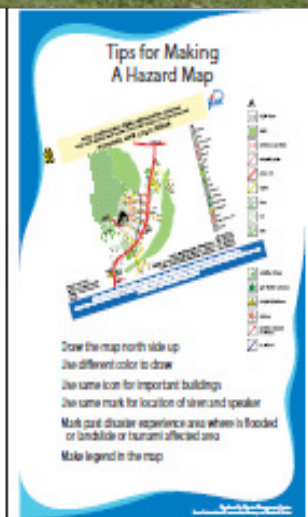
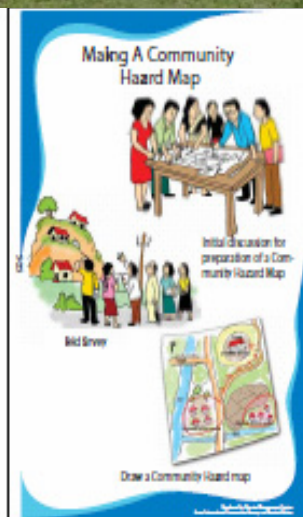




International Strategy for  
Disaster Reduction

## JICA's Assessment of its Contribution to the Hyogo Framework for Action



February 2011

Global Environment Department

Japan International Cooperation Agency

## Preface

Natural hazards including strong winds, floods, landslides, earthquakes and forest fires constitute serious threats to life, the natural environment, infrastructure, and property and cause great damage to the lives of people.

In recent years, the world has frequently experienced natural disasters with many people affected. Once a disaster strikes in developing countries, which are highly vulnerable to natural disasters, local and national development is extensively affected as well as the livelihoods of vulnerable groups, in particular the poor.

Historically, Japan has achieved economic development while strengthening preventive measures against disasters and overcoming challenges associated with various natural disasters. The Japan International Cooperation Agency (JICA) has actively participated in international cooperation in the field of disaster risk reduction (DRR), contributing knowledge and experience in this area. The Initiative for Disaster Reduction through Official Development Assistance (ODA) was announced at the United Nations World Conference on Disaster Reduction held in Kobe, Hyogo prefecture in January 2005. The Initiative demonstrated Japan's key policies and approaches to international cooperation for disaster reduction. In response to these developments, more efficient and effective international cooperation in DRR will be increasingly required as part of ODA.

The idea for agency assessment report developed during the mid-term review of the Hyogo Framework for Action (HFA). JICA established an advisory committee in April 2010 to formulate future cooperation strategy in line with the HFA, preparing this Assessment Report as an internal document on DRR activities at JICA. This report consists of three parts:

1. A brief review of the HFA and JICA's strategies, directions of assistance and achievements in DRR;
2. An analysis of achievements for each priority action of the HFA from evaluations of recent JICA projects (1997 - 2008); and
3. A discussion of findings and recommendations for future DRR activities.

Although this Assessment Report was initially prepared for internal use, JICA decided to translate it at the suggestion of the United Nations International Strategy for Disaster Reduction (UNISDR), in order to share further information with other stakeholders involved in the HFA Mid-Term Review. We hope that the Assessment Report will contribute towards improving and accelerating efforts towards achievement of the goals of the HFA by 2015.

February 2011

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# **I. Introduction**

## **1-1 Background and Objectives**

### **1-1-1 JICA Policies of Assistance on Disaster Risk Reduction**

In January 2005, *the Hyogo Framework for Action (HFA) 2005 – 2015: Building the Resilience of Nations and Communities to Disaster*, a comprehensive set of three strategic goals and five priorities action, was approved by 168 countries at the United Nations World Conference on Disaster Risk Reduction held in Hyogo, Japan. The HFA has since become the guiding instrument for international cooperation in the field of DRR. JICA, as an ISDR system partner, has been implementing projects that are based on the HFA and Initiative for Disaster Reduction through ODA from the Government of Japan.

JICA prepared issue-specific guidelines for 23 sectors. One of them is the Issue-Specific Guideline for Disaster Risk Reduction (the Guideline for DRR) was released in March 2008 (with revision in February 2009).

The JICA Guideline for DRR sets out three objectives.

#### **➤ Contributing to the improvement of human security**

Poor communities are highly vulnerable to the multiple effects of disasters. Disasters can exacerbate already difficult living conditions, affecting both short and long-term human security. Cooperation in the field of DRR contributes towards the reduction of vulnerability and improvement of the coping capacities of both individuals and communities.

#### **➤ Contributing to sustainable development in developing countries**

The prioritisation of short-term national economic development over sustainable development can lead to the neglect or postponement of DRR efforts. DRR is a critical component of medium and long-term development, particularly in developing countries that are vulnerable to natural hazards. Cooperation between donors is critical if we are to successfully incorporate DRR into development activities.

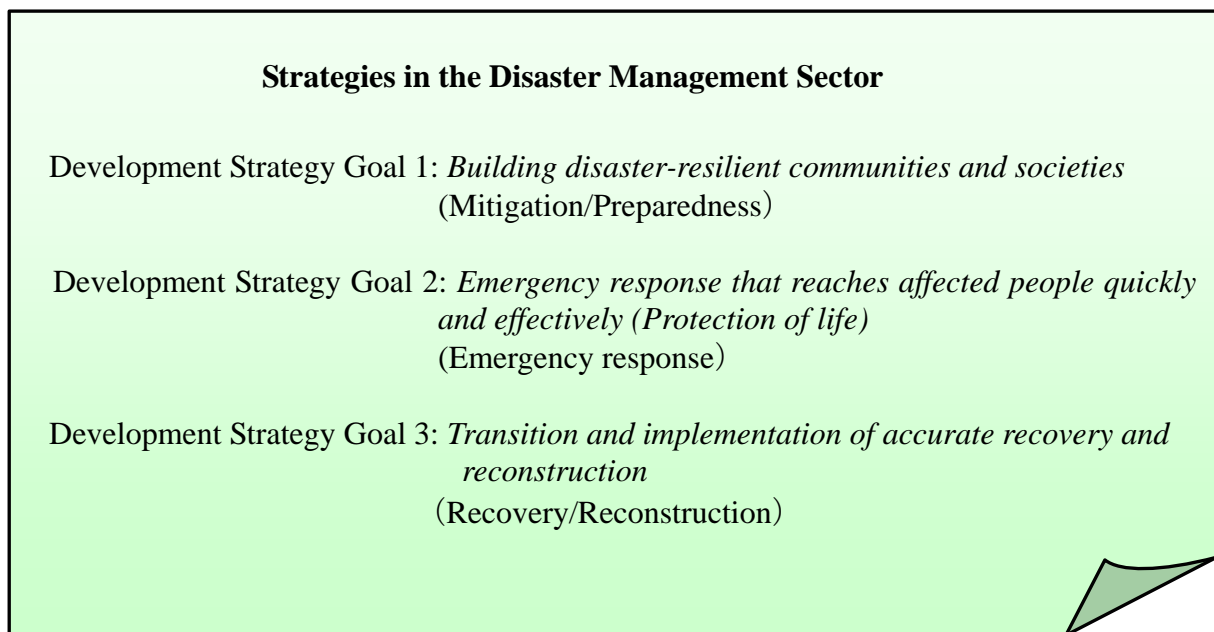
#### **➤ Contributing to the promotion of international cooperation in the field of DRR as an advanced nation of disaster management**

Japan has held a leading role in the development and implementation of an international framework using national experience and expertise in DRR. JICA focuses on three strategies based on the Disaster Management Cycle (DMC) in order to facilitate coordinated assistance:

1. Prevention, mitigation and preparedness during times of peace
2. Emergency response activities conducted immediately after the disaster

3. Recovery and reconstruction to restore quality of life after a disaster (Figure 1).

The Guideline for DRR was prepared to facilitate harmonization with the HFA. JICA regards *Development Strategy Goal 1: Building disaster-resilient communities and societies*, as the most important strategy that aligns with the HFA Strategic Goal 1: Building resilience to hazards. Mitigation and preparedness, however, must also be complemented by emergency response, recovery and reconstruction if a culture of DRR and preparedness is to be sustainable and encourage intergenerational change.



Typical activities under the JICA Development Strategies are listed in Table 1. Development Strategy Goal 1 for mitigation and preparedness places emphasis on institutional capacity development of national governments, local governments, research institutions and non-government organisations (NGOs), with particular emphasis on community-based disaster risk reduction (CBDRR). This approach is based on lessons learnt from the 1995 Great Hanshin-Awaji Earthquake. For example:

- 70% of survivors coped by themselves or were rescued by family members, while 20% were rescued by their communities, and 10% were supported by public emergency and rescue workers<sup>1</sup>.
- Lack of information and destruction of infrastructure can hamper or delay rescue and other assistance efforts. In addition, members of rescue teams and their family members can also be directly affected by disasters.
- Community and community members are the main actors of the recovery and reconstruction stage

---

<sup>1</sup> Japanese named “Self-help”, “Mutual-help”, “Public-help” and “Three Helps” to learn from these experiences.

until the society recovers capabilities that existed prior to a disaster.

Community-based disaster risk reduction is implemented as part of activities or as project components. An integrated approach is effective to achieving Development Strategy Goal 1.

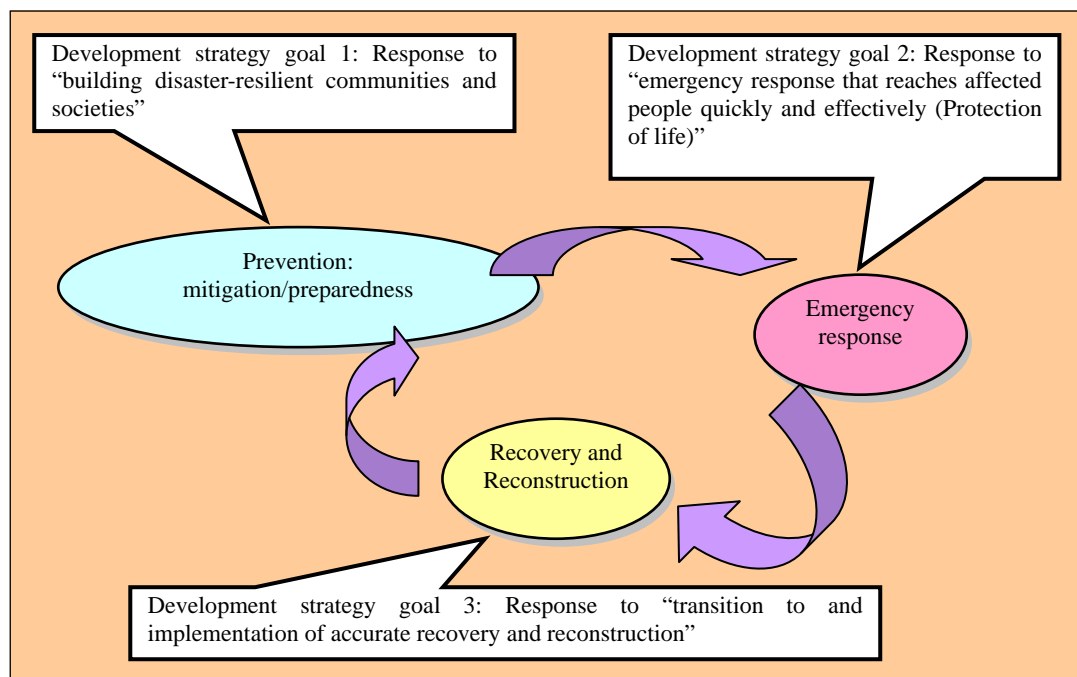


Figure 1. Disaster Management Cycle (DMC)

Table 1. Development Strategies, Policies of Cooperation and Activities

| Development Strategy  | Policy of Cooperation  | Activities   |
|---|--|--|
| Development strategy goal 1: “Building disaster-resilient communities and societies”  | <ul style="list-style-type: none"> <li>• Activities to enhance capacity to respond to disasters, especially of communities</li> <li>• Integration of disaster reduction into development plan</li> </ul> | <ul style="list-style-type: none"> <li>• Preparation of legal system (national level), preparation of disaster management plans (national, local and community levels)</li> <li>• Establishment and strengthening of disaster management systems (capacity development of organizations involved in disaster risk reduction (administration, research institutions and NGOs), especially of the community)</li> <li>• Understanding disaster risks and preparation of maps for disaster risk reduction (national, local and community levels)</li> <li>• Preparation of forecast and early warning systems, and evacuation systems</li> <li>• Education and creation of culture of disaster risk reduction</li> <li>• Improvement of capacity to prevent and mitigate through hard measures</li> </ul> |
| Development strategy goal 2: “Emergency response that reaches affected people quickly and effectively (Protection of life)” | <ul style="list-style-type: none"> <li>• Continuation of emergency disaster relief</li> <li>• Sanitation and medical support for victims</li> </ul>  | <ul style="list-style-type: none"> <li>• Speedy implementation of needs assessment of emergency disaster relief, which is integrated into international support</li> <li>• Speedy dispatch of rescue and medical teams</li> <li>• Dispatch of specialist team harmonized with local needs</li> <li>• Speedier supply of goods</li> <li>• Mental care</li> </ul>  |
| Development strategy goal 3:  | <ul style="list-style-type: none"> <li>• Continuous support for victims</li> </ul>   | <ul style="list-style-type: none"> <li>• Speedy implementation of needs assessment of recovery and reconstruction</li> </ul>   |

|  |  |   |
|--|--|---|
| “Transition to and implementation of accurate recovery and reconstruction” | <ul style="list-style-type: none"> <li>• Support to build a resilient community and society during the recovery and reconstruction phases</li> </ul> | <ul style="list-style-type: none"> <li>• Recovery and reconstruction of lifelines and public facilities</li> <li>• Reconstruction by participation of community</li> <li>• Recovery of livelihood</li> <li>• Medium- and long-term mental care for victims</li> </ul> |
|--|--|---|

### 1-1-2 The purpose for JICA review of activities in DRR

JICA has assessed its activities through recipient countries’ progress towards the achievement of the strategic goals and priorities for action on the HFA as part of the Mid-Term Review for the following reasons:

- 1) As a country that is prone to disasters, DRR is critical in Japan at all levels of governmental and non-governmental organizations including communities because of the potential for great loss of lives, property and infrastructure every year. Disaster management laws and systems have been developed and strengthened because of bitter experience with large-scale natural and manmade disasters and accidents in Japan. Japan strongly advocated advancing international cooperation in DRR by utilizing knowledge and technologies acquired from numerous disaster experiences.
- 2) JICA actively participates in international cooperation on DRR and implements a large number of related projects. The Mid-Term Review of the HFA provides an opportunity for JICA to review and assess its activities to ensure that projects align with the HFA.
- 3) The number of natural disasters has increased worldwide since the 1950s. Natural disasters, particularly climatic disasters, are increasing in frequency, intensity and devastation. Fortunately, there is growing recognition of the impact of natural disasters in hindering development achievements.
- 4) JICA is currently conducting a study on JICA’s assistance to DRR and established an advisory committee for the formulation of future DRR cooperation plans. This assessment report is one reference that is to be submitted to the committee.
- 5) UNISDR is presently conducting the Mid-Term Review of the HFA. By sharing JICA’s assessment in DRR with the international community, we hope to facilitate a clearer understanding of the HFA.

### 1-1-3 Objective of the Assessment

The objective of the assessment is to analyse and to review the achievements of JICA activities, including good practice and lessons learnt, to formulate future DRR cooperation plans.

### 1-1-4 Other Studies related to the Assessment

JICA has been conducting studies to build up institutional knowledge for the effective use and improvement of assistance on DRR.

➤ *The Handbook on Climate Change Adaptation in the Water Sector*



This publication provides a new approach to formulating and implementing projects for climate change adaptation. The English version of the handbook is available at the following website:

[http://www.jica.go.jp/english/operations/thematic\\_issues/water/pdf/guideline\\_02.pdf](http://www.jica.go.jp/english/operations/thematic_issues/water/pdf/guideline_02.pdf)

➤ **Analytical Review on Lessons Learnt from JICA DRR Projects**

Approximately a hundred of projects are under review for analysis of lessons learnt. The first version will be compiled by March 2011.

➤ **Country Profiles on DRR**

Information on DRR in fifty countries is available now in Japanese. JICA is also preparing an English version

## **1-2 Three Strategic Goals and Five Priorities for Action of the Hyogo Framework for Action**

Three Strategic Goals and Five Priorities for Action were adopted at the World Conference on Disaster Reduction based on a review of conclusions obtained while implementing the Yokohama Strategy<sup>2</sup> to achieve the agreed outcomes of the HFA.

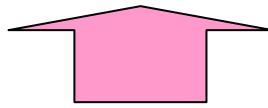
The HFA offers guidance to all UN member States on building the resilience of countries and communities against disasters by preparing a DRR plan and promoting the integration of DRR activities into economic and social programmes. The Five Priorities for Action (Figure 2 and Table 2) are outlined the HFA to guide states, regional and international organizations, and other stakeholders at all levels in designing their approach to DRR by using methodologies suited to their conditions and capacities. Progress and achievements will be evaluated under the ISDR System.

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<sup>2</sup> “Yokohama Strategy and Plan of Action for a Safer World” adopted at the UN World Conference on Natural Disaster Reduction held in Yokohama, Japan, in May 1994.

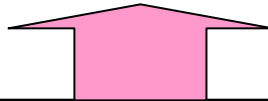
| Historical Overview of International Cooperation for Disaster Reduction  |   |  |
|--|---|--|
| International Organizations  |   | Japan and JICA's   |
|  |   | 1953-1990 Loan by World Bank   |
|  |   | 1954 Joined in Colombo Plan  |
|  |   | 1958 Started Yen Loan, 1969 Started Grant Aid  |
|  |   | 1961 OECF 1962 OTCA(1974 JICA), 1965 JOCV  |
|  |   | 1982 Japan Medical Team for Disaster Relief  |
| 1987   | the 42th United Nations General Assembly                | 1990's was decided as "International Decade for Natural Disaster Reduction"  |
| 1990-1999 International Decade for Natural Disaster Reduction(IDNDR):First International Cooperation for Disaster Risk Reduction                           |   |  |
| 1990   | IDNDR International Conference(In Yokohama,Kagoshima)   | Emphasis : From reactive relief to proactive prevention applying science and technology  |
| 1994   | Yokohama World Conference on Natural Disaster Reduction | Reviewing achievement during first half of IDNDR, adopted Yokohama Strategy for the second half                                |
| 1998   |   | ADRC was established   |
| 2000-2015 United Nations International Strategy for Disaster Reduction(UNISDR) : International Disaster Reduction Program taking over the IDNDR activities |   |  |
| 2001   | Inauguration of ISDR Secretariat                        | Role: To follow up IDNDR for promotion of disaster reduction world wide  |
| 2002   | Global review of Disaster Reduction Initiative          | "Living with Risk" is the first integrated report on Disaster Reduction by United Nations                                      |
|  | World Summit on Sustainable Development(Johannesburg)   | "Disaster" was recognized as a menace to human being ranked among conflict, AIDS etc for the first time at high level meeting  |
| 2003   | The 3rd World Water Forum(Kyoto)                        | Disaster reduction was discussed for the first time  |
| 2005   | World Conference on Disaster Reduction(Kobe)            | Reviewing implementation of Yokohama Strategy, adopted Hyogo Framework of Action (HFA)   |
| 2006   | Global Facility for Disaster Reduction and Recovery     | Multi-fund of WB is supported by 16 donors including Japan. It plays leading role for disaster reduction together with ISDR    |
| 2007   | The 1st Global Platform assembly                        | To promote "Hyogo Framework for Action" and international cooperation for Disaster Reduction was confirmed                     |
| 2008   |   | "Issue Specific Guideline for Disaster RISK Reduction"(JICA)   |
| 2009   | Global assesment report                                 | "Risk and Poverty in Changing Climate"   |
|  | The 2nd Global Platform assembly                        | The activity based on the global assesment report was reviewed and the priority issues for 2009 to 2015 were proposed          |
| 2010   | "Hyogo Framework for Action" Mid-term review            | To review achievement during 2005-2010 and prepare plan for 2010-2015. Result will be reported to UN General Assembly in 2011. |
| 2015   | "Hyogo Framework for Action" final evaluation           | Result will be reported to UN Sustainable Development Committee  |

## Building the Resilience of Nations and Communities to Disasters



### Three Strategic Goals

- ✧ The integration of disaster risk reduction into sustainable development policies and planning
- ✧ Development and strengthening of institutions, mechanism and capacities to build resilience to hazards
- ✧ The systematic incorporation of risk reduction approaches into the implementation of emergency preparedness, response and recovery



### HFA Five Priority Actions

- 1: Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation.
- 2: Identify, assess and monitor disaster risks, and enhance early warning systems.
- 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 an effective response at all levels.

Figure 2 Concept of the HFA

Table 2. The HFA Five Priority Actions and Key Activities

| Priority Actions  | Key Activities   |
|---|--|
| <p><b>Priority Action 1</b></p> <p>Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation.</p> | <p>(1) Create and strengthen national institutional and legislative frameworks</p> <p>(2) Assess, develop and allocate resources</p> <p>(3) Promote community participation in disaster risk reduction</p>   |
| <p><b>Priority Action 2</b></p> <p>Identify, assess and monitor disaster risks, and enhance early warning systems.</p>  | <p>(1) Assess national and local risks</p> <p>(2) Develop early warning systems</p> <p>(3) Support the development of capabilities</p> <p>(4) Assess and monitor apparent regional-level risks</p>   |
| <p><b>Priority Action 3</b></p> <p>Use knowledge, innovation and education to build a culture of safety and resilience at all levels.</p>                         | <p>(1) Manage and exchange information</p> <p>(2) Strengthen networks</p> <p>(3) Promote and strengthen activities of disaster risk reduction in communities and schools</p> <p>(4) Research</p> <p>(5) Public awareness</p>   |
| <p><b>Priority Action 4</b></p> <p>Reduce the underlying risk factors.</p>  | <p>(1) Environmental and natural resource management</p> <p>(2) Social and economic development practices</p> <p>(3) Land-use planning and other technical measures</p>  |
| <p><b>Priority Action 5</b></p> <p>Strengthen disaster preparedness for an effective response at all levels.</p>  | <p>(1) Strengthen policy, technical and institutional capabilities in regional, national and local disaster management.</p> <p>(2) Promote and support dialogue, exchange of information and coordination among all levels of agencies and institutions concerned with early warning systems, disaster risk reduction, disaster response, and development.</p> <p>(3) Strengthen and, when necessary, develop coordinated regional approaches, and create or upgrade regional policies, operational mechanisms, plans and communication systems.</p> <p>(4) Prepare or review and periodically update disaster preparedness and contingency plans and policies at all levels. Promote regular disaster preparedness exercises, including evacuation drills, with a view to ensuring rapid and effective disaster response and access to essential food and non-food relief supplies, as appropriate, to local needs.</p> |

## 1-3 JICA's Trend of Cooperation since its inception in 1960s

### 1-3-1 Shift of Priorities of Assistance

International community attention to the necessity of shifting approaches to DRR continued after the International Decade for Natural Disaster Reduction (1990 – 1999) (IDNDR). The goals and the priority actions of the HFA formed part of these movements, along with the following trends:

- (a) A shift from structural measures to non-structural measures
- (b) A reorientation from focusing solely on national governments towards consideration of local governments and communities
- (c) A shift from response to prevention, mitigation and preparedness
- (d) Integration of disaster risk reduction into development planning

Implemented JICA projects (around 350 projects in total) conducted under technical assistance schemes (technical cooperation projects and development studies), grant aid and

ODA loans are analyzed below with Figures 3 and 4 referencing the shifting approaches of (a) and (b). These Figures show that the number of projects of DRR has been increased and that projects reflect a shift in the types of measures employed and target groups.

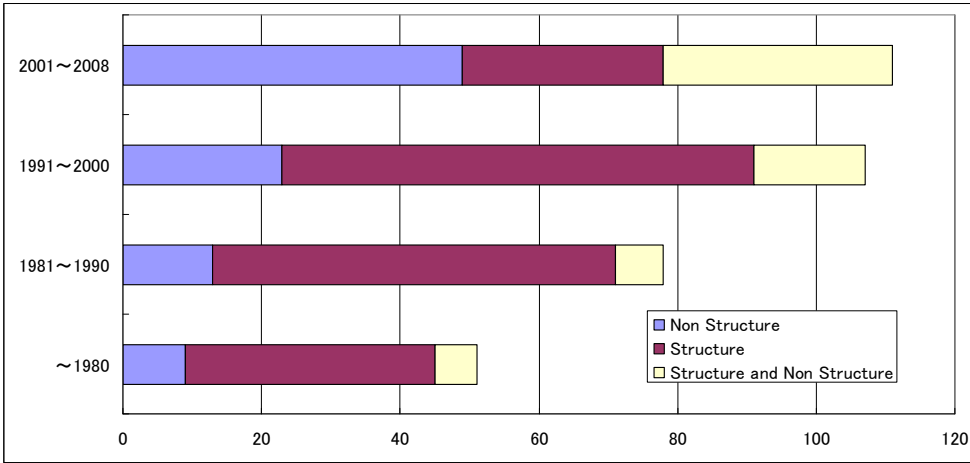


Figure 3. Trend of Shifting from Structural Measures to Non-Structural Measures

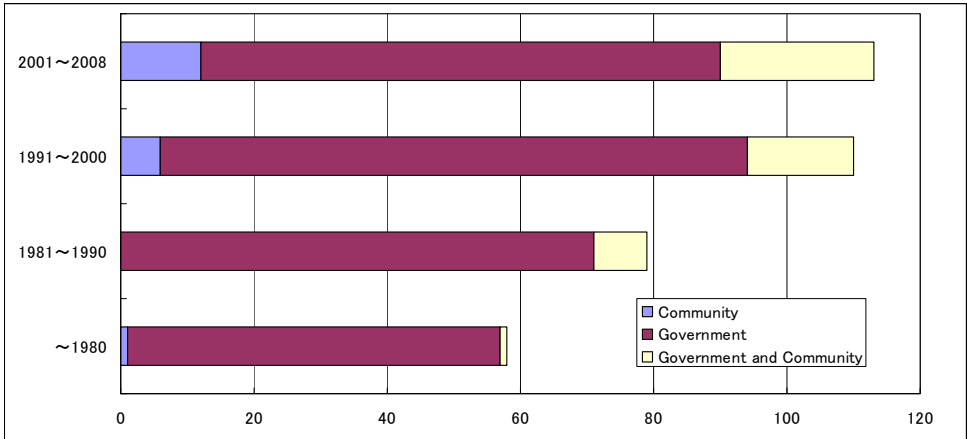


Figure 4 Trend of Shifting from National Government to Local Governments and Community

The increased number of projects reflects a growing awareness by stakeholders of the importance of DRR, as well as acknowledgement of the rapid increase of natural disasters within the past thirty years.

Structural measures characterised JICA assistance until the 1990s. Since then, there has been a marked increase of projects adopting non-structural measures as well as a gradual increase of projects that combine structural and non-structural measures.

The shifts from structural measures towards non-structural measures are attributed to the following factors:

- JICA received many requests<sup>3</sup> from the ministries in charge of public works and infrastructure as a result of demands for economic development
- Increased requests for capacity building within the context of the IDNDR and the HFA from government institutions in charge of DRR.
- A combination of structural and non-structural measures assist activities such as involuntary resettlement and minimize environment impact and project costs related to climate change and urbanization.

Governmental organizations are still major partners in JICA cooperation programmes, as shown in Figure 4. However projects focusing on communities have increased since the 1990s.

The trend towards community-orientated projects is explained below:

- Capacity development of government officers such as engineers was originally the main target of technical transfer through JICA experts in order to promote construction of economic and social infrastructures.
- Decentralization has led to the strengthening of local governments and communities.
- From a human security perspective, capacity development of communities including local NGOs is a key factor of tackling natural disasters and promoting safer societies.
- Disaster management should be practiced at all levels to ensure effectiveness and sustainability by utilizing the models like instructional design. Creating linkages and reviewing systems between national and local governments and communities through policies, plans and activities enhances cooperation and coordination; and enables the sharing of information and feed back at all levels.

### **1-3-2 Input into DRR of JICA**

JICA provides assistance through the schemes of technical cooperation, grant aid, yen loans (ODA loans) and emergency disaster relief. Technical cooperation includes technical cooperation projects, development studies (renamed “technical assistance for preparation of a development plan”), the dispatch of experts, training courses (in Japan, third countries and recipient country), the provision of necessary equipment, and cooperation with NGOs.

JICA’s assistance in DRR from 1997 - 2008 consisted of the following:

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<sup>3</sup> Japanese ODA projects are implemented on request basis from recipient countries.

- Technical cooperation: 51.48 billion yen (an annual average of 4.29 billion yen)
- Grant aid: 50.52 billion yen (an annual average of 4.21 billion yen)
- Yen loans: 633.36 billion yen (an annual average of 52.78 billion yen)

Figure 5 illustrates the amount of DRR assistance during 1997 - 2008 by origin and scheme. In the case of technical cooperation, 42% was allocated to flood management, followed by earthquakes (25%), comprehensive approaches (14%), and sediment disasters (5%). Grant aid was composed of flood management (46%), weather observations (18%), earthquakes (12%), tropical cyclones<sup>4</sup> (12%) and other activities. Yen loans were composed of flood management (60%), earthquakes (12%), sediment disasters (10%) and other activities.

The reasons for prioritised assisting of flood management are as follows:

- Flooding is a major natural disaster that occurs at high frequencies in Asia
- Flood control reduces damages and is an effective use of water resources.
- River works such as the improvement of embankments are necessary to protect the lives of peoples as well as social and economic infrastructures.
- Flood damage is exacerbated by urbanization and climate change.

Weather-related hazards are critically important. More than two-thirds of the mortalities and economic losses are associated with meteorological, climatological and hydrological hazards. According to the Intergovernmental Panel on Climate Change, the geographic distribution, frequency and intensity of these hazards are already being affected by climate change. In response, the *JICA Handbook on Climate Change Adaptation in Water Sector* provides a new approach for climate change adaptation.

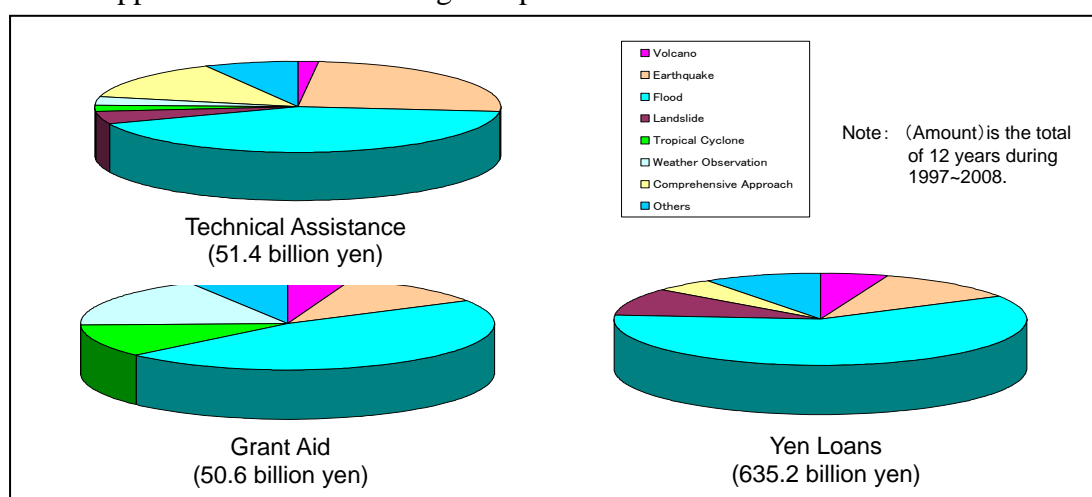


Figure 5. Assistance in Disaster Risk Reduction the Period 1997 - 2008

<sup>4</sup> A tropical cyclone is a low-pressure system formed in tropical and sub-tropical regions. Tropical cyclones produce weak winds through to powerful winds such as typhoons and hurricanes (Terminology of Typhoon, Meteorological Agency, Japan)

Table 3. Number of people reported killed by type of disaster 1991 – 2005

| Hydrometeorological<br>(%) | Geological<br>(%) | Biological<br>(%) | Total<br>(%)     |
|----------------------------|-------------------|-------------------|------------------|
| 410,157<br>(42.7)          | 431,027<br>(44.9) | 119,318<br>(12.4) | 960,502<br>(100) |

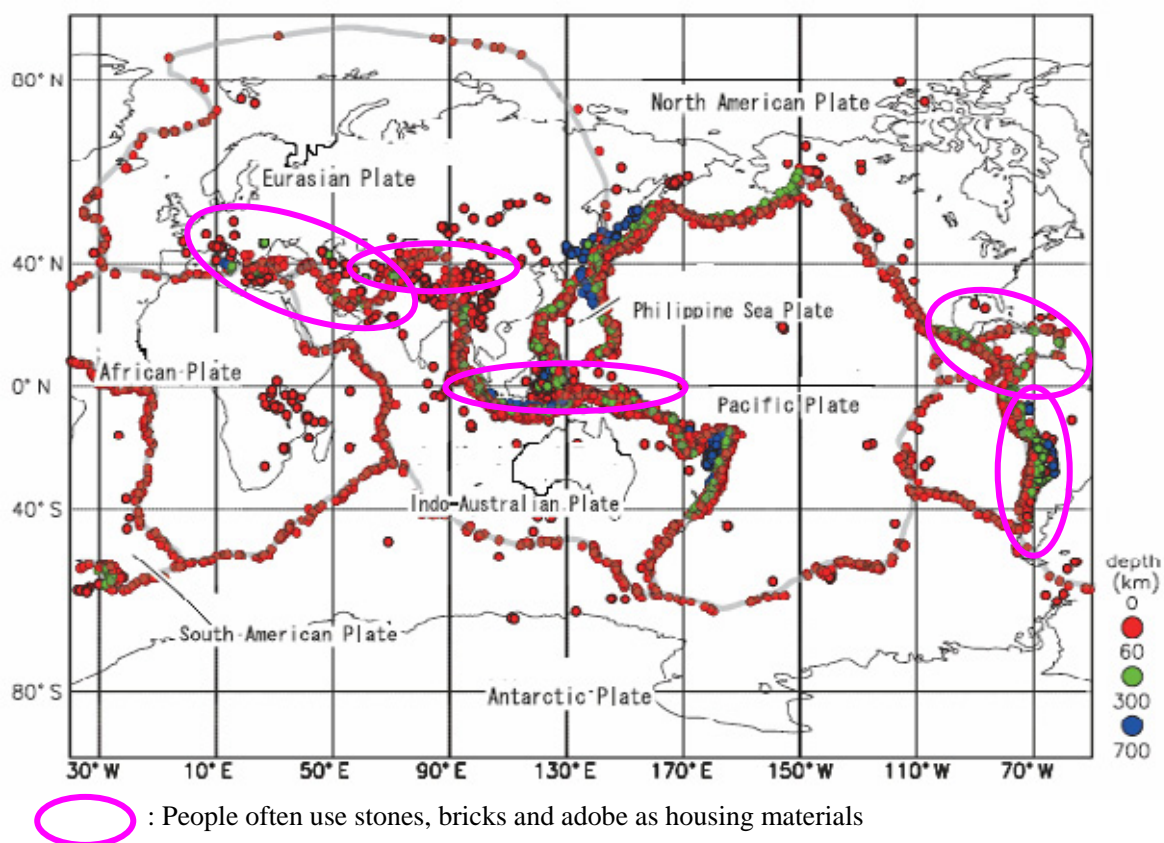
(Source: Disaster Statistics 1991-2005, UNISDR)

\*Hydrometeorological : flood, wind storm and drought(including extreme temperature)

\*Geological: earthquake, tsunami, landslide and volcanic eruption

On average, geological disasters such as earthquakes have accounted for approximately 10% of all disasters in the past 30 years (more than 70% is weather-related disaster) with associated fatalities accounting for 44.9% of all disasters (see Table 3).

80% of earthquake-related deaths in Japan consisted of people crushed to death beneath collapsed houses. Figure 6 depicts “Seismic Activities and Plates” and shows that houses are not earthquake-resistant in most of regions affected by earthquake (more than 200,000 people died in Haiti last year).



(Source: Whitepaper of Disaster Risk Reduction 2010, Japan)

Figure 6 Seismic Activities and Plate

#### 1-4 How JICA’s Approach associated with the Priorities for Action

Table 4 summarizes numbers of projects categorised in accordance with priority actions conducted during the period 1997 – 2008 (individual expert and training programs are not



included). Activities of the projects are listed in Table 1, and harmonized with each priority action and key activities in Table 2. Characteristic relations of the scheme and priority actions are described below:

- Development studies covered priority actions 2, 4 and 5. This scheme addresses the formulation of master plans, feasibility studies including baseline surveys of structural and non-structural measures.
- Technical cooperation projects covered priority actions 2, 3, 4 and 5. This scheme addresses capacity development at all levels. Technical cooperation projects were also implemented in combination with grant aid projects to maximize effectiveness in some cases.
- Grant aids and yen loans covered priority actions 4 and 2. These priority actions required structural measures.

Table 4. Contribution of JICA to “Hyogo Framework for Action”  
(Number of projects that covered priority actions during the period 1997 - 2008)

| Scheme                        | Priority Actions |    |    |     |    |       | Total Number of Projects 1997-2008 |
|-------------------------------|------------------|----|----|-----|----|-------|------------------------------------|
|                               | 1                | 2  | 3  | 4   | 5  | Total |                                    |
| Development Study             | 3                | 35 | 14 | 60  | 21 | 133   | 70                                 |
| Technical Cooperation Program | 1                | 14 | 9  | 16  | 10 | 50    | 34                                 |
| Grant Aid                     | 0                | 14 | 4  | 11  | 3  | 32    | 30                                 |
| Yen Loan                      | 0                | 0  | 1  | 20  | 3  | 24    | 24                                 |
| Total                         | 4                | 63 | 28 | 107 | 37 | 239   | 158                                |

Most projects pursued an integrate approach to cover multiple priority actions.

Before the IDNDR, most of JICA projects targeted single priority actions. As seen in Table 4 and Figure 7, more projects involved two or more priority actions, a reflection of increased coverage of priority actions following the IDNDR.

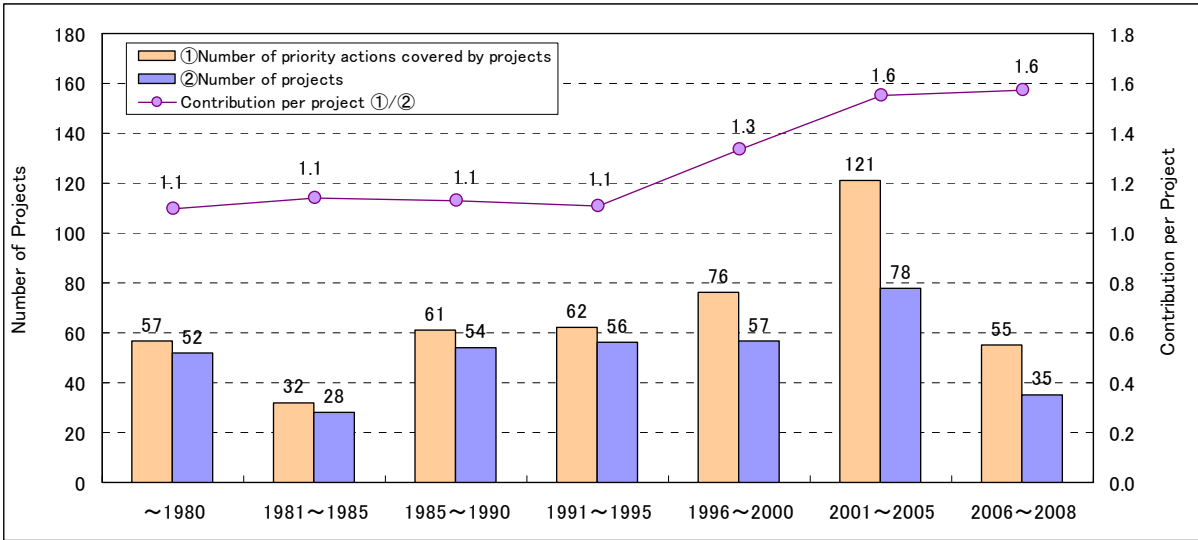
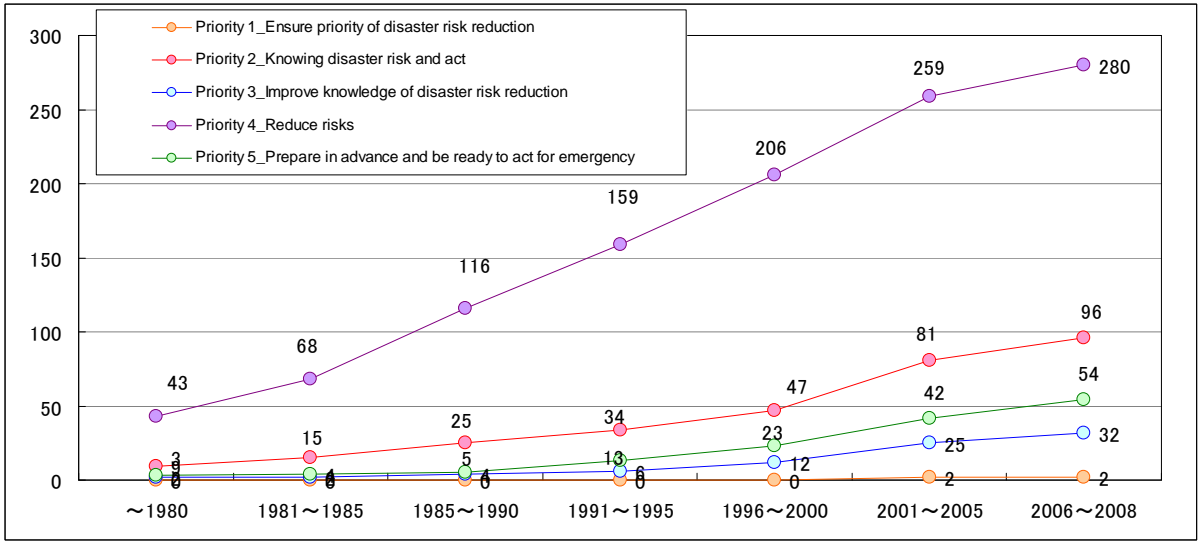


Figure 7. Trend of Contribution to Priority Actions

Figure 8 shows a trend of covering priority actions of JICA projects. The projects related to priority action 4 are increasing rapidly compared to others. Priority action 4, mitigation of disaster risk reduction, is covered by all the schemes of JICA because it entails the use of structural and non-structural measures.



(Based on commencing year of project)

Figure 8. Trend of Projects which covers Priority Actions

Projects related to priority action 1 are low because training programs (training in Japan as well as third countries) and the dispatch of individual experts are not included. JICA, however, conducted three projects in Indonesia, Thailand and Sri Lanka after the catastrophic West Sumatra Earthquake and Indian Ocean Tsunami in order to establish and strengthen organizations responsible for disaster management through practices such as evacuation drills in model communities. Feedback from activities was subsequently collated.

Though coverage of the priority actions is 1.6 in average as seen in Figure 7, cross-cutting efforts towards DRR through suitable combination of the priority actions is important, as shown in Figure 9, “Project on Capacity Development in Disaster Management in Thailand”.

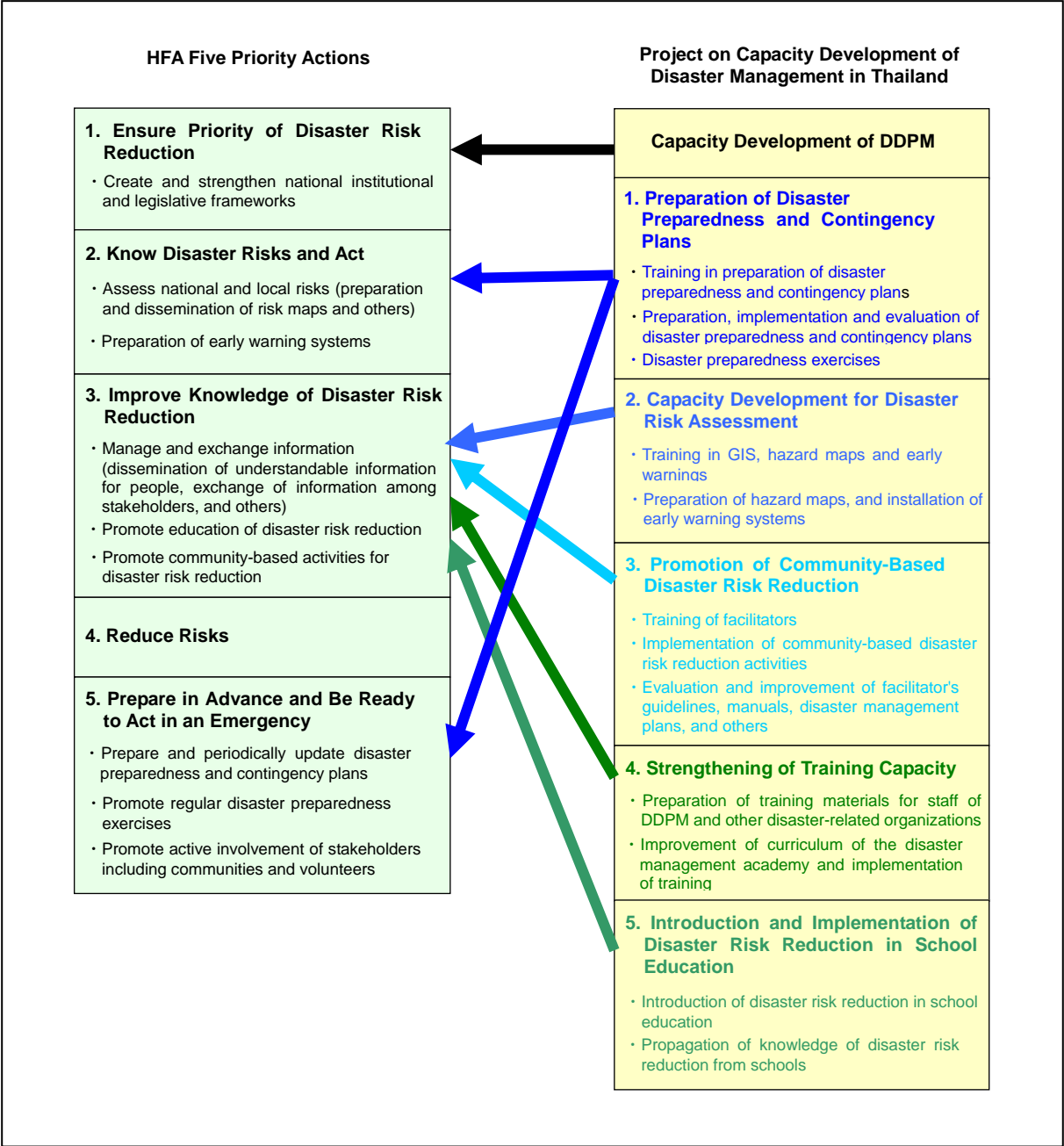


Figure 9. Priority Actions and JICA implemented Project on Capacity Development in Disaster Management in Thailand

## II. Activities and Results for each Priority for Action

In this chapter, JICA's assistances are reviewed in accordance with Priorities for Action. Effectiveness of DRR projects/programs is difficult to measure until disasters occur. However general views and findings are derived from project implementation.

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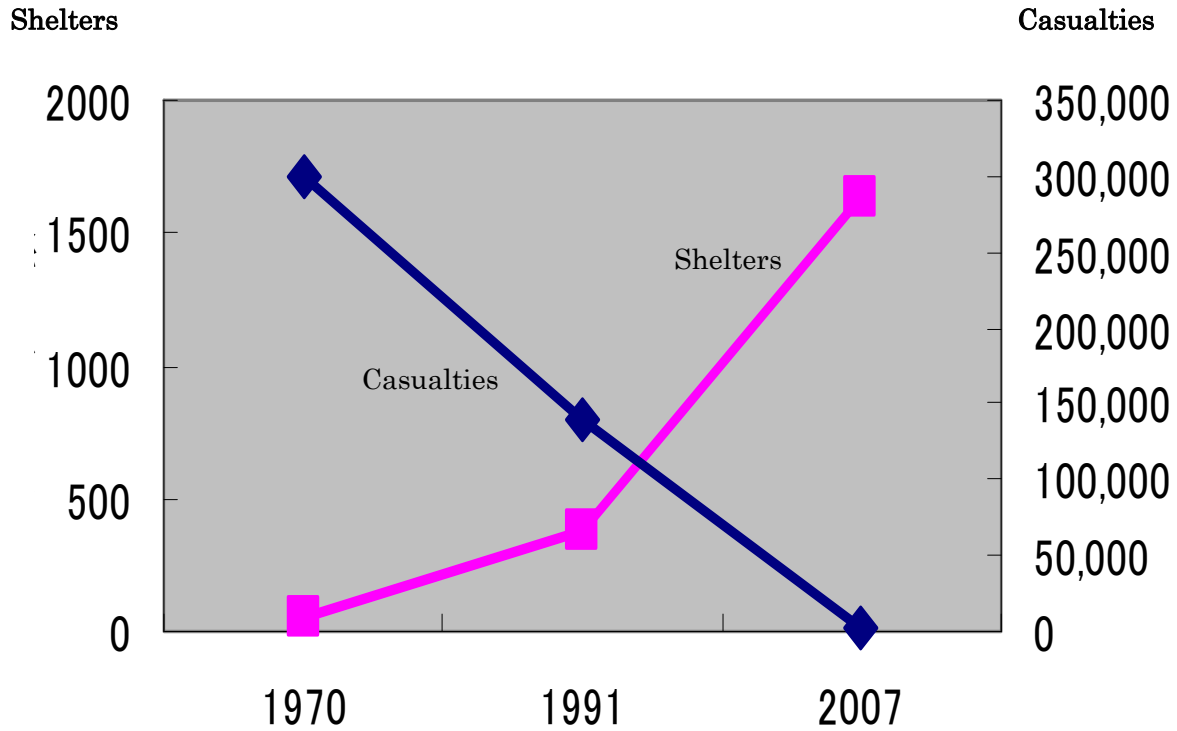


Figure 10. Relationship of the number of the shelters and the number of the casualties



Meteorological Rader



Cyclone Shelter and Evacuation Drill

**Great Effort in Bangladesh**

## **Priority Action 1** **“Make Disaster Risk Reduction a Priority”**

Ensure that disaster risk reduction is a national and local priority  
with a strong institutional basis for implementation

### **2-1 Assessments and Findings of JICA’s activities on Priority Action 1**

JICA implements projects related to Priority Action 1 as a part of project activities in many cases. An approach similar to the PDCA cycle of “policy” ⇒ ”plan” ⇒”implementation/practice “(evacuation drill, new building code etc.) ⇒”revision of plan” is applied to strengthen and improve all levels of organizations. Several points emerged from assessment of activities:

- Governments including Japan review and amend relevant laws, regulations, institutional setup and standards such as anti-seismic structure after severe disasters.
- Traditions and customs of societies and communities such as indigenous knowledge are key factors for successful setup of institutions. Therefore, JICA advises stakeholders in projects comparing their own system to the institutions of other countries.
- Newly established organizations face difficulties such as less allocation of human resources and budget compared to long-established ministries. In this regard, some arrangement should be taken such as 1) working directory under the President or the Prime Minister to give an authority and a power, and 2) clarifying roles and coordination systems among ministries concerned.
- For rapid increase of natural disaster and climate change, it is necessary to strengthen capacity of institutions by setting up new department/division.
- Public supports and the political leaderships are important to spread awareness of DRR (not only for Priority Action 1 but also for all priority actions).

#### **2-1-1 Creation and Strengthening of National Institutional and Legislative Framework**

After the West Sumatra Earthquake and Indian Ocean Tsunami in 2004, many countries made efforts to strengthen their institutional systems. JICA assists these disaster affected countries by implementing projects including:

- ① *Capacity Development in Disaster Management in Thailand*, aimed at building capacity development of the national government, local government and communities and strengthening coordination between all levels;
- ② *The Comprehensive Study on Disaster Management in Sri Lanka*; and
- ③ *The Study on Natural Disaster Management in Indonesia*, aimed at the preparation of disaster management plans for the national government, local governments and

communities.

The outline of the three projects is as follows:

| Name of Country<br>(Duration) | Name of the Project<br>Outline of the Project  | Result and achievements  |
|-------------------------------|--|--|
| Thailand<br>(2006.8~2008.8)   | <p>The Project on Capacity Development in Disaster Management</p> <p>The purpose of the project is to strengthen capacity of national and local government as well as community level for disaster risk reduction through Department of Disaster Prevention and Mitigation (DDPM). DDPM, as responsible agency of disaster risk reduction, executed following activities.</p> <p>1)Collection, analysis, distribution and accumulation of data and information</p> <p>2)Coordination of organizations concerned</p> <p>3)Formulation and review of disaster management plan for both national and local level</p> <p>4)Execution of disaster risk reduction projects</p> | <ul style="list-style-type: none"> <li>➤ Building up of GIS DATA base</li> <li>➤ Making up of Hazard Maps</li> <li>➤ Drawing out of White Paper of disaster risk reduction</li> <li>➤ Development of e-learning system</li> <li>➤ Drawing out of disaster management plan in model village</li> <li>➤ Development of texts for disaster management education</li> </ul>  |
| Sri Lanka<br>(2006.10~2009.3) | <p>The Comprehensive Study on Disaster Management</p> <p>The purpose of the project is to reduce disaster risks through strengthen capacity of national and local government as well as community of pilot area.</p> <p>Main activities were as follows.</p> <p>1) To formulate integrated flood management plans for selected river basin in the south-western region</p> <p>2) to support the establishment of early warning and evacuation systems</p> <p>3) to support community based disaster management activities</p> <p>4) to strengthen capacity of organizations concerned</p>  | <ul style="list-style-type: none"> <li>➤ Formulation of master plan for flood management in four river basins.</li> <li>➤ Establishment of early warning system and evacuation system</li> <li>➤ Execution of community based disaster management in model areas(15 communities)</li> <li>➤ Development of educational tools for community based disaster management</li> <li>➤ Strengthening of Disaster Management Center and other organizations concerned</li> </ul> |
| Indonesia<br>(2007.3~2009.3)  | <p>The Study on Natural Disaster Management</p> <p>The purpose of the project is to strengthen capacity of management of natural disasters through a formulation of disaster management plan both national and local level. Targeted disasters were earthquake, tsunami, flood and landslide. One district of East Java and one district including a municipality of West Sumatra were selected for model area.</p>  | <ul style="list-style-type: none"> <li>➤ Formulation of National Disaster Management Plan</li> <li>➤ Formulation of Regional Disaster Management Plan in model areas</li> <li>➤ Strengthening of National Disaster Management Agency and Regional Disaster Management Agency</li> <li>➤ Execution of community based disaster management in model areas</li> <li>➤ Guideline for Formulation of Regional Disaster Management Plan</li> </ul>                             |



JICA implements Phase-2 projects<sup>5</sup> to maximize the effectiveness of Phase-1 project to strengthen their capacities. These countries achieved remarkable progress through the implementation of these projects.

### Box 1 <Sri Lanka> Strengthening of National Level Disaster Management Platform

After experiencing recent large scale natural disasters such as the 2004 Indian Ocean Earthquake, the Government of Sri Lanka has started to make efforts towards strengthening the national disaster management system. Disaster Management Act No. 13 was enacted in May 2005 to set up the comprehensive framework of disaster management. Under the act, the National Council for Disaster Management (NCDM), the highest decision-making body for disaster management, and the Disaster Management Centre (DMC), the national level planning and coordinating body for disaster management, were established. The DMC is expected to act as a focal organization for planning, coordinating and implementing disaster risk reduction measures.

Since the new organization, the following issues were identified:

- Insufficient measures for water-related disasters such as floods and sediment disasters
- Insufficient efforts for non-structural measures such as early warning systems and evacuation planning and community based disaster management
- Insufficient capacity and inadequate coordination among the DMC and related organizations

Under these circumstances, JICA implemented a project, the “Comprehensive Study on Disaster Management in Sri Lanka” (2006~2008). The project assisted the establishment of the DMC and, subsequently, supported enhancement of the capabilities of staff of the DMC. Capacity development of disaster-related organizations, such as the Department of Irrigation (floods), the National Building Research Organization (slope failure), the Department of Meteorology (weather observations), the local coordination bodies of disaster management, local governments and communities were also conducted. The project contributed towards enhancing the capacity of the disaster management system of Sri Lanka as a whole.



Hazard Mapping



Handbook of Community Based Disaster Management

(Source: JICA study team)

#### \*Conclusions and Recommendations of the project

The disaster management system in Sri Lanka has changed meaningfully after the Tsunami 2004. While memories of this catastrophe are fading with time, the Government of Sri Lanka is strengthening disaster management administration, particularly DMC.

Recommendations are 1) establishment of DMC's core areas and implementing focused activities, 2) preparation, consolidation and sharing of the information related to disaster management, 3) incorporating disaster management into development and enforcement of Disaster Impact Assessment (DIA), 4) promotion of cooperation among organizations concerned, 5) authorizing the plans presented in the project and their early implementation.

<sup>5</sup> Phase-2 projects have been implemented in Thailand and Sri Lanka. Phase-2 project for Indonesia is under preparation.

**2-1-2 Securing of Resources (Human and Financial Resources for DRR)**

One of the pillars of the JICA technical assistance scheme is its training program. The JICA training program is unprecedented in terms of scale and scope, and is well regarded as one of the important characteristics of Japan’s international cooperation. Around 10,000 people participates training programs in Japan annually.

Human resource development is essential for smooth and effective implementation of DRR measures. JICA supports education, training and raising awareness for all concerned of central government officials, local government officials, local institutions worker, NGOs, communities and others. These training courses are well organized by JICA domestic offices such as JICA Hyogo Center in cooperation with concerned ministries, local governments (i.e. Hyogo prefecture, Kobe city), international organizations, NGOs etc.

The disaster management sector became one of the important areas of the JICA Training Program by providing various types of disaster management programs. Figure 11 shows the number of participants in disaster management sector from 1997 to 2008. During this time, the number of participants doubled to approximately 600 by 2004 with a total number of 4,296. In Figure 12, the earthquake disaster management course attracted the highest number of participants (2,103 persons with a share of 43% of the total number), followed by weather observation (865 persons, 19%), comprehensive approach (716 persons, 16%), and floods( 612 persons, 13%).

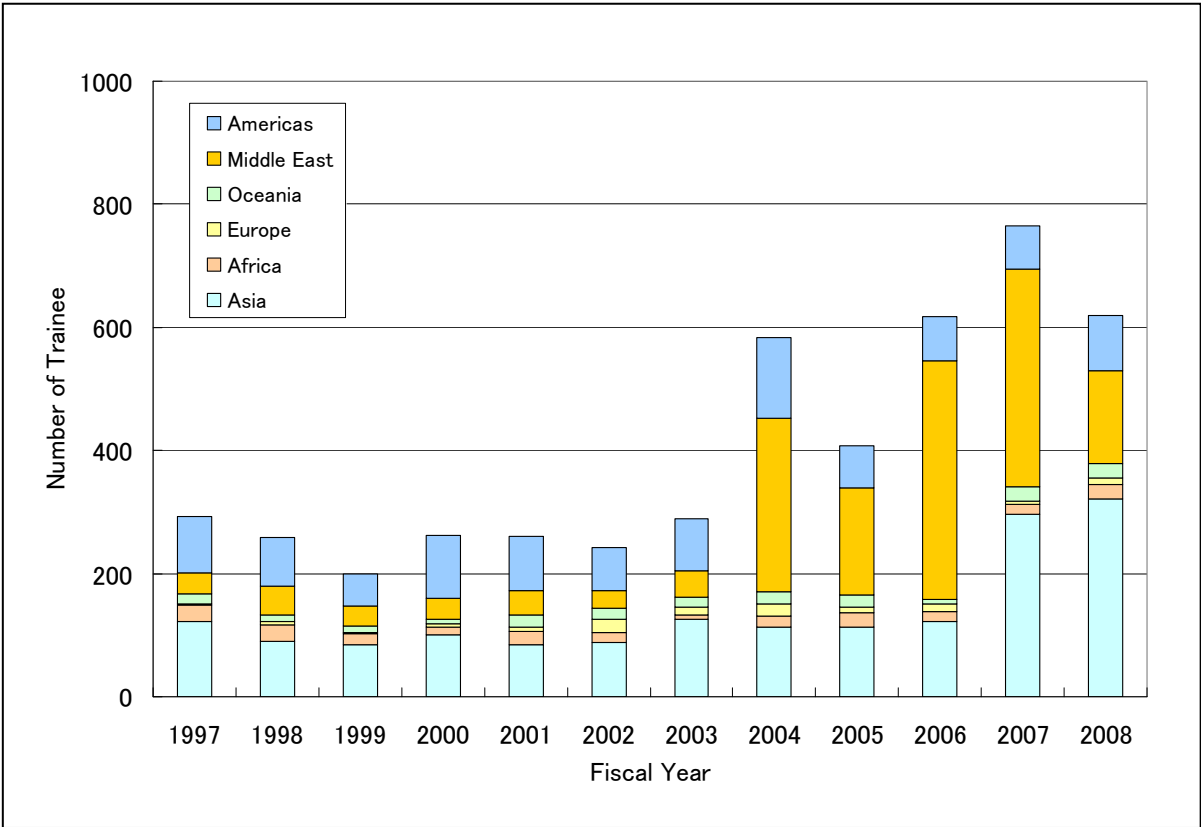


Figure 11. The number of participants in training courses for DRR by region



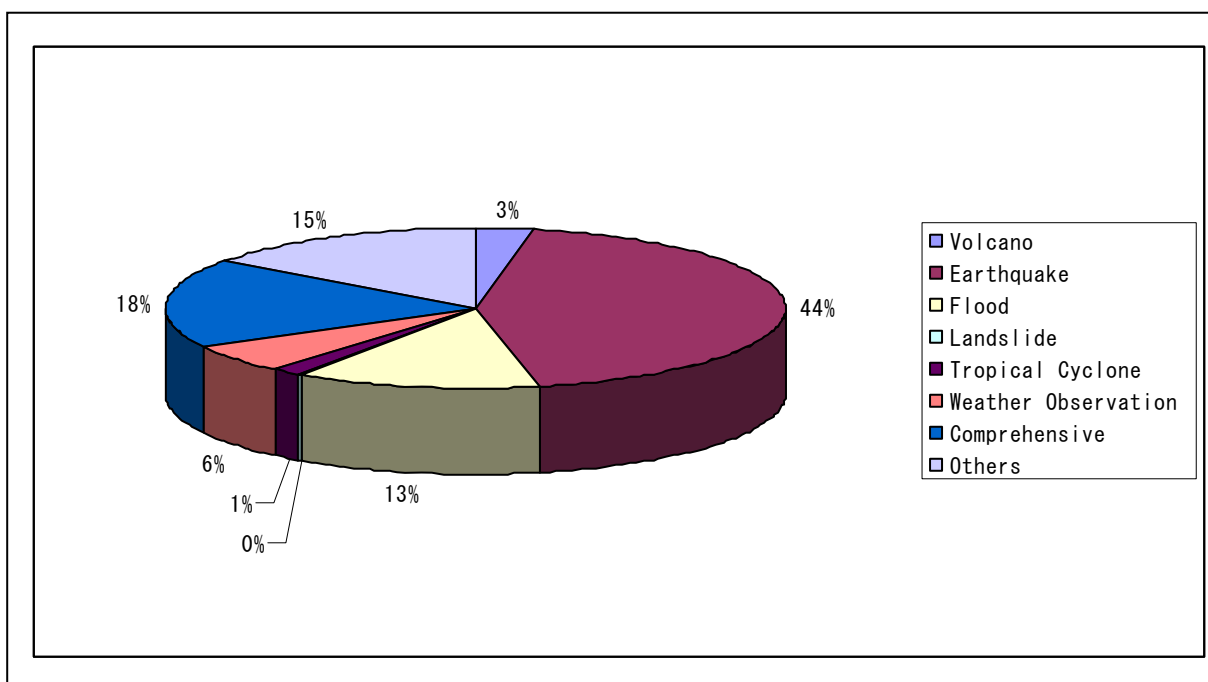


Figure 12. The number of participants in training courses for DRR by type of disaster during 1997 - 2008

Typical training courses are listed in Table 5. Wide ranges of training courses provided by JICA are offered to the staff of technical agencies including “Seismology and earthquake engineering”, “Design and construction of earthquake resistant structures”, “Establishment of an Indian Ocean tsunami early warning system”. Other courses including “Administration of building construction”, “Management of earthquake disasters”, and “Earthquake disaster risk reduction” are available to administrative staff and heads of local government.

Table 5. Typical Training Courses in DRR

| Disaster          | Typical Training and Dialogue Programs  |
|-------------------|---|
| Volcanic eruption | <ul style="list-style-type: none"> <li>● Operation and management of earthquake, tsunami and volcano observation systems</li> <li>● Volcanology and measures for sediment disasters</li> </ul>  |
| Earthquake        | <ul style="list-style-type: none"> <li>● Seismology and earthquake engineering</li> <li>● Design and construction of earthquake-resistant structures</li> <li>● Administration of building construction</li> <li>● Management of earthquake disasters</li> <li>● Earthquake disaster risk reduction (training of mayors, training of engineers, enhancement of coordination capacity for disaster management, capacity development of local governments)</li> <li>● Establishment of Indian Ocean tsunami early warning system</li> </ul> |

|                        |  |
|------------------------|--|
| Flood                  | <ul style="list-style-type: none"> <li>● Strengthening of capacity of early warning system for floods</li> <li>● Preparation of flood hazard maps</li> <li>● Training of flood disaster experts</li> <li>● Administration for risk management of floods</li> <li>● Integrated river basin management</li> <li>● Integrated water resource management</li> </ul>  |
| Sediment disaster      | <ul style="list-style-type: none"> <li>● Landslide and disaster management</li> <li>● Development and dissemination of mitigation technology for sediment disasters</li> </ul>   |
| Tropical cyclone       | <ul style="list-style-type: none"> <li>● Weather forecast and disaster management for cyclones</li> </ul>  |
| Weather observation    | <ul style="list-style-type: none"> <li>● Capacity development related to climate change</li> <li>● Training of senior and core engineers in observation of weather and hydrology</li> <li>● Strengthening of capacity of weather forecasts and forming networks</li> </ul>   |
| Comprehensive approach | <ul style="list-style-type: none"> <li>● Mitigation measures for natural disasters</li> <li>● Measures for disaster risk reduction</li> <li>● Planning of civil defense and education of disaster risk reduction</li> <li>● Practice of community based disaster risk reduction</li> <li>● Seminar for administrative managers of disaster management</li> <li>● Administration for comprehensive disaster risk reduction</li> </ul> |
| Others                 | <ul style="list-style-type: none"> <li>● Search and rescue in urban disasters</li> <li>● Seminar on medical services for emergency and large scale disasters</li> <li>● Mental care and health services after disasters</li> <li>● Training of emergency measures for disasters</li> <li>● Seminar on JICA emergency disaster relief and disaster management system</li> </ul>   |

### Box 2 <Turkey> Capacity Development of Heads of Administration

Two large earthquakes in 1999, namely the Izmit Earthquake of August 17, 1999 (M = 7.4) and the Duzce Earthquake of November 12, 1999 (M = 7.2), killed more than 18,000 people. Damages by the earthquakes were enormous, such that the national and local governments of Turkey could not respond swiftly and effectively. From the lessons of the earthquakes, the Government of Turkey has started various measures to strengthen the disaster management system and to enhance the response capacity of administrations. Since 2001, JICA and the Ministry of Interior of Turkey have worked on capacity development of officials of the national and local governments of Turkey.

Between 2001 and 2002, selected persons from the core people who will be responsible for disaster management in Turkey were invited to Hyogo and studied the experiences of the recovery and reconstruction from the damages caused by the 1995 Great Hanshin Earthquake through the country-focused training and dialogue program "Mitigation/Reconstruction from Earthquake Disaster". The training participants recognized the importance of awareness raising for heads of the administration for earthquake disaster risk reduction, and after returning to Turkey, they, as the main members, developed their own curriculum for Turkey with the support of the JICA Turkey office. By using this curriculum, JICA carried out the technical cooperation program "Project on Training for Disaster Measures" for heads of local administrations during 2003 and 2004, and, in 2 years, 253 people, one third of the incumbent deputy governors and district heads, underwent the training. The "Project on Disaster Mitigation Measures" (2005~2007) followed, and 390 mayors and heads of city planning were trained by 2006.

Participants of the programs commented that they thought disaster risk reduction was important, however they have had few opportunities to receive systematic knowledge about them. They considered the program very useful. "By preparing hazard maps by myself in the program, I realize that I should take the initiative for awareness raising of disaster risk reduction, instead of relying on the staff in charge. When I go back, I will start action," one member commented. Other participants requested additional lectures to learn more knowledge for their active involvement in awareness-raising activities. The program assisted awareness raising and capacity development among the people involved in disaster risk reduction.

### (3) Promotion of Community Participation

JICA's Development Strategy 2 places great importance on the capacity development of organizations concerned with DRR, such as agencies of national governments, local governments, research institutions, NGOs and, especially, communities in terms of community-based disaster management. In the past, a large portion of the assistance for the disaster management sector was allocated for flood prevention in Asian countries. At that time, structural measures were used rather commonly to protect social and economic assets of the countries. However, in recent years, by taking into account the lessons from the 1995 Kobe Earthquake and discussions at the World Conference on Disaster Risk Reduction (2005, Hyogo), soft approach and/or combination of soft and hard approaches are becoming dominant. Projects which include community DRR as a major component are tabulated in Table 6.

Table 6 List of Projects which include community DRR as a major component

| Country             | Project Name   | Period            |
|---------------------|--|-------------------|
| Barbados and others | The Caribbean Disaster Management Project  | 2002-2011         |
| Peru                | The Study on Housing Reconstruction with Seismic-resistant Houses  | 2007-2010         |
| Kazakhstan          | The Study on Earthquake Disaster Risk Management for Almaty City   | 2007-2009         |
| Indonesia           | The Study on Natural Disaster Management   | 2007-2009         |
| Sri Lanka           | The Comprehensive Study on Disaster Management   | 2006-2009         |
| Morocco             | The Master Plan Study on a Flood Forecasting and Warning system for Atlas Region and Flood Mitigation Project              | 1998-2003<br>2009 |
| Sri Lanka           | Mannar District Rehabilitation and Reconstruction through Community Approach Project                                       | 2006-2008         |
| Thailand            | Project on Capacity Development in Disaster Management   | 2006-2008         |
| Nicaragua           | Desarrollo Rural Comunitario Para la Reduccion de la Vulnerabilidad ante Desastres Naturales en el Municipio de Villanueva | 2003-2008         |
| Romania             | Earthquake Disaster Reduction Plan   | 2002-2007         |
| Indonesia           | Integrated Sediment-related Disaster Management Project for Volcanic Areas   | 2001-2006         |
| Maldives            | The Study on Tsunami Recovery, Rehabilitation and Development of Islands   | 2004-2005         |
| Nepal               | Disaster Mitigation Support Programme Project  | 1999-2004         |
| Armenia             | The Study on Landslide Disaster Management   | 2003              |
| Philippines         | Earthquake Impact Reduction Study for Metropolitan Manila  | 2002-2003         |
| Bolivia             | The Afforestation and Erosion Control Project in the Valley of Tarija  | 1998-2003         |
| Philippines         | Agno River Emergency Rehabilitation Project  | 1995-2003         |
| Nepal               | The Study on Earthquake Disaster Mitigation in the Kathmandu Valley  | 2000-2001         |
| Philippines         | Dam Flood Forecast and Warning System Development Project (II)   | 1986-1994         |
| Bangladesh          | Construction of Multipurpose Cyclone Shelters  | 1993-             |

### **Box 3 <Nepal >Activities of Community Based Disaster Risk Reduction by :**

- (1) Water Induced Disaster Prevention Technical Center Project: DPTC(1991-1999)**
- (2) Disaster Mitigation Support Programme Project: DMSP(1999-2004)**

Nepal is prone to landslides, debris flows, slope failures and floods due to the mountainous terrain, weak geological conditions and heavy monsoon rains. JICA carried out government and community capacity development for DRR through “Water Induced Disaster Prevention Technical Center Project (1991-1999)” and “Disaster Mitigation Support Programme Project (1999-2004)”. In the two projects, development and dissemination of technologies, development of human resources and activities for awareness raising were conducted. Core organizations for conducting community activities, namely, “Disaster Management User’s Groups”, were formed by utilizing the existing groups such as “forest users”, “road users”, “water users” and others.

The projects focused on the development and dissemination of technologies which were suitable for the conditions of Nepal and could be used by the villagers by consulting the government engineers of the Department of Water Induced Disaster Prevention (DWIDP), Ministry of Water Resources and the disaster management user’s groups. The technologies were applied to the actual prevention works. These helped to improve the technologies, to develop human resources and to raise awareness of villagers.

For education for DRR, textbooks for primary school children were prepared and used in public schools in a model area. Awareness of families and neighbours was then raised through the students. This incorporated guidelines such as “do not feed goats in the afforested areas” and “do not take stones from slopes”. As the effectiveness of the school education was confirmed from the success in the model area, DWIDP decided to cooperate with Ministry of Education and Sports to expand the education program nationwide through their 12 regional offices.

The projects also supported the establishment of a course on water-induced disasters in the Engineering Department of Tribhuvan University as well as the preparation of textbooks and dispatch of lecturers. Most of the graduates joined the government technical offices as engineers and helped these offices improve the technical level.



## Priority Action 2 “Know the Risks and Take Action”

Identify, assess and monitor disaster risks and enhance early warning systems

### 2-2 Assessments and Findings of JICA’s activities on Priority Action 2

#### 2-2-1 Assessment of National and Local Risks

Most of the technical cooperation projects and development studies for DRR include risk assessment and mapping (see Figure 13) as an important component to be implemented at the initial stage of DRR project. In these projects, firstly, risks of the target areas are assessed. Secondly, risk maps are prepared. Thirdly, the maps are used for awareness raising, disaster management planning. More importantly the maps are used for planning of development projects by municipal authorities. Methodologies for risk assessment/mapping are transferred to counterparts through the on-the job training.

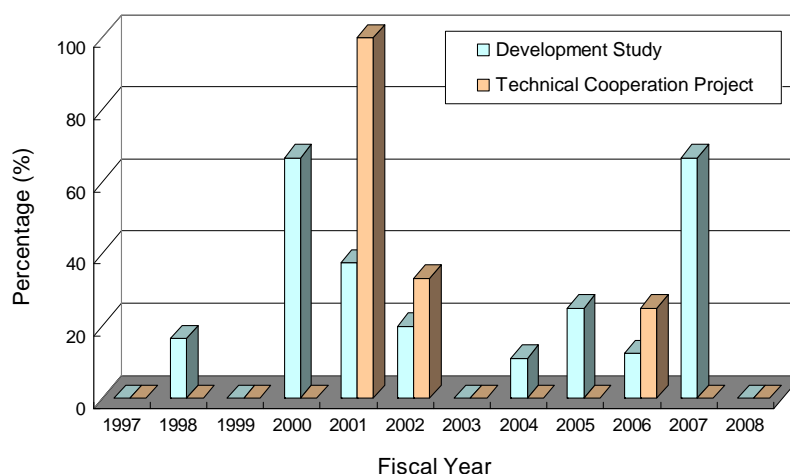


Figure 13. Percentages of projects including risk assessment/mapping as the major component

Table 7 lists the projects that include risk assessment or mapping as the major component. Figure 14 shows typical earthquake risk maps prepared by a JICA development study. Seismic environment, peak ground acceleration, distribution of damaged buildings and proposed measures for Istanbul are presented.

Table 7. List of Projects which include Risk Assessment/Mapping as the Major Component

| Hazard               | Country             | Project Name   | Period    |
|----------------------|---------------------|--|-----------|
| Volcanic eruption    | Indonesia           | Integrated Sediment-related Disaster Management Project for Volcanic Areas (Technical Cooperation Project) | 2001-2006 |
| Earthquake           | Kazakhstan          | The Study on Earthquake Disaster Risk Management for Almaty City   | 2007-2009 |
|                      | Algeria             | A Study of Seismic Microzoning of the Wilaya of Algiers  | 2004-2006 |
|                      | Philippines         | Earthquake Impact Reduction Study for Metropolitan Manila  | 2002-2003 |
|                      | Turkey              | The Study on a Disaster Prevention/Mitigation Basic Plan in Istanbul Including Seismic Microzonation       | 2000-2002 |
|                      | Nepal               | The Study on Earthquake Disaster Mitigation in the Kathmandu Valley  | 2000-2001 |
|                      | Iran                | The Study on Seismic Microzoning of the Greater Tehran Area  | 1998-2000 |
| Flood                | Barbados and others | The Caribbean Disaster Management Project (Technical Cooperation Project)                                  | 2002-2011 |
|                      | Sri Lanka           | The Study on Storm Water Drainage Plan for the Colombo Metropolitan Region                                 | 2001-2002 |
| Landslide            | Nepal               | The Study on Disaster Risk Management for Narayangharh – Mugling Highway                                   | 2007-2008 |
|                      | Indonesia           | Integrated Disaster Mitigation Management for “Banjir Bandang”   | 2004-2008 |
|                      | Philippines         | The Study on Risk Management for Sediment-related Disasters in Selected National Highways                  | 2005-2007 |
|                      | Philippines         | The Study on Sabo and Flood Control for Western River Basins of Mount Pinatubo                             | 2001-2003 |
| Earthquake landslide | Venezuela           | Study on Disaster Prevention Basic Plan in the Metropolitan District of Caracas                            | 2002-2005 |
| Flood landslide      | Honduras            | The Study on Flood Control and Landslide Prevention in Tegucigalpa Metropolitan Area                       | 2000-2002 |
| Multi-hazard         | Indonesia           | The Study on Natural Disaster Management in Indonesia  | 2006-2008 |
|                      | Thailand            | Project on Capacity Development in Disaster Management (Technical Cooperation Project)                     | 2006-2008 |
|                      | Guatemala           | The Study for Establishment of Base Maps and Hazard Maps for GIS   | 2000-2003 |
|                      | Colombia            | The Study on Disaster Prevention in the Bogota Metropolitan Area   | 2001-2002 |



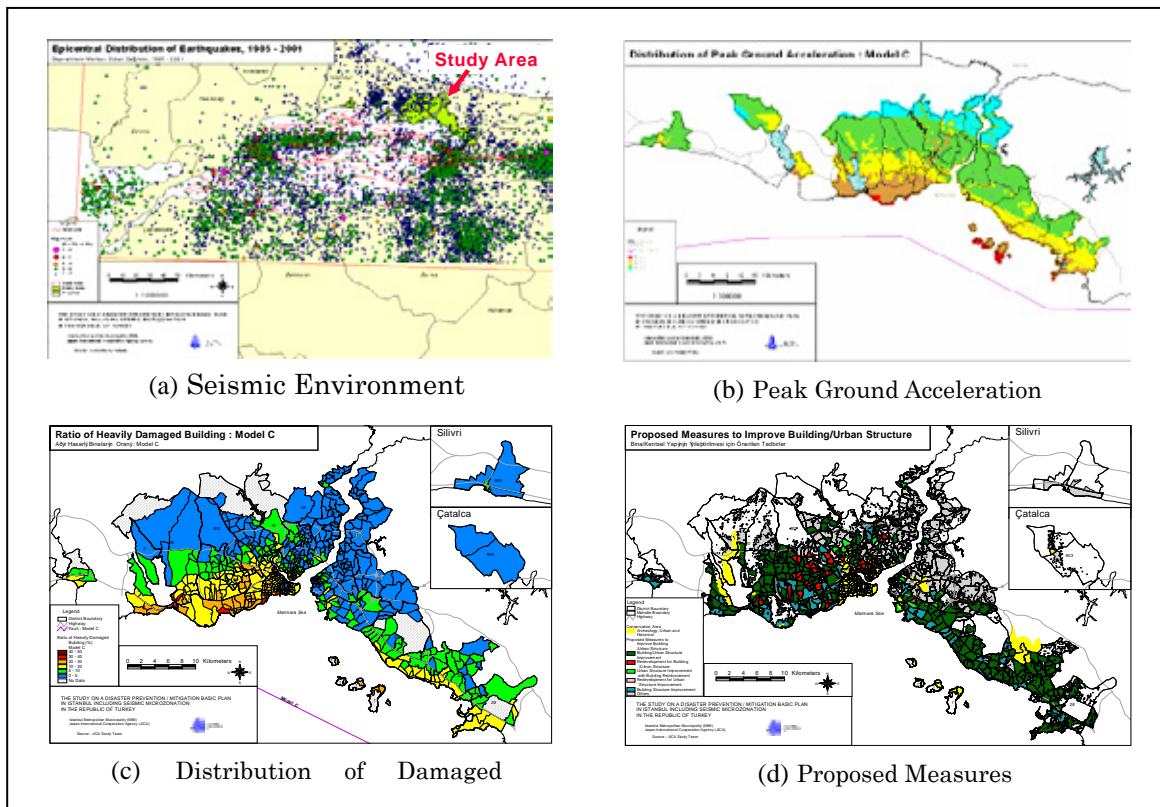


Figure 14. Typical Examples of Hazard and Risk Assessment (Istanbul)

#### Box 4 <Turkey> Disaster Prevention/Mitigation Basic Plan in Istanbul (2002)

In 1999, two large earthquakes occurred around Izmit and Adapazari, and caused tremendous damage to human lives and properties in the area. These earthquakes occurred along the North Anatolian Fault (NAF), which is a large scale fault line of more than 1,000 km in length from east to west and located in the northern territory of Turkey. Historically, many strong earthquakes have occurred along this fault line. There is a clear trend in the epicentres of these strong earthquakes shifting from east to west along the NAF, and it is pointed out that another big earthquake may hit Istanbul, which is located at the western edge of the NAF.

Under these circumstances, JICA and Istanbul Metropolitan Municipality (IMM), as a counterpart agency, carried out “The Study on a Disaster Prevention/Mitigation Basic Plan in Istanbul Including Seismic Microzonation”. In the study, firstly, seismic microzonation was carried out, in which earthquake ground motion, liquefaction potential and the stability of slopes were assessed for selected scenarios. By using these results, human casualties, damage to public buildings, private houses, infrastructure such as roads and bridges, and lifelines such as electricity, water and gas were estimated quantitatively. Damages were summarized for each Mahalle, the minimum administrative division of Istanbul, and their distribution was presented visually on GIS maps.

Issues to be solved and a strategy and programmes for implementation were proposed to reduce the earthquake disaster risks for Istanbul. Short-term issues include strengthening of public buildings and facilities, strengthening of infrastructure and lifelines, establishment of a disaster management center and enhancement of awareness. Medium- and long-term issues include the preparation of a master plan for earthquake disaster management, urban renewal, strengthening of private houses and enhancement of disaster management systems.

Hazards and damages presented visually on GIS maps had a strong impact. Through this study, the national government, local governments (Istanbul Province, IMM), research institutions, and international organizations has started in earnest activities for earthquake disaster risk reduction for Istanbul. Recommendations of the JICA Study became milestones of the activities carried out by these organizations.

**2-2-2 Development of Early Warning Systems**

JICA assists with the establishment early warning systems for volcanic eruptions, earthquakes, floods, sediment disasters and weather observations as well as capacity development to operate early warning and evacuation systems (Figure 15). To protect human lives from natural disasters, it is necessary to establish two functional systems. One system obtains disaster-related information accurately and timely. The other system is a dissemination system to transmit necessary disaster information to responsible agencies and people in risk areas for evacuation. Responsible agencies must have the capability to forecast disasters accurately and issue timely warnings on disaster information to communities and residents. The public should also be equipped with the knowledge and ability to obtain accurate information and evacuate to safe places. JICA continues to assist in the development and establishment of forecasting, early warning and evacuation systems.

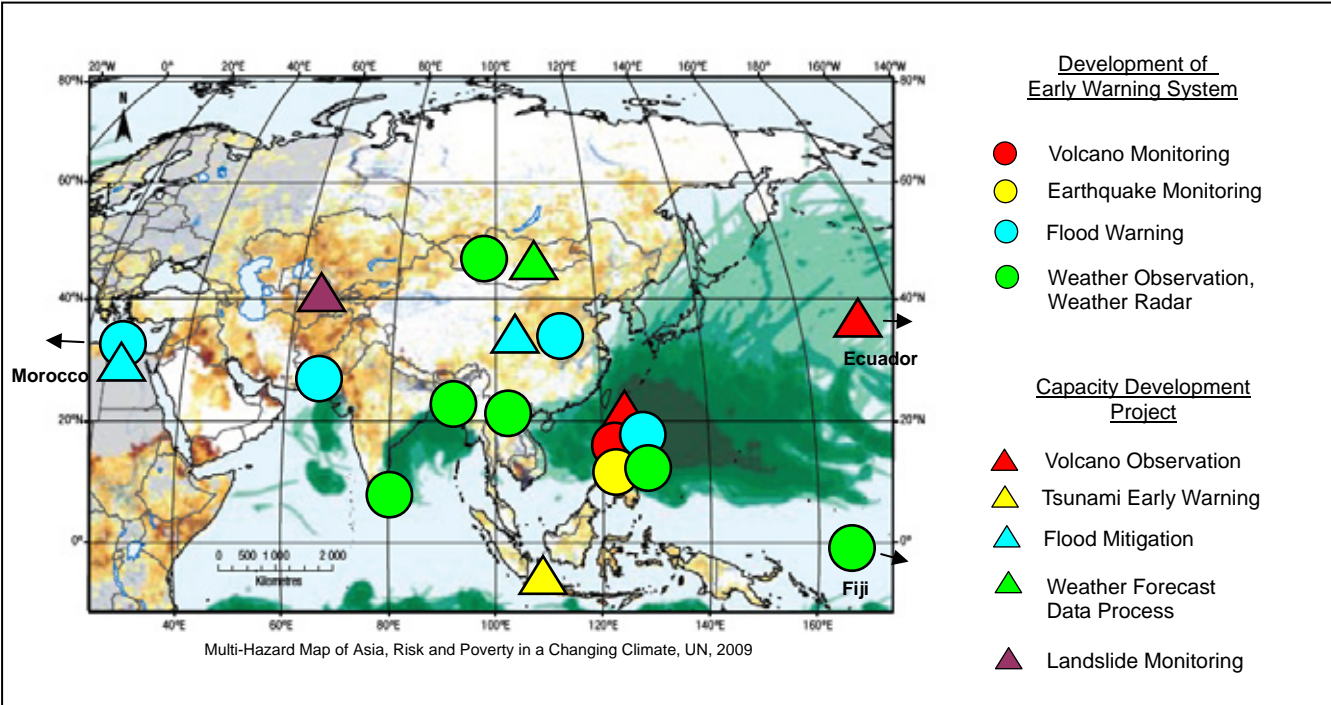


Figure 15. Projects for Establishment of Early Warning Systems and Capacity Development



### **Box 5. <Bangladesh> Radars for Early Warning Systems for floods and cyclones**

By using the “Grant Aid for Disaster Risk Reduction and Reconstruction Support” scheme, a meteorological radar system was installed at Moulvibazar in the north eastern part of Bangladesh in 2007. The radar system was expected to improve the accuracy of flood forecasts as well as to establish a system of releasing early warning announcements for rainstorms and flash floods.

In 2006, a meteorological radar system was installed at Cox’s Bazar with Grant Aid. This helps to enhance the capacity of the Bangladesh Meteorological Department for observation of Cyclones.

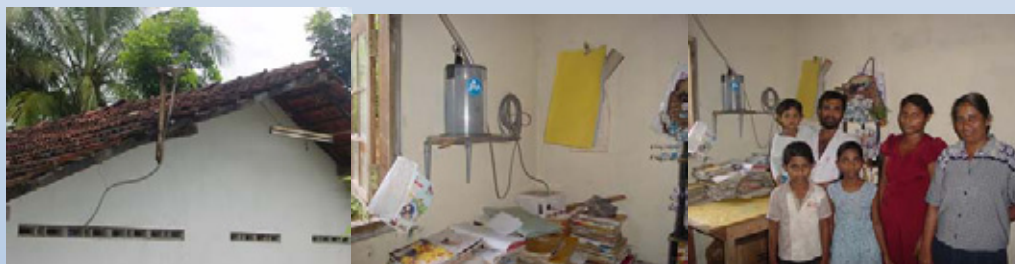
(2008 White Paper, Disaster Risk Reduction)

### **Box 6. Development of Equipment for Community-Based Early Warning Systems (Floods & Sediment Disasters)**

In developing countries, observation systems for natural disasters are inadequate (insufficient number of observation points, and equipment is not functional due to lack of maintenance). Therefore, a community-based early warning system, whereby observations and warnings to residents are carried out by the community people themselves, is crucial. Especially, needs are high for flash floods and sediment disasters. In order to make the community-based early warning system workable, the development of equipment suitable for the community is required, which should be inexpensive, easy to operate and easy to maintain. Some JICA projects focused on expanding community-based early warning systems by developing equipment within the projects and by sharing information and experiences with other projects.

Photographs show a rain gauge (outdoor), a sensor (indoor) used in the “Comprehensive Study for Disaster Management, Sri Lanka” project and a family in charge of observations. This rainfall equipment was developed by “The Caribbean Disaster Management Project”, and has the advantages of being inexpensive, easy to operate, easy to maintain, can be observed safely in a house, and can warn of intensive rain by an automatic warning system (buzzer).

During a sediment disaster that occurred in the night of 22 November 2007, the system worked as planned. The appropriate response of the observer successfully evacuated the residents before the disaster occurred.



JICA is also assisting to ensure that communities are safe and able to cope by developing systems for safe and timely evacuation. Such systems entail the rapid communication and sharing of disaster information. Individuals and communities must also be equipped to evacuate through preparedness. It is therefore important to increase awareness through the daily activities of residents, communities and administrations. Activities include strengthening the ability to identify and assess risks using risk maps, monitoring the natural or urban environment and understating disaster simulation; as well as (town watching and disaster imagination game) and evacuation drills. JICA also promotes and supports local

ownership of activities such as the preparation of evacuation routes and evacuation sites, as undertaken by residents, communities and local governments. These activities are important to establishing functional evacuation systems.

**Box 7. <Morocco> Development and Installation of Community-Based Early Warning System**

To avoid the heat during weekends, the people of Morocco and people from abroad visit the Tensift River basin located in the south west part of the Atlas Mountains. In 1995, more than 100 people were killed by a flood that occurred in a valley in Ulica, situated in this basin. Victims included many tourists who failed to evacuate in time. Heavy rain in the mountains caused a flash flood, and a large volume of water ran down through the valley. As it is difficult for the people in the downstream areas to know in advance rains and floods in the upstream areas, similar disasters would occur if appropriate measures would not be taken.

The government of Morocco requested JICA to carry out a master plan study of forecast and warning systems for floods in the Atlas Region. In the study, a pilot project was carried out in order to develop a workable system for people and to avoid a repetition of the 1995 disaster. A forecast and warning system was installed in the pilot area and put into a trial operation. An evacuation exercise was also carried out, and the JICA team members demonstrated the mechanism of debris flow by using a simple model for easy understanding by residents. At the end of the exercise, a workshop was conducted with the attendance of residents and staff of the provincial office to improve the forecast and warning system.

After completion of the master plan study, short-term experts were dispatched short-term for follow up. They held meetings on operation of the forecast and warning system checked the effects and efficiency of the system, reviewed the operation manual, and conducted operation training for the system. The training included observations, warnings and evacuations with the participation of technical and administrative agencies of the national government, local governments and communities. From the results of the training, the threshold value for warnings was reset; the route for information transfer was reviewed; and traffic control during evacuation was studied.

Furthermore, after attending the first operation training, leaders of the communities developed their confidence and started to think that they could contribute something. Leaders called people for participation in the training and, as a result, residents of the downstream area and tourists participated in subsequent training. The disaster management capacity of the communities is growing steadily.

(Capacity Development and Community-Based Disaster Risk Reduction, JICA, March 2008)

### **2-2-3 Development of Capacity for Disaster Risk Reduction**

JICA supports the promotion of science and technology and capacity development of relevant institutions with regard to the observation and forecasting of natural disasters. In 2008, JICA and the Japan Science and Technology Agency (JST) launched a new scheme, “Science and Technology Research Partnership for Sustainable Development”. This scheme promotes international joint research and development (R&D) between Japanese research institutions and those of developing countries to address global issues pertaining to the environment, energy, bio-resources, natural disaster prevention and infectious disease control. The aim of the scheme is to strengthen the capacity of researchers and R&D in developing countries; and to apply research outputs to sustainable development.

Table 8 lists eight natural disaster prevention projects that were selected in 2008-2009. Implementation of the projects ranged from three to five years.

Japan as a disaster prone country has advanced its technologies and expertise in various

areas of DRR for different types of natural disasters. These technologies and expertise could be applied and utilised to reduce disaster risks in developing countries. In particular, timely and accurate early warnings of earthquakes, tsunami and weather information are very important. Considering that progresses in the area of information systems and other DRR technologies are rapid, in addition to the R&D in Japan, it is expected that universities and research institutions are also encouraged to undertake joint research with counterparts in developing countries in order to foster collaboration and develop new technologies for DRR.

Table 8. List of Projects of the Science and Technology Research Partnership for Sustainable Development

| Country      | Project Name   | Period    |
|--------------|--|-----------|
| Bhutan       | Study on GLOFs in the Bhutan Himalayas   | 2008-2011 |
| Indonesia    | Multi-Disciplinary Hazard Reduction from Earthquakes and Volcanoes in Indonesia  | 2008-2012 |
| Croatia      | Risk Identification and Land-Use Planning for Disaster Mitigation of landslides and Floods in Croatia                            | 2008-2013 |
| Thailand     | Integrated Study Project on Hydro-Meteorological Prediction and Adaptation to Climate Change in Thailand                         | 2009-2014 |
| Philippines  | Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines | 2009-2014 |
| South Africa | Observational Studies in South African Mines to Mitigate Seismic Risks   | 2009-2014 |
| India        | Information Network for Natural Disaster Mitigation and Recovery   | 2009-2014 |
| Peru         | Enhancement of Earthquake and Tsunami Disaster Mitigation Technology in Peru   | 2009-2014 |

#### **Box 8 <Thailand> Enhancing Capacity of Research on Natural Disasters due to Climate Change**

Thailand's water demand has increased sharply due to recent industrialization and urbanization. Water shortages during the dry season and frequent floods during the rainy season occur almost every year. There is concern that unpredictable weather due to climate change will amplify the phenomena and impact further on society and the economy of Thailand.

Many countries in the world share the issues related to water highlighted in Thailand, such as an increase in damage by floods, land subsidence due to over pumping of groundwater, a long-term trend of decreases in the flow of the main channel (Chao Phraya River), proper operation of large scale reservoirs (including dams) between dry years and flood dominated years, and construction of dams at branches of the international river, the Mekong. In addition to strengthening the current approaches, planning and implementation of further measures are required in order to develop an appropriate water resource management system, which can accommodate future climate change.

However, Thailand lacks long term monitoring of climate change, hydro-meteorological observations for changes in the water cycle, and modelling of the water cycle and water resources.

Under these circumstances, in 2008, the Government of Thailand requested the "Integrated Study Project on Hydro-Meteorological Prediction and Adaptation to Climate Change in Thailand" project, under the "Science and Technology Research Partnership for Sustainable Development" scheme, and the project was accepted by the Government of Japan. With the cooperation of Kasetsart University, the Thai Meteorological Department and the Royal Irrigation Department of Thailand, studies were made on the assessment methodologies of impacts on water-induced disasters due to changes in the water cycle caused by future climate change.

#### **2-2-4 Assessment and Monitoring of Emerging Risks at the Regional level**

JICA offers "Third Country Training" at the regional level to develop the DRR capacity of each country through sharing of information, knowledge and experience on common disaster-related issues among countries in the same region. Third Country Training also facilitates the development of systems for DRR at the regional level, which includes observation and monitoring, sharing information among countries within the regions and capacity development for early warning systems.

#### **Box 9. <Oceania> Capacity Development on Weather Forecasting and Network Forming**

Since 2001, under the JICA scheme of "Third Country Training", the Fiji Meteorological Service has carried out training on weather forecasting for weather forecasters from 11 countries of Oceania, including Fiji. The training course conforms to the training standards of the WMO (World Meteorological Organization) of the UN, and training participants who complete the course receive a WMO certificate. After five years of implementation, it was judged that a sufficient number of forecasters had been trained in weather forecasting techniques. Since the training covered the basic level of the WMO approved courses, it is required from now on that higher and applied level of training that could deal with forecasts of higher precision, and medium- and long-term forecasts.

For three years from 2007, JICA continued the "Third Country Training" of weather forecasters and supported improvements in the level of weather forecasting in the Oceania region. Furthermore, through the training, a human network of weather forecasters in the region was formed, and this helped smooth exchanges and utilization of weather information.

## **Priority Action 3**

### **“Build Understanding and Awareness”**

Use knowledge, innovation and education to build a culture of safety and resilience at all levels

## **2-3 Assessments and Findings of JICA’s activities on Priority Action 3**

### **2-3-1 Management and Exchange of Information**

JICA promotes the use of communication methods which are clear comprehensible for people who work and live in vulnerable areas that are prone to natural disasters. Communication systems must also have the capacity to quickly deliver disaster-related information from observation points to related governmental agencies and communities. Various appropriate mediums can disseminate disaster information to residents and communities, including the use of TV, radio, mobile phones, wireless radio and warning sirens to issue timely warnings.

One pilot project promoted community-based disaster risk reduction activities by utilizing Disaster Management Audio Materials (DMAM) in Indonesia (refer to Box 10). The Disaster Reduction Learning Center of JICA Hyogo and the COMBINE Resources Institution of Indonesia held workshops to strengthen the disaster management capacity of communities. The project involved the use of community radio to broadcast information from two locations in highly vulnerable areas in central Java, Indonesia.

#### **Box 10. Disaster Management Audio Materials (DMAM) for Community Broadcasting**

The Disaster Reduction Learning Center (DRLC <sup>Note 1</sup>) of JICA Hyogo and the World Association of Community Radio Broadcasters (AMARC <sup>Note 2</sup>), Japan developed Disaster Management Audio Materials (DMAM) for community radio broadcasting.

The lesson from the 1995 Kobe Earthquake that foreign nationals living in Kobe could not receive adequate disaster information during and after the earthquake was the background of the development of DMAM. DMAM was a set of 193 audio and text messages for radio broadcasting for different types of disasters. The messages in 9 languages (English, Chinese, Thai, Tagalog, Indonesian, Vietnamese, Spanish, Portuguese and Russian) were prepared and stored on CD-ROM.

In 2009, JICA and COMBINE, an Indonesian NGO, held workshops to test utilization of DMAM through community radios at two locations in areas of high disaster vulnerability in central Java, Indonesia. This case study was used to prepare a handbook for utilization of DMAM.

Note 1: JICA and Hyogo Prefectural Government jointly established the DRLC in the office of JICA Hyogo in April 2007 in order to implement effectively JICA training in the field of disaster management by utilizing experiences and lessons from the 1995 Kobe Earthquake. The first phase was completed in March 2010, and the second phase started in April 2010.

Note 2: International NGO. AMARC has more than 5,000 members in 117 countries and regions, and, under international cooperation, contributes to the development of radio broadcasting with the participation of communities and citizens.



## 2-3-2 Strengthening Networks

JICA promotes dialogue among specialists, engineers and scientists who participate in the JICA Training Program. In the disaster management sector, networks were formed globally through JICA alumni networks. One example is an alumni network who studied at the International Institute of Seismology and Earthquake Engineering (Box 11). Distribution of alumni is shown in Figure 16.

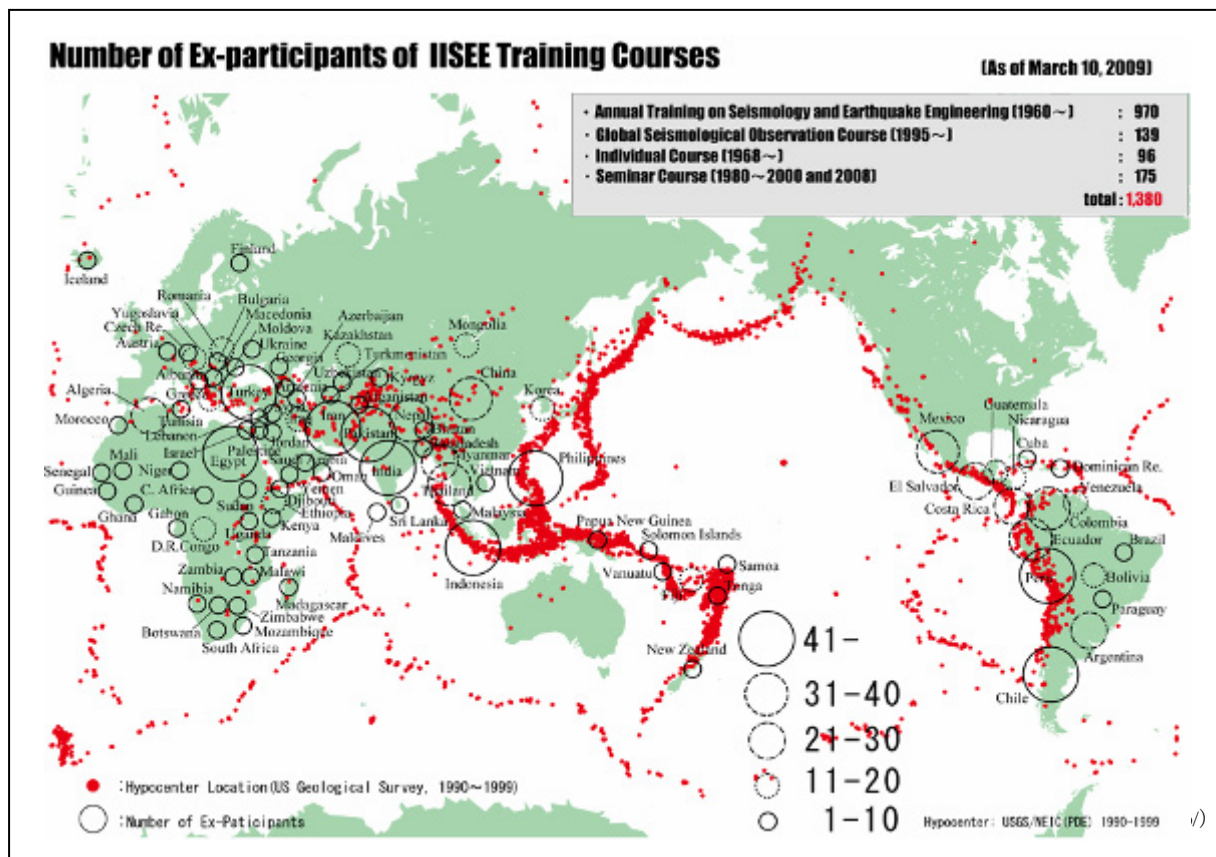


Figure 16. Distribution of Alumni who Studied at the International Institute of Seismology and Earthquake Engineering

### Box 11. Network of Researchers and Engineers of Seismology and Earthquake Engineering

JICA has supported the International Institute of Seismology and Earthquake Engineering (IISEE) of the Building Institute of Japan and carried out training on seismology and earthquake engineering for researchers and engineers from developing countries since 1962. A new course, the “tsunami disaster mitigation course”, started in 2006.

As of March 2009, 1,380 researchers and engineers from 95 developing countries completed the courses, and most of them are actively working at the front line of earthquake disaster risk reduction in their home countries. Training participants have formed alumni. They exchange information and participate in discussions, improve their technologies, and promote cooperation through a web-site operated by IISEE (IISEE net: information network of earthquake disaster prevention technologies for buildings). IISEE also utilizes the web-site to follow up the training courses by providing technical information as well as information about earthquakes.

### 2-3-3 Promotion of Education for Disaster Risk Reduction

JICA also actively promotes DRR education school levels. Teaching youth about the nature of natural disasters and conducting evacuation exercises improves the capacity of students to protect themselves as well as the society through them by expanding awareness to their families, communities and surrounding communities.

#### Box 12. <Thailand> Promotion of Education of Disaster Risk Reduction at School

Thailand suffered tremendous damages, including around 8,500 deaths and missing persons, as a result of the tsunami caused by the 2004 Indian Ocean Earthquake. To reduce risks of future disasters, agencies of the national government, local governments and communities of Thailand are required to improve coordination among them and to enhance their capacity to cope with disasters. JICA, in cooperation with the Department of Disaster Management of the Ministry of Interior of Thailand, Ministry of Education of Thailand and other agencies carried out the “Project on Capacity Development in Disaster Management (2006 - 2008)”.

The Government of Thailand focused on school education to activate activities of disaster risk reduction at local and community levels, and made further efforts to promote school education on disaster risk reduction by enhancing the capacity of staff of the Ministry of Education and school teachers.

The project prepared readers explaining tsunamis, floods and sediment disasters for children and students of primary school, junior high school and high school together with instruction books for teachers. These were distributed to public schools nationwide. At model schools, demonstration classes, workshops, the Disaster Imagination Game (DIG) and evacuation exercises were carried out. A Disaster Risk Reduction Room was set up at the model schools for displaying materials related to disaster risk reduction. Teachers of the model schools have gained knowledge and know-how through classes, such as lectures on natural disasters, DIG and evacuations exercises, and are now conducting practical education in disaster risk reduction.

It is expected that the Ministry of Education will push forward their efforts to scale up and consolidate the results of the project to the schools nationwide.



Children and parents singing a Japanese song, “Heart to Heart”. The song helps foster mutual support as a basis for DRR.



Children participate the Disaster Imagination Game (DIG)

**Box 13. <Algeria> Education on DRR and Expansion of relationship between Algeria and Japan through Loan Program**

The 2003 Boumerdes Earthquake hit Boumerdes Province and the capital Algiers, and caused tremendous damage, including around 2,300 deaths and more than 10,000 injuries. Following dispatching emergency disaster relief teams, the Japanese Government provided a yen loan for reconstruction. A total of 38 schools were rebuilt, and immediately after the completion classes were restarted in the new buildings.

Besides the reconstruction of school buildings, this loan program included soft components, namely, the preparation of teaching materials and conducting model classes. This was requested by the Minister of National Education of Algeria. The minister was impressed by the Kobe City educational materials for disaster risk reduction and so requested a translation of the materials in order to use the know-how in Algeria. JBIC (at the time), with the cooperation of the board of education of Kobe City and Embassy of Algeria in Tokyo, translated a reader for education about disaster risk reduction, “Bring Happiness (for junior high school student)”, into Arabic and French. The book has been used in classes of junior high schools in Algeria and introduced to students and teachers.

**2-3-4 Promotion and Strengthening of Activities for DRR at the community level**

JICA considers DRR Strategy 1, “Building a disaster resilient community and society”, as the most important objective for assistance in the disaster management sector. CBDRR projects in DRR schemes (as listed in Table 9) support the activities for strengthening the capacity of target communities and organizations that support community-based DRR, including central governments, local governments, research institutions, universities and NGOs.

**Box 14. <Middle East and Asian Regions> Training of Practices of Community-Based Disaster Risk Reduction**

During the 1995 Kobe Earthquake, in some cases, fires were extinguished at the early stage and injuries were given temporary treatment swiftly in the areas where close ties between residents existed. From this lesson, Kobe City came up with a plan to establish “Disaster Prevention and Welfare Community” for every primary school district, where mutual support by neighbouring residents was fostered through conducting evacuation exercises and other activities. The city requested the cooperation of neighbourhood self-governing bodies, women’s clubs, the PTA and other organizations in its establishment.

In JICA’s training course, the approach of Kobe City was introduced with an aim to encourage training participants from developing countries to promote the capacity enhancement of communities for disaster risk reduction in their countries. The course included lectures, visits to disaster prevention and welfare communities, and visits to Kobe City, where actual activities were being carried out. Furthermore, in an exercise session, an action plan was prepared by each trainee by considering the conditions of his/her country.

After the course, the training participants understood the limit of public help, and the importance of self-help and mutual help. It was expected that the training participants would promote and strengthen the community-based disaster risk reduction activities in their home countries according to the action plans



Table 9. Example of projects which include Community-Based DRR as a Major Component

| Country                                    | Project Name  | Key Features   |
|--|---|--|
| <b>Technical Cooperation Project</b>       |   |  |
| Indonesia                                  | Integrated Sediment-related Disaster Management Project for Volcanic Areas                                    | Establish a model integrated disaster management plan including the community by mainly technical organizations                              |
| Nepal                                      | Disaster Mitigation Support Programme Project   | Approach to a wide range of actors   |
| Barbados and others                        | The Caribbean Disaster Management Project   | Develop a framework of sustainable dissemination for promoting regional cooperation  |
| <b>Pilot Projects of Development Study</b> |   |  |
| Morocco                                    | The Master Plan Study on a Flood Forecasting and Warning system for Atlas Region and Flood Mitigation Project | Develop a forecast and warning system by utilizing local environmental and tourism organizations as an interface with communities            |
| Maldives                                   | The Study on Tsunami Recovery, Rehabilitation and Development of Islands                                      | Education of disaster risk reduction and community participation in a recovery and reconstruction project by the emergency development study |
| Nepal                                      | Pilot Projects of The Study on Earthquake Disaster Mitigation in the Kathmandu Valley                         | Trial to create a sense of self-help   |
| Armenia                                    | The Study on Landslide Disaster Management  | Trial to develop a landslide disaster management plan incorporating a village development plan   |
| Philippines                                | Pilot Projects of the Earthquake Impact Reduction Study for Metropolitan Manila                               | Trial to strengthen cooperation among actors   |
| <b>Grant Aid</b>                           |   |  |
| Bangladesh                                 | Cyclone Shelter Construction Plan   | Collaboration of volunteer program and grant aid project   |
| <b>Yen Loan</b>                            |   |  |
| Philippines                                | Agno River Emergency Rehabilitation Project   | Preparation of a plan through participation of people  |
| Philippines                                | Dam Flood Forecast and Warning System Development Project (II)  | Inform about existing forecast and warning systems through school education  |

(Source: Community-Based Disaster Risk Reduction and Capacity Development, JICA, 2008)

### 2-3-5 Research

JICA supports the establishment of technical and/or research centers that focus on volcanoes, earthquakes, floods and weather observations in order to promote R&D technologies and the capacity development of researchers and engineers. Assistance to such centers is shown in Figure 17. As the technologies for DRR are making rapid progress, the centers aim at utilizing such newly developed technologies without delay for the purpose of implementing actual measures in the countries. Furthermore, it is expected that researches on disasters will be carried out within various fields of natural science, engineering and social science by researchers in their own countries.

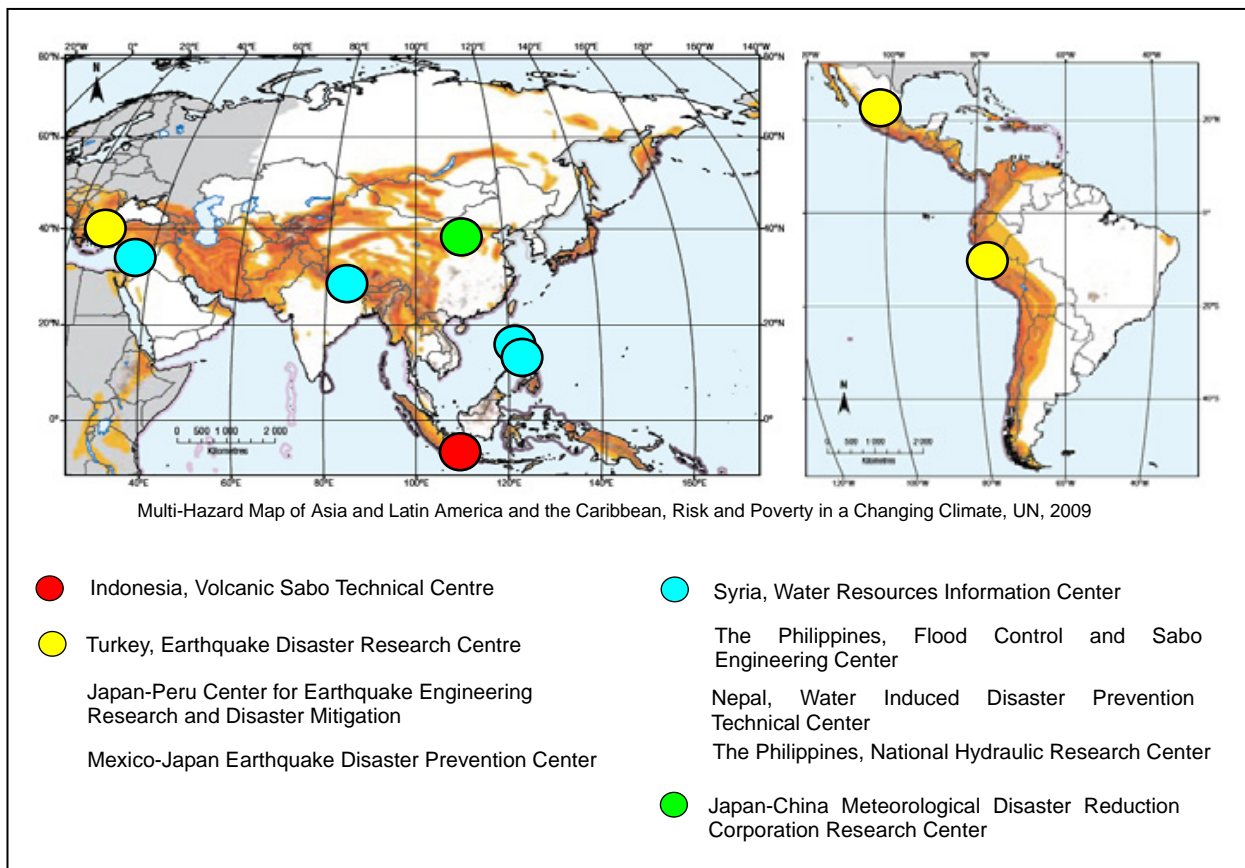


Figure 17. Assistance for Establishment of Technical/Research Centres and Capacity Development

**Box 15 <Turkey> Earthquake Disaster Research Centre Project**

One of the components of the “Earthquake Disaster Research Centre Project (April 1993 - March 1998)” was to enhance the capabilities of a structural laboratory and a soil testing laboratory of Istanbul Technical University (ITU).

Regarding the structural laboratory, 80 to 90% of testing equipment was provided through the JICA project. One of their research topics is the retrofitting of existing reinforced concrete buildings. Many areas of buildings are under testing, and computer simulations are carried out as part of the research.

Four researchers from the structural laboratory of ITU have studied or been trained in Japan under this JICA project. Three researchers are still with the structural laboratory. They are now core members (level of associate professor) of the laboratory and work actively in research and education. The number of undergraduate students majored in civil engineering is around 250. Each year, 120 to 150 students go on to the masters course and around half of them major in structural engineering. The number of doctorate students is around 10 each year, and again half of them take structural engineering. One of the associate professors who studied in Japan has been a supervisor for six doctorate and 10 master students so far. Although indirect, JICA’s cooperation is spreading through the education of undergraduate and postgraduate students of ITU.

### 2-3-6 Promoting Awareness

CBDRR activities form a critical component of projects listed in Table 9. Activities aimed at raising public awareness are carried out in various ways. Activities include the distribution of leaflets, posters and calendars, and organization of seminars. Modes of traditional communication that are commonly utilized in project areas are also employed, including the use of plays and skits (refer to Box 16).

#### **Box 16 <Nepal> Performing Skit for Awareness Raising**

Skits are a typical and old folk art of Nepal. Skits that satirize politics are particularly popular among Nepalese, and they even played an important role in the democratization of Nepal in 1990. During the “Disaster Mitigation Support Programme Project” of JICA, comedians and villagers played skits together and won the applause of their audience. This helped to raise awareness of disaster risk reduction in the community and ferment a sense of mutual cooperation among villagers.



#### **Box 17 <Asian Region> Dissemination and Establishment of Culture of Disaster Risk Reduction**

After the 2004 Indian Ocean Earthquake, the focus has shifted to disaster risk reduction. However, in most of the countries, actual actions have just started. The JICA “Dissemination and Establishment of Disaster Prevention Culture for Asian Countries” training course aimed to enlighten administrators of the national governments and local governments of the Asian region for promoting actions of disaster risk reduction in their home countries.

The training course covered:

- ① Lectures: Education for disaster risk reduction, human resource development for disaster risk reduction, activities for raising awareness of disaster risk reduction in communities, inheriting culture of disaster risk reduction to future generations.
- ② Visits: Joint exercise of Hyogo Prefectural Government, the memorial of the Nojima fault, visits to Tokyo, Shizuoka and Nagasaki
- ③ Exercises: Town watching, preparation and presentation of action plans

The training course included a discussion session with students who studied disaster management. It was expected that training participants would be enlightened through the discussion with the students who had sufficient professional knowledge.

## Priority Action 4 “Reduce Risk”

Reduce the underlying risk factors

### 2-4 Assessments and Findings of JICA’s activities on Priority Action 4

#### 2-4-1 Environmental and Natural Resource Management

JICA is shifting its focus of assistance from structural measures to a combination of structural and non-structural measures on flood protection and water resource development. Integrated environmental and natural resources management, promotion of sustainable management of ecosystems, and disaster risk reduction are also incorporated in this sector.

Figure 18 outlines the amount of yen loans that have been invested in flood management since 1967. The loans have helped fund the development and protection of major river basins of countries, particularly Indonesia, China and Philippines.

Integration approaches to the water resource management of river basins are required to address new developments that are contributing to increased vulnerability in developing countries. Water demand in many countries has risen rapidly as populations have increased. Economic growth and urbanization have caused water shortages and degradation of water quality in rural and urban areas. Climate change has increased the frequency and intensity of drought and floods. Integrated approaches consider social, economic and environmental impacts on river basins and assist with the development of effective coordination systems among stakeholders<sup>6</sup>.

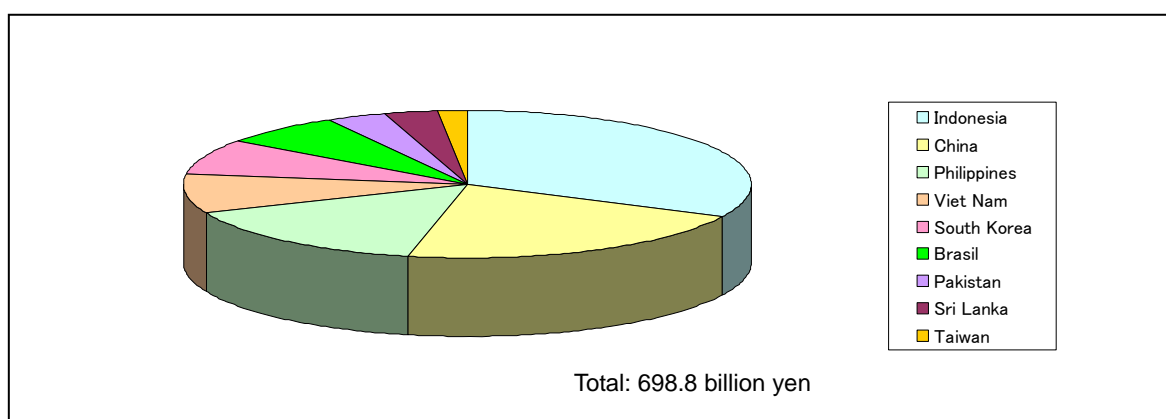


Figure 18. Investment by Country for Flood Mitigation Sector  
(Yen Loans from 1967 - 2005 (commencing year))

<sup>6</sup> River Basin Governance involves a wide range of stakeholders and incorporates climate change adaptation planning. It is important to establish councils or forums comprised of stakeholder organizations, experts and academics at the early stages of planning.

### **Box 18 <Indonesia> Capacity Development for Integrated River Basin and Water Resources Management**

In Indonesia, water shortages in rural and urban areas have become a serious problem due to the rapid increase in water demand in the country and the delay of water resources development. Adopting an integrated approach for a river basin that deals with various issues such as water shortages, floods, degradation of the water quality in the basin has become important.

The government of Indonesia enacted the Law on Water Resources in 2004 and tried to push forward integrated water resources management with the participation of stakeholders within the river basins. The Department of Public Works decided to manage directly the selected 30 important river basins and established river basin organizations (RBOs) for the 30 river basins. RBOs' responsibilities cover the preparation of plans for water resource development and management, the installation of necessary facilities, management and maintenance of the facilities, coordination of interests of water users and other issues.

As RBOs were river construction offices, they have experience in the construction of facilities. On the other hand, they do not have sufficient capacity to carry out the integrated water resource management of entire river basins, and also guidelines and manuals for this purpose did not exist. Under these circumstances, the Ministry of Public Works established the Dissemination Unit for Water Resources Management and Technology (DUWRMT) for the preparation of guidelines, training of RBO staff and establishment of a system of consultation.

JICA assisted with the establishment of DUWRMT and development of their capacity through a technical cooperation project, the "Capacity Development Project for River Basin Organizations (RBOs) in Practical Water Resources Management and Technology" (2008 - 2011) . The goal of the project was to develop a system of strengthening the capacity of RBOs by DUWRMT for implementing river basin management.

### **Box 19 <China> Forestation as a Measure for Sediment Disaster Management and Recovery of the Natural Environment**

The Xiao-iang river basin of Yunnan Province is prone to debris flows and landslides due to its topography, heavy precipitation and earthquakes. Stagnation of the regional economy has caused destruction of forests and the river basin. Degradation of the environment exacerbates sediment disasters and then leads to further stagnation of the economy. The region has fallen into a vicious circle of degradation and disaster.

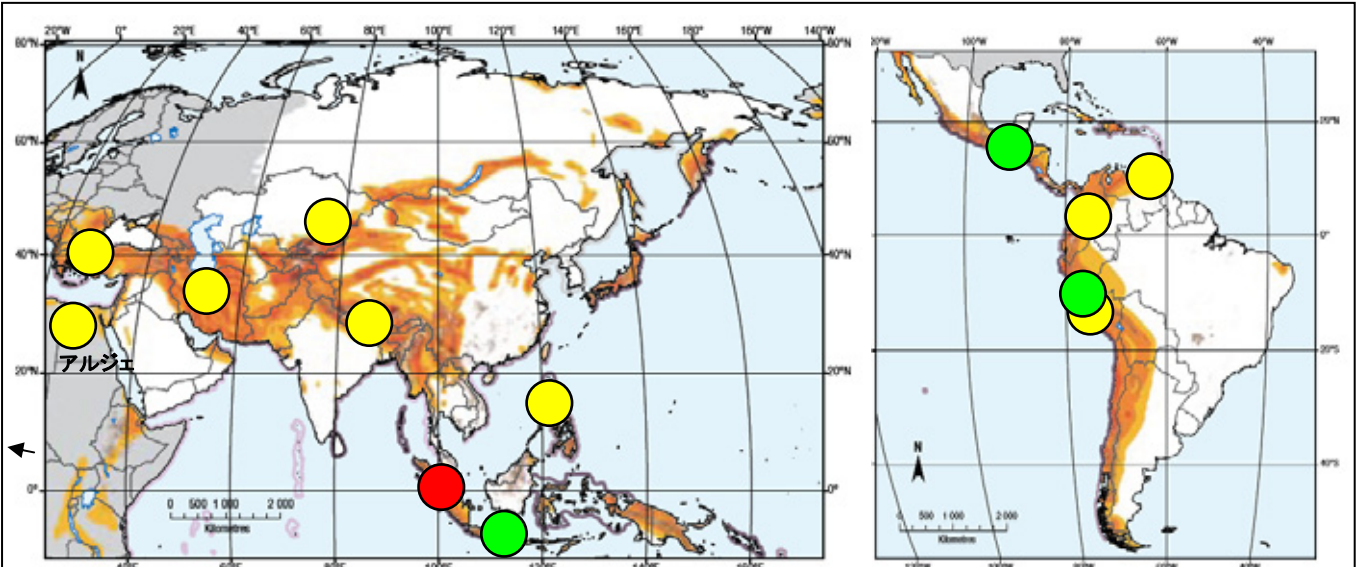
JICA carried out the "Comprehensive Measures for Sediment Disasters and Recovery of Natural environment of the Xiao-iang River Basin of Yunnan Province" study, and, with the Chinese counterpart, prepared a basic plan to halt the vicious circle by structural measures such as constructing river banks, as well as by soft measures such as improvement of the natural environment through forestation. The plan included the implementation of structural measures, the improvement of the natural environment, strengthening of forecast and warning systems, and the establishment of a new organization that would be responsible for implementation of measures and their management.

## **2-4-2 Practices of Social and Economic Development**

The 2010 Haiti Earthquake was an unprecedented disaster with more than 200,000 fatalities that resulted from the combined effect of a major earthquake and vulnerable social and economic infrastructure. In order to reduce the scale of earthquake disasters, JICA provides assistance for activities that are aimed at improving the seismic resistance of buildings and facilities. Particular attention is given to low-income housing and critical public facilities and infrastructure.



Figure 19 indicates the locations of major cities in the world that have a high seismic risk which JICA has assisted. Related activities that JICA has supported include damage assessments to buildings, the promotion of techniques for strengthening buildings, improvement of seismic design codes, improvement of administration for building construction, construction of low-cost houses, retrofitting of school buildings, and capacity enhancement of researchers and engineers.



Multi-Hazard Map of Asia and Latin America and the Caribbean, Risk and Poverty in a Changing Climate, UN, 2009

Grant Aid

- Indonesia: Reconstruction Assistance Project (School construction) for the Padang Off coast Earthquake, West Sumatra

Technical Cooperation Project

- Indonesia: Project for Enhancement of Administrative Capacity for Improvement of Seismic Resistance of Buildings
- Peru: Training and Dissemination of Low-Cost Seismic Resistant Housing
- El Salvador: Strengthening of the Technology for the Construction and Dissemination of Popular Earthquake-Resistant Housing

Development Study

- Kazakhstan: The Study on Earthquake Disaster Risk Management for Almaty City
- Peru: The Study on Housing Reconstruction with Seismic-Resistant Houses
- Algeria: A Study of Seismic Microzoning of the Wilaya of Algiers
- Philippines: Earthquake Impact Reduction Study for Metropolitan Manila
- Venezuela: Study on Disaster Prevention Basic Plan in the Metropolitan District of Caracas
- Colombia: The Study on Disaster Prevention in the Bogota Metropolitan Area
- Nepal: The Study on Earthquake Disaster Mitigation in the Kathmandu Valley
- Turkey: The Study on a Disaster Prevention/Mitigation Basic Plan in Istanbul Including Seismic Microzonation
- Iran: The Study on Seismic Microzoning of the Greater Tehran Area

Figure 19. Assistances to Improve Seismic Resistance of Buildings

**Box 20 <Nepal> Approach for Improving Seismic Response of Buildings**

JICA carried out “The Study on Earthquake Disaster Mitigation in the Kathmandu Valley” as a development study between 2000 and 2001. At the time of the study, the Ministry of Interior was the only organization who was responsible for disaster management, and they were focused on emergency response and relief. The study triggered and expanded various approaches for earthquake disaster risk reduction in Nepal. An improvement in the seismic response of buildings is one of them.

Among the agencies of the national government, the Department of Urban Development and Building Construction, the Ministry of Physical Planning and Works, has carried out a revision of the building law, standardization of building materials and training of stone masons. The Ministry of Education and Sports has conducted strengthening work on school buildings.

The building standard was revised in 2003 to improve the seismic response of buildings. The new standard was adopted by Kathmandu Metropolitan City Office and Lalitpur Sub-Metropolitan City Office. Especially, after the study, Lalitpur established the earthquake safety section in the Department of Urban Development. The section is now involved in checking the structural design of buildings, applications of building permits and applications of occupation permits. Activities for awareness rising are also within their scope. A senior volunteer of JICA was sent to the earthquake safety section to provide support for technical issues of building permits.

Japanese experts who are dispatched to the field in developing countries assist administrators and engineers to develop and disseminate technologies for DRR that are suited to the conditions of each country. Figure 20 shows the numbers of experts in the disaster management sector that were dispatched between 1997 and 2008. Figure 21 organizes the total number of 1,600 experts by hazard type.

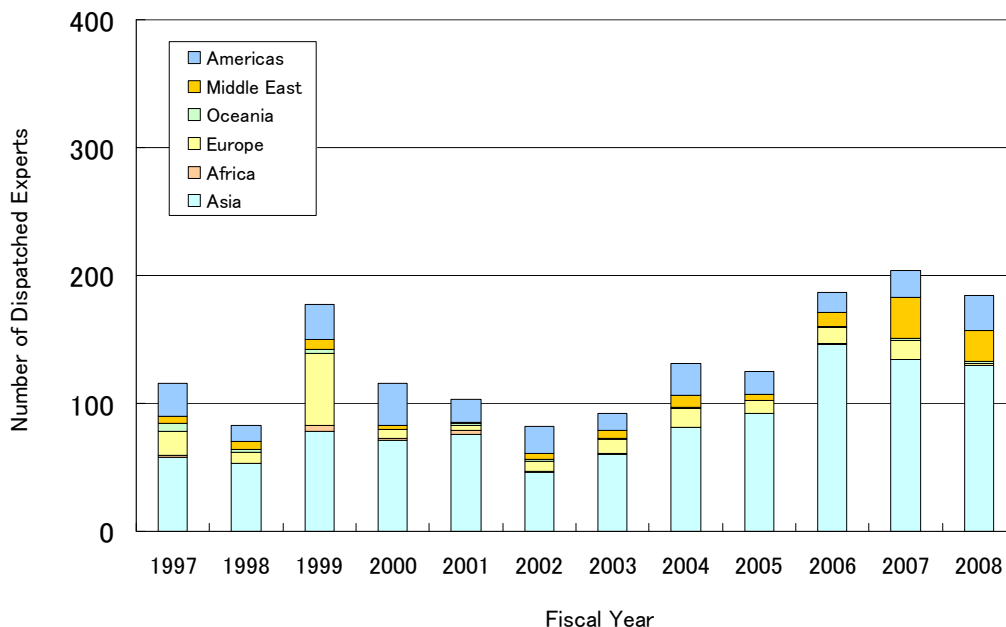


Figure 20. Dispatch of Experts in the Disaster Management Sector during the period 1997 - 2008

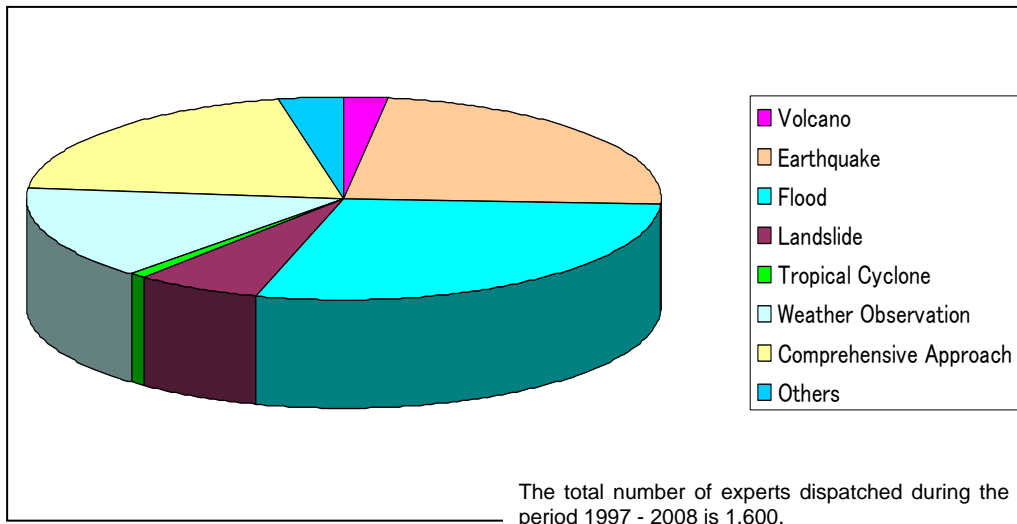


Figure 21. Dispatch of Experts by Disaster during the Period 1997 - 2008)

### Box 21 <Turkey> Dispatching of Experts and Retrofitting of Large Scale Bridges

A yen loan of 12 billion yen was approved in 2002 for the “Seismic Reinforcement Project for Large-Scale Bridges in Istanbul”. The project was for reinforcement of the first and second Bosphorus Bridges, spanning the Bosphorus strait and thus connecting Europe and Asia, the old and new Golden Horn Bridges in the centre of the city, and elevated approaches to those bridges. The reinforcement of the bridges is now underway.

Securing the safe flow of traffic of the four bridges after an earthquake disaster is indispensable for Istanbul to rescue and support victims after an earthquake and also to conduct rehabilitation and reconstruction works effectively. JICA’s contribution through strengthening the bridges is crucial for Istanbul.

In addition to the strengthening of the bridges with the yen loan, JICA dispatched four long-term experts over seven years between 1999 and 2006 to the General Directorate of Highways (KGM), Ministry of Public Works and Settlement. The experts were assigned the mission of transferring technology related to the strengthening of large-scale bridges to KGM. They also worked as coordinators among KGM, consultants and contractors to aid smooth implementation of the project. The experts from JICA contributed to the transfer of technologies and capacity enhancement of engineers of the ministry and, especially, of KGM.

### 2-4-3 Land-use Planning

JICA also carries out needs assessments for recovery and reconstruction and assists with the preparation of recovery and reconstruction plans for damaged areas (JICA has constructed schools and hospitals as part of urgent pilot projects in some countries). Recovery and reconstruction plans encompass strategies and planning for land-use, urban planning, recovery and reconstruction of infrastructure, and rebuilding living conditions of victims. Community participation is also a critical aspect of rebuilding disaster resilient societies.

Land-use planning has a critical role to reducing disaster risk in urban planning as well as planning for recovery and reconstruction.



**Box 22 <Pakistan> Rehabilitation and Reconstruction Plan of Muzaffarabad**

Located near the epicentre, Muzaffarabad was utterly destroyed by the 2005 Kashmir Earthquake. Houses, public buildings and infrastructure were heavily damaged, and administrative functions of the city were paralyzed. Although the improvement of living conditions of victims was urgent and the early start of reconstruction works was hurried, the government had difficulty preparing an integrated plan of rehabilitation and reconstruction of the destroyed city by itself. Under these conditions, JICA carried out “The urgent development study on rehabilitation and reconstruction in Muzaffarabad City (2007)”.

In a master plan of rehabilitation and reconstruction, the following principles for rebuilding the city to be disaster resistant were adopted; namely, 1) development of the urban area with multi-cores, 2) restriction of developments in high-risk areas, 3) special attention and regulations for developments near the faults, 4) development of a network of parks and open spaces, and 5) reduction of flood risk.

## **Priority Action 5**

### **“Be Prepared and Ready to Act”**

Strengthen disaster preparedness for an effective response at all levels

## **2-5 Assessments and Findings of JICA’s activities on Priority Action 5**

### **2-5-1 Strengthening Policy and Technical and Institutional Capacities for Regional, National and Local Disaster Management**

JICA continues to provide assistance to capacity strengthening of administrative agencies in developing countries to conduct disaster management swiftly and effectively. Assistance includes defining the roles and responsibilities of the agencies and inter-agency relationships, budget allocations, development of coordination systems, and promotion of continuous dialogue and action between governmental institutions and communities.

#### **Box 23 <Iran> Enhancement of Capacity of Disaster Risk Reduction of Tehran**

Tehran, the capital of Iran, is located in one of the most active earthquake zones in the world and experiences large earthquakes around every 150 years. However, since 1980, Tehran has been free of major earthquakes. Rapid urbanization of Tehran since the 20<sup>th</sup> century has increased the vulnerability of the city, and it is estimated that an unprecedented disaster would occur if a large earthquake were to hit Tehran.

JICA conducted “The Study on Seismic Microzoning of the Greater Tehran Area” (2002 - 2004). Hazards, vulnerability and risk of the Greater Tehran Area that covers 22 districts and surrounding buffer zones were assessed, and microzoning maps were prepared by using GIS (Geographical Information System). The microzoning maps became the basic information for formulating an earthquake disaster management plan. JICA continued the assistance and conducted “The comprehensive Master Plan Study on Urban Seismic Disaster Prevention and Management for the Greater Tehran Area” (2002 - 2004). In the study, the plans for three phases, namely prevention/mitigation, response and recovery/reconstruction, were prepared. According to the plans, projects/programs were proposed to achieve the necessary measures.

During implementation of the second study, an earthquake of magnitude of 6.4 struck Bam and the surrounding Kerman province on December 26, 2003. Because more than 40,000 people were killed by the earthquake, the urgent need for strengthening the emergency response system in Iran was raised. Upon the request of the Government of Iran, JICA started “The Project for the Establishment of an Emergency Response Plan for the first 72 Hours after an Earthquake” (2006 - 2010) for enhancing of the emergency response capacity of Tehran.

In the project, a “Quick Damage and Loss Estimation System” (QD&LE) was developed; an evacuation plan during emergency was prepared; and the capacity of officials of the Tehran Municipality for managing evacuation was enhanced. QD&LE can estimate the maximum ground surface acceleration, damages of buildings, casualties and others by using records of installed seismographs. The estimated information can be transferred to Disaster Mitigation and Management Organization (TDMMO) of Tehran Municipality within 30 minutes after the occurrence of an earthquake. QD&LE would support effective mobilization at the initial stage of response. Regarding the evacuation plan, training on town watching and sessions of the Disaster Imagination Game (DIG) were conducted not only for staff of TDMMO, but also for officials in charge of disaster management of the 22 districts of Tehran Municipality. Evacuation maps were distributed to residents of pilot areas, and then evacuation exercises were conducted.

JICA training and dialogue programs provide courses to strengthen search and rescue, and medical service capabilities that are required immediately after a disaster. Training courses include “urban search and rescue”, “emergency medical services for large-scale disasters”, “post disaster health and mental care services”, “emergency response measures for disasters” and “JICA’s emergency disaster relief and disaster management system”.

### **2-5-2 Promotion and Support of Dialogue, Exchange of Information and Coordination among Agencies and Institutions at All Levels**

#### **Box 24. Comprehensive Strategy for Earthquake Disaster Risk Reduction for Urban Areas**

The JICA Hyogo Disaster Reduction Learning Center (DRLC), with the cooperation of the Urban Safety Management Laboratory of Kobe University, held a training course on a comprehensive strategy for earthquake disaster risk reduction for urban areas, which was based on the experiences and lessons of the 1995 Kobe Earthquake. Eight administrators and researchers from eight developing countries were invited to participate in the training in order to promote approaches of earthquake disaster risk reduction in their countries.

The course aimed to introduce and teach implementation of the comprehensive strategy for earthquake disaster risk reduction. The strategy is based on the knowledge of a variety of fields such as engineering, medical science, science and social sciences. The course was composed of risk assessment, risk management, risk communication, etc. and provided a wide range of knowledge of risk reduction before, during and after a disaster.

### **2-5-3 Fostering Ownership, Volunteer Activities and Active Involvement of All Stakeholders**

#### **Box 25. <Asia> Training of NGOs on Disaster Risk Reduction**

Compared to international NGOs who have a wide range of networks, local NGOs have a limited network of information sharing and their cooperation is normally insufficient. Consequently, activities of local NGOs are sometimes duplicated, and in some cases their activities are not effective or efficient. Strengthening the information network of NGOs who work in the field of disaster risk reduction is one of the issues to be tackled in developing countries.

Under the schemes of the “JICA Training and Dialogue Program” (in Japan) and “Third Country Training” (abroad), a program, “Disaster Risk Reduction Training for Asian NGOs”, was carried out to enhance the capacity of NGOs for disaster risk reduction as well as to strengthen the information network. At the final stage of the training, training participants were expected, under directions of the Asian Disaster Reduction & Response Network (ADRRN), to conduct training on disaster risk reduction for the people in their countries and to gain and improve their capacity for training.

Through the program, it was expected that the networks among NGOs, the residents and other stakeholders would be strengthened; the residents would become actively involved in activities; and ownership and the spirit of volunteering of residents would be fermented.

### 2-5-4 Preparation, Review and Updating of Disaster Preparedness

JICA is specified as the secretariat of the Disaster Relief Program under the Japanese law. It has a mandate to dispatch Japan Disaster Relief (JDR) teams to provide emergency assistance for major disasters abroad in response to requests from the governments of affected countries or international agencies.

JICA dispatches JDR teams, which are composed of rescue workers, medical staff, and other experts. Self-Defense Forces units may also be deployed as JDR teams where necessary. The main tasks of a rescue team are to search for, detect and rescue people, providing first aid and evacuation assistance. Medical teams are tasked with the diagnosis and treatment of survivors and the prevention of infection and diseases, where applicable. Expert teams provide guidance on stopgap measures to prevent further disasters and advise on recovery.

JICA also stockpiles and provides emergency relief supplies, such as blankets, tents, water purifiers, generators and pharmaceutical products. A system is established for swift provision of emergency relief supplies in the wake of disasters from four depots which are strategically located abroad.

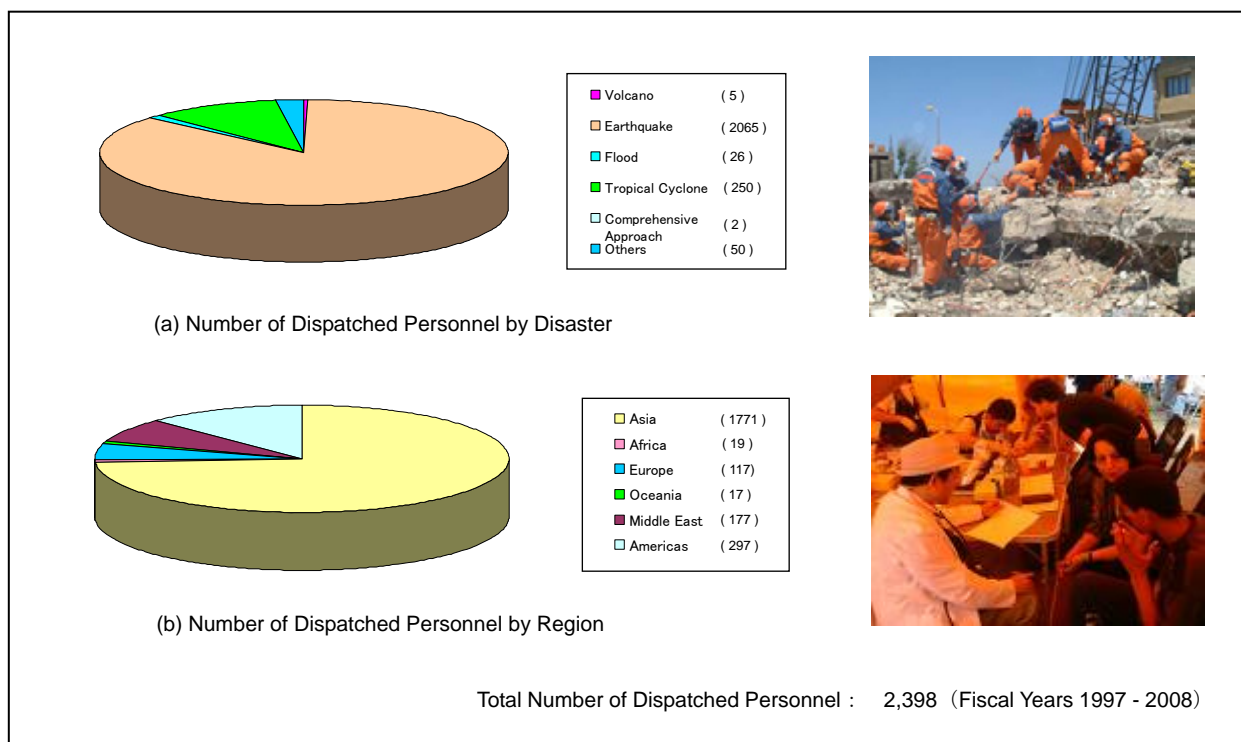


Figure 22. Dispatch of Emergency Disaster Relief Teams by Hazard and by Region (1997 - 2008)

Figure 22 provides a summary of the records of JDR teams for the period from 1997 to 2008. Dispatched personnel, a total of 2,398, are divided by hazard type and by region. As shown in Figure 23, the number of dispatched personnel increased when major disasters occurred. JICA recently sent rescue and medical teams, a unit of the Japanese Self-defense Forces, and emergency relief supplies in response to a request from the Government of Indonesia for the 2009 Sumatra earthquake. This earthquake (magnitude 7.6) killed around 1,100 people and injured around 2,900.. JICA provided emergency relief supplies in the same year to 14 countries including Mexico (flu pandemic), Burkina Faso (flood), the Philippines (typhoon), Papua New Guinea (infectious diseases including cholera), Independent State of Samoa (earthquake and tsunami), Socialist Republic of Vietnam (typhoon), the Republic of Indonesia (earthquake, described above), Lao People’s Democratic Republic (typhoon) and Kingdom of Bhutan (earthquake).

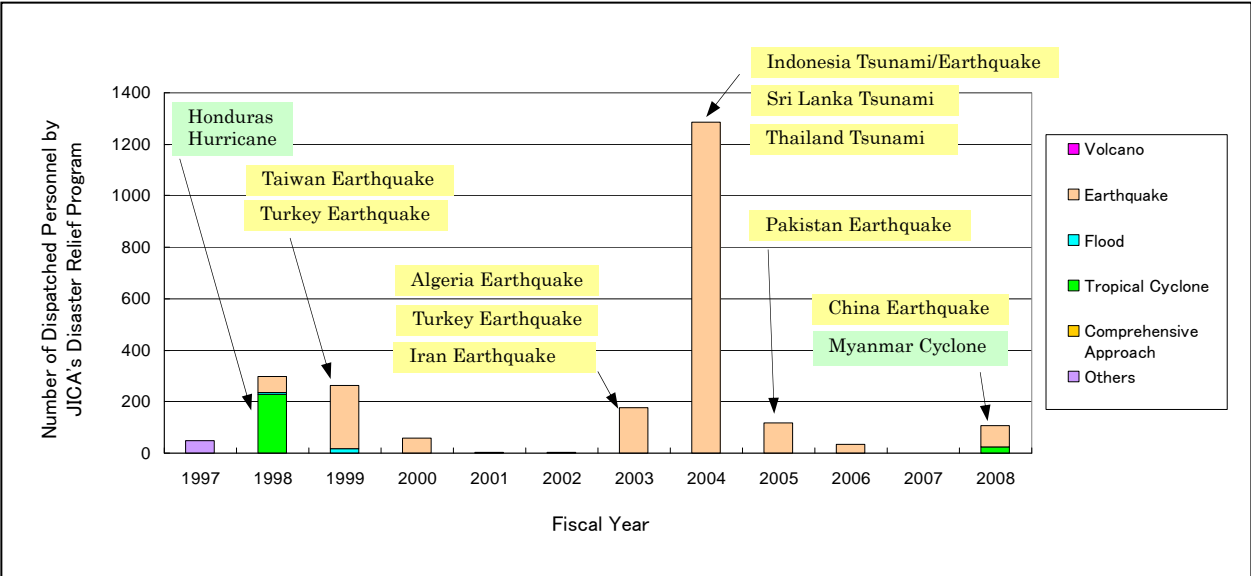


Figure 23. Dispatch of Emergency Disaster Relief Teams (1997 - 2008)

**Box 26 <China> 2008 Sichuan Earthquake**

The 2008 Sichuan Earthquake was a deadly earthquake that recorded a magnitude of 8.0 and occurred on May 12, 2008 in Sichuan province, China and killed around 70,000 people. Japan provided a total sum of 0.5 billion yen as an emergency grant and emergency relief supplies such as tents. Upon request of the Government of China, JICA dispatched Japan Disaster Relief (JDR) teams; a rescue team of 62 members and a medical team of 23 members.

The rescue team worked continuously from May 16 to May 19 in search and rescue operations. After consultation with the Chinese side, the medical team started medical treatment with the Chinese medical staff at West China Hospital of Sichuan University, where demands on the emergency medical service were judged to be high. The medical team was engaged in medical treatment after being divided into 8 groups such as emergency clinic, ICU and radiation medicine. During the 10 days from May 21, around 1,500 patients were treated by the medical team.

(2008 White Paper, Disaster Risk Reduction)

In 2010, the JDR rescue team was classified by the International Search and Rescue Advisory Group External Classification (IEC) as “Heavy” with regard to its capacity to exercise relief operations. In order to relieve the burdens of countries affected by disasters, this international system established under the Office for the Coordination of Humanitarian Affairs requires that:

- (1) rescue teams from different countries conduct rescue operations by following a common guideline; and
- (2) rescue teams are classified according to their capacity using a common criteria and accordingly allocated different tasks in the field.

The classification system commenced in 2005 with 17 teams, including the JDR team, has been classified as “Heavy”.

JICA also sends teams to assess needs for recovery and reconstruction immediately after the occurrence of a disaster. Assessment teams observe damages caused by the disaster, identify needs for recovery and reconstruction, and share information with the government and other donor organizations in order to plan appropriate assistance for the recovery and reconstruction stage.

Figure 24 summarizes investment amounts in yen loans between 1967 and 2005. Amounts are divided by the stages of the disaster management cycle for each hazard. The majority of financial assistance that was directed towards recovery and reconstruction phases addressed disasters caused by volcanoes (84%), earthquakes (87%) and tropical cyclones (52%).

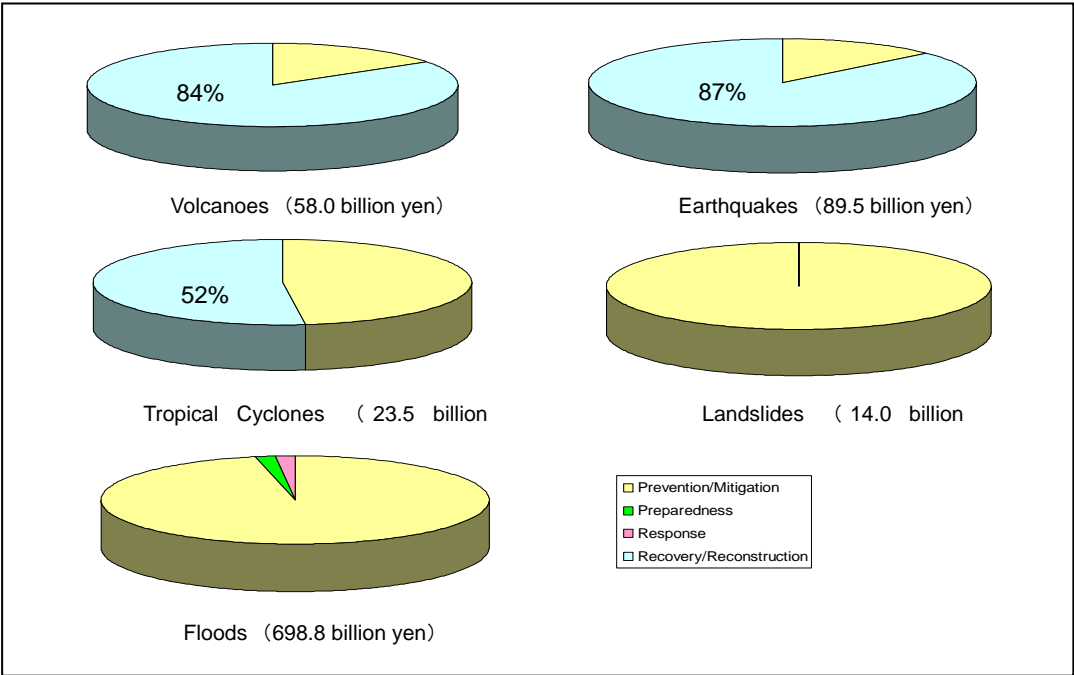


Figure 24. Yen Loans for Disaster Risk Reduction Sector (1967 - 2005 (commencing year))

Assistance from JICA for the establishment of self-help systems after a disaster focuses on the recovery and reconstruction of infrastructure necessary to sustaining the daily lives of survivors. Grant aid and yen loans after recent large-scale earthquakes and tsunamis were directed towards the recovery and reconstruction of critical activities including the restoration of the lifeline such as water supply and sewerage systems, housing construction and the use of low-cost technologies to retrofit buildings. For assisting recovery of livelihood in disaster affected areas, JICA conducts urgent programs for rehabilitation and construction. After the Indian Ocean Tsunami in 2004, one of the urgent programs for rehabilitation and reconstruction was conducted in Ache, Indonesia. The result of the study provided inputs on the design and preparation of a construction plan for fishery facilities that assisted with the self-help recovery of the local fishing industry. Dispatching volunteers to disaster affected areas supported the empowerment of communities. With the participation of residents, improvements in residents' incomes, and planning and implementation of education and sanitation programs were undertaken.

Grant aid and yen loans also facilitated the recovery and reconstruction of social functions, and reconstruction of educational facilities, medical facilities and transportation systems. Assistance was further complemented by technical cooperation projects that focused on the training of techniques for retrofitting buildings,, as demonstrated in Pakistan and Indonesia after the earthquake disasters.

**Box 27 <Turkey> Emergency Response and Assistance for Reconstruction after the Earthquakes**

After two large earthquakes in 1999 in Turkey, namely the Izmit Earthquake of August 17, 1999 and the Duzce Earthquake of November 12, 1999, JICA dispatched Japan Disaster Relief teams. Rescue teams, medical teams and expert teams were dispatched and emergency supplies were provided after two earthquakes under “Emergency Assistance for the Great Marmara Earthquake” (August and November 1999). Furthermore, experts were dispatched to assist with construction of temporary houses under “Assistance for Rehabilitation and Reconstruction after the Great Marmara Earthquake” (June 2000 - August 2000).

Achievements of the Japan Disaster Relief teams were visible. For example, after 2 days of the Izmit Earthquake, the rescue team found and rescued a 74 year-old lady from a collapsed building.

JBIC (at the time) and JICA, reinforced assistance in the field of earthquake disaster risk reduction after the earthquakes. A Yen Loan of 23.6 billion yen was provided for reconstruction of the damaged areas under the “Emergency Earthquake Damage Reconstruction Plan” (approved in 1999). The loan was used for repairing or clearing damaged houses, construction of temporary and permanent houses, supporting victims, and the rehabilitation of Sakarya University and others. As the loan targeted the rehabilitation and reconstruction of basic infrastructure for living, securing houses and recovery of livelihood, the outcomes of the loan were visible.



## **III. Conclusion**

### **3-1 Conclusion**

➤ **The global progress of the HFA**

The global progress of the HFA is available in the UNISDR Global Assessment Report on Disaster Risk Reduction 2009 “Risk and Poverty in a Changing Climate”. Sixty-two countries submitted national progress reports, and their progress of HFA was evaluated and classified from levels 1 to 5. Figure 25 summarizes the level of progress for each priority action by income of countries and by region. Countries of low income averaged rankings of between level 2 (some progress is discernible, however systematic policy and/or institutional commitment remains inadequate) and level 3 (institutional commitment is present however achievements are neither comprehensive nor substantial). In particular, levels of achievement in priority actions 3 and 4 are low. From a regional perspective, the progress levels of countries in Asia, Africa, and Central and South America are generally low.

➤ **JICA will refer to the MTR of the HFA to revise its Guideline for DRR**

The Report of the Mid-Term Review of the HFA was drafted at the end of 2010 and will be finalized by the beginning of 2011 following a series of literature review studies, regional workshops and related activities. The Mid-Term Review of the HFA is valuable for JICA to formulate and modify its strategy towards the achievement of HFA by 2015; and will guide JICA to review of the “Issue-specific Guidelines for Disaster Risk Reduction”.

➤ **JICA assistance for DRR**

JICA continues to provide assistance to the disaster management sector. The average annual investment amounts during the period between 1997 and 2008 were 4.2 billion yen for technical assistance, 4.2 billion yen for grant aid and 53 billion yen for yen loans. JICA technical assistance includes development studies, technical cooperation projects, dispatching experts and training in Japan. Flood-related activities attract the highest amount of investment, accounting for around 50% of the total investment, followed by earthquakes, volcanic eruptions and tropical cyclones. The region that received the greatest assistance from JICA was Asia.

➤ **Shifting from structural measures to non-structural measures**

JICA assistance has shifted from prevention through structural measures to the inclusion of preparedness by non-structural or soft-measures. Although the capacity development of organizations of national governments, local governments, research institutions and NGOs remains important, there is a greater emphasis on the enhancement of

disaster management capabilities for communities.

➤ **Collaborations with people in recipient countries, other donors and NGOs**

Assistance from JICA contributes widely to putting forward activities of developing countries to achieve the five priority actions of the HFA through collaboration with institutes and individuals in recipient countries, other donors and NGOs. The key components of JICA assistance are human resource development (Priority Action 1), enhancement of community DRR capacities (Priority Action 3), national and local risk assessments (Priority Action 2), development of early warning systems (Priority Action 2), strengthening of networks (Priority Action 3), research (Priority Action 3), social and economic development practices (Priority Action 4), and preparations, reviews and updates of disaster preparedness (Priority Action 5).

➤ **Findings of each priority action**

Findings from a review of past projects of JICA and lessons learnt identified from their implementations are summarized for each HFA priority action. These findings include percentages of these JICA projects in terms of categorization of their coverage according to these five HFA priority areas as indicated in Table 4.

**Priority action 1: Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation.**

Contribution to priority action 1 is least among 5 priority actions, which is less than 2% of the JICA projects for the last 10 years.

- (1) It is important that roles and responsibilities are clearly defined and agreed on by a ministry responsible for DRR, in consultation with other ministries and organizations at the central level. The capacity of the ministry responsible for DRR will be strengthened through a process of discussion and coordination with other organizations. JICA identified an example where the establishment of a task force/platform that was composed of representatives from stakeholder ministries helped to facilitate close coordination between concerned parties.
- (2) Building a two-way feedback system between central government, local governments and communities is an effective method of strengthening capacity and improving communication and coordination at all levels.
  - 1) The central government shows the policy and guideline for disaster management plan to local governments.
  - 2) Local governments can then formulate a disaster management plan based on the guideline.

3) The disaster management plan is tested on evacuation drills, table top exercises, disaster simulations and other activities at community level.

The results of these exercises are fed back to the central government and the local government to improve disaster management systems.

- (3) The central government formulates a disaster management plan and guideline to assist the development of disaster management plans at local government level, providing advice, when required. The guideline operates as the framework for disaster management plan and assists with the prioritisation of disasters in different areas based on type, frequency and intensity. Each local government is subsequently equipped to develop disaster management plans that are appropriate to local conditions.
- (4) Successful community-based disaster management requires enhancement of awareness at community level through workshop, risk mapping, evacuation drill etc. with the continuous support by central and local governments. Outcomes of community activities are fed back to the central government, which is then able to disseminate successful programs and lessons learnt to other districts and communities. The incorporation of traditional practices in DRR activities also assists with establishing and maintaining a sustainable culture of DRR within communities. In Japan, the traditional festival, “*mochi tsuki taikai*” has been incorporated into a DRR activity where participants pound steamed rice into cake for consumption after the completion of an evacuation drill. *Mochi tsuki taikai* serves as a motivation to participate in disaster management activities and promotes cooperation and solidarity.
- (5) The institutional development of government organizations responsible for disaster management is relatively nascent compared to other established government agencies. These relatively nascent organisations tend to encounter challenges in coordinating different organizations, and also human and financial resource challenges. Donors should take these factors into account when providing assistance for DRR to developing countries

**Priority action 2: Identify, assess and monitor disaster risks, and enhance early warning systems.**

Contribution to Priority action 2 accounts for 26.3% of JICA projects for the past 10 years. JICA provides assistance with the risk assessment of disasters such as floods, earthquakes and volcanic eruption, and the establishment of early warning systems using structural and non-structural methods.

- (1) Awareness is essential for the successful implementation of DRR. JICA implements

activities to promote awareness and understanding of DRR by communities and individuals. Public awareness activities are complemented by activities focusing on capacity development for central and local governments.

- (2) Disaster management plans can be formulated effectively using GIS and past data etc. It is important, however, to update systems with new disaster data.
- (3) Satellite images and aerial photography are useful for conducting risk assessments. JICA carried out a risk assessment by aerial photography in 2009 in order to avoid a secondary disaster in wake of the Padang earthquake in Indonesia. Results were shared with central and provincial government officials who issued immediate warnings to people in danger zones.
- (4) Information that is disseminated through early warning systems must reach end users promptly to enable the public to take appropriate evacuation actions based on the received information. In Bangladesh, the Bangladesh Metrological Department issues warnings which are transmitted by the Red Crescent societies to communities. Regular evacuation drills are jointly organised with NGOs for each community.
- (5) Risk mapping is enhanced by community participation because residents in community become well aware of dangerous places and evacuation routes through such exercises.

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| <p><b>Priority action 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels.</b></p> |
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Contribution to Priority action 3 accounts for 11.7% of JICA projects for the past 10 years.

- (1) Building a culture of safety and resilience at all levels is not easy. Preparation of a white paper on disaster management can assist in facilitating a culture of safety and resilience at all levels, as demonstrated by “The Project on Capacity Development in Disaster Management in Thailand”. In this project, capacity development of the Department of Disaster Prevention and Mitigation (DDPM) was strengthened through cooperation with stakeholder organisation in the collection and analysis of information for the government white paper.
- (2) Continuing dialogue exchange between engineers and researchers after project completion encourages the maintenance of contacts and networks. Communication between researchers who participated in the project, "Japan-Peru Centre for Earthquake Engineering Research and Disaster Mitigation (1986-1991)", continued even after the completion of the project. Their continuous communication resulted in a joint research project under the scheme called the “Science and Technology Research Partnership for

Sustainable Development” with the aim to pursue the most advanced technology.

**Priority action 4: Reduce the underlying risk factors.**

Contributions towards Priority action 4 accounts for 44.8% of JICA projects for the past 10 years and constitute the highest contribution overall. Reduction of underlying risk factors remains critical given that the risk is heightened in many areas by the effects of rapid urbanization and climate change.

- (1) Factors such as rapid urbanization have also increased the vulnerability of populations. Reducing vulnerability requires a multi-disciplinary approach that integrates DRR into sustainable development perspectives. Poor people tend to live in areas near rivers which are prone to risk of flooding. Solutions for this kind of case are required not only from the view point of DRR but also from socio-economic development perspectives.
- (2) The JICA "Handbook on Climate Change Adaptation in Water Sector" applies to projects that focus on flood risk reduction, water resource management and other activities. JICA intends to share this publication with other development partners.
- (3) A simulation of the impacts of climate change using a super computer, the "Earth Simulator", was conducted in a JICA training course. Participants also held seminars in each country to share information on effective actions to address climate change. Japan has Climate-change related activities should continue as part of programming as it is an area that Japan has particular expertise in..

**Priority action 5: Strengthen disaster preparedness for an effective response at all levels.**

Contribution to Priority action 5 accounts for 15.5% of JICA projects for the past 10 years.

- (1) In general, countries that frequently experience disasters are comparatively better prepared than those which experience disasters less frequently. One example was the disaster of Cyclone Nargis which affected Myanmar in 2008. The cyclone hit areas which had never experienced a cyclone of that intensity. Residents did not receive warning and there were no evacuation shelters. Affected communities suffered extensive losses and damage. In Bangladesh, a country that frequently experiences cyclones, communities are better prepared.
- (2) In many cases, information on damage and emergency operations are not well recorded and disaster managers are subsequently unaware of prevention measures that can be implemented beforehand. JICA recently advised the China Earthquake Administration on the systematic compilation of information on the Sichuan earthquake in order to develop staff capacity. After the earthquake in Padang, Indonesia, JICA conducted surveys to

collect and analyze chronological data to prepare its next project. Chronological feedback can assist projects in other countries. JICA assistance with the establishment of data-collection systems in developing countries will also enhance the collective knowledge of other countries, including Japan.

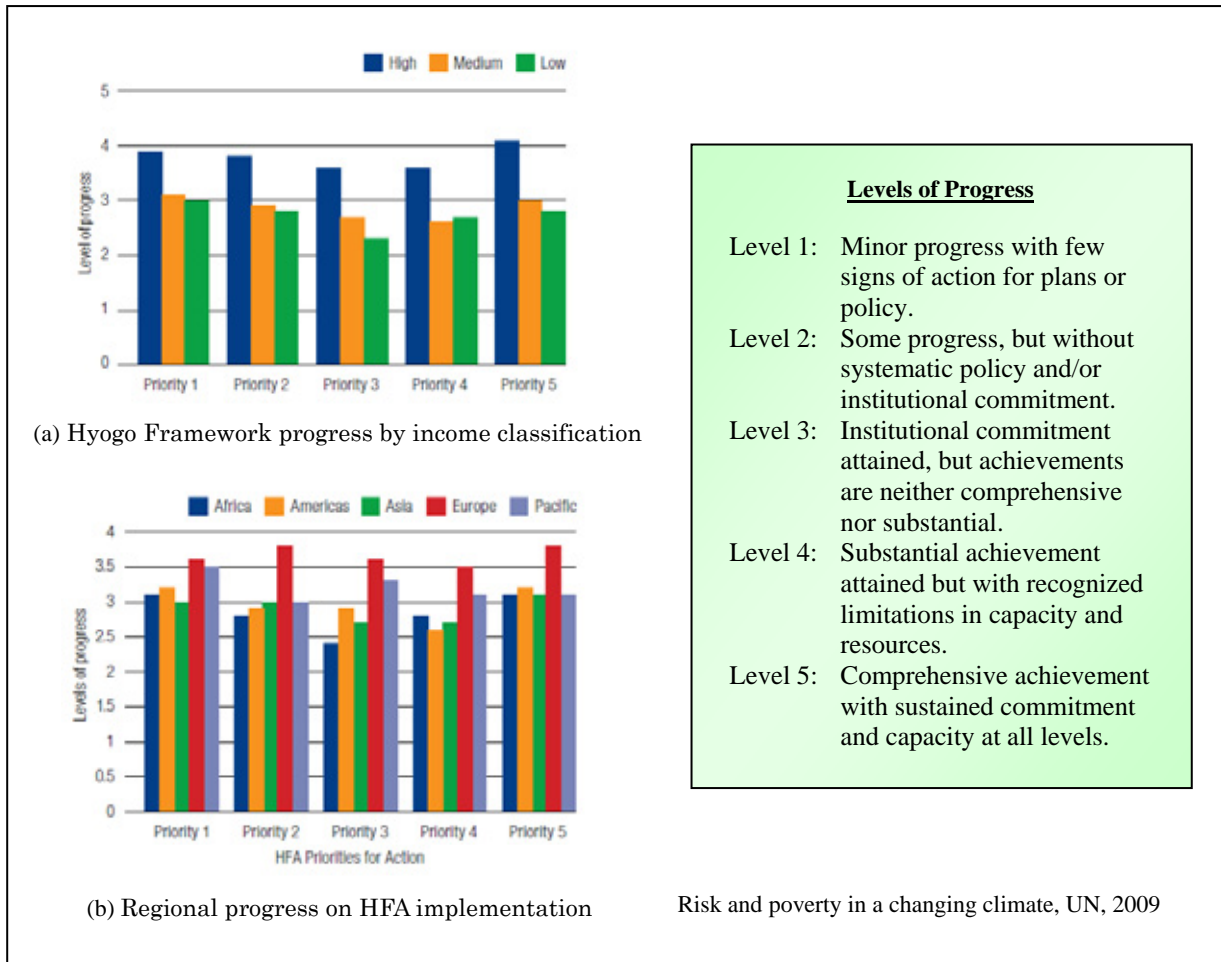


Figure 25. Mid-term Report on Progress of the Hyogo Framework for Action

### 3-2 Recommendations

The 3<sup>rd</sup> Global Platform will identify priority actions for 2011-2015 and beyond, based on the results of the Mid-term Review and proposals from the 2<sup>nd</sup> Global Platform as in the Chair’s Summary. In the meantime, JICA has established an advisory committee of members from academic institutes, international organizations and NGOs under the leadership of Mr. Kenzo Oshima, the Senior Vice President of JICA. The committee has focused on how best to contribute to the promotion of DRR in developing countries in coming years under the global partnership.

In reference to the outcomes of the Global Platform and discussions at the Advisory Committee, JICA intends to develop a new “Guideline for DRR” by revising the current Guidelines (2008). The new guideline will continue to define priority areas for action and activities to promote DRR.

The priority areas for action and activities to promote DRR, as suggested by the interim report of MTR and the 2<sup>nd</sup> Global Platform, include the following key areas and activities- some of which align with what JICA has proposed in international conferences and other occasion.

### **3-2-1 Priority Areas for Action**

- **DRR at the community level in close linkage with central and local governments**
- **Management of urban disaster risks**
- **Climate change adaptation**
- **Reconstruction/recovery for development in the future**

### **3-2-2 Actions to promote DRR**

- **Setting targets to key areas of actions**
- **Measures for more funds from national budgets**
- **Development of common guidelines for cost benefit analysis**
- **Sharing knowledge including indigenous and traditional knowledge**

While looking forward to the outcomes of the 3rd Global Platform and the JICA's Advisory Committee, JICA continues to work as appropriate taking into account what are suggested by the interim report of MTR, the UNISDR Global Assessment Report on Disaster Risk Reduction, and proposals in the Chair's Summary of the 2<sup>nd</sup> Global Platform as mentioned above.

(END)





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February 2011