruction to disaster prevention is divided into four stages: damage protection, damage mitigation, response and recovery/reconstruction.
[31] Website of EM-DAT (http://www.em-dat.net/)
[32] Relief Web of UNOCHA (http://reliefweb.int/rw/dbc.nsf/doc100?OpenForm)
[33] JICA's website (httm://www.jica.go.jp/branch/ific/jigyo/report/field/200309_02.html)
[34] World Bank's website (http://devdata.workdbank.org/wdi2005/Section2.htm)

Table: Basic Check Items

	Check Item/Indicator	Sub-category
General Status		
1	Total population	Population
2	Percentage of urban population	Population
3	Population growth rate	Population
4	Population density	Population
5	Percentage of population below poverty line of the concerned country	Population
6	Population below international poverty line	Population
7	Family members	Population
8	Number of households	Population
9	Ethnic distribution	Population
10	Gross National Product (GNP)	Income
11	GNP per capita	Income
12	Percentage of mountainous areas in the total area of the country	Basic data
13	Percentage of plains in the total area of the country	Basic data
14	Population concentration ratio in the plains	Basic data
15	Asset concentration ratio in the plains	Basic data
16	Epidemic rate	Basic data
17	Presence of basic data (meteorological, hydrological, geographic, geologic, etc.)	Basic data
18	Topographic map (whether it is scaled down or digitized)	Basic data
19	Geologic map (scale)	Basic data
20	Land-use map (scale)	Basic data
21	Number of fire engines	Basic data
22	Basic data for economic and financial evaluation	Basic data
23	Number of natural disasters	Data on past disasters
24	Number of deaths and affected people from natural disasters	Data on past disasters
25	Economic loss of natural disasters	Data on past disasters
26	Number of houses damaged by natural disasters	Data on past disasters
27	Administrative system (central)	Administration
28	Administrative systems (local: Region, Province, Municipality, Village, Balangay, Bario, Desa, etc.)	Administration
29	Development status of disaster-reduction-related laws and their details	Disaster-reduction system/plan/organization
30	Outline of disaster-reduction-related budgets	Disaster-reduction system/plan/organization
31	Presence of upper-level plans, such as national development plan, and their details	Disaster-reduction system/plan/organization
32	Development status of disaster-reduction-related plans and their details	Disaster-reduction system/plan/organization
33	Presence of land-use plans according to disaster risks and presence of land-use regulations (legal system)	Disaster-reduction system/plan/organization
34	Development status of disaster-reduction-related organizations (activities employed in the previous disasters)	Disaster-reduction system/plan/organization
35	Process of forming a disaster-reduction council involving related organizations	Disaster-reduction system/plan/organization
36	Organizational chart and members of disaster-reduction-related organizations	Disaster-reduction system/plan/organization
37	Institutions for disaster-reduction research and NGOs	Disaster-reduction system/plan/organization
38	Disaster-reduction experts (consultants and researchers)	Disaster-reduction system/plan/organization
39	Details of Japan's assistance for disaster reduction	Details of assistance
40	Details of other donor's assistance for disaster reduction	Details of assistance
Earthquake Disaster		
41	Annual number of deaths from earthquakes	Data on past disasters
42	Annual number of affected people	Data on past disasters
43	Annual amount of economic loss	Data on past disasters
44	Number of earthquakes	Data on past disasters
45	Overview of major earthquake disasters (attach assessment and research report, if any)	Data on past disasters
46	Presence of earthquake disaster-reduction plan	Disaster-reduction system/plan/organization
47	Presence of plan of preparatory measures	Disaster-reduction system/plan/organization
48	Presence of plan of response measures	Disaster-reduction system/plan/organization
49	Presence of recovery/reconstruction plan	Disaster-reduction system/plan/organization
50	Presence of earthquake hazard map	Disaster-reduction system/plan/organization
51	Presence of earthquake scenario/estimated damage	Disaster-reduction system/plan/organization
52	Presence of earthquake disaster-prevention plan at a community level	Disaster-reduction system/plan/organization
53	Status of land-use/land development regulations	Disaster-reduction system/plan/organization
54	Presence of GIS database/system	Basic data
55	Percentage of earthquake-resistance public buildings	Seismic reinforcement
56	Percentage of earthquake-resistant houses	Seismic reinforcement
57	Presence of earthquake resistance standards for structures	Seismic reinforcement
58	Development status of earthquake disaster-reduction facilities	Disaster-reduction facility
59	Status of designated evacuation areas	Disaster-reduction facility

60	Status of designated evacuation routes	Disaster-reduction facility
61	Presence of communication and coordination systems	Disaster-reduction facility
62	Monitoring system of meteorological department	Observation
63	Development status of monitoring system (installation of seismograph/early damage estimation system, etc.)	Observation
64	Monitoring devices (strong-motion seismograph / high-sensitivity seismograph / GPS seismograph)	Observation
	Check Item/Indicator	Sub-category
Earthquake Disaster		
65	Presence of monitoring data and analyzing capacity	Observation
66	Development status of event notification systems following detection of earthquake	Observation
67	Presence of government compensation for earthquake damage	Observation
68	Dissemination status of earthquake insurance	Observation
Tsunami Disaster		
69	Number of deaths from tsunami in the past 30 years	Data on past disasters
70	Number of tsunami-affected people in the past 30 years	Data on past disasters
71	Amount of economic loss from tsunami in the past 30 years	Data on past disasters
72	Number of tsunami events	Data on past disasters
73	Overview of major tsunami disasters (attach assessment and research report if any)	Data on past disasters
74	Presence of tsunami disaster-reduction plan	Disaster-reduction system/plan/organization
75	Development status of tsunami hazard map	Disaster-reduction system/plan/organization
76	Percentage of development and earthquake resistance of coastal embankments	Disaster-reduction facility
77	Monitoring system of meteorological department	Observation
78	Presence of meteorological and hydrological equipment	Observation
79	Presence of meteorological and hydrological data and analyzing capacity	Observation
80	Presence of early tsunami warning system	Observation
81	Local penetration ratio and evacuation ratio at the time of release of forecast and warning information	Observation
82	Status of designated evacuation areas	Observation
83	Status of designated evacuation routes	Observation
Wind and Flood Disaster		
	(Flood)	
84	Annual number of deaths from floods	Data on past disasters
85	Annual number of flood-affected people	Data on past disasters
86	Annual amount of economic loss from floods	Data on past disasters
87	Annual number of flood occurrences	Data on past disasters
88	Overview of major flood disasters (attach assessment and research report if any)	Data on past disasters
89	Inundated area in the past	Data on past disasters
90	River basin area	Basic data
91	Riverbed slope	Basic data
92	Precipitation (annual/monthly)	Basic data
93	Presence of hydrological data	Basic data
94	Presence of river measurement data	Basic data
95	Annual deforestation	Basic data
96	Year probability of floods	Basic data
97	Population living in flood-prone areas	Basic data
98	Year-by-year comparison of the ratio of forests to river basin areas	Basic data
99	Presence of flood-prevention plan	Disaster-reduction system/plan/organization
100	Development status of flood protection system	Disaster-reduction system/plan/organization
101	Development status of flood hazard map	Disaster-reduction system/plan/organization
102	Monitoring system of meteorological department	Observation
103	Installation status of ombrometer, water level indicator, and flowmeter and presence of data	Observation
104	Development status of hydrological observation station and network	Observation
105	Development status of weather forecast system	Observation
106	Local penetration ratio of weather forecast	Observation
107	Development status of flood forecast/warning system	Observation
108	Development status of warning criteria	Observation
109	Local penetration ratio and evacuation ratio at the time of release of forecast and warning information in the past	Observation
110	Status of designated evacuation areas	Observation
111	Status of designated evacuation routes	Observation
	(Landslide disaster)	
112	Annual number of deaths from landslide disasters	Data on past disasters
113	Annual number of people affected by landslide disasters	Data on past disasters
114	Annual amount of economic loss from landslide disasters	Data on past disasters
115	Annual number of occurrences of landslide disaster	Data on past disasters
116	Overview of major landslide disasters (attach assessment and research report if any)	Data on past disasters
117	Presence of data on history of occurrences of landslide disasters (date/time, location/type/magnitude, etc)	Data on past disasters
118	Landslide area	Data on past disasters
119	Speed of landslide movement	Data on past disasters
120	Presence of data on landslide blocks	Basic data
121	Presence of geographic and geologic data	Basic data
122	Population living in landslide-prone areas	Basic data
123	Development status of vegetation-distribution map	Basic data

124	Condition of precipitation (cumulative precipitation/short-time precipitation)	Basic data
	Check Item/Indicator	Sub-category
Water and Flood Disaster		
125	Presence of landslide-prevention plan	Disaster-reduction system/plan/organization
126	Development status of landslide hazard map	Disaster-reduction system/plan/organization
127	Presence of designated landslide-prone area	Disaster-reduction system/plan/organization
128	Monitoring system of meteorological department	Observation
129	Installation status of landslide-monitoring device	Observation
130	Presence of landslide forecast/warning system	Observation
131	Local penetration ratio and evacuation ratio at the time of release of the landslide forecast and warning information in the past	Observation
132	Status of designated evacuation areas	Observation
133	Status of designated evacuation routes	Observation
Volcano Disaster		
134	Annual number of deaths from volcano disasters	Data on past disasters
135	Annual number of people affected by volcano disasters	Data on past disasters
136	Annual amount of economic loss from volcano disasters	Data on past disasters
137	History of volcanic eruption activity	Data on past disasters
138	Overview of major volcano disasters (attach assessment and research report if any)	Data on past disasters
139	Number of active volcanoes	Basic data
140	Types of volcano disaster (pyroclastic flow, lava flow, ash fall, volcanic mudslide)	Basic data
141	Population living in volcanic disaster-prone areas	Basic data
142	Presence of volcanic disaster-prevention plan	Disaster-reduction system/plan/organization
143	Development status of volcanic disaster hazard map	Disaster-reduction system/plan/organization
144	Monitoring system of meteorological department	Observation
145	Development status of volcano-monitoring station	Observation
146	Presence of volcano disaster forecast/warning system	Observation
147	Local penetration ratio and evacuation ratio at the time of release of the landslide forecast and warning information in the past	Observation
148	Status of designated evacuation areas	Observation
149	Status of designated evacuation routes	Observation

Annex 4.Characteristics of Disasters by Region and Priority Issues

This section is an overview of regional characteristics of natural disasters, regional efforts for disaster reduction, priority issues, approaches and points to consider. With respect to regional characteristics of natural disasters, data is summarized based the International Strategy for Disaster Management and EM-DAT[35]. Regional efforts are outlined using information obtained from the websites of regional organizations as references. Priority issuies, apporaches and points to consider are classifed by regional zones categorized by the Japan International Cooperation Agency, and compiled into a table at the end of the section.

First, the actual conditions are summarized based on the disaster history data of EM-DAT covering 1974 to 2003. Disaster proportions by the United Nations Sub Regions is as follows.

[35] According to EM-DAT Criteria, an event is classified as a disaster when any of the following criteria is fulfilled:
① 10 or more people reported killed
② 100 or more people reported affected
③ Declaration of a state of emergency
④ Call of international assistance

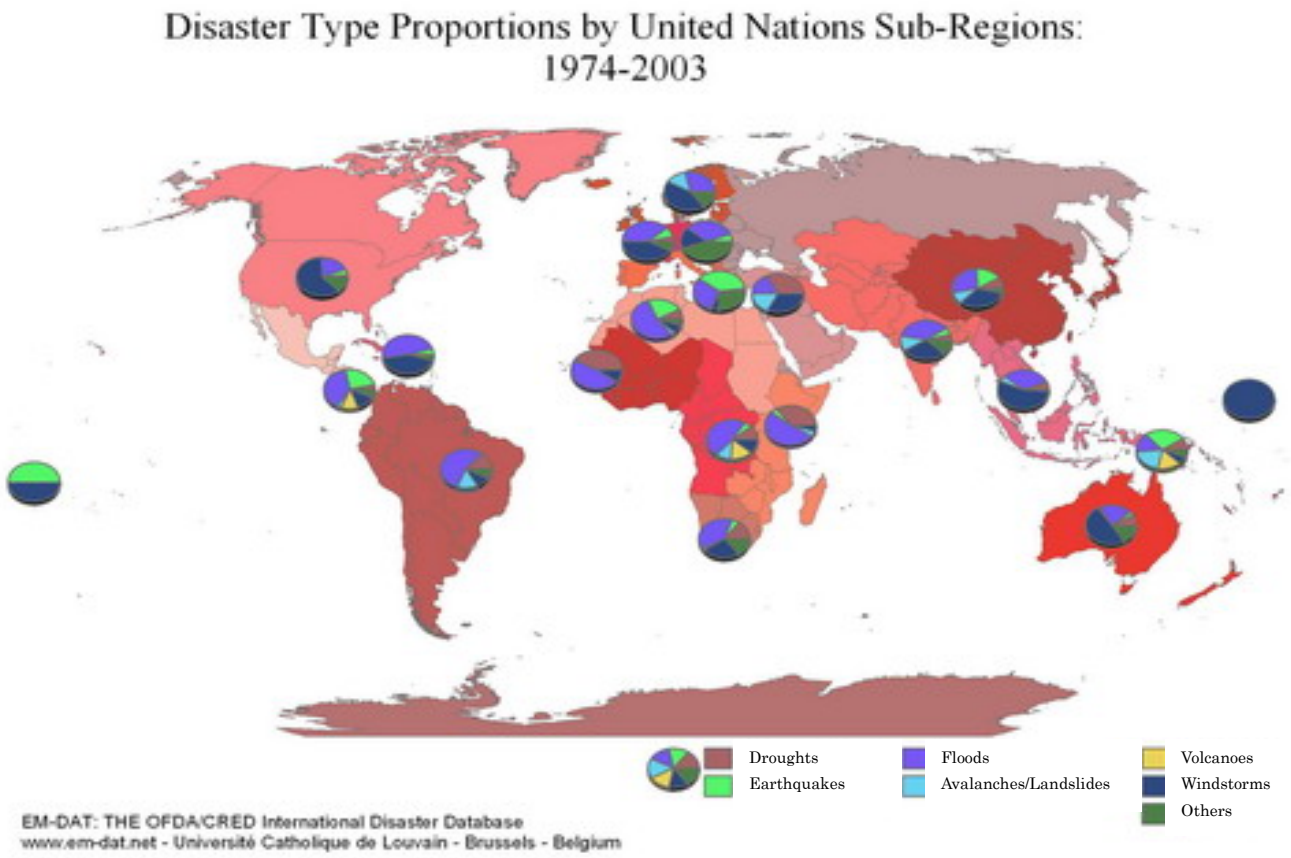


Figure: Regional Disasters (1974-2003)

(Source: EM-DAT website)

When taking an overview of the actual conditions of disasters by region, the proportion of flood disasters is high particularly in Africa and South America. The proportion of windstorms (typhoons, hurricanes and cyclones) and subsequent disasters is high in North America, the Caribbean, Europe and Oceania. On the other hand, the proportion of earthquakes and landslides is relatively high in the Middle East. In South East Asia, the proportion of windstorms is high, but in Indonesia and the Philippines, various types of disasters occur, such as windstorms, landslides, earthquakes and volcanoes.

Next, the number of occurrences of different disasters (floods, avalanches/landslides, earthquakes, volcanoes, windstorms such as typhoons/hurricanes/cyclones and droughts) are classified by country, as shown below.

- Various types of disasters occur in Indonesia and Philippines.

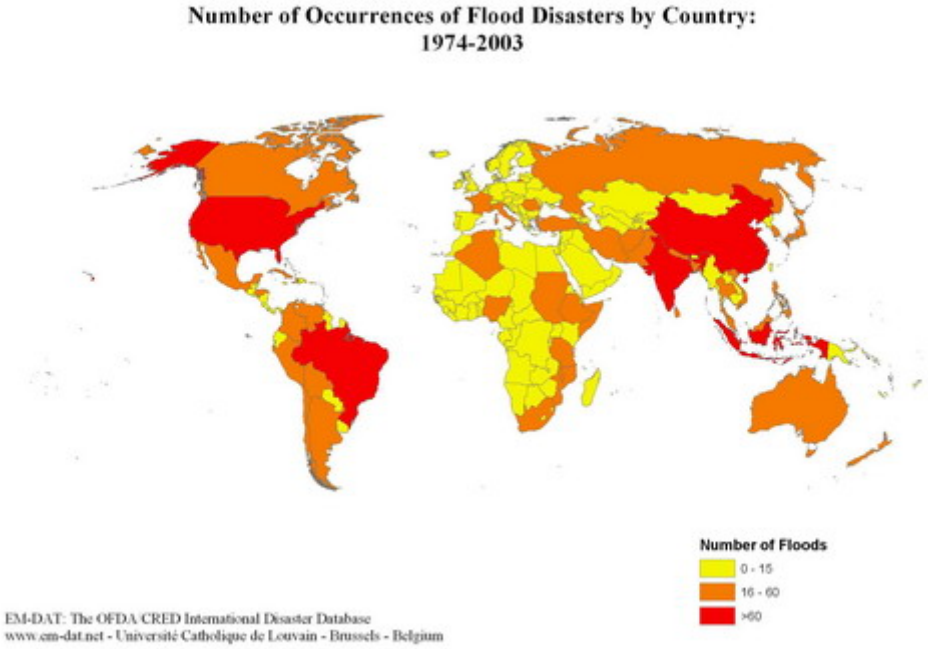


Figure: Number of Occurrences of Flood Disasters (1974–2003)

(Source: EM-DAT website)

Disasters from floods occur frequently in East Asia, South East Asia, South West Asia, North America and South America.

It is clear that flood disasters frequently occur in East Asia, Southeast Asia, Southwest Asia, North America and South America. Frequent flooding in rapidly growing BRICs (such as China, India and Brazil) has caused considerable damage to the economy.

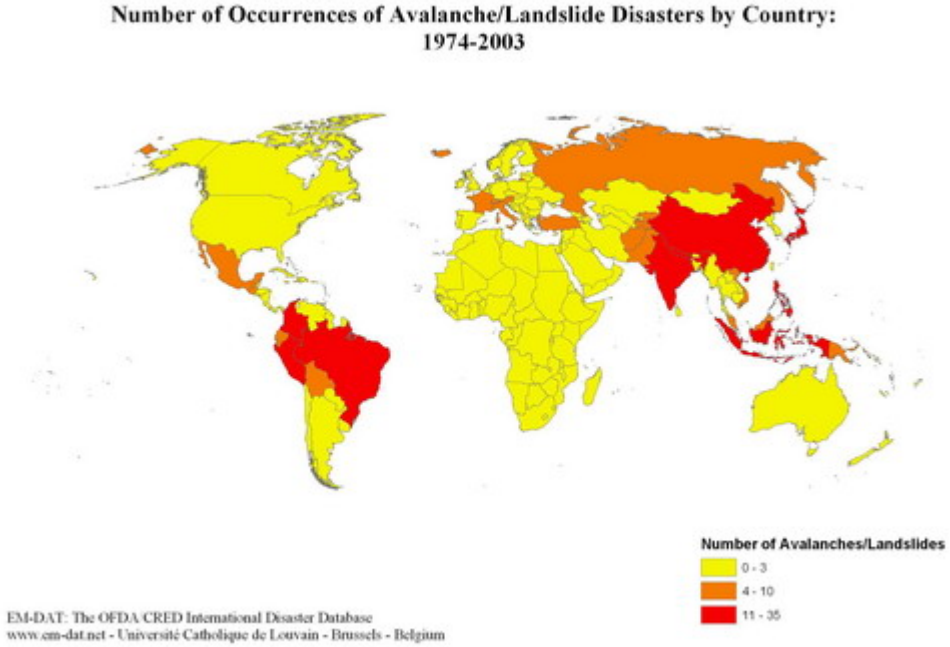


Figure: Number of Occurrences of Avalanche/Landslide Disasters

(1974-2003) (Source: EM-DAT website)

Avalanches/landslides occur frequently in East Asia, India, South East Asia, and South America.

Avalanches/landslide disasters occur frequently in Latin America and Southeast Asian countries with large mountainous areas like Japan, China, India, Philippines, and Indonesia.

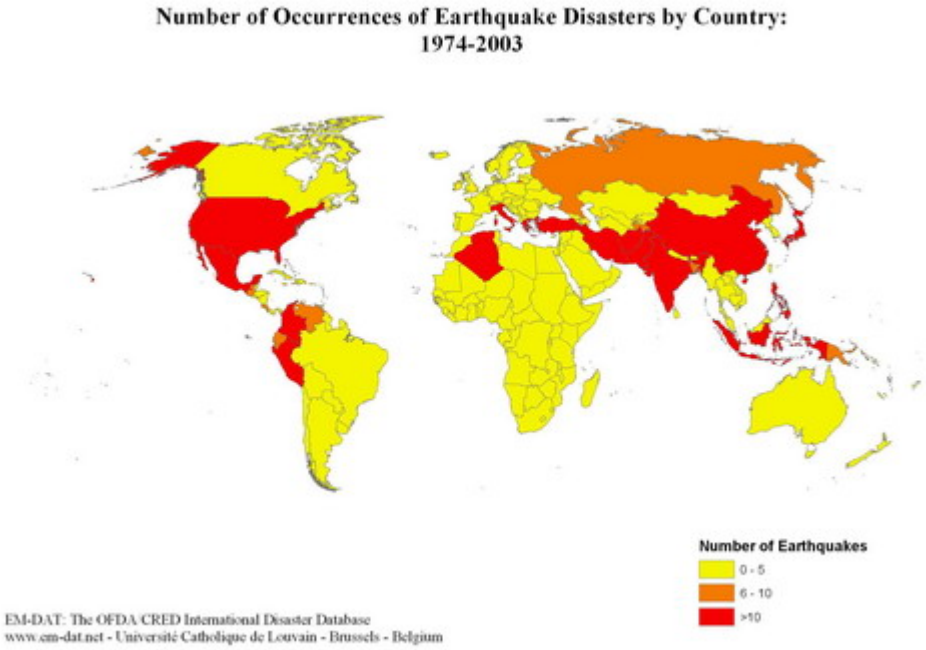


Figure: Number of Occurrences of Earthquake Disasters

(1974–2003) (Source: EM-DAT website)

Earthquake disasters frequently occur in East Asia, South East Asia, Middle East, North America and South America.

Earthquake disasters frequently occur in East Asia (including Japan), Southeast Asia, Middle Eastern countries (such as Turkey, Iran and Algeria), North America and South America (particularly the Andean Community countries). The occurrence of earthquakes is closely related to plate boundaries.

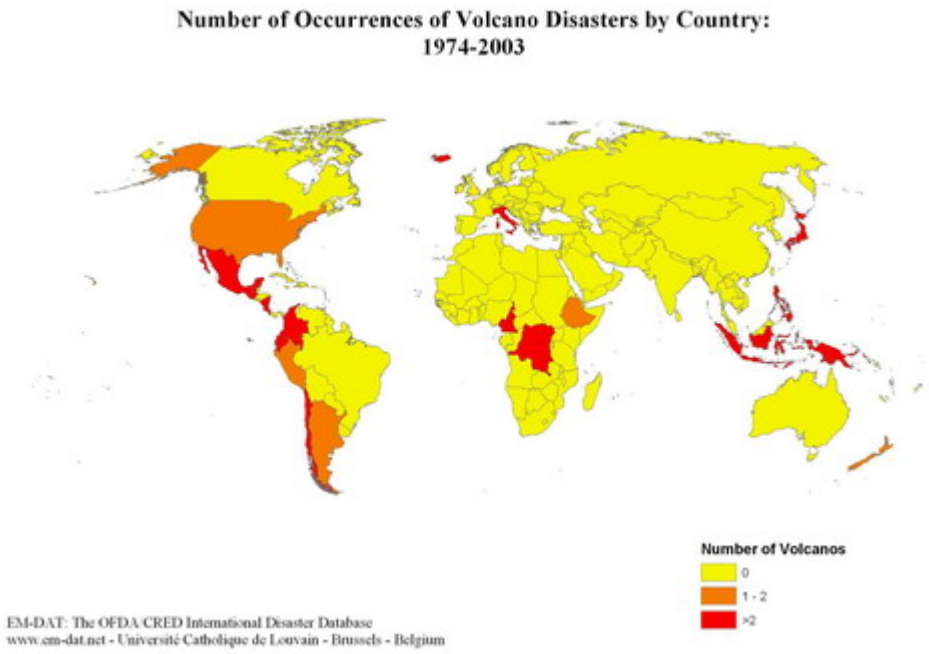


Figure: Number of Occurrences of Volcano Disasters

(1974–2003) (Source: EM-DAT website)

Volcano disasters frequently occur in Japan, the Philippines, Indonesia, Central and South American countries and African countries.

Volcano disasters are relatively frequent in Japan, the Philippines, Indonesia, Central and South American countries (like Mexico, Columbia, and Chile) and African countries (such as Democratic Republic of the Congo and Cameroon).

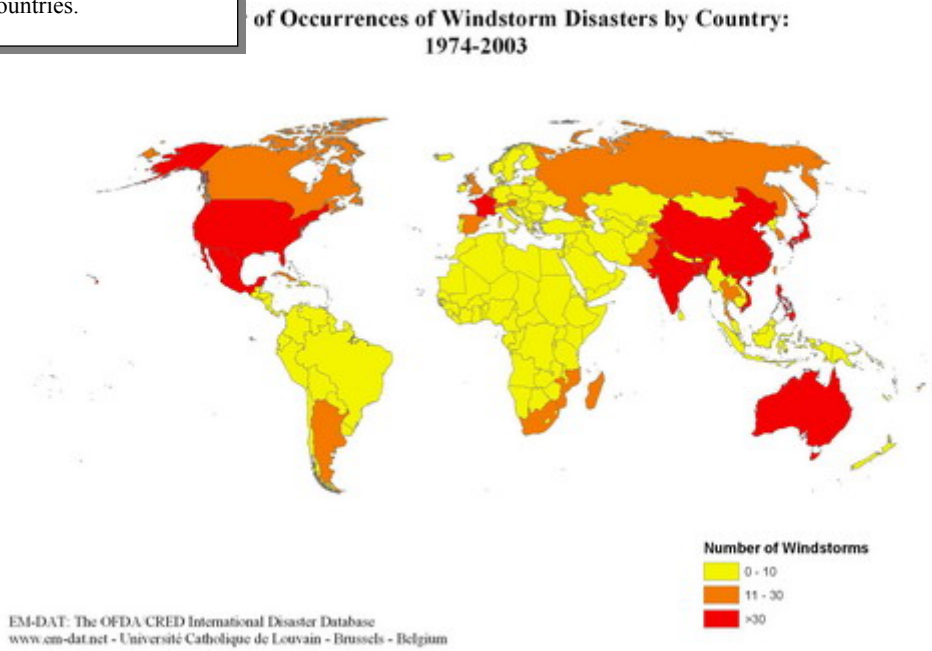


Figure: Number of Occurrences of Windstorm Disasters

(1974–2003) (Source: EM-DAT website)

Windstorm disasters occur frequently in East Asia, South East Asia, North America, the Caribbean coasts, Europe and Australia.

Windstorm disasters such as typhoons, hurricanes and cyclones (and subsequent flood disasters) occur frequently in East Asia, Southeast Asia (e.g., Vietnam and the Philippines), North America and Caribbean coast countries, Europe (e.g., France) and Australia.

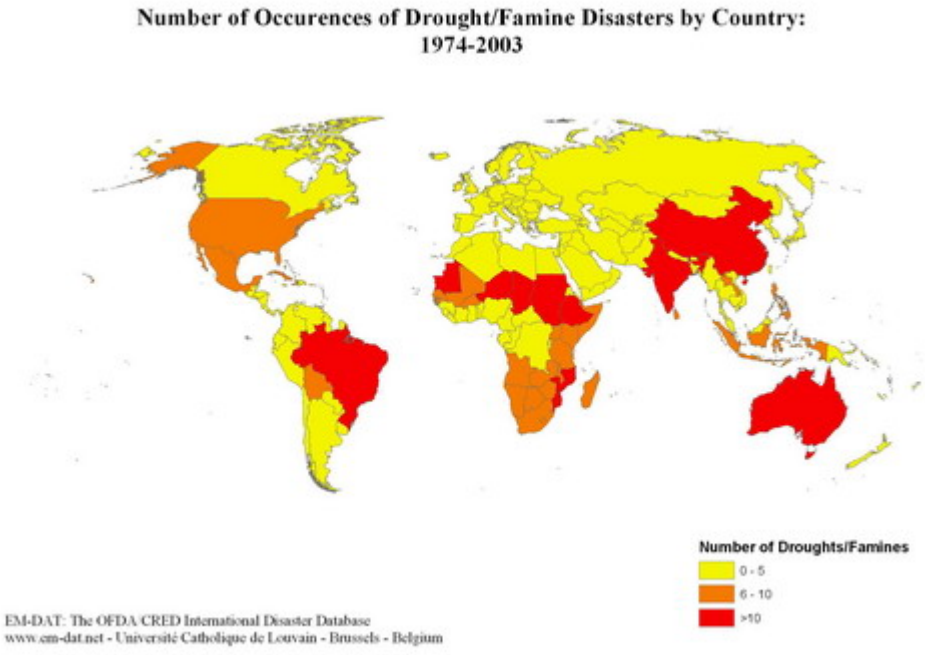


Figure: Number of Occurrences of Drought/Famine Disasters

(1974–2003) (Source: EM-DAT website)

Drought/famine disasters frequently occur in China, India, Iran, Australia, Brazil and African countries.

Drought/famine disasters occur frequently in China, India, Australia and Brazil, in addition to African nations such as Ethiopia, Sudan, Chad, Niger, Mauritania and Mozambique.

Based on the data above, disasters are analyzed by region and the priority issues on disaster reduction are studied.

1. Asia
Southeast Asia

4-1 Asia

4-1-1 Southeast Asia

・Monsoon is a seasonal shift in wind. Monsoon climate is characterized by dry and wet seasons. The monsoon winds bring the humid climate. Therefore, the regions with monsoon climates have one of the following: tropical monsoon climate, temperate wet summer climate, or mild humid climate.

(1) Characteristics of natural disasters

Due to the Asian Monsoon, Southeast Asia has a tropical/temperate climate. The climate of the Asian Monsoon region is divided into wet and dry seasons and the region with heavy rains concentrated during a wet season is in typhoon territory. It is therefore prone to flood or landslide disasters.

Southeast Asia has a high frequency of disasters in general and the scale of damage is relatively large due to the high population density and high economic concentration. When looking at the number of disasters by type, windstorms (such as floods and typhoons) comprise the largest portion, followed by earthquakes and avalanches/landslides. Major disasters in recent years include the Sumatra earthquake and tsunami of December 2004, which claimed the lives of about 165,000 people in Indonesia and more than 8,000 people in Thailand, the 2005 Central Java earthquake in Indonesia, which left about 5,800 people dead, and the 2006 landslide disaster in Layte, Philippines, which killed more than 1,100 people.

(2) Major regional efforts for disaster reduction

1) Association of Southeast Asian Nations (ASEAN)

Currently, ASEAN (established in 1967) has 10 member states. At the ASEAN meetings, the necessity for regional cooperation on disaster reduction has been discussed particularly following the 2004 Sumatra Earthquake and Tsunami Disaster. The ASEAN-Japan Summit Meeting in Kuala Lumpur in 2005 has reaffirmed the commitment to the response to tsunamis, earthquakes, floods and other disasters in cooperation between Japan and ASEAN, as well as cooperation between the region and other countries around the world. In association with this movement, Japan has announced that it would provide support to establish early warning systems and prevention, post-disaster response systems and recovery/reconstruction systems. Furthermore, at the ASEAN-Japan Summit held in January 2007 in Cebu, Philippines, it was agreed to deepen regional cooperation within Southeast Asia through Japan's assistance in promoting disaster education, utilizing an earth observatory satellite and providing equipment towards developing disaster-reduction systems in ASEAN. All of these indicate increasing emphasis on cooperation for disaster reduction.

2) Meeting on the Role of the ICT in Disaster Reduction (APT-ITU joint

meeting)[36]

The APT - ITU Joint Meeting on the Role of the ICT in Disaster Reduction was held in Bangkok, Thailand in February 2005, with the objective of establishing a disaster-reduction communications system in the Asia-Pacific region. At the meeting, opinions were exchanged on the role of Information and Communications Technology (ICT) at times of emergency in the Asia-Pacific region and importance was stressed of the disaster-reduction communications system.

(3) Priority issues, approaches, points to consider

Japan has thus far implemented various types of cooperation for disaster reduction in Southeast Asian countries. JICA, in particular, has exerted efforts to reduce disaster risks that individual countries in Southeast Asia are faced with while placing focus on risk assessment and formulation of measures through development studies and on enhancement of hardware measures through yen loans or grant aids. JICA is resolved to promote disaster-reduction education and the development of observation and disaster-reduction systems, reflecting the outcomes of the Japan-ASEAN Summit Meeting of January 2007, while continuing to maintain cooperation to reduce disaster risks.

In countries, such as Indonesia and the Philippines, that have been greatly damaged by various types of disasters ranging from windstorms and floods to earthquakes, landslides and volcanoes, it is necessary to promote cooperation for a community-level coping capacity, while emphasizing cooperation for the capacity development of governments, development of legal and implementation systems, formulation of disaster-reduction plans, and so on.

Many of the countries affected by frequent disasters are making efforts to develop legal and institutional systems and standards to reduce damage. However, there are cases where these systems and standards have not been fully utilized, thus failing to reduce disasters. It is therefore necessary to promote technical cooperation, such as enlightenment activities, to ensure compliance with building standards and earthquake resistance of constructions in preparation for earthquakes.

Countries like Thailand, Vietnam and Cambodia continue to experience disasters (mainly windstorms and floods), and several tens or several hundreds of people have been victimized even after 2000. In these countries, JICA intends to seek ways of cooperation for strengthening coping capacity mainly against windstorms and floods, particularly at the community level.

Since Japan is geographically close to the Southeast region, support for building disaster-resilient communities and societies as well as prompt implementation of disaster

[36] Website of the Ministry of Justice: http://www.soumu.go.jp/s-news/2005/050301_5.html

relief operations and recovery/ reconstruction assistance will be provided when a large-scale disaster occurs in this region.

4-1-2 Southwest Asia

(1) Characteristics of natural disasters

Because of the impact of monsoons, the Southwest Asian region (except for the northern part) has a tropical and temperate climate, and is prone to floods and landslides. Countries like India, Pakistan and Nepal lie on the boundary between the Eurasian plate and the Australian plate, and are subject to frequent earthquakes.

Large-scale disasters occur frequently in Southwest Asia. As for types of disasters, the region is prone to windstorms such as floods and cyclones, as well as earthquakes and landslides. Particularly in Bangladesh, frequent cyclones have killed tens of thousands or several hundred thousands of people. Large natural disasters in recent years include the 1991 cyclone in Bangladesh claiming the lives of about 140,000 people, the January 2001 Gujarat earthquake in western India killing about 20,000 people, the December 2004 Sumatra earthquake and tsunami disaster leaving about 35,000 dead or missing in Sri Lanka and about 16,000 in India, and the October 2005 earthquake killing more than 73,000 people in north-western Pakistan.

(2) Regional efforts for disaster reduction

1) Efforts of the South Asian Association for Regional Cooperation (SAARC)

The South Asian Association for Regional Cooperation (SAARC) is a framework for regional cooperation officially established at the summit meeting held in Bangladesh in December 1985, based on the proposition made by President Zuaur Rahman of Bangladesh. There are seven member states in Southeast Asia (India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan and the Maldives), and the membership to Afghanistan was approved in principle at the summit meeting in November 2005 (officially becoming the eighth member at the summit meeting later in April 2007). Japan's participation as an observer was agreed upon, in principle, at the meeting.

The specifics of the SAARC-Japan cooperation were discussed at the SAARC Symposium, convened in Dhaka India in July 2006; and the Asian Disaster-reduction Center (ADRC) proposed the following five specific measures for disaster reduction: 1) study on disaster-reduction system of SAARC member states, 2) holding of experts meetings concerning the establishment of disaster-prevention systems, 3) seminars, training and lectures for engineers, 4)

establishment of regional disaster-reduction strategies, and 5) strengthening of the SAARC Disaster-Management Center. In response to this, participants collectively urged the realization of the Japan-SAARC Special Fund Cooperation Program at an early time, since disaster reduction was a common issue in the region, which was then included as one of four recommendations of the Symposium.

Subsequently, at the SAARC Summit meeting of April 2007, the government of Japan made a statement that Japan would provide specific support measures for disaster reduction, which has high priority and is the common issue of SAARC, as part of the support for the promotion of regional cooperation in order to facilitate regional connectivity. Since then, Japan currently provides cooperation for developing regional disaster-reduction and response systems.

(3) Priority issues, approaches, points to consider

Japan has thus far implemented effective cooperation projects in Southwestern countries, including construction of cyclone centers in Bangladesh (used as schools during peacetime), construction of the Water-Induced Disaster-Prevention Technical Center (later upgraded to the Department of Water-Induced Disaster Prevention), and construction of embankments in the Maldives (that were effective to reduce tsunami disasters caused by the 2004 Sumatra Earthquake).

As often discussed at the SAARC meetings, the region has common disaster risks, such as cyclones, floods and earthquakes, and disaster reduction is seen as a common regional issue. In light of the agreement on cooperation for disaster reduction within the framework of Japan-SAARC cooperation, JICA will study the feasibility of cooperation in view of solving common regional issues. Furthermore, some reports have indicated that disaster risks in the region have increased due to the impact of climate change, etc. Therefore, it is necessary to contrive a method of cooperation with due consideration particularly to the impact of climate change.

Considerable damage is done every year to Bangladesh due mainly to windstorms, such as cyclones, and floods. Nonetheless, the number of deaths is on decline owing to cyclone shelters, etc. developed by donors' cooperation, including Japan. It is necessary to consider ways to prevent the spread of damage and secondary disasters caused by climate change, while maintaining effective cooperation for disaster reduction focusing of windstorms.

Since Pakistan and Nepal have mountainous areas, landslide disasters often occur, in addition to windstorms. JICA therefore promotes cooperation with the aim of enhancing the coping capacity of communities, which includes understanding of disaster risks and development of forecast/warning and evacuation systems. With respect to cooperation for mountainous countries, it is necessary to consider

cooperation with international organizations, such as the International Centre for Integrated Mountain Development (ICIMOD), etc. Bhutan, Nepal, Pakistan and India lie on the plate boundary, and there are fears that a large-scale earthquake will hit the region, such as the 2005 earthquake in north-eastern Pakistan. It is important to enhance the coping capacity of the communities by disseminating a low-cost, earthquake-resistant construction method.

Sri Lanka and the Maldives were greatly damaged by the 2004 Sumatra Earthquake. It is important to conduct cooperation for disaster prevention while the memory of the disaster is still fresh. In that vein, JICA launched the "Comprehensive Study on Disaster Management" (Development Study) in 2006 and formulated a plan for countermeasures against floods and a plan for developing early forecast/ warning systems. Along with this, JICA conducts community disaster-reduction activities and drills in model districts based on the above plans. JICA will proceed with strengthening disaster-prevention systems and coping capacities of communities in relevant countries in continuation of these efforts.

4-1-3 Central Asia and the Caucasus

1. Asia
Central Asia/ the Caucasus

・The eastern part of the Central Asia is an alpine region (the Pamir) and the western part is a desert area.
・There are international rivers in the region: the Amu Darya River, Syr Darya River and Pyandzh river, facing flood-control issues.

(1) Characteristics of natural disasters

The climate of Central Asia and the Caucasus is mainly cool-temperate/humid/ apline climate. The Central Asia and Caucasus region is prone to floods, earthquakes and landslides. Large-scale floods and earthquakes that kill dozens of people frequently occur particularly in Kazakhustan and Tajikistan. Examples of natural disasters in recent years are the 2004 landslide that left about 50 people dead and the flood that killed about 400,000 people in 2004.

(2) Regional efforts for disaster reduction

1) Efforts of Central Asia +Japan

The Second Foreign Ministers' Meeting of the "Central Asian Japan" Dialogue was held in Tokyo on June 5, 2006. Central Asian countries affirmed to further cooperation for sustainable social and economic development of the entire region as well as of individual countries, by overcoming various difficulties. Japan reaffirmed the commitment to assistance for intra-regional cooperation in order to complement the proactive efforts of the Central Asian countries and to promote mutual cooperation in the region. Having identified disaster reduction as one of the priority areas of intra-regional cooperation, development of a common disaster-prevention plan was included in the action plan, which includes mutual support systems at times of disaster and sharing of outcomes of cooperation projects implemented by JICA in

the region.

(3) Priority issues, approaches, points to consider

Japan has expanded its cooperation for disaster reduction in the Central Asia/Caucasus. In particular, following the 2006 "Central Asian Japan" Dialogue, Japan has implemented a development study to understand earthquake risks and to formulate countermeasures in Almaty, Kazakhstan, carried out a technical cooperation project aiming to enhace the landslide-observation capacity in Uzbekistan, conducted a development study aiming for the formulation of a plan for countermeasures agaist floods of the Pyandzh River.

Since it is diffiuclt to conduct large-scale cooperation projects due partly to budgetary constraints, it is necessary to provide cooperation targeting characteristic disasters in individual countries: for instance, earthquakes in Kazakhstan, landslides in Uzbekistan, floods in Tazikistan, and so on.

In light of the success of the Asian Conference on Disaster Reduction held in Almaty, Kazakhstan in June 2007, it is necessary to understand new risks and to promote further sharing of achievements of intra-regional cooperation, while effectively using "disaster-reduction administration training," which is region-specific training currently underway in Central Asian/Caucasus countries, and while maintaintaining the cooperation framework of the Asian Disaster-Reduction Center.

1. Asia
East Asia

4-1-4 East Asia

(1) Characteristics of natural disasters

East Asia, to which Japan belongs, lies on the northern rim of the Asian Monsoon regions, and is influenced by warm humidity from the tropical climate. Since it is located in typhoon territory, the region is prone to meteorological disasters. At the same time, earthquakes often occur in this region because many plates (Pacific plate, North American plate, Philippines Sea plate, Australian plate, Eurasian plate) are convergent.

East Asia is frequently affected by various types of disasters such as windstorms caused by intensive rainfalls and typhoons, earthquakes, landslide, and volcanoes. The memories of the Great Hanshin-Awaji Earthquake of 1995 and the Chuetsu Earthquake of 2004 are still vivid as recent natural disasters in Japan. Other countries in East Asia also have experienced large-scale disasters: for instance, the July 2006 typhoon in China causing the deaths of more than 800 people and the August 2007 flood in North Korea that left at least 600 people dead.

(2) Regional efforts for disaster reduction

1) Joint research for meteorological disaster reduction in East Asia

East Asia has a common issue of frequent extreme meteorological disasters caused by typhoons or rainy seasons, and the meteorological observation system of one country is not sufficient. It is therefore important to have an intra-regional cooperation system. In response, under the cooperation framework led by the Japan Meteorological Agency, efforts for meteorological disaster reduction are being made to enhance meteorological systems by holding the International Council for Science meetings, implementing research projects and conducting pilot experiments of international joint observation of typhoons and rainy seasons.

2) Cooperation of the East Asia Summit (EAS)

The Second East Asian Summit (EAS) was held in Cebu, Philippines in January 2007, and enhancement of disaster-reduction systems was listed as one of the priority issues to be addressed by the region. Japan promised to provide US$ 3 million to support projects and equipment worth US$ 6 million to ASEAN.

(3) Priority issues, approaches, points to consider

Japan provides technical cooperation to China and Mongolia with the aims of reducing disasters that greatly impede social and economic development of the countries in the region and of developing the capacity of those engaged in meteorological work and experts on environment to enable them to understand and appropriately provide more reliable and useful meteorological information (including that on yellow sands). In view of a major issue of achieving sustainable development and correcting regional gap in China, assistance will be provided to develop response systems at times of disaster, aiming to minimize disasters in impoverished areas. In Mongolia, JICA intends to seek feasibility of future cooperation based on the achievements of an on-going technical cooperation project that aims to develop the capacity of meteorological and environmental monitoring.

2. Oceania

4-2 Oceania

(1) Characteristics of natural disasters

The Oceania region is prone to rainstorm disasters because it belongs to a tropical rainforest and is located near the equator. Island states that lie in between the Australian plate and the Pacific plate are particularly affected by earthquakes and subsequent tsunamis.

The Oceania region is prone to various types of disasters, including windstorms caused by cyclones, earthquakes, landslides and volcanoes. Major natural disasters in recent years include the 1998 earthquake and tsunami in north west of Papua New Guinea that claimed the lives of about 2,200 people, the 2002 landslide in Papua New Guinea that killed 36 people, and the Solomon Islands earthquake of April 2007 that left 52 people dead.

It has been reported that the island states are affected by a rise in sea level due to climate change, and the land has eroded, resulting in increasing vulnerability to disasters.

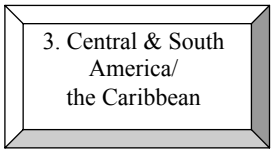
(2) Regional efforts for disaster reduction

The Pacific Tsunami Warning System (PTWS) is part of a wide-area cooperation that includes the Oceania region. The tsunami disaster triggered by the 1960 Great Chilean Earthquake prompted the establishment of the PTWS. Currently, the PTWS comprises 28 countries in the Pacific region.

(3) Priority issues, approaches, points to consider

Japan continues cooperation for disaster reduction in the Oceania region. In response to past disasters, cooperation projects have been undertaken: for example, technical cooperation for installation and operation of an earthquake observation network in Fiji and its neighboring countries and technical cooperation for developing meteorological capacity of the Fiji Meteorological Service and neighboring island states, such as Nauru, Tubal, and Kiribtati.

The prospect of large-scale cooperation in each country of the Oceania region is not optimistic but the region shares similar disaster risks. Therefore, Japan will promote regional cooperation in the area of meteorology or earthquakes mainly in Fuji. Furthermore, in addition to regional efforts, the feasibility of cooperation will be studied to enhance coping capacity particularly at the community level, by identifying target areas or type of disasters of individual countries, such as earthquake/tsunami or windstorms.



4-3 Central and South America[37]

4-3-1 Central America and the Caribbean

(1) Characteristics of natural disasters

The coastal part of the Central America and the Caribbean region is classified under a

[37] This guideline excludes North America.

・The major distinction between typhoons and hurricanes is their place of origin. They are both tropical cyclones.

・A typhoon is a tropical cyclone that developed in the North Western Pacific Ocean. A hurricane is a tropical cyclone that developed in the North Eastern Pacific Ocean.

tropical rainforest climate or Savanna climate. The inland area has a tropical highland climate, to which many major cities belong. Hurricanes that hit the region from July to October of each year are a typical natural disaster[38] in Central America and the Caribbean. Floods caused by intensive rainfalls also occur frequently. Furthermore, the Central America and Caribbean region is frequently hit by earthquakes since it lies on the convergence of many plates: namely, the North American plate, the Cocos plate and the Caribbean plate.

Major recent disasters in Central America and the Caribbean include Hurricane Mitch in 1998 that left more than 10,000 people dead in Honduras, Guatemala, Nicaragua and El Salvador, the 2001 El Salvador earthquake that killed more than 800 people, and the 2004 flood causing the deaths of about 2,600 people in Haiti and about 700 people in Dominican Republic, and the 2005 Guatemala hurricane that left more than 1,500 people dead.

(2) Regional efforts for disaster reduction

Since many of the Central American and Caribbean countries have weak economic bases and country-based efforts are insufficient, and also because the response from individual countries is not effective for disasters, such as hurricanes, that affect wide areas, regional cooperation for disaster reduction is being practiced by establishing a disaster-reduction organization that covers the entire region.

[38] JICA: Report of the Second Study Group on the Sector-Specific Assistance in the Environment, Annex 1: Region-specific Issues

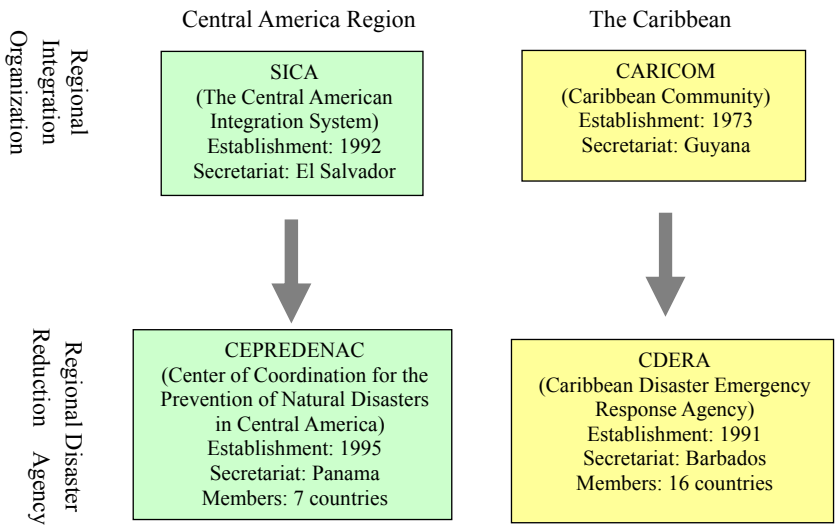


Figure: Regional Integration Organizations and Regional Disaster-Reduction Agencies in the Central America/the Caribbean[39]

Prompted by the disaster caused by Hurricane Mitch in 1998, full- fledged efforts against disasters began, led by the Center of Coordination for Prevention of Natural Disasters in Central America (CEPREDENAC). In 1999, the Central American Summit was held in Guatemala and "Building Disaster-Resilient Societies" (Guatemala Declaration II) was adopted by the president-level officials of six countries in Central America. The CEPREDENAC Secretariat formulated the five-year Central American Plan for Disaster Reduction (PRRD) immediately after the declaration (end of 1999). Since PRRD ends in 2004, a development of the Second Central American Plan for Disaster Reduction (2006–2015) is under consideration.

The leaders of the Caribbean countries agreed to establish the Caribbean Disaster Emergency Response Agency (CDERA) at the CARICOM Summit in September 1991, and it conducts activities to provide emergency relief at times of disaster and to promote preventive activities, involving government agencies and NGOs.

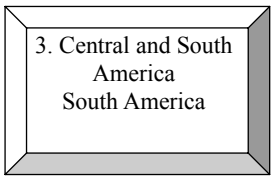
(3) Priority issues, approaches, points to consider

Japan continues to provide assistance with an aim to reduce windstorm and flood disasters in Central America and the Caribbean, mainly in the form of technical cooperation.

The region comprises a number of small countries, both in terms of land area and size of the economy, and the scale of assistance in each country is not large. Therefore, Japan will promote region-based cooperation, rather than country-based

[39] Compiled based on "The Development of Regional Cooperation for Disaster Reduction," Hideomi Oi, (International Cooperation Specialist, JICA) Journal of the Japan Society of Civil Engineering Vol.88, 2003.2

cooperation. For example, cooperation will be implemented, while collaborating with CEPREDENAC and CDERA, mainly in Panama and Barbados, but including other member states as well, with the aims of establishing disaster-reduction systems in each country and enhancing community-level coping capacity.



4-3-2 South America

(1) Characteristics of natural disasters

The northern part of the Central American continent has a savanna climate and the southern has a temperate climate. The Andean Mountain region has a highland climate with a variety of climates, depending on altitude. There are many active volcanoes in the mountainous areas of the Andean Mountain region and are on the boundary between the South American plate, the Cocos plate and the Nazca plate, and is thus frequently hit by earthquakes, in addition to floods and landslides.

Floods occur most frequently in South America, followed by landslides, and earthquakes/tsunamis. The examples of recent major disasters include the 1999 Columbia earthquake that killed about 1,200 people, the 2001 Peru earthquake that caused the deaths of about 150 people, floods in Brazil from 2003 to 2004 causing the deaths of about 160 people, and the August 2007 Peru earthquake with a death toll of more than 5000.

(2) Regional efforts for disaster reduction

The Andean Community (CAN)[40] was established as a regional integration organization in South America, and the Andean Committee for Disaster Reduction and Assistance (CAPRADE) was established as a disaster-reduction agency, which strives toward disaster reduction in the region.

The Andean Regional Program for Risk Prevention and Mitigation (PREANDINO) was also established in the South American Region. At the Central America/ Caribbean, South American regional conference held in Johannesburg in 2002 in preparation for the World Summit on Sustainable Development, the emphasis was made on the necessity of measures and education for disaster reduction to improve vulnerability to disasters and of awareness-raising through early forecast/warning signals.

[40] Member stats are Peru, Bolivia, Columbia and Ecuador. Associate member states are Argentina, Brazil, Paraguay, Uruguay and Chile.

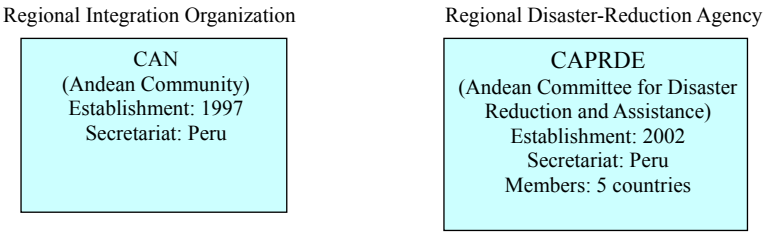


Figure: Regional Integration Organizations and Regional Disaster-Reduction Agencies in the South American/the Andean[41]

(3) Priority issues, approaches, points to consider

Japan continues to provide support in the South American region to reduce disasters from floods, landslides and earthquakes, mainly in the form of technical cooperation. Particularly in disaster prone areas such as Columbia, Peru and Chile, Japan has been conducting technical cooperation with the aims of conducting comprehensive disaster-risk assessment, formulating disaster-prevention plans, developing forecast/warning systems for floods/landslides and developing and disseminating a low-cost earthquake-resistant construction technology.

In considering the fact that the technical cooperation scale is not so large, it will be necessary in the future to promote the implementation of disaster-reduction projects meeting local needs and to formulate projects in other areas with the aim of incorporating a disaster-reduction perspective into development. Also, in order to spread the results of cooperation to other parts of the region, cooperation with regional organizations and use of third-country training will be promoted.

4. Africa

4-4 Africa

(1) Characteristics of natural disasters

- Disaster reduction and measures against poverty are closely related in Africa.
- The natural disaster that causes the most casualties is flood.
- There are many victims of diseases in Africa, and they are often considered to be one of the disasters. However, diseases are not regarded as a natural disaster in this guideline.

Sub-Saharan Africa hosts a variety of climates: a desert climate in the north, savanna and sub-tropical climates in the central part, and a steppe climate in most of the south. Thus, various types of natural disasters occur, and the disasters that occur most frequently are floods and droughts.

The major recent disasters in the African region include the 2000 Mozambique flood that killed 800 people, the 2001 Nigeria flood that resulted in about 200 casualties, the 200 Zaire forest fire that left 200 people dead, the 2004 tsunami disaster in Somalia caused by the Sumatra earthquake that caused deaths of about 300 people, and the 2006 Ethiopia flood with death toll of about 500.

[41] Compiled based on “The Development of Regional Cooperation for Disaster Reduction,” Hideomi Oi, (International Cooperation Specialist, JICA) Journal of the Japan Society of Civil Engineering Vol.88, 2003.2

(2) Regional efforts for disaster reduction

The statement by leaders of Africa at the World Summit on Sustainable Development stressed that frequent natural disasters impede sustainable development on the African continent and pointed out that the capacity for forecast, observation, response and mitigation was particularly insufficient.

The Millennium Declaration[42] adopted in 2000 highlighted the reduction of vulnerability to natural disasters and environmental risks in Africa along with economic growth, improvement of access to energy, and improvement of basic medical services. In particular, response to droughts and floods caused by drastic climate change was identified as a priority issue.

The Regional Consultative Meeting on Early Warning for the East Coast of Africa was held in October 2005 in Nairobi, Kenya and 10 participating countries affirmed the priority accorded to the development of an early warning system and to disaster mitigation. In addition, in December 2005, the first ministerial-level meeting and specialist meeting on disaster reduction were held in Addis Abeba, Ethiopia. Forty-one participating countries (including Middle Eastern countries like Egypt and Algeria and the Maghreb countries) proposed a review of policies and a framework for disaster reduction, organizational development, capacity enhancement, management and sharing of information and expertise, and also agreed to include disaster reduction on the agenda of the next African Union Summit.

(3) Priority issues, approaches, points to consider

Floods and droughts in Africa directly inflict enormous damage and can often induce secondary damage such as infections. The African economy relies heavily on agriculture, but droughts and floods undermine sustainable development and aggravate poverty. Thus, development needs to take disaster reduction into consideration. However, the priorities are given to poverty reduction in the region, and basic human needs (BHN) assistance (for education, healthcare, water resources) is given higher priority. Hence it is necessary to devise a way to integrate a disaster-reduction perspective as part of poverty reduction.

5. Middle East

4-5 Middle East

(1) Characteristics of natural disasters

The Middle East region comprises different and diverse countries, stretching from Afghanistan in the east to Morocco in the west and from Egypt in the south to Turkey

[42] Website of the Ministry of Foreign Affairs: http://www.mofa.go.jp/mofaj/kaidan/kiroku/s_mori/arc_00/m_summit/sengen.html

□Various types of disasters occur in the Middle East, and particularly, large-scale disasters frequently occur.
・In order to reduce human damage of earthquakes, measures are taken for seismic reinforcement of buildings and infrastructure.

in the north. Climates in the region include the Mediterranean climate, steppe climate and desert climate. Since climates are diverse and various plates are convergent (Eurasian plate, Australian plate, Arabic plate and African plate), a wide range of disasters occurs such as floods, landslides and earthquakes.

The major recent disasters in the Middle East include the 1999 Turkey earthquake with more than 17,000 fatalities, the 2002 Afghanistan earthquake, which killed about 1,000 people, the 2003 earthquake in Algeria, which left more than 2,200 people dead, and the Bam earthquake in Iran in 2003 with a recorded death toll of around 27,000, which all caused considerable damage in the region.

(2) Regional efforts for disaster reduction

Besides complicated ethnic and religious issues, social conditions are often unstable in the Middle East due to recent years' increase in unemployment, expansion of income gaps and democratization movements.

Since earthquakes occur frequently and the academic level is relatively high in the Middle East, many excellent human resources concerned with seismic engineering have been developed in Turkey and Iran. It is thus necessary to have a perspective to utilize these human resources in the entire region.

(3) Priority issues, approaches, points to consider

Japan has implemented technical cooperation focusing on disaster reduction against earthquakes in the Middle East. Particularly in Turkey, Iran and Algeria, which have been devastated by massive earthquakes in the past, earthquake-risk assessment and formulation of disaster-reduction plans were conducted, and cooperation has been launched linked with technical cooperation with the objectives of the enhancing capacity of disaster-reduction administration and strengthening coping capacity.

In Iran and Turkey, which are subject to potential earthquake hazards, Japan will review their urban and land-use plans and implement technical cooperation to promote building of disaster-resilient cities, such as earthquake-resistant reinforcement for existing buildings, and at the same time will continue enhancing the disaster-reduction capacity of administrations.

In countries that are susceptible to water-induced disasters (floods and landslides) like Afghanistan, Iran and Turkey, the risks will be identified through a dispatch of experts and feasibility of cooperation aiming for enhancing coping capacity particularly at the community level. Since countries such as Afghanistan and Iraq, where reconstruction assistance is currently provided, are faced with frequent disasters, the reconstruction assistance in these countries shall incorporate a

disaster-reduction perspective.

6. Europe

4-6 Europe

(1) Characteristics of natural disasters

Europe has a marine west coast climate and a Mediterranean climate; regions around the Alps and Russia have a cool, temperate, humid climate. The most frequent disaster in Europe is flood, although the frequency is relatively low compared to other regions like South East Asia, since there are no typhoons or monsoons. Earthquakes often occur particularly in Italy and Greece, which is located on the convergent boundary between the Eurasian plate and the African plate. Some southern European countries like Romania are also known as potential earthquake areas.

The major recent disasters in Europe include the 1998 landslide in Italy that claimed the lives of 160 people, the 1999 earthquake in Greece that killed more than 140 people, the 2002 flood in Germany resulting in 27 deaths and some US$ 11.7 billion worth of economic losses, and also the 2002 flood in France causing 23 deaths and some US$ 1.2 billion worth of economic losses.

Furthermore, damage caused by heat waves is also quite serious. The 2003 heat waves killed about 22,000 people throughout Europe. The damage in France was particularly extensive, and about 15,000 people were killed. Heat waves are believed to be associated with climate change, but no scientific evidence has been emerged to substantiate the theory.

(2) Regional efforts for disaster reduction

In Europe, countermeasures against floods had previously been taken by each country, instead of comprehensive measures for all of Europe. However, the death toll of floods has exceeded 700 people and economic losses 3 trillion yen since 1998. In response, the European Commission developed a new guideline[43] in January 2006 for prevention and mitigation of flood disasters.

The new guideline calls member states to conduct preliminary assessment to identify estimated flood-inundation basins and coasts. The identified areas shall be designated as target areas for hazard maps and management plans.

The international committee meetings are held for each of the international rivers, such as the Rhine and the Elbe, to discuss flood control-measures and enhancement of flood protection measures.

[43] See: http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/50&format=HTML&aged=0&language=EN&guiLanguage=en

(3) Priority issues, approaches, points to consider

Japan's technical cooperation for disaster reduction has not been particularly active thus far and no large-scale cooperation is in prospect. It is expected to make efforts to disseminate the knowledge and expertise of Japan on disaster reduction throughout the region through disseminations of the results of a project in Romania that aims for earthquake-disaster reduction to the neighboring countries and through integrating flood-control approaches into comprehensive water resources management projects.

Table: Regional Characteristics of Disasters and Priority Issues/ Summary of Approaches

Region	Characteristics of natural disaster	Priority issues/Approaches
Southeast Asia	【Climate】 Tropical/temperate climate with wet and dry seasons affected by the Asian monsoon. The rainfall is concentrated during the rainy season and the region is located on the typhoon path. 【Frequent disaster】 Windstorms (hurricanes) and floods occur most frequently, followed by earthquakes and landslides. 【Other characteristics】 In general, the frequency of disasters is high; the magnitude of damage is relatively large due to high population density and economic concentration.	【Indonesia, Philippines】 ➢ No target disaster because the countries are affected by a wide range of disasters from windstorms and floods, to earthquakes, landslides and volcanoes. ➢ To put emphasis on cooperation for capacity development of administrative agencies, legal systems and implementation systems, and formulation of disaster-reduction plans, and to promote enhancement of coping capacity at the community level. 【Other countries】 ➢ Targeting mainly windstorms and floods ➢ Consider feasibility of cooperation aiming for coping-capacity development particularly at the community level 【Overall region】 ➢ When a large-scale disaster occurs, rapid emergency relief and recovery/ reconstruction assistance are provided, since the region is geographically close to Japan.
Southwest Asia	【Climate】 Tropical/temperate climate influenced by Asia monsoon【Geographic condition】 India and Pakistan are located on the boundary of the plates. 【Type of disaster】 Frequently affected by windstorms (cyclones) and floods, earthquakes and landslides 【Other characteristics】 Large-scale disasters occur frequently.	【Bangladesh】 ➢ Targeting windstorms and floods ➢ Consider feasibility of cooperation to check the spread of disasters due to climate change and to prevent secondary disasters 【Mountainous countries, such as Pakistan and Nepal】 ➢ Targeting windstorms and floods, landslides and earthquakes ➢ To promote cooperation aiming at understanding disaster risks, developing forecast/warning systems and evacuation systems, and strengthening the coping capacity of communities ➢ To enhance the coping capacity of communities against earthquakes by spreading a low-cost earthquake-resistance construction method 【Sri Lanka, Maldives】 ➢ Targeting floods and landslides ➢ Continue cooperation for community disaster-reduction activities and disaster drills, which were implemented in the past, in an effort to strengthen disaster-reduction systems and coping capacity of communities. 【Overall region】 ➢ It has been reported that disaster risks are increasing due to the impact of climate change, and the method of cooperation will be studied taking the impact of climate change into consideration.
Central Asia/ the Caucasus	【Climate】 Has cool, temperate, humid climate/highland climate 【Type of disaster】 Frequent occurrence of floods, earthquakes and landslides	【Overall region】 ➢ Targeting floods, earthquakes and landslides ➢ Due to budgetary constraints, it is difficult to provide large-scale cooperation only for disaster reduction. ➢ To understand new needs and to share the results of cooperation in the region through utilization of "Disaster-Reduction Administration Training" (region-specific training for Central Asia/the Caucasus) and cooperation within the framework of the Asian Disaster-Reduction Center

East Asia	【Climate】 Located at the northern rim of the Asia Monsoon area and also on the typhoon path. 【Geographic condition】 Located on the complicated convergence of plates 【Type of disaster】 The region is frequently affected by various disasters, such as windstorms and floods caused by intensive rainfalls and typhoons, and earthquakes, landslide, and volcanoes.	【China】 ➢ Targeting earthquakes and meteorological observations ➢ To implement assistance aiming to minimize disasters in poor regions 【Mongolia】 ➢ Targeting meteorological observations ➢ Consider the feasibility of future cooperation based on the results obtained from cooperation that aims to improve the capacity of the on-going meteorological and environmental monitoring.
Oceania	【Climate】 Belongs to tropical rainforest climate and located near the equator 【Geographic condition】 Volcanic islands located on the plate boundary 【Type of disaster】 The region is frequently affected by various disasters, such as windstorms (cyclones) and floods, and earthquakes, landslides and volcanoes. 【Other characteristics】 The region is susceptible to sea-level rise caused by climate change.	【Overall region】 ➢ Targeting earthquakes/tsunamis, windstorms and floods ➢ Since it is difficult to provide large-scale cooperation for disaster reduction, regional cooperation will be promoted focusing on Fiji, etc. ➢ To promote cooperation aiming to strengthen coping capacity, particularly at the community level, by identifying type of disasters and target areas.
Central America・the Caribbean	【Climate】 Coastal region has tropical rainforest climate/savanna climate. Inland area and many major cities have a tropical highland climate. Islands in the Caribbean Sea have a marine tropical climate, except for land at a relatively high altitude in the inland area. 【Type of disaster】 The region is frequently affected by hurricanes, floods from intensive rainfall, earthquakes and volcanoes.	【Overall region】 ➢ Targeting windstorms and floods, and earthquakes ➢ There are many small countries in terms of both land area and economic size, and the scale of assistance by country is not so large. Thus intra-regional cooperation will be promoted. Identifying Panama and Barbados as a center, cooperation will be implemented for member states of CEPREDENAC and CDERA while collaborating with these organizations.
South America	【Climate】 The region exhibits various climates: the northern half of the region has a savanna climate and the south has a temperate climate, and the Andean mountain region in the west has a highland climate. 【Geographic condition】 The Andean mountain region is on the boundary of plates. 【Type of disaster】 Flooding is the most frequent disaster, followed by landslides, earthquakes/tsunamis, and volcanoes.	【Overall region】 ➢ Targeting floods, landslides, earthquakes and volcanoes ➢ Since the scale of technical cooperation in the region is not large, disaster-reduction projects individually tailored to local needs will be promoted, and projects in other areas will be formulated with the aim of integrating a disaster-reduction perspective into development. ➢ In order to apply the cooperation results in the past to the region, efforts will be made for collaboration with local institutions and for utilization of the third-country training.
Africa	【Climate】 The region contains a wide variety of climates. Much of the north has a desert climate, the central part has a savanna or sub-tropical climate, and the south mainly a steppe climate.	【Overall region】 ➢ Targeting floods and droughts ➢ Development assistance needs to incorporate a disaster-reduction perspective. However, priority is placed on assistance concerning Basic Human Needs (BHN) such as education, healthcare and water resources.

	【Type of disaster】 The region is most frequently affected by floods and droughts. Floods and droughts induce the secondary damage, such as infectious disease or decline of agricultural productivity.	Thus, efforts for disaster reduction should be made as part of poverty-reduction assistance.
Middle East	【Climate】 The region has a wide variety of climates, the Mediterranean climate, the steppe climate and the desert climate. 【Geographic condition】 Located on the convergence of many plates 【Type of disaster】 Affected by various disasters: floods, landslides, earthquakes, etc.	【Iran, Turkey】 ➢ Targeting earthquakes and landslides ➢ Urban plans and land use will be reviewed, and cooperation will be implemented to build earthquake-resilient cities through seismic reinforcement of existing buildings, etc. ➢ Continue to strengthen the coping capacity of administrations 【Countries frequently subject to water-induced disasters (flood, landslide)】 ➢ Identify risks through expert dispatch, and consider the feasibility of cooperation that aims to enhance coping capacity particularly at the community level. 【Countries to which reconstruction assistance is provided, such as Afghanistan and Iraq】 ➢ Implement cooperation for reconstruction with disaster-reduction perspective, considering the fact that the region is affected by frequent disasters.
Europe	【Climate】 The region has a marine west coast climate/the Mediterranean climate, the Alps area and Russia have a cool, temperate, humid climate. 【Geographic condition】 Such countries as Italy and Greece are located on the plate boundary. 【Type of disaster】 Floods occur most frequently, and there is a risk of earthquakes.	【Overall region】 ➢ Since it is difficult to conduct large-scale cooperation in the future, cooperation to disseminate knowledge and expertise on disaster reduction throughout the region by spreading the results of projects against earthquakes implemented in Romania and by integrating disaster-reduction perspective into projects of other sectors.

Annex 5 Major Terms Related to Disaster Reduction

Alpha Rice

Alpha Rice is prepared by drying the cooked rice with hot air. It has high shelf life and can be stockpiled to be emergency food supply. The rice can be restored to its original state by soaking it in hot water for about 20 minutes and in cold water for about one hour.

Temporary Evacuation Site

The place where, in times of disaster (massive earthquakes/floods), people can flee temporarily before moving to evacuation camps, etc.

Rainfall Intensity

The amount of rain. Hourly precipitation **mm indicates the amount of rain that falls in an hour. The amount of rain that would fall in one hour if the rain with certain intensity during a unit of time continued for the full hour is expressed as rainfall intensity.

Class-“AA” Active Fault

Active fault with average slip rate of more than 10mm/year. It exists only in the ocean area. No Class-“AA” active fault has been found in the inland area.

Class-“A” Active Fault

Active fault with an average slip rate of 1-10mm/year

Liquefaction

The phenomenon in which a massive earthquake induces a buildup of pore water pressure, breaking the soil structure and resulting in the loss of their strength, which occurs at landfill sites where the saturated (with water) porous soil is loose. Liquefaction is likely to occur in the parts where the size of sands is even, the groundwater level is high and soil cohesiveness is weak.

Economy Class Syndrome

The formation of blood clots in a deep vein (venous thrombosis) in the legs due to poor blood circulation from long periods of immobility, resulting in breathing difficulty when the clot has occluded the pulmonary artery. It may cause death. The term “economy class syndrome” was coined because passengers in economy class are known to experience these symptoms. Some deaths of the Chuetsu earthquake in Niigata were caused by economy class syndrome, which afflicted survivors living in cars.

S-wave

Earthquakes produce two types of waves: the primary wave (P-wave) and the secondary wave (S-wave). The P-wave travels fast and arrives first, followed by the slower S-wave. The horizontally polarized component of the S-wave is referred to as an SH-wave and the vertically polarized component as an SV-wave.

MSK Seismic Intensity Scale

A seismic intensity scale first proposed by three European scholars in 1964 to evaluate the severity of ground shaking. The name MSK comes from the initials of three scholars. The use of the MSK is recommended by UNESCO.

Golden 72 Hours

The first 72 hours after an earthquake is crucial since the survival rate of those buried alive under rubble becomes drastically low after 72 hours. The term “golden” is used to indicate the importance of the 72 hours*.

Acoustic Survey

A method to survey the soil and active faults in bodies of water such as rivers and oceans. A survey ship tows a transmitter and a receiver and reflected waves are analyzed to examine the ground formation and faults.

Ocean Trench Type Earthquake

In the ocean trench, the oceanic plate retracts beneath the continental plate. Thus, the edge of the continental plate is significantly bent from being dragged down by the retracting oceanic plate. When this bending reaches its limit, the continental plate recoils and causes an earthquake. Earthquakes that occur in this manner are called ocean-trench earthquakes or plate-boundary earthquakes.

Modified Mercalli Intensity Scale(MM)

Modified form of the 12 levels of Mercalli Intensity Scale developed in 1923. It is widely used, including in the United States. Its assumed intensity is different from that of the “nine levels of intensity” scale used in Japan.

Ocean Bottom Seismograph

Seismograph installed at the ocean bottom mainly to measure the movement of plates.

Fire Spread Area

The area where an earthquake-induced fire is expected to spread in central urban areas crowded with buildings.

Pyroclastic Flow

The phenomenon in which a combination of hot volcanic gases, rocks, ash and pumice move down slope on the volcano flanks. Since pyroclastic flow is extremely hot, it is said to be the most dangerous natural phenomenon among volcanic eruption phenomena. The speed of flow sometimes exceeds 100km/hour. The

density of pyroclastic particles is smaller than water; it can move on the water surface and may spread over a wide area.

Volcanic Earthquake

The earthquake caused by volcanic activities in the volcanic region. Some volcanic earthquakes can be differentiated from regular earthquakes by seismographic data.

Acceleration

Change in speed per unit of time. It is expressed in units such as m/s^2, G or gal. "Gal" is used for earthquakes; 1 gal is equal to 1 cm/s^2 and a derivation from the name of Galileo Galilei.

Active Fault

A fault that is likely to move some time in the near future. Geologically, it is defined as the one with evidence of surface displacement during the late Quaternary period (10000–12000 years ago).

Caldera

A volcanic feature formed by the collapse of land when a large volume of magma is erupted. A large volume of magma normally spreads as a pyroclastic flow.

Seabiscuit

Hard-baked food made from flour. It has a high shelf life and is used as stockpiled food. Since they are dry food and too dry to eat, they are often packed with sugar candies to induce saliva secretion.

Japan Meteorological Agency Seismic Intensity Scale (JMA Scale)

The seismic intensity scale introduced in 1949 with the seven levels of seismic intensity. Following the 1995 Hyogo-ken Nanbu Earthquake, intensity levels 5 and 6 were divided into lower and upper respectively, and are now categorized into nine levels of intensity. The JMA Scale is used in Japan and Taiwan.

Seismic intensity was traditionally set qualitatively from the scale of damage, etc., but has been measured using the mechanical records of seismographs since 1995. This is called instrumental seismic intensity, as opposed to traditional intensity scale. The intensity level 7 was not recorded in the Hyogo-ken Nanbu Earthquake; but it was assessed to be level 7 from the scale of damage. (It was initially reported to be level 6, but was later revised to level 7 in the areas where more than 30% of houses had been completely destroyed.)

Medical Aid Hospital

A hospital that offers medical services at times of disaster, accepting persons who have been classified at a first aid station as requiring emergency treatment. Depending on the level of required treatment, some are transferred to an emergency base hospital. A first aid station is an emergency medical facility set up to offer first aid services. Medical doctors are sent from medical associations and societies, etc.

Allowable Stress Design Method

A method to determine the level of safety of materials and components of structure in seismic-resistant design. A structure is to be designed in such as way so that the stress intensity of a material (the effect of a force on a material per unit area) is within the allowable stress range. Since it is not clear how the material breaks when a force exceeds the allowable stress, and because the strength of the same material varies, a limit state design method has been used more often in recent years.

Emergency Vehicle

Any vehicle that is authorized to run at times of disaster. It is categorized into emergency-relief vehicles and emergency-transport vehicles. Emergency relief vehicles are those authorized to run on roads at times of emergency under the Road Traffic Law; they include fire engines and road maintenance vehicles. Emergency transport vehicles are those authorized to run on emergency-transportation roads under the Law for the Special Measures against Large-scale Earthquakes.

Emergency Fire-Relief Team

Fire-relief teams dispatched from other prefectures. In the event of a disaster that exceeds the capacity of the fire department forces of an affected municipality, the governor requests that the Director-General of the Fire Agency provide assistance from neighboring municipalities.

Crush Syndrome

A clinical condition developed following the rescue of victims who have been pressed for a long period of time by falling objects or collapsed houses, which can result in shock or renal failure. When the trunk or lower limbs are pressed for hours, the muscles are damaged severely. When the pressure is removed, the damaged muscle tissues release potassium and other toxic substances into the blood circulation, which in consequence leads to shock or renal failure. In this case, it is necessary carry out treatment after the person is rescued, which includes artificial dialysis, intravenous drip or blood transfusion.

Swarm Earthquakes

A series of small earthquakes that are continuously observed within a certain area. There are various swarm earthquakes, from those lasting for a short period to those lasting several years.

Estimated High-Water Level

The level of water used as a standard for design or development of an embankment. The level of water against the amount of water calculated from estimated rainfall in the water-control plans.

Safety Evacuation Area

The area of temporary evacuation set up in the wide-area evacuation site (evacuation zone) where people can protect themselves from secondary disasters after an earthquake has occurred. It has emergency supply storages and temporary medical centers, and serves as the base of relief and information operations.

Macroanomaly

To detect abnormal phenomena in nature using five senses, such as vision or hearing, which includes earthquake clouds, abnormal behavior of animals, change in groundwater level, temporal variation in the hot spring water and earthquake lights.

Flood Forecast

Flood forecast is a warning to be released when there is a possibility of a disaster occurring due to heavy rain. In Japan, the Japan Meteorological Agency issues flood forecasts, and the Japan Meteorological Agency and the Ministry of Land, Infrastructure and Transport and Tourism also issue flood forecasts. The latter forecast notifies the relevant municipalities and the public when there is a risk of substantial damage to rivers that run through more than two prefectures or those with large watersheds.

Structural Measures (Non-Structural Measures)

Measures to reduce disasters by structures and to manage and control natural phenomena: also known as hardware measures. Structural measures for major disasters are listed at the end of this section. As opposed to structural measures, there are non-structural measures: also known as software measures, which include hazard maps, development of evacuation systems and land-use regulations.

Characteristic Earthquake Hypothesis

The theory that activity intervals and scale of faults are characteristic of each fault. The recurrence interval of M8 class earthquakes in the Tokai and Nanki regions is about 150 years.

Disaster Relief Act

The law stipulating that the central government shall provide necessary emergency-relief assistance operations under cooperation among municipalities, the Japanese Red Cross Society and the people at times of disaster in order to protect disaster-affected people and maintain the social stability. Enforced in October 1847.

The following relief activities shall be funded by government contribution once an event is declared to be a disaster under the Disaster Relief Act.

1. Cost of setting up evacuation centers (¥30,000/100 persons)
2. Provision of food by preparing hot meals and other means (¥1010/person)
3. Relief of survivors (unlimited)

Emergency Base Hospital

A hospital that meets the requirements set by the Ministry of Health, Labor and Welfare, such as provision of 24-hour medical services or having means of wide-area transportation, such as helicopters.

Disaster Countermeasures Basic Act

The law enacted in 1961 after the 1961 Isewan Typhoon in order to integrate disaster-reduction laws and

regulations. It stipulates development of necessary systems for central and local governments and public organizations in order to protect land, life and property from natural disasters, to clarify where responsibility lies, to formulate plans and to take such measures as disaster prevention, emergency relief and reconstruction.

GPS

Abbreviation of Global Positioning System, which enables one to obtain position coordinates by receiving the signals from a constellation of 24 satellites placed into the Earth's orbit. The GPS has been developed and improved by the United States Department of Defense for military purposes since the 1970's. Initially, the precision of the data provided was intentionally reduced; however, this regulation was removed in May 2000. Low-cost GPS devices that can measure location with high precision are now available.

Class-"C" Active Fault

Active faults with an average slip rate of 1cm to less than 10cm/1000 years (or 0.01-0.1mm/year). Ex.) Fukozu fault

The Coordinating Committee for Earthquake Prediction (CCEP)

A private advisory panel to the Director-General of the Geographical Survey Institute, which conducts information exchanges and academic studies on earthquake prediction, including surveys, monitoring and research results. Founded in 1969. The committee comprises 30 experts from government agencies and national universities who meet four times a year.

Voluntary Disaster-Reduction Organization

An organization formed by volunteers in the community to conduct disaster-reduction activities, such as fire extinguishing at its early stage, life-saving and first-aid activities, and group evacuation.

Self-help, Mutual-help, Public Help

Self-help is to protect oneself. Mutual-help is to help each other in the community. Public help is the provision of assistance from public organizations. Since public help is not sufficiently provided immediately after a disaster, self-help and mutual-help are important.

Seismic wave

Seismic vibration caused by breaking of faults. There are two types: the primary wave (P-wave) and the secondary wave (S-wave).

Landslide

The phenomenon whereby the soil mass influenced by groundwater begins to move down slowly in the place of a gentle slope. This phenomenon generally covers a wide area range and involves a large amount of soil, causing considerable damage.

Slope Failure

The phenomenon that the slope gets unstable and collapse caused by intensive rainfall, etc. Similar to landslide but slope failure does not have a landslide surface.

Flexible Structure

A structure with a movable section to be flexible so as to be easily deformed and to release an external force applied to the structure. High-rise buildings with rigid structures (thick pillars and joists) are subjected to both a quake's tremors and sways on the higher floors, possibly causing damage to the building. In the case of a flexible structure, the deformation of a building releases the force, and the chance of damage is low. However, depending on the seismic wave pattern, the building may happen to resonate with the earthquake ground motion, causing the building vibrations to greatly increase. Thus, in recent years, dumpers are installed to reduce the vibration of buildings.

Gravity Survey

A method of studying underground structures by measuring and analyzing the gravity of the Earth. The Earth's gravity is about 980 gal (cm/s²). The force of gravity is different in different places due to land features. The underground structures can be detected by analyzing these differences.

Earthquake Focus

The place where a fault first slips to cause an earthquake. The ground surface directly above the earthquake focus is called "epicenter." The depth-of-earthquake focus is the distance between the earthquake focus and the ground surface.

Estimated Flood-Inundation Map

A map compiled to show estimated flood-inundation areas to raise awareness among the residents about responding to floods. The compilation of the map was stipulated in the Flood-control Act, which was revised in June 2001. Concerned municipalities shall compile a "flood hazard map" based on the designation/disclosure of the estimated flood-inundation map. It is a typical example of software measures to promote self-help.

Seismic Intensity

Indicates the magnitude of a quake. The intensity is expressed in nine levels in Japan from 0 to 7 (Levels 5 and 6 are subdivided into lower and upper, respectively). In some cases it refers to a design seismic coefficient.

Seismic Intensity Scale

The scale showing the intensity of an earthquake on the ground surface. Different countries use different scales. There are the Japan Meteorological Seismic Intensity Scale in Japan, the Modified Mercalli Intensity Scale (MM) used in the United State and other countries, and the MSK Intensity Scale.

Flood-Prevention Activity

Patrol, inspection and maintenance activities conducted when there is a risk that an embankment may not withstand a flood. The activities are conducted when a flood warning is issued. The Flood-control Act (enacted and enforced in 1948) stipulates the roles of the central government, local governments, city/town/village governments, and the residents, and provides that flood activities shall be conducted by city/town and village governments in the relevant areas. When flood prevention office associations or water hazard prevention associations are formed, these organizations shall be responsible for flood prevention.

Flood Management Organization

An organization of city/town/village governments responsible for flood prevention or those comprehensively dealing with flood-prevention-related clerical works (flood-prevention office association) or water hazard prevention association. A flood-prevention office association is established jointly by concerned city/town/village governments when they have difficulty assuming the responsibility individually. A water hazard prevention association shall be established pursuant to the Act of Water Hazard Prevention Association (1908). When a governor of a prefecture decides that it is necessary for city/town/village governments to take flood-prevention measures in a concerted manner, the governor is vested with the power to form a water hazard prevention association comprising concerned villages/cities/towns.

Flood Warning

Flood warning is issued by the Ministry of Land, Infrastructure, Transport and Tourism or the governors of prefectures to flood management organizations to stand by, prepare for and conduct flood-prevention operations. The warning is issued when the water level of a river rises to a notice/designation level, warning level or dangerous level. In response, flood-prevention teams conduct flood-prevention activities accordingly.

Flood-Prevention Team

An organization formed by the flood management organization to carry out flood-prevention operations. When a fire-fighting team of a city/town/village is able to conduct flood-prevention operations, it may act as a flood-prevention team instead of establishing a separate team. The members are residents living in the area, and have other occupations in peacetime. Due to falling birth rates in recent years, there have been issues regarding fewer members of the flood prevention teams as well as aging members.

Snow Depth

The depth of snow accumulated on the ground. The depth of snow that has fallen in an hour or the depth of snow that has fallen in one storm is called depth of snowfall.

Seismic Diagnosis

To examine the seismic resistance of existing structures. When the resistance is lower than an estimated force, seismic reinforcement is often carried out.

Local Disaster-Reduction Plan

A disaster-reduction plan formulated by local governments that stipulates disaster-reduction measures to be taken to protect life and property of the citizens, based on Article 42 of the Disaster Countermeasure Basic Act. It is stipulated that the plan shall be in line with the National Disaster Reduction Basic Plan. The local disaster-reduction plan contains "disaster prevention" prior to disaster, "disaster response measures" immediately after disaster, and post-disaster "recovery/reconstruction."

Tsunami

When an earthquake occurs at the ocean bottom, waves are generated by seismic fault displacement; these waves are called tsunamis. The wavelength of a tsunami is long, with about several hundred kilometers, whereas that of a regular wave is several meters long. One of the characteristics of a tsunami is that the wave gets larger as it gets closer to shore, into shallow water. Some tsunamis reach more than 10 meters in height.

Tsunami Earthquake

An earthquake that generates a much larger tsunami than expected from its seismic waves. The mechanism of causing a tsunami earthquake is unknown. Because the size of a tsunami depends on the vertical movement of sea surface, an earthquake is believed to be generated when the magnitude of deformation is large. One example of a tsunami earthquake is the 1896 Sanriku tsunami earthquake. It is believed that the tsunami disaster caused massive damage, since the earthquake was relatively small and many people had not fled.

Protected Lowland, Riverside Land

A protected lowland is the area protected from floods by a levee, such as residential and agricultural areas. A riverside land is the area between both banks, where water flows. Since a low or flat land was protected from floods by a circle levee in Japan, a residential area used to be regarded as inside the levee.

Levee

A civil engineering facility constructed by piling up soil on both sides of a river to release flood water safely down the river.

Telemeter

Precipitation or water-level data automatically collected at observation stations are sent automatically to offices through a transmission network. This system of automatic observation and transmission is called a "Telemeter System."

Trough

A depressed boundary formed when a plate retracts from another. The boundary is also called trench.

Triage

Process to determine the first priority for treatment and transportation of patients depending on the severity of

injury or illness in response to mass casualty incidences caused by natural disaster or accident. A triage tag is used to categorize the injured into four groups by color code: I. Highest priority group (red), II. Delayed group (yellow), III. Minor group (green), and O. Deceased (black).

Inland Earthquake

When two plates push each other, strains are accumulated within the inland plate where the rock strength is weak. When the strains reach the limit, faults slip to release the force. Earthquakes that occur in this way are called inland earthquakes.

P-Wave

Earthquakes produce two types of waves: the primary wave (P-wave) and the secondary wave (S-wave). The direction of displacement and the direction of wave travel of P-wave are identical.

Geophysical Survey

A method of examining underground structures without having to dig them up, by measuring and analyzing phenomena (response) generated on the ground by giving vibration or injecting an electric current into the ground.

Plate

Composed of more than ten slabs of massive rock strata with a thickness of between 30km-100km. A plate moves gradually over many years, as the mantle moves.

Eruption

A phenomenon in which volcanic ash and lava are erupted fiercely from a crater. The scale of eruption is measured by the amount of erupted magma. Large-scale eruption refers to an eruption with a large volume of erupted magma. The strength of eruption is measured by the amount of magma erupted per unit time (eruption rate).

Magnitude

A unit to indicate the scale of seismic energy.

Lahar

An Indonesian word for a flow of sediment-containing water in the volcanic region, such as debris flow or mudslide. When an eruption occurs in the snowmelt period, a Lahar disaster could affect extensive areas.

Running Stock

A method to store the necessary amount of food within its expiration date at all times. Food is stored for a certain period of time and consumed within its expiration date. Since new stock will be procured before or immediately after the old stock expires, the required amount of food within its expiration date is always in stock.

Real-Time Precipitation, Real-Time Water Level

The most recent data of precipitation of the water level is automatically collected. In order to provide the most recent data in a timely manner, the data on precipitation or a river water level automatically observed is automatically collected and calculated. Since the data is provided almost simultaneously with observation, it is called a real-time precipitation/water level. Currently, the data-renewal time is different depending on the monitoring devices of different observation points. Data is normally renewed every 10 minutes.

Radar Precipitation

Precipitation calculated based on the radio-field strength reflected by raindrops, ice crystals, or clouds that are present within the monitoring scope in the air, which is obtained by emitting radar waves in a 360 degree horizontal direction.

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Major Structural Measures by Disaster Type

(1) Anti-earthquake measures

Earthquakes cannot be prevented, but human damage can be mitigated through anti-earthquake measures by preventing houses from collapsing. Many of the victims of the 1997 Hanshin-Awaji Great Earthquake were crushed to death under collapsed houses and buildings. Thus major structural measures are to make structures earthquake-resistant.

Damage in urban areas is particularly crucial when an earthquake occurs. When an earthquake hits the metropolitan area and an economic center of a country, its impact on the economy is immeasurable. It is difficult to make all the buildings earthquake-proof, and priorities should be given to critical facilities such as government buildings, hospitals and main roads, which serve as emergency transport routes. Since earthquake-resistant measures of the government cannot fully cover individual houses, it is necessary to promote self-help through dissemination of low-cost earthquake-resistant technologies and implementation of disaster-reduction education. Adobe houses are often found in the agricultural and mountainous areas, and they are vulnerable to collapse from earthquakes. It is particularly important in these regions to disseminate low-cost reinforcement technologies.

(2) Anti-tsunami measures

Piers and ports used to be called “tsu.” A wave (“nami”) that causes considerable damage in shallow water (“tsu”) is said to be the origin of the word “tsunami.” A tsunami is the wave induced by movement of the sea surface from an earthquake (slip of a fault) under the ocean. The wavelength of a tsunami is quite long at more than 10 km. When it reaches coastlines, the wavelength becomes shorter and the wave height increases. This is why be the damage to coastal areas tends to be severe.

Tsunami disaster may spread far and wide. A tsunami generated by the 1960 Earthquake off the Chile Coast in South America reached the Pacific coast of Japan 23 hours after the earthquake, leaving some 140 people dead or missing. This type of tsunami is called a distant tsunami. A tsunami caused by the 2004 Off-Sumatra earthquake is also a distant tsunami. A tsunami generated by an earthquake occurring within 600 km of the coast is called a local tsunami, and countries having plate boundaries along the coastlines, such as Japan and Indonesia, frequently experience local tsunamis.

Structural countermeasures against tsunami include those protecting the coastlines directly by building levees and revetments and those mitigating tsunami effects by breakwaters. Since tsunami waves are usually much higher than regular waves, more emphasis is placed on software measures for “escaping,” which includes the development of early-warning sand evacuation systems, rather than structural measures.

(3) Anti-flood measures

A flood is a phenomenon in which river water rises, caused by rains pouring into the river basin. Damage from a flood is inundation damage. When the water breaks the levee and river water pours into the protected lowland, it is called a flood inundation outside the levee (gaisui-hanran). On the other hand, when rainwater, not being drained into rivers, inundates the urban areas and lowlands, it is called a flood inundation inside the levee (naisui-hanran). The following countermeasures are available:

- Control rainwater drainage by natural conservation and land-use regulations
- Reduce the maximum water flow by dams and reservoirs
- Improve the flow capacity by building levees and making river channels deeper/wider
- Reinforce existing river structures
- Develop rainwater drainage
- Install pumps to drain wetland

Developing countries have limited investment resources for flood-control projects, and it is difficult to put emphasis on hardware measures such as the development of levees or construction of dams. Thus assistance for developing countries tends to prioritize software measures like development of flood-warning systems and hazard maps, or land-use regulations. However, effective flood-control measures require an appropriate combination of hardware measures and software measures, and lop-sided measures do not generate sufficient flood-control effects. It is therefore necessary to take the most suitable measures for a region with due consideration to the social and environmental conditions of the region.

Flood-control measures may at times increase disaster potential. For example, if safety is improved because of flood-control measures, people would start living in an area where they were not previously able to live, which increases disaster risks in the area. It is necessary to take appropriate measures to avoid development-induced disasters.

(4) Countermeasures against sediment disasters

Major sediment disaster includes debris flows, landslides and cliff failures. A debris flow is a phenomenon whereby the collapse sediment on a mountain slope and deposited sediment in a valley descends mixed with rainwater from a downpour. Countermeasures include installation of sediment-control dams and flow paths and forestation. Sediment-control dams stop debris flows, contributing to control of debris flows and stabilization of mountain slopes, but at the same time block the movement of sediments that form rivers and coasts. Thus in recent years, slit-type dams are constructed, letting small pebbles and debris go downriver and retaining large rocks.

A landslide is a phenomenon whereby the soil mass on a slope begins to move down along with the slope. Because the soil mass is generally huge, the damage that is causes becomes extensive. Countermeasures include control works such as drainage works or mound-layering works, and prevention works such as pile-foundation works and anchor works.

A cliff failure refers to a soil collapse without a slip surface. The scale is smaller than that of a landslide. Countermeasures include slope-stabilization works by concrete spraying or vegetation, anchor works and prevention works. Control works are the ones that eliminate or mitigate the occurrence of natural disasters by improving natural conditions, such as geographic features or groundwater and stabilizing soil. Prevention works are to partially or entirely prevent natural phenomenon using the resilience of structures.

(5) Anti-volcano measures

Volcanic eruptions cause various natural phenomena: for instance, lava flow, volcanic deposits (pyroclastic flow, volcanic ash, etc.), eruption of volcanic gases, volcanic mudflow and snowmelt-type mudflows (or Lahar). Although infrequent, disasters caused by volcanoes may be extensive due to the massive amount of energy they release.

Countermeasures include installation of volcanic sediment-control facilities to control lava flow and pyroclastic flow, and training levees that change and direct the lava or mud flow toward a place where no damage would be done. Since the scale of damage is large as a tsunami, emphasis of the countermeasures against volcanoes should be on measures such as monitoring of volcanic activities or development of hazard maps, instead of structural measures.

(6) Countermeasures against storm surges

A storm surge is a phenomenon in which the sea level rises due to a pressing force on the sea surface, and is reduced as a typhoon or depression approaches due to a lower barometric pressure. At the time of high tide or when the sea surface rises from strong winds, the sea surface would be raised even higher. Major countermeasures against storm surges include countermeasures against inundation by installing revetments and levees. It also includes wave absorption (suppression) using breakwaters.

It is possible to improve disaster-reduction capacity through structural measures against each disaster described above. Still, maintenance and management are essential to fully utilizing the effectiveness of these facilities. When implementing structural measures, it is also necessary to determine whether the recipient countries are able to continuously maintain and manage the facilities, by examining the social and economic capacity of these countries.

Damage cannot be avoided if the disaster exceeds the capacity of the facilities. Thus, it is necessary to make efforts to minimize the damage of a disaster by taking non-structural measures, etc.


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