



*JICA's Cooperation on Disaster Management*  
**Toward Mainstreaming  
Disaster Risk Reduction**  
*— Building Disaster Resilient Societies —*



# 1. JICA's Concept for mainstreaming DRR

## Mainstreaming Disaster Risk Reduction

The world faces rising costs of natural disasters that have been increasing in frequency and severity/intensity in recent years. Devastating extreme weather events and disasters recorded in the past ten years include: the 2004 Indian Ocean Tsunami, Hurricane Katrina in the United States of America (the US) in 2005, Cyclone Nargis in Republic of the Union of Myanmar in 2008, Sichuan earthquake in the People's Republic of China in 2008, the 2010 Haiti earthquake, floods in Kingdom of Thailand and the Great East Japan Earthquake in Japan in 2011, Hurricane Sandy in the Caribbean Sea and the US in 2012, and Typhoon Haiyan (Yolanda) in Republic of the Philippines in 2013. In recent years, loss of human life due to natural disasters is on decrease, while economic loss from natural disasters is on increase. In addition, natural disasters in developing

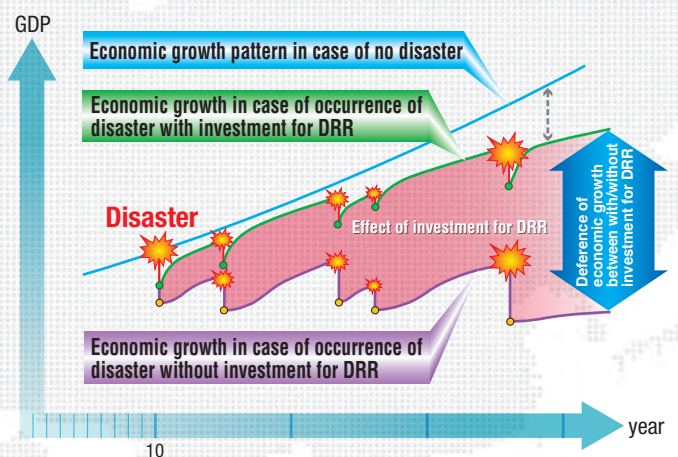
countries are an obstacle to achieving sustainable development and worsen poverty. In order to reduce the damage caused by natural hazards, all actors involved in disaster risk reduction need to understand the importance of proactively implementing comprehensive risk reduction and preparedness initiatives in addition to post disaster efforts. This signifies mainstreaming disaster risk reduction (DRR).

At this moment, there is no common definition of "mainstreaming DRR" in the world. Nevertheless, it can be assumed that mainstreaming DRR has three pillars: ① government prioritizes DRR in the country's policy, ② disaster risk reduction is incorporated into plans and programs for development in all sectors or fields, and ③ prior investment in DRR is increased.

## Importance of Investing in DRR

Many people lose their lives due to disasters, and there is no doubt that saving lives against disasters is the top priority in all countries. However, disasters affect not only human life but also properties and assets made by individuals, companies, governments and society, depriving the affected locality of development opportunities and development outcomes in seconds. Without livelihood restoration and a future prospect for development, survivors cannot find hope and live whole and meaningful lives, and in the true sense of the word, they have not been saved from the disaster. What is most required for protecting assets, properties, development opportunities and outcomes against disasters is not an emergency response nor disaster recovery, reconstruction/rehabilitation but investment in DRR for Prevention, Mitigation and Preparedness. A United Nation Development Program study suggests that "every dollar invested into DRR could save seven dollars in disaster aftermath". Investment in DRR will "pay" economically compared to emergency response and disaster recovery and reconstruction/rehabilitation. JICA places importance on prior investment in DRR and also pays more attention to national and regional economy as well as protecting people's life.

Pattern Diagram of Investment for DRR and Economic Development



## Strengthening DRR in development planning and strategy

National and local governments allocate human and financial resources to social and economic development including infrastructure, food production, education and health care, according to their proper priorities. However, spending on "DRR" may have been regarded as "subserving" to society as a whole, and has not been allocated to invest enough resource in DRR. Especially, developing countries where priority is given to economic growth often have a limited budget for DRR and tend to allocate their DRR budget not to disaster prevention and mitigation but to the expense for emergency response provision (rescue and provision of supplies) following a natural disaster.

However, as mentioned above, disasters can damage and even destroy the outcome of the development outcome in the affected regions and/or countries. Recovery and reconstruction/rehabilitation require a long time, leaving a prolonged adverse impact on the region/country and thus hindering sustainable development. In addition, as certain parts of a country are susceptible to storms and floods that occur more frequently than other natural disasters, and in such disaster-prone areas, lives are lost and

survivors are deprived of opportunities for economic growth repeatedly. Therefore, JICA regards DRR as a cross-sector issue which is essential for sustainable development and people-centered approach, and recognizes that it is imperative to incorporate the viewpoint of DRR into "development agenda" such as the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs).

Another Viewpoint of Mainstreaming Disaster Risk Reduction: Cross-sectional Function

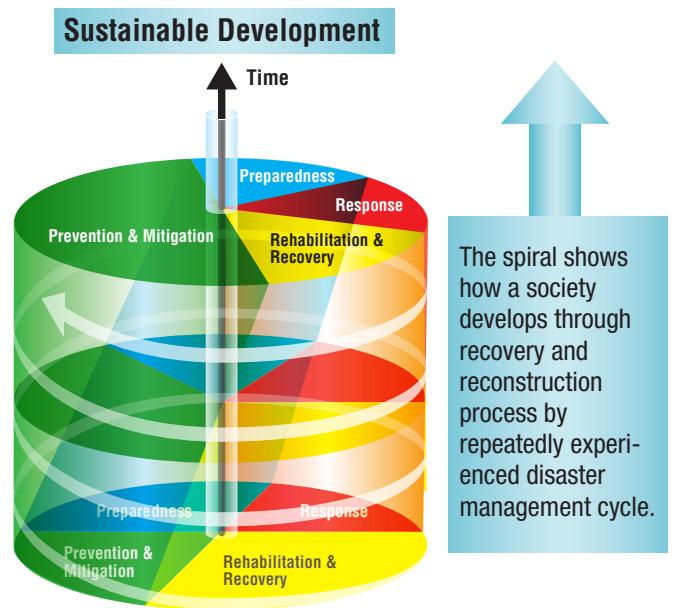




## Focus on Disaster Management Cycle and Build Back Better

Disaster management cycle consists of four phases following a disaster: ① emergency response, ② post-disaster recovery and reconstruction/rehabilitation, ③ learning from experience and taking countermeasures for prevention and mitigation to minimize the damage from disasters and ④ better preparation against future disasters. This cycle is a basic concept of building disaster-resilient societies.

JICA disseminates a concept called “Low Regret Investment”, or prior investment in development and application of DRR policies, strategies and practices that can adapt to future environmental conditions, and also aims to minimize the direct and indirect (social) damage caused by future disasters with prior investment for prevention and mitigation and to make expenditures for emergency response, recovery and reconstruction as soon as possible. However, in reality, since it is difficult to predict exactly when a disaster will occur and how much loss it will cause, many governments/donors are reluctant to invest in DRR while often prioritizing their investment in economic infrastructure. Decision to invest in DRR before a disaster occurs is hard to make especially in many developing countries. It is necessary to have an explicit “Build Back Better” policy to reduce vulnerability to repeated cycles of natural disasters, eliminate the vicious spiral where natural disasters worsen poverty and aim for sustainable development. The recovery and reconstruction plan prepared by the Philippine government in response to Typhoon Haiyan (Yolanda) has a clear policy to “Build Back Better” in place, asking “unless we take this disaster as an opportunity to rebuild a better, safer, and more resilient society, when can we become resilient to natural disasters?”



(Source) Philippine National Disaster Risk Reduction and Management Framework



## Reinforcing the governance in DRR

The first step in building a resilient society is that a state recognizes the importance of the central government’s role in DRR. Needless to say, involvement in DRR activities by local governments, private sector, regional communities, non-governmental organizations (NGOs) is also important in DRR. Nevertheless, only central agencies responsible for DRR are capable of mainstreaming DRR on a national level, i.e. promote pre-disaster investment in

DRR by prioritizing DRR in national planning, and using all available measures to enable all related parties to focus on DRR, including preparation of legal and regulatory framework and long-term plans, budget allocation, granting incentives, etc. Initiatives by central agencies responsible for DRR and platforms established through mainstreaming DRR will strengthen all related parties’ efforts in DRR and help to enhance national capacity in DRR.



## Important aspect of disaster risk assessment

DRR not based on scientific analysis of accurate data and proper risk assessment may result in wasted investment and prevent residents and related parties from correct understanding of disaster risks. Disaster risk analysis and assessment is a first step to implement proper DRR in all three dimensions, i.e. in policies (e.g. examination of the needs for DRR, budget allocation) in practices (e.g. implementation of DRR activities) and in activities by local

residents (e.g. DRR education and DRR in communities). Disaster risk assessment needs to be based on scientific data and analysis, and is a field that donors and international organizations should prioritize.

In addition, as one of its specific efforts towards mainstreaming DRR, JICA proposes that a disaster risk assessment should be conducted for all development projects of it, and will incorporate the idea into process of them.



## Coordination with various stakeholders

Devastating disasters around the world in recent years have heightened interest in “DRR”, which is expected to lead to wider awareness of the importance of investment in DRR. Nevertheless, “DRR” in a project or a DRR project alone is not enough to build a resilient society. Therefore, in order to protect people

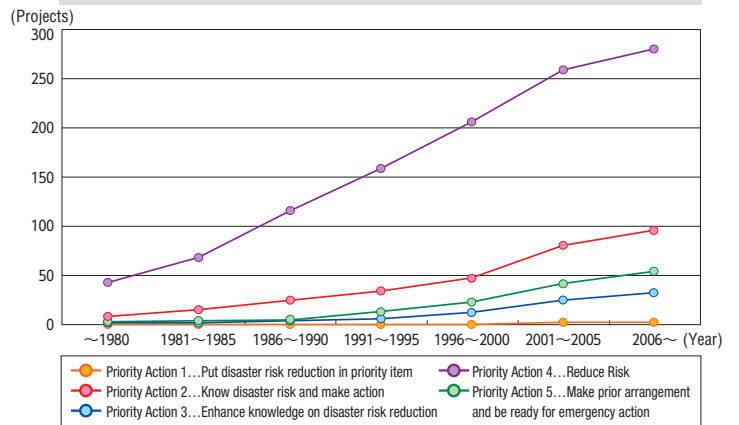
against disasters and reduce economic loss from disasters in the future, collaboration and communication across different sectors are required to incorporate DRR into social and economic development.

## JICA's approach – Contribution to HFA –

The Hyogo Framework for Action(HFA), which was adopted at the second world conference on Disaster Reduction(WCDRR) in January 2005, is a guideline for DRR and it consists of three strategic goals and five priority actions.

JICA has been performing cooperation projects with an eye on HFA. JICA's performance in relation to HFA is shown in the right figure. Specifically, JICA has conducted a great number of cooperation projects related to "Priority Action 4: Risk Reduction." By keeping this framework in mind, JICA aims at "the departure from the repeated poverty cycle caused by disasters" and "the achievement of sustainable development by DRR". JICA intends to make strenuous efforts for the cooperation in building disaster-resilient society through "Mainstreaming DRR", which introduces the perspective of DRR into development projects of various sectors.

Progress of the Number of Projects Including DRR Activities in Each Priority Action



## JICA's approach – Seamless Cooperation –

JICA has been carrying out seamless cooperation in various ways making use of its characteristics of a project implementing body.

### 1. Continuity of Time

JICA ensures seamless response, recovery and prevention activities, and strong link between these activities and social and economic development in the disaster management cycle.



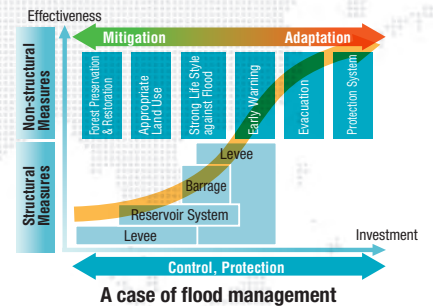
### 2. Continuity in Sectors

JICA promotes DRR efforts across all sector activities through mainstreaming DRR.



### 3. Continuity of the Implementation of Disaster Risk Reduction Project

In order to enhance the effectiveness of DRR efforts, JICA implements its programs with due consideration to the continuity and mutual links in all activities including structural and non-structural measures, capacity building of DRR administrative organization(s) and technical agencies, enhancement of capacity of human resources and organizations with technical cooperation, and implementation of practical development projects with financial cooperation at all levels of central governments, local governments and communities.



## JICA's five Development Strategic Goals

JICA is making efforts to integrate DRR across all sectors by "Mainstreaming DRR". At the same time, recognizing the strong link between stable development of developing countries and DRR, JICA sets out and is endeavoring to achieve five development strategic goals that aim at improving DRR activities and enhancing the developing countries' capacity for undertaking DRR activities at the national and regional levels.

The right figure shows how improved DRR activities through Strategic Goal 1 as the foundation and the four pillars (Strategic Goal 2 – 5) of the development strategic goals would contribute to sustainable development in developing countries.



## 2. JICA's Strategic Goals

### Strategic Goal 1

## “Establishment and Strengthening of Disaster Management System”

In order to build a disaster-resilient country or region, it is necessary to build a strong foundation for performing DRR activities. During the time of disaster as well as ordinary times, it is obvious that central and local organization's responsibility for DRR are playing important roles from the disaster experience of Japan. In terms of promoting “Mainstreaming DRR” that is the present trend in the DRR field, the establishment of the DRR system for a country or a region has become increasingly important. In concrete terms, JICA has been providing supports focusing on the following points; clarifying who (or which organization) is responsible for

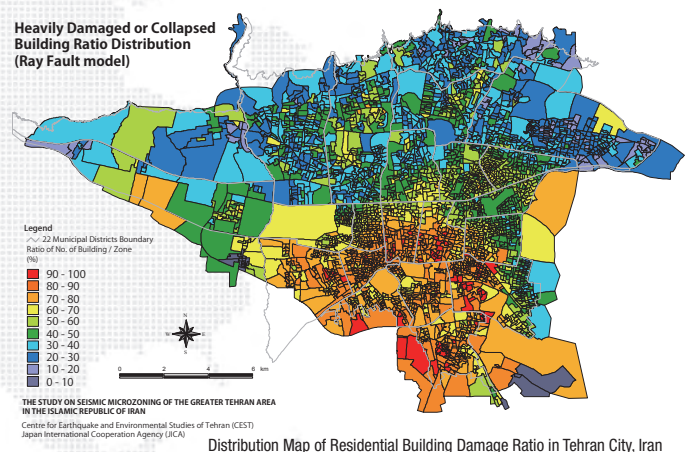
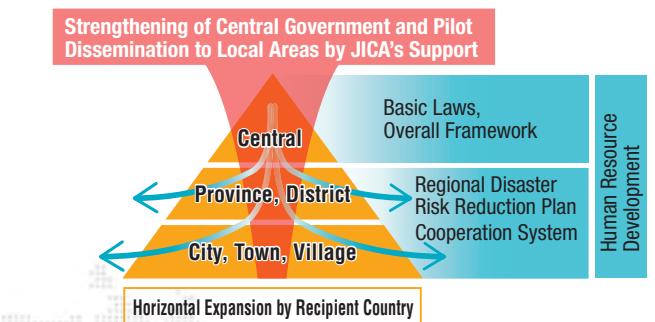
what in a country or region by improving basic laws related to DRR and establishing organizational structure responsible for DRR; strengthening DRR administrative functions of Central and Local government by formulating DRR plan of the country or regions and setting up building codes; to build cooperation system between public and private sector and among DRR related organizations; sharing disaster related information owned by each organization; promoting researches on DRR, and training personnel and engineers in the field of DRR.

### JICA involves in Various Activities ranging from the Preparation of a Country's Organizations and Systems to Human Resources Development of Local Municipalities

Activities at various levels are required to establish and strengthen the DRR system. JICA takes diversified approaches on all levels of DRR related framework, ranging from building central organizations and systems that become the base of overall framework and policies related to the development of human resources involved in practical DRR task and public services.

After the 2004 Indian Ocean Earthquake and Tsunami, Japan-Indonesia Joint Commission on DRR was established and capacity building project for the DRR in Indonesia was commenced. JICA implemented “The Study on Natural Disaster Management Plan (2007-2009, Development Study)” provided a support for the establishment of the Indonesian National Board for Disaster Management (Indonesian: Badan Nasional Penanggulangan Bencana (BNPB)) and provided a support for the preparation of the national DRR plan. Based on this national DRR plan, JICA assisted them in preparation of regional DRR plan in several provinces as pilot projects. Furthermore, JICA has been strengthening DRR capabilities with both top-down and bottom-up approaches by implementing DRR activities at a community level as a pilot scheme in accordance with the DRR plan and also by conducting feedback into matters to be considered for the nationwide expansion, and upgrading both regional DRR plan and national DRR plan by “The Project for Enhancement of the Disaster Management Capacity (2011-2015, Technical Cooperation Project)”

JICA also provided a series of support to Teheran Disaster Mitigation and Management Organization (TDMMO), such as the preparation of earthquake micro-zoning map supplying basic information for the preparation of the national earthquake DRR plan with “the Study on Seismic Micro-zoning of the Greater Tehran Area in the Islamic Republic of Iran (1998-2000, Development Study),” establishment of DRR system and framework at each step of prevention, response, recovery by “Comprehensive Master Plan Study on Urban Seismic Disaster Prevention



and Management for the Greater Tehran Area (2002-04, Development Study),” and review of the emergency response plan in Teheran under “the Project on the Establishment of Emergency Response Plan for the First 72 Hours after an Earthquake (2006-10, Technical Cooperation Project),” which made development of an earthquake damage estimation system, establishment of emergency response system at residents' level, and capacity building for emergency response after earthquake.

Country Name	Project Name	Implementation Period	Concerned Organization
Indonesia	The Study on Natural Disaster Management Plan	2007-09	The National Coordinating Board for Disaster Management
	The Project for Enhancement of the Disaster Management Capacity of BNPB and BPBD	2011-15	National Board for Disaster Management
Philippines	Disaster Risk Reduction and Management (DRRM) Capacity Enhancement Project	2012-15	Office of Civil Defense
Thailand	Project on Capacity Development in Disaster Management (Phase 1)	2006-08	Ministry of Interior, Department of Disaster Prevention and Mitigation
	Project on Capacity Development in Disaster Management (Phase 2)	2010-14	Ministry of Interior, Department of Disaster Prevention and Mitigation
Sri Lanka	The Disaster Management Capacity Enhancement Project	2006-09	Disaster Management Center
	The Disaster Management Capacity Enhancement Project Adaptable to Climate Change	2010-13	Disaster Management Center
Turkey	Capacity Development toward Effective Disaster Risk Management	2013-17	Prime Ministry, Disaster and Emergency Management Presidency



White paper for disaster management formulated by the project on capacity development in disaster management in Thailand

Correct understanding of disaster risk is prerequisite and fundamental for deciding on DRR measures. For the preventive and response actions to be implemented effectively, it is important that all stakeholders in the community including its authorities and residents, have common understanding on the risks. For example, DRR cannot function well without a system designed based on accurate risk evaluation and analysis, and we can hardly expect the reduction of casualties unless all residents take appropriate evacuation action during a disaster.

In policy and planning process, JICA approaches Strategic Goal 2 through risk assessment and analysis which aim to establish the correct understanding of disaster risk, preparation of hazard maps, economic analysis of the investment for DRR measures, and assessment of climate change effects. To identify regional disaster risk is an important element for the examination of DRR as prevention measures in development plan. Capacity building of community’s DRR activities and disaster education are specified as an attempt

for the enhancement of disaster risk understanding in a society. At the community level activities, it is important for generating effects to conduct activities by considering each condition, covering disaster characteristics, damage characteristics, social culture, etc.

As DRR plan sometime causes serious conflict among stakeholders, it is not always possible to make public the result of risk assessment. In order to disclose information on disaster risk, it is important to take into consideration how to promote correct understanding, whether or not the society is ready to accept risk information, and how to disclose the information so it can be accepted by the society.

JICA has been making efforts to achieve this goal through the implementation of various technical trainings in Japan and technical cooperation projects with the cooperation of local municipalities and communities that experienced the Great Hanshin-Awaji Earthquake Disaster in 1995 and the Great East Japan Earthquake in 2011.

**Promotion of Understanding of Risk to a Wide Range of People**

**School-based Disaster Education Project in Turkey**

When a disaster happens, all residents in the area has to take appropriate evacuation action. In particular, evacuation action in school is very important. As many children are in school during school hours, it is indispensable to secure the safety of children. Even if a disaster occurs outside of school hours, children’s appropriate action leads to the support for their family members. When considering the school’s function as a stronghold for DRR, disaster education in school plays a very important role. In the School-based Disaster Education Project in Turkey started in 2011, JICA implemented the preparation of disaster education teaching plan, conducted teacher training and aiming at disseminating correct knowledge of DRR from teacher to children and from children to family.

One of the important roles of disaster education is to promote people’s awareness of DRR in ordinary times. The project aimed to train participants with fun, “to be delightfully taught and delightfully learn,” and the training performed “Bear Caravan” that is the Turkish version of Japanese “KAERU Caravan” in which participants experienced the disaster prevention training learned from Japan. It is important for the promotion of disaster risk understanding to conduct not only activities for specialized DRR, but also other activities incorporated DRR elements.



Scene of Disaster Education



Teaching Materials prepared in Disaster Education

**More Precise Understanding of Disaster Risk**

**Chile Tsunami Disaster Risk Reduction Project (Science and Technology Cooperation)**

Although occurrence frequency is lower, once tsunami hits, it inflicts enormous amount of damage. Risk assessment for earthquake and tsunami is limited only to the range that re-examines assumed damage based on actual damage after the disaster. Thus, a great deal of time and budget are required for precise estimation of damage amount. On the other hand, it is necessary to take various measures based on the estimated damage amount (evacuation plan, technical criteria including structural design of buildings).

Through the science and technology cooperation project, “Research Project on the Enhancement of Technology to develop Tsunami-resilient Community,” scientists have proposed accurate tsunami simulation using the newest model and advanced observation method, and measures and technologies based on damage prediction, aiming for the improvement of laws and project development, and improvement of community DRR plan.

**Japanese Experience to the World**

**Development of Human Resources with the Cooperation of Disaster-experienced Local Governments**

Local governments are responsible for taking initial action for disaster response in Japan. In particular, local governments which experienced a mega disaster have accumulated knowledge on DRR. And how to develop human resources for DRR in national and local government is one of the biggest challenges in many developing countries. Thus, it has become increasingly important to work together with those local governments.

Under these circumstances, JICA established Disaster Reduction Learning Center (DRLC) in cooperation with Hyogo Prefecture that experienced the Great Hanshin-Awaji Earthquake with the aim to nurture human resources through training program on disaster risk reduction for developing countries.



Trainees participating in Local Emergency Drill

In order to protect human lives and mitigate damages on social, economic, and environmental resources from natural disasters, it is important to make preparations from ordinary times (preventive measures) so that disaster damages can be minimized even if a disaster occurs. JICA has examined the combination of preventive and mitigation measures from the both views of structural and non-structural measures for various potential disaster risk elements. With the objective of the formulation of development plan incorporating disaster risk reduction, JICA has been examining disaster risk reduction measures in each sector, and measures and policies considering disaster vulnerable people, poverty group, etc. (example: school reconstruction project in Indonesia). Furthermore, JICA has been examining hazard prevention measures such as flood prevention project, and risk

avoidance measures such as land use regulation, targeting the implementation of balanced risk reduction projects (example: Preparation of Integrated Flood Management Plan (IFMP) in Vietnam). In addition, JICA has been assisting in the creation of DRR culture including self-help, mutual help, and public help and the establishment of cooperation and collaboration mechanism between administrative sectors and private sectors targeting the improvement of DRR capability by multi-layered activities and independent-minded contribution and cooperation of private sectors for DRR. Pursuing further mainstreaming of DRR, JICA’s future challenge is how to incorporate the examination of disaster prevention and mitigation measures into various development projects, such as urban planning, land-use plan, transportation plan, etc.

**Flood Prevention Measures in Manila**

**Project Introduction: Flood Prevention Measures in Metro Manila, Philippines**

The Philippines is one of the countries that are most severely damaged by natural disasters. Metro Manila is the center of the politics, economy and culture of the Philippines, with a population of 12 million (in 2010). It accounts for approximately one-third of the country’s GDP, but it has suffered great economic and social damage from frequent floods every year.

The Philippine government has been making continuous efforts to mitigate this problem for more than 50 years, such as the formulation of flood control and drainage improvement plans and the implementation of projects based on those plans. Especially, since the Pasig-Marikina River is a river in Metro Manila that flows through a highly urbanized and heavily populated area, which is the center of administration and the economy, floods in the river basin have inflicted a tremendous amount of economic and social damage to the country.

Japan has provided support on a number of occasions for flood control projects in Metro Manila since a Japanese ODA Loan Project for flood control in 1973. In particular, the Manggahan Floodway, which was constructed under Japanese ODA Loan, has enhanced the safety level for flooding in the downtown area of Metro Manila by diverting flood water of the Marikina River to the Laguna de Bay. When the country was hit by Typhoon Ketsana (also known as Tropical Storm Ondoy) in 2009 whose return period was said to be approximately 100 years, the Floodway drastically reduced flood damage to the downtown areas along the lower reaches of the river.

Furthermore, the improvement of Pasig-Marikina River itself also started in 1999 under a Japanese ODA Loan Project, in which embankments and revetments are constructed or rehabilitated.

The construction work has been steadily carried out from the lower reaches of the river, thus contributing to enhanced flood safety level in Metro Manila.



**Well Balanced Structural and Non-structural Measures**

**Project Introduction: Formulation of Integrated Flood Management Plan in Vietnam**

Historically, the Socialist Republic of Vietnam (Vietnam) suffered from strong storms and floods every year. It is projected that more frequent flood damage may occur due to the effects of climate change. Repeated flood damage may greatly interrupt Vietnam’s long-term and sustainable economic development. JICA implemented projects for the enhancement of DRR capacity for floods in Huế Province, Quảng Nam Province, and Quảng Ngãi Province in the central part of Vietnam (2009-2012).

The formulation of IFMP with consideration of the effects of climate change was one of the important components of this project. Floods are greatly affected by various existing infrastructure and natural conditions. In order to mitigate damages caused by floods, synergetic effect of well-balanced measures for both structural measures such as dams and levees, and non-structural measures such as the preparation of hazard maps and reviewing of land use are needed. For IFMP formulation, other fields of experts including economic development, road development and urban development worked together to improve the development effects and enhanced the disaster prevention capability.

In addition, for the purpose of reducing regional economic loss by riverbank erosion, JICA implemented a test construction of small-scale, low-cost riverbank erosion protection works and prepared standard design and construction manual.



Test Construction of Riverbank Erosion Protection Works

**Earthquake Resilient Primary Schools**

**Project Introduction: Rehabilitation and Reconstruction Support for Schools as Stronghold in Indonesia**

In areas close to the seismic center, including Pedang, many buildings were destroyed by Indian Ocean Earthquake off Sumatra and Tsunami in 2004. 2,164 school buildings were destroyed and immediate rehabilitation and reconstruction were required. School buildings needed to have functions that can allow students a place to study at ease in ordinary times and that can accommodate local residents as a safe evacuation center during a disaster. Considering these situations, JICA provided supports for the construction of a seismic resistant model school building and the development of disaster-resilient community by implementing community disaster risk reduction activities in the school district. In addition, JICA prepared manuals on safe school building design and construction

management and made efforts for the improvement of earthquake resisting capability of school buildings. As a result, six primary schools and three secondary schools were rebuilt under the grant aid project.



Earthquake Resilient School in Indonesia



Training for earthquake-resistant countermeasure

In order to lower the impacts of natural disaster, it is desirable to make damage itself as small as possible by preventive measures. However, it is impossible to protect all areas from all disasters, and also there is a budget limitation to do so. For these reasons, in order to protect lives from a natural disaster, it is important to respond with better preparedness immediately before and after the occurrence of the disaster event. Response with better preparedness means to forecast the occurrence of natural disasters in early stage, quickly disseminate the forecast and warning information, appropriately alerts or evacuate people in accordance with the information and once a disaster occurs, immediately provide relief to victims and suffered areas (lifesaving, medical care and relief

supplies, etc.). JICA has been providing support for a series of preparedness and response capacity building, including support for the improvement of forecasting and warning capabilities of technical agencies (technologies and facilities, such as weather radar), information disseminating capability from central organizations to local municipalities and communities, enhancement of awareness of disaster risk, alert and evacuation system such as trainings for DRR and emergency response system.

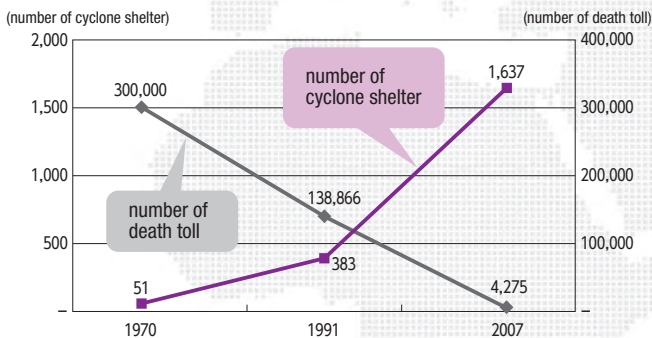
In addition to above, JICA provides emergency assistance to stricken areas including lifesaving activities such as dispatch of rescue and medical teams, support to disaster victims such as emergency relief supplies.

**Success Case of Dramatic Decrease in Damage Cyclone Shelters in Bangladesh**

Bangladesh suffers from cyclone and flood damages every year. When a large cyclone hits, tide level rises 5 to 6m by storm surge and maximum wind speed sometimes reaches 70m/sec and many lives, livestock, and properties are lost. In the coastal area along the Bay of Bengal, particularly vulnerable area, severe cyclone occurred in 1991 and deprived around 140,000 lives.

In many case when human lives are deprived, it is reported that many poor farmers and fishermen dwelling outside the levees are either swallowed by the storm surge, blown by the stormy wind, or directly hit by trees or galvanized sheets. In order to mitigate those cyclone damages, JICA built multi-purpose cyclone shelters at 117 locations and installed five weather radars that cover entire Bangladesh, with grant aid project by JICA. Many more cyclone shelters have been built either by aids from other countries or by Bangladesh’ s own funds. As a result, the number of victims inflicted by the same magnitude cyclone that occurred in 2007 drastically decreased as shown below:

**Construction of Cyclone Shelters and Change in Cyclone Victims in Bangladesh**



**Saved 5,000 People from Natural Dam Failure Failure of Natural Dam in Ambon Island, Indonesia**

In Ambon Island, a 110m tall large natural dam with approximately 15 million m<sup>3</sup> of lake water formed in July 2012. JICA dispatched an expert team and, based on the site survey result, proposed necessary measures to be taken to the Ministry of Public Works of Indonesia. Based on the proposal, the government of Indonesia monitored the condition of the dam body, confirmed information transmitting method, established alert and evacuation system, conducted evacuation trainings, and constructed a diversion channel. In addition, Public Works Research Institute of Japan conducted joint activities such as monitoring the lake water level.

One year after the natural dam formation, the dam broke in July 2013 and caused a large scale debris flow. With these assistances, people evacuated before coming the debris flow, it was possible to minimize the number of death toll among the approximately 5,000 of residents in the village located 2 km downstream of the dam.



Site Survey Scene in Ambon



Cyclone Shelter



Weather Radar

**Speedy Support to Affected Areas International Disaster Relief System**

Many lives and properties are lost in large-scale disasters, such as earthquakes, floods, etc., in various parts of the world. In particular, in developing countries, as their economic and social infrastructure is fragile, many of those countries suffer from a large amount of damages inflicted by natural disasters. JICA has established the International Emergency Relief System using Japan’s experience of variable disaster response and has been carrying out a large-scale relief activities in various parts of the world.

JICA’s international emergency relief activities include the Japan Disaster Relief Team that is dispatch of personnel, the provision of emergency supplies that is relief supplies and emergency grant aid that is financial aid.

The Japan Disaster Relief Team consists of rescue team, medical team, expert team, and Japan self-defense forces. Upon request, JICA dispatches

appropriate one or plural teams depending upon the type of disaster to the affected area. When typhoon Haiyan (Yolanda) hit the Philippines in November 2013, JICA conducted comprehensive support activities dispatching medical teams (three teams took care of approximately 3,300 people), two expert teams (helped early recovery and spilled-oil removal), and provision of supplies (tents, sleeping bags, plastic sheets, etc.) which contributed to the mitigation of disaster damages.



Activity of Medical Team (December 2013)



When planning recovery and reconstruction activities after disaster, JICA considers necessary to approach for rebuilding not to the same as before disaster but to a disaster-resilient society under the concept of “Build Back Better.” A practical approach to build a more disaster resilient society overlaps with JICA’s strategic goals 1 through 4, but takes into account the viewpoint of DRR at recovery and reconstruction stage after disaster. Consideration for DRR requires effort and cooperation of other sectors and people, such as increasing cost of each project and/or changes in land-use, so it is not always easy to conduct. However, if we do not make consideration for DRR after disaster, it will be almost impossible to build a disaster resilient society, once affected society is

recovered same as to the pre-disaster condition.

Based on the lessons of JICA’s past experiences that emergency relief and recovery activities were independently conducted with insufficient coordination, JICA has been making efforts to provide supports immediately after disaster and conduct seamless recovery activities and provide speedy support to meet the needs of the affected area. By taking into consideration the mainstreaming DRR, JICA is making efforts to increase the value of JICA’s support in addition to the seamless efforts by adding the strategy of recovery and reconstruction for more disaster resilient society.

**Speedy and Wide Variety of Assistance  
Response to 2011 Thailand Flood**

In response to the 2011 Thailand Flood of the Chao Phraya River that gave an extensive effect to world economy, as shown in the right figure, JICA has been providing a series of recovery and reconstruction assistance ranging from emergency relief, needs survey for recovery and reconstruction assistance, to restoration and reconstruction of a disaster-resilient society. JICA expert was the only foreign expert assigned to national strategy committee to decide national policy for reconstruction which was chaired by prime/deputy prime minister. For recovery and reconstruction assistance, JICA has been conducting cross-sectoral activities. JICA prepared accurate topographic maps, prepared the comprehensive flood management plan based on the topographic maps to protect important areas while allowing deliberate flooding mainly on farm lands, and prepared a guideline for building disaster-resilient farming and farm village in the agricultural sector. Furthermore, in response to the strong needs from industrial sector, JICA developed a flood inundation forecasting system. It is a unique system in the world that can forecast not only ordinary river-water level but also one-week ahead of flood inundation. In addition to these technical assistances, JICA made investment for DRR, such as strengthening of sluice gates and raising major roads.



2011 Thailand Flood Scene



Direct request for assistance by prime minister of Thailand

**Example of Recovery and Reconstruction Plan setting “Build Back Better” including the Perspective of DRR  
Typhoon Yolanda Disaster Emergency Recovery and Reconstruction Assistance Project in the Philippines**

Typhoon Haiyan (Yolanda), that was referred to as being historically unprecedented scale crossed Visayas, central part of the Philippines, on November 8, 2013 and inflicted extensive damages to nine regions out of the total of seventeen regions in the country (maximum speed of 312 km/h and storm surge height of 4 to 7m). It was reported that the typhoon caused the death toll of more than 6,000, damaged more than one million houses, and displaced more than four million people. The damages were the worst in the Philippine history.

provide assistance including technical advice based on Japan’s experience of the restoration of areas devastated by the Great East Japan Earthquake in 2011. The Project is not a mere recovery and reconstruction project, but is to assist a comprehensive process for early recovery and reconstruction of the afflicted areas and building a disaster resilient societies and communities based on Japanese experience and lessons. In addition, for the preparation of the recovery and reconstruction plan with the cooperation of local governments related to the Great East Japan Earthquake, JICA will examine restoration from the disaster and how to prepare preventive measures against similar disasters in the future and provide assistance for restoration and reconstruction of strong cities and regions. In disaster response, rebuilding of disaster victims’ lives will become a large issue. Thus, JICA focuses on the rebuilding of victims’ lives and builds steps continuously for the restoration of disaster victims’ lives in order.

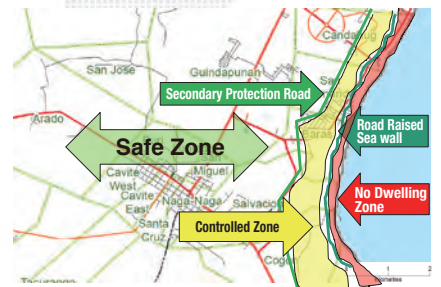
In response to the request by the government of the Philippines, the government of Japan dispatched the Japan Disaster Relief Medical Team and Expert Team and immediately conducted investigation for disaster condition and needs survey for recovery. JICA intensively discussed with high ranking official to embrace the concept of “Built Back Better” for sustainable reconstruction. Based on the survey results, the government of Japan is seamlessly connecting the assistant activities to the emergency assistance (development plan study-type technical cooperation) based on “Build Back Better” the concept of the Typhoon Yolanda recovery and reconstruction assistant plan.



Case of affected area of Leyte island, Philippines



Reconstruction assistance on YOLANDA by the government of Philippines



An example of concept of “Build Back Better”

Since February 2014, JICA has been implementing the Typhoon Yolanda Disaster Emergency Recovery and Reconstruction Assistance Project in the Philippines as an emergency recovery project. The government of the Philippines expects Japan to

# 3. Toward DRR mainstreaming

## Considerations for DRR

Having analyzed a linkage between “DRR” and “sustainable development”, JICA concluded that: ① investment in DRR contributes to sustainable development and poverty reduction, ② intermittent updates on DRR-related frameworks and continuous investment in DRR support economic development and ③ realizing sustainable development requires incorporation of DRR into development.

Based on the above conclusion, JICA assumes that disasters come in all sizes, and develops and implements risk reduction comprehensively and continuously throughout all development phases in all fields to build resilient societies. By doing so, JICA aims to protect people against disasters and

work towards sustainable development and poverty reduction. To be more specific, like other ongoing cross-sector efforts such as gender, environmental and social considerations, JICA aims to incorporate DRR into planning of all JICA-led projects. In addition, incorporating DRR into all project implementation processes may help related parties grasp disaster risks accurately, prepare multi-layered DRR measures to be prepared for disasters larger than previously thought, improve DRR to adapt to disaster risks that may change over time, and establish a framework in which to build disaster resilient societies.

### Consideration for DRR in formulation stage

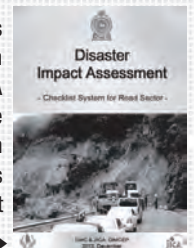
A grant aid for “Educational Facility Development Plan for Nueva Segovia Province in Republic of Nicaragua (Nicaragua)” was requested by the government of Nicaragua to improve primary school attendance rate and learning environment in northern mountain area in Nicaragua. JICA incorporated DRR considerations into this project. In conducting a feasibility

study for the project, JICA included in its research items “river survey/flood control”, “sediment control” and “anti-earthquake procedures, or items not to be usually checked in JICA’s educational projects. JICA also assessed natural disaster risks in the locality, based on the scientific data, and examined the land and structure of the educational facilities.

### Disaster impact assessment for infrastructure development

While Democratic Socialist Republic of Sri Lanka (Sri Lanka) has been developing the infrastructure such as roads and harbors/ports in recent years, many cases of disasters caused by these development activities are reported. Therefore, it is required to assess disaster risks that may occur in a development project beforehand and take appropriate actions to reduce the risks, if any. JICA supported the establishment of a Disaster Impact Assessment (DIA) system in a DRR project for the country’s road sector. A DIA checklist was introduced to assess appropriateness of natural disaster

control measures, designs and construction methods (disaster management, design and inspection) in infrastructure development projects. In addition, JICA helped the sector keep records of disasters to become prepared for future. The government of Sri Lanka has been working to institutionalize the DIA system, which was first introduced in bureau of public road, in all development projects.



DIA checklist ▶

### Typhoon Resistant Hospital

#### Aurora Memorial Hospital in the Philippines

Aurora Province locates in typhoon prone Central Luzon (Region 3). Annually two or three typhoons land the area. Roads are often cut off during the typhoon season and residents do not have access to sufficient medical cares.

JICA provided assistance to build a new hospital and provide medical equipment so that operations and medical care can be provided even during a disaster.

Special attentions were paid to overcome the effects of strong typhoons; Hospital building was designed to be wind resistant by applying building style of Okinawa

(typhoon prone islands in Japan) Also, the floor is raised up to refrain from inundation. When strong typhoon Yolanda hit the area in 2013, damages to Aurora Hospital was small and the hospital was able to provide medical services as usual.



Aurora Memorial Hospital

### Ecosystem-based DRR (Eco-DRR)

【Enhancement of Disaster Prevention along coast through Mangrove Rehabilitation in Republic of the Union of Myanmar (Myanmar)】 Given the increasing frequency of meteorological disasters, such as sea level rise and unusual typhoons due to climate change, and coast erosion, land slide, soil runoff and tsunami due to earthquakes, JICA has been working to strengthen the role of forests in reducing disaster risks in developing countries. The cyclone that hit the country in May 2008 left significant damages to the residents in the affected area, although mangroves planted along the coast helped mitigate the damages to a certain extent. Following the disaster, JICA conducted a survey on damages from the cyclone and prepared a hazard map to reinforce the positive role of mangroves in decreasing disaster risks. In 2012, JICA started planting mangroves (1,154ha) and constructing a cyclone evacuation facility with a tower to monitor the forest.



Mangrove rehabilitation

### Subway Operation even during Flood Time by Proactive Measures

#### Bangkok Metro Blue Line in Thailand

Metro Blue Line, an important transportation means for the citizens of capital Bangkok, started its operation in 2004. The Blue Line’s project study and construction were assisted by Japan. As Bangkok is located in a flood-prone area, metro entrances were made higher than the ground level. In addition, various flood protection measures were taken including; Water shielding boards were installed at the metro entrances to prevent water entering the subway; Ventilation holes were installed at high elevation; Drainage pumps were installed. Operation procedure made to close metro stations depending on flood level for safe operation of the public transportation system. During 2011 Thailand floods, although many roads and airports were closed, Blue Line could continue its operation even at submerged areas.



Blue Line Entrance

## Collaboration with a research institute - Science and Technology Research Partnership for Sustainable Development - (SATREPS)

Implementing appropriate DRR initiatives smoothly requires research institutes' technologies and knowledge, disaster data collection based on scientific data, their monitoring and analysis to grasp disaster risks.

JICA, in collaboration with Japan Science and Technology Agency (JST), conducts "Science and Technology Research Partnership for Sustainable Development (SATREPS) program". SATREPS is not a unilateral technology transfer from Japan to developing countries, but is a program in which researchers in both Japan and developing countries work together to create

new technologies adapted to specific natural environment, and to address issues by applying the technologies and knowledge to local and global society. SATREPS projects regarding DRR include: research to enhance technology for monitoring of earthquakes and tsunami, research on technology for monitoring volcanoes and reducing volcano-related risks, and efforts towards preparing comprehensive DRR plans and providing DRR education. Research institutes in Japan and developing countries are working together in these projects to tackle with global issues.

### "Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines"

Like Japan, the Philippines is subject to earthquakes and volcano eruptions. National Research Institute for Earth Science and Disaster Prevention (NIED), Japanese research institutes and The Philippine Institute of Volcanology and Seismology (PHIVOLCS) conducted a joint research on ① estimation of ground shaking and damage in the Philippines by installing real-time networks of broadband seismometers, strong motion accelerometers, and seismic intensity meters; ② evaluation of the potential of large earthquakes by measuring crustal deformations (in and around Mindanao) and ③ detecting and predicting the activity of underground magma through real-time monitoring of earthquakes, crustal deformations and electromagnetism at volcanoes.

The joint research progressed smoothly, and earthquake and volcano disaster information collected in the above activities is published on the internet website. In addition, during training in Japan, based on the findings from inter-

views with the Filipinos affected by the 2011 Great East Japan Earthquake, educational materials were prepared in form of cartoon to communicate their experience to younger generations. Efforts are being made to enhance awareness of DRR among the residents and children in the locality.



Cartoon prepared to disseminate their tsunami experience

## Utilization of local governments' and civil societies' experience and knowledge on Disaster Management(DM)

In Japan, local governments are at the frontline for DM. In peace time, the local governments prepare and revise their DM plans, conduct disaster prevention training in collaboration with voluntary disaster prevention organizations, prepare for future disaster, disseminate warnings and evacuation information to citizens. Once a disaster has taken place, the local governments set up and operate evacuation shelters, support the affected persons and make efforts in disaster recovery. These activities are supported by technologies and expertise owned by civil societies, including private companies, universities and nonprofit organizations (NPOs) in Japan.

JICA makes use of the technologies and expertise owned by local

governments, universities and NPOs, for reducing disaster risks overseas through its technical cooperation at the grass-roots level and training projects. In the field of disaster risk reduction and prevention, JICA is making efforts to assist developing countries in; enhancing their DM including response capacity by sharing on the local governments' experiences; promoting community DRR activities by local governments, disseminating voluntary DRR activities; making DRR efforts in collaboration with parent-teacher association (PTA); disseminating school-led community DRR by making use of universities' and NPOs' knowledge; and preparing comprehensive assistance policy for disabled and other vulnerable people in natural disasters.

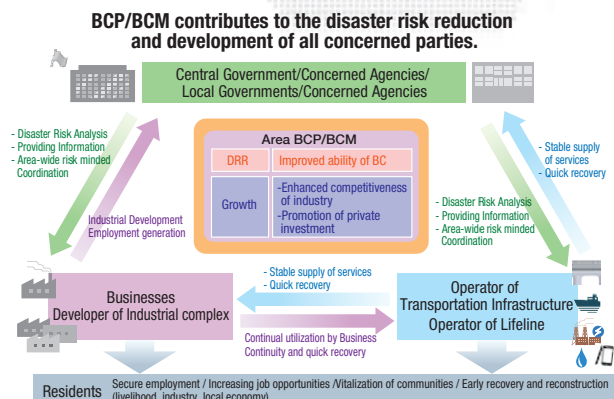
## Inclusion of Private Sector in Disaster Risk Reduction Area BCP/BCM

Occurrence of the Great East Japan Earthquake in 2011 (occurred on March 11, 2011) and the Flood of Chao Phraya River in Thailand in 2011 inflicted tremendous amount of damages to many industries and their operation because of lack of electricity and water supplies, severed roads and communication networks and caused not only direct damages but also huge amount of losses of the local and national economy. It has been strongly recognized that the risk of business stagnation by the disasters and disaster damages itself affect not only to the economy of local areas and countries but also world economy.

As a large scale disaster stops the functions of key infrastructure, there is a limit for each enterprise to prepare for countermeasures. In addition, for local and national government, damages to key industries are a big issue related to employment, tax revenue, and the reliability of the country and local areas. For this reason, it is necessary for government, infrastructure operators and private sectors closely cooperating to manage disaster risk and take countermeasures for DRR.

The Area BCP (Business Continuity Plan) designates a framework and direction of coordinated damage mitigation measures and recovery actions of stakeholders including individual enterprises, industrial area managers, local authorities and administrator of the infrastructures in order for business continuation of area-wide economy such as industrial agglomeration or urbanization.

The Area BCM (Business Continuity Management) then is defined as a cyclic process of disaster risk assessment, sharing risk and impact information, determining common strategy of risk management, developing the Area BCP, implementing the planned actions and monitoring to self-improve the Area BCM System recurrently in coordination among stakeholders, in order to enhance the capability of effective business continuity of the area.



## Gender and DRR

In the event of a natural disaster, it is imperative for every member of the community to take proper action to reduce damage from the disaster. On the other hand, members to be affected by the disaster may differ, depending on time and place of the disaster occurrence. For instance, when a disaster happens in an agricultural village during the daytime, those who are at home are often women, elderly people and children, rather than adult males. Therefore, women and older children play a key role in assisting others in evacuation, and the importance of their role is pointed out in many regions. In order to address the needs of the disaster-affected people, it is imperative to incorporate considerations for women into activities in the recovery and rehabilitation/rehabilitation phase following a disaster. It is pointed out that whether or not shelters or emergency medical facilities are operated with special considerations for women results in differences in utilization rate of the facilities in women compared with men. Incorporating considerations for women into restoration phase at the early stage is important for the subsequent reconstruction/rehabilitation phase to ensure that psychological and emotional support are provided for the affected people, prevent imbalance of support among beneficiaries and ensure fairness among them. Following the 2011 Great East Japan Earthquake, JICA offered its Nihonmatsu Training Center in Fukushima prefecture as an emergency shelter, and actually understood the importance of special considerations in operating the emergency shelter.

Women play an important role in DRR. In order to use their ability and

knowledge to the full in DRR and disaster reconstruction/rehabilitation, women should participate in preparing policies and plans on DRR and disaster reconstruction/rehabilitation, so that they reflect women's opinions. Furthermore, efforts to enhance women's capability should be made through training and education to enable them to participate in decision making process concerning DRR and disaster restoration and recovery. JICA incorporates considerations for women in its cooperation activities (e.g. to curtain off a part of a room in emergency medical facility, to provide space exclusively for women and conduct training for women and evacuation drills at the convenient time for women.)



DRR workshop for women in "the Strengthening Community-based Disaster Risk Management Project in the Pacific Region"

## Disability and DRR

Those who are hard to receive a warning in the event of a disaster and those who are hard to protect themselves against the disaster after the receipt of the warning are considered as "people vulnerable to disasters", who include people with disabilities, elderly, children, foreigners and travelers. For instance, wheelchair users may have difficulty with emergency evacuation, and people with visual or hearing impairments and people with intellectual disabilities may have difficulty with access to DRR information. In the 2011 Great East Japan Earthquake, people with disabilities were killed almost twice as many. Even in shelters, vulnerable people faced various issues, such as a lack of barrier-free access and adaptation to environment where many people live in a limited space.

In collaboration with JICA's technical cooperation at the grass-roots level, "community based adaptation and resiliency against disasters in Iloilo City, the Philippines" and Japan Overseas Cooperation Volunteers dispatched to disabled people's groups in the same city, representatives of disabled peoples' groups participated in the process for planning the city's DRR, in which they voiced their opinions as to ways to operate a shelter in the event

of a disaster. In addition, a map indicating addresses of people with disabilities/special needs was drawn to be prepared for disasters.

As a result, when Typhoon Haiyan (Yolanda) hit the country in November 2013, emergency supplies were distributed promptly to the people with disabilities/special needs in the affected area, since the contact information on the people with disabilities/special needs had been made available to leaders of the disabled people's groups in the affected area beforehand through the disabled people's groups' cooperation. Furthermore, while the disabled people themselves delivered emergency supplies to the group members, support was given not only to the people with disabilities, but also to the hard-to-reach people such as single mothers.



Barrier-free training

## Climate change

Climate change is a global common issue. The Fifth Assessment Report published in 2014 by the United Nations Intergovernmental Panel on Climate Change (IPCC) writes that warming of the climate system is unequivocal and that climate change is projected to amplify existing climate-related risks and create new risks for natural and human systems.

Generally, the term "measures against climate change" may remind you of "mitigation measures" to reduce greenhouse gas emissions and prevent global warming itself. However, "adaptation measures" to mitigate and prevent the impacts of climate change on human society is also equally imperative. As global warming progresses, extreme weather events such as heat wave/cold wave, heavy rain and draught are expected to increase. These changes, coupled with sea level rise, increase hazards that cause disasters, such as flooding and high tide. Therefore, more efforts and control measures are required to reduce adverse effects of disasters.

JICA's efforts to contribute to climate change adaptation measures include: installment of meteorological observation devices like ground based radars, flood control including river improvement, landslide control measures, coastal erosion control, installment of early warning system, establishment of emergency evacuation shelters and human capacity development in these fields.

Many of these disasters already exist and pose problems to many countries. Taking appropriate control measures may mitigate adverse effects of these disasters if and when climate change should increase the magnitude of hazards in future. On the other hand, since it is difficult to quantitatively calculate an increase in hazard and uncertainty caused by climate change, the design scale of adaptive measures against climate change needs careful consideration.

As explained earlier, to reduce the effects of a disaster, disaster preparedness and investment in DRR are imperative. However, an unexpected large disaster will cause severe damages to wider areas. In such a case, disaster recovery and reconstruction/rehabilitation require large amounts of expenditure, which may not be covered by state budgets.

In order to meet financial needs for a fast emergency response, JICA provides funds through “Stand-by Emergency Credit for Urgent Recovery (SECURE)”, or a normal yen loan to finance its action of recovery and reconstruction/rehabilitation after the disaster. In addition, JICA supports the introduction of disaster insurance to disperse disaster risks, thus reducing adverse effects of a disaster.

## Stand-by Emergency Credit for Urgent Recovery(SECURE)

Japan’s assistance in the emergency relief phase in immediate aftermath of a disaster in developing countries includes the dispatch of international disaster relief teams and the provision of emergency supplies. Its assistance in the reconstruction/rehabilitation phase includes assistance for infrastructure development. However, Japan had provided no support in the recovery phase that connects emergency phase to reconstruction/rehabilitation phase. In the recovery phase, temporary financial needs arise for temporary supply of fuels, temporary housing, emergency repair and recovery of disaster-damaged roads, waterworks and hospitals, etc., and debris removal. Stand-by Emergency Credit for Urgent

Recovery (SECURE) was introduced to promptly meet these financial needs. Procedures for SECURE are as follows: Prior to occurrence of a disaster, an agreement is signed on an estimated amount of funds required and purposes of funds, etc. Once a disaster has occurred, loan is provided at the agreed amount without delay in response to a request from developing countries. Prior to signing an agreement for the provision of the Stand-by Credit, they are required to agree on DRR capacity enhancement through JICA’s technical cooperation, and it is expected to produce a beneficial interaction between technical cooperation and loan assistance.

## Weather index insurance and agricultural insurance

In “Rural Resilience Enhancement Project” in Federal Democratic Republic of Ethiopia (Ethiopia), a weather index insurance scheme for farmers in low rainfall areas was introduced as a pilot project. Farmers participating in the scheme receive a payment if the rainfall index level falls below a previously agreed threshold. In addition, in JICA’s “Project of Capacity Development for Climate Change Strategies” in Republic of Indonesia (Indonesia), JICA helps to enhance related parties’ understanding of the agricultural insurance to cover farmers’ losses from total harvest failure (\*), which was implemented by the country’s Ministry of Agriculture. Through these efforts, JICA helps the country’s farmers against risks arising from climate change and climate-related disasters.



Climate index insurance is sold to farmers

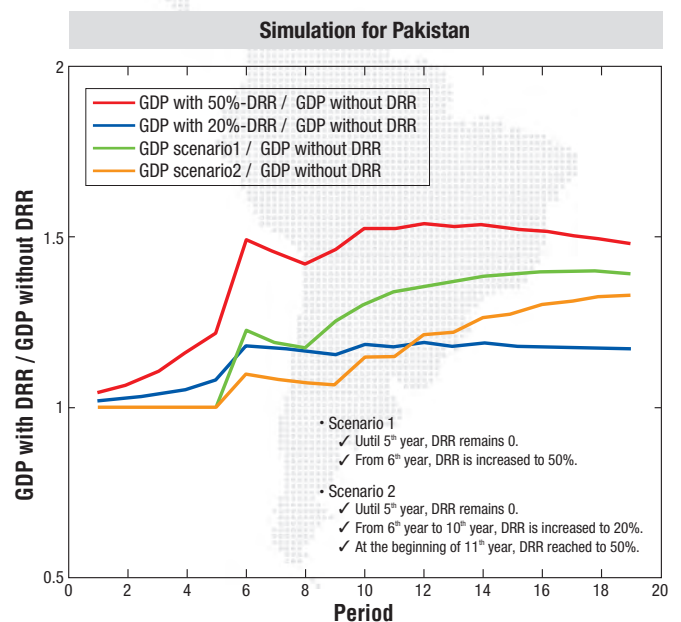
(\*) a scheme to compensate farmers for the damages to farm produce due to climate and other factors

# Economic effect of investments for DRR

## Economic Simulation Model (DR<sup>2</sup>AD) for Investment for Disaster Risk Reduction

The government of Japan placed the investment for DRR as a priority issue and continued prior investment and, as a result, reduced the death toll caused by natural disasters as described above section. However, there was no quantitative explanation about how the prior investment affects to the economic development process with and without DRR countermeasures.

Consequently, the prior investment was only 3.6% of the total amount of investment for DRR during 1980 through 2009. People went through human sufferings and economic damages and then sustainable development of the disaster affected countries was often cut off. In order to end this negative spiral of poverty and disaster, try to implement DRR measures prior to the occurrence of disaster, and, as a consequence, minimize disaster damage, it was necessary to clarify the effectiveness of the investment for DRR. Thus, JICA has developed an economic simulation model, DRR Investments Accounts for Development (DR<sup>2</sup>AD) and is still trying to improve the model for putting it to practical use. DR<sup>2</sup>AD is a useful tool for explaining the effects of prior investment for DRR to decision-makers in developing countries, senior officers of the ministry of finance, and international communities. JICA would like to contribute to the promotion of mainstreaming DRR by accelerating the concept of the prior investment for the DRR in each country.



# 4. Experiences of Japan's disaster management and their dissemination to the world

## Transit of investment for DRR and its effect in Japan

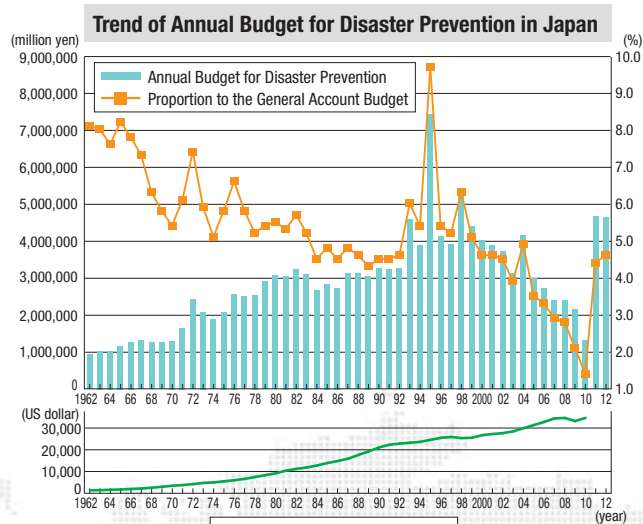
### Transitions in Budget for Disaster Risk Reduction in Japan

Japan has been allocating a large proportion of budget among the general account budget for DRR over the years. The graph shows that Japan has been promoting DRR through prior investment. Particularly, in the wake of enormous amount of damages inflicted by the Great Hanshin-Awaji Earthquake (occurred on January 17, 1995) and the Great East Japan Earthquake and Tsunami (occurred on March 11, 2011), Japan has been building disaster-resilient communities and stable country while securing necessary funds for emergency response and recovery after disaster. Furthermore, Japan has emphasizes non-structural measures, such as disaster education and community-based disaster risk management, and, as a result, disaster-resilient culture is being fostered within the country, rural areas and communities through continuous activities to uplift DRR awareness during ordinary times. Japan is making continuous efforts for the realization of a disaster-resilient country.

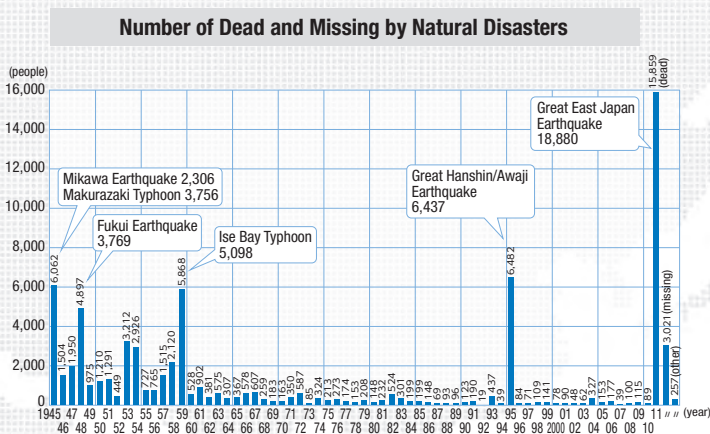
### Progress of Reducing Damage by Disaster in Japan

The government of Japan has continuously implemented both structural and non-structural measures for DRR over the long term by making prior investment. Severe disaster mainly earthquake and typhoon frequently happened which took over 1,000 people's life from in the late 1940s and 1950s. Since then, systemic reforms and prior investment for DRR have been implemented at every disaster which decreased the number of death and missing was dramatically.

Though the Great Hanshin-Awaji Earthquake in 1995 caused 6434 deaths and 3 missing and main cause of death was crushing death by collapsed buildings. Even the Great Japan East Earthquake in 2011 caused nearly 20,000 deaths and missing, number of collapsed building could minimize by earthquake because of the effort for enhancing earthquake safety after 1995. Unexpected height of Tsunami, however, attacked and brought severe damages. We, Japanese, have a renewed sense of the importance of preparation for unexpected scale of disaster based on the experience in 2011. JICA strengthens dissemination of lesson from mega disasters to the entire world.



(Source) the Cabinet office



(Source) White Paper on Disaster Prevention for 2012



Permeable Sand Control Dam under Rokko Sabo Office, Kinki Regional Development Bureau, MLIT



enclosing bund in Iwate Prefecture

## Experience of the Great East Japan Earthquake in 2011

Based on the analysis and verification results regarding damages by the Great East Japan Earthquake in 2011, the government of Japan rebuilt the disaster management measures for earthquakes and tsunamis. While gravely acknowledging the fact that this disaster event caused damage greatly exceeding the pre-disaster damage estimate, the government drastically rebuilt the pre-disaster damage estimate and approach to DRR. For relatively frequent tsunamis that had occurred at intervals of years ranging from several decades to one hundred and several decades, Japan's DRR aims to protect human life, assets, various industrial and economic activities and land by structural measures like coastal levees, and for largest-possible tsunamis that is expected to occur once in 1000 years, like the Great East Japan Earthquake in 2011, the country's DRR aims to mitigate the tsunami damage by taking a "multi-layer countermeasures" approach in which structural measures and non-structural measures are utilized to the full, including designation of exclusion areas and land use-restricted areas in coastal region, construction of infrastructures including raised roads as well as evacuation of residents, in accordance with a 'disaster reduction' philosophy that focuses on minimizing damage.

With this policy, the government is preparing a framework in which to allow for smooth evacuation and the related rules, and is making efforts to build more resilient societies against earthquake and tsunami and prepare countermeasures to enhance awareness of tsunami risk reduction. Having learnt lessons from the 2011 Great East Japan Earthquake, JICA focuses on three points, 1) multiple countermeasures (redundancy), 2) risk communication and 3) improvement (regular update of control measures). JICA incorporates these lessons learnt into its DM assistance policy and provides assistance to help developing countries become more resilient to disasters, while paying attention to their cultural and social background.

In addition, JICA shares lessons learnt and examples from the 2011 Great East Japan Earthquake with DM-related administrators through technical training program conducted by JICA. From April 2012 to March 2014, a total of 2,419 participants visited the affected areas for lectures and field study. Through these activities, JICA disseminates lessons learnt and points of note to DM-related organizations around the world, for instance, the importance of DM education in peace time and a route clearance operation started immediately after the disaster for emergency rescue operation through "road clearance" works (Operation "Teeth of a Comb") which was realized by pre-existing agreement signed between administrators and private groups beforehand, cooperation agreements on disaster management signed between local governments and private companies before the disaster occurred, lessons learnt from emergency responses as exemplified by Disaster Medical Assistance Team (DMAT) which effectively performed

wide-area patient transfer; community participation in the planning process for recovery and reconstruction/rehabilitation and communication; and collaboration with universities and NPOs.

In response to Typhoon Haiyan (Yolanda) that hit the Philippines in November 2013 and caused significant damage to the country, JICA provided emergency relief and assistance for recovery and reconstruction/rehabilitation. Putting the lessons learnt from the Great East Japan Earthquake to good use, the Philippine government formulated a Yolanda Recovery and Reconstruction Plan to "build back better" communities and infrastructure.

JICA, in collaboration with Higashi-Matsushima city affected by the 2011 Great East Japan Earthquake, is working to contribute to the locality through "earthquake disaster reconstruction/rehabilitation". Specifically, JICA held training sessions in Higashi Matsushima city for government officials of Banda Aceh, Republic of Indonesia, to share experiences in disaster recovery and reconstruction/rehabilitation in the both countries, as the city was affected by the 2009 Sumatra earthquake and the 2004 Indian Ocean earthquake and tsunami. In response to Typhoon Haiyan (Yolanda) in the Philippines, four persons, including municipal employees of Higashi Matsushima city, participated in JICA-led early recovery and reconstruction/rehabilitation assistance. They told about their efforts towards rebuilding the local communities affected by the Great East Japan Earthquake to the Philippine government-related organizations, and also offered advice to them on importance of demarcation between central and local governments from the municipality's point of view.



Training for participants from Banda Aceh at Higashimatsushima City Office

### Disseminate experience from the 2011 Great East Japan Earthquake to the world

#### - learn lessons from the efforts by *Sanriku* -

In the 2011 Great East Japan Earthquake, thanks to local DM efforts and education for DM, many lives were saved. In addition, various efforts are being made in recovering from the 2011 Great East Japan Earthquake, including separation and recycling of large amounts of debris from the earthquake and tsunami as resources, new attempts to restore agriculture and fishery sectors, and reconstruction/rehabilitation to build more resilient societies.

The knowledge and expertise gained through the earthquake can be used for reducing disaster risks in foreign countries. JICA shares these efforts by the local governments and private sectors in the coastal regions with DM-related parties in foreign countries. Through eyes of participants in training/projects, Japan's steady recovery from the disaster has been disseminated, and this helps international DM-related parties learn from Japan's experience to establish a DRR framework in their countries. In addition, some of the disaster-affected people voiced that they were encouraged by the foreign trainers' visits.

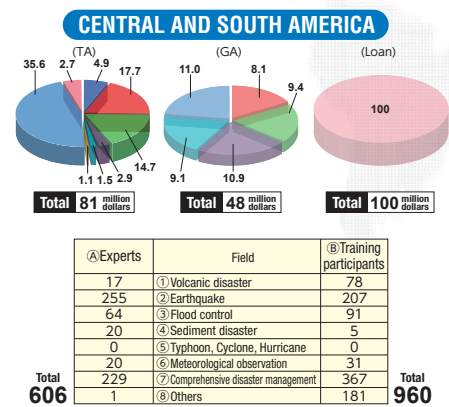
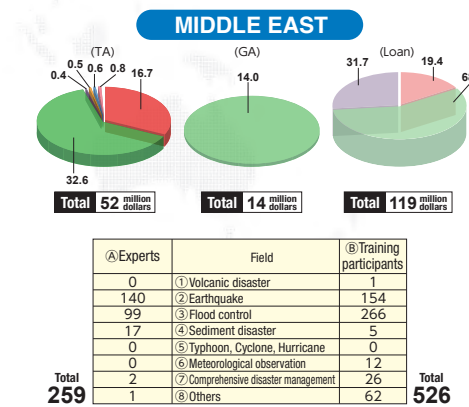
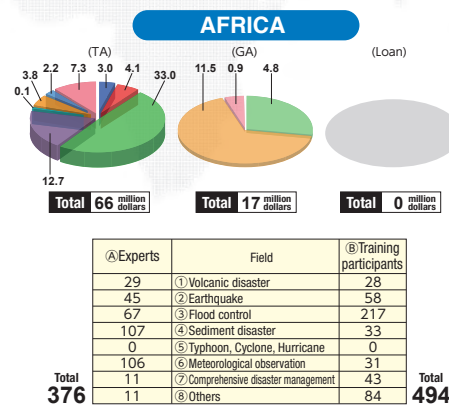
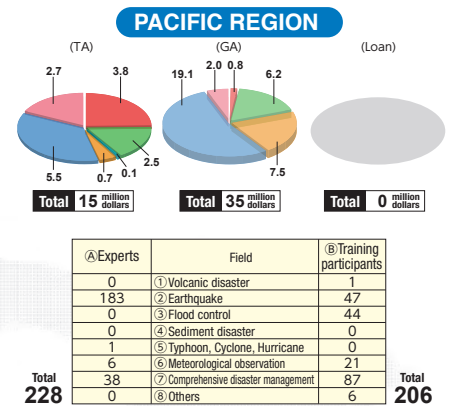
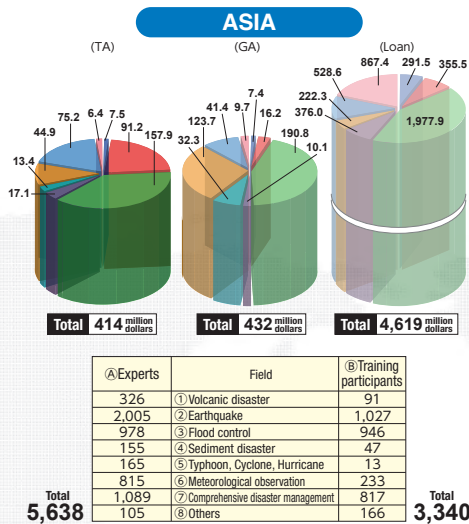
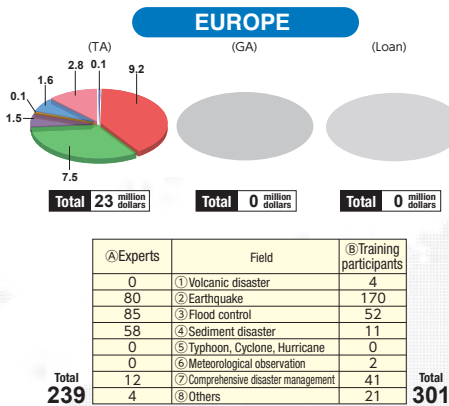
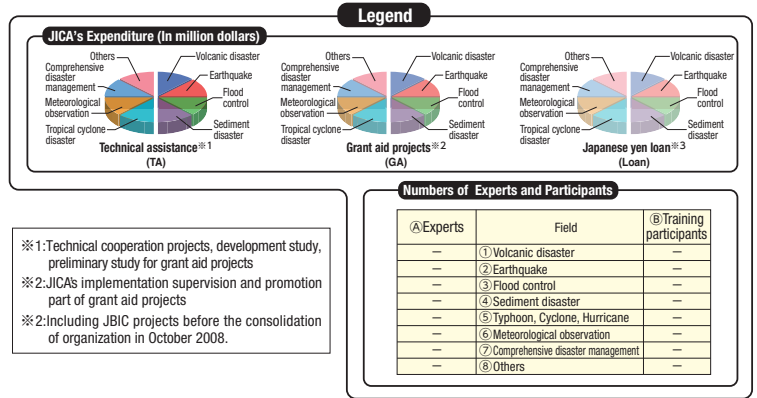


Trainees learning recovery efforts in Miyako city, Iwate prefecture

# JICA's Assistance at a glance

## JICA's Assistance in DRR (2004 through 2013 Fiscal Years)

For the DRR projects conducted during 2003 through 2012 fiscal years, (1) the amount of money spent (technical cooperation, JICA's supervision and promotion portion of technical cooperation and grant aid cooperation and grant aid cooperation of the Ministry of Foreign Affairs, paid financial assistance cooperation); (2) number of persons (number of dispatched experts and training participants), total number per each type of disaster measures and per each region.



### The Amount of Money spent

Total amount of money spent for technical cooperation in the disaster risk reduction was 67.7 billion yen including 2.7 billion yen for non-regional assistances; 41.4 billion yen (61.1%) in Asia, 8.1 billion yen (12.0%) in Latin America and the Caribbean, 6.6 billion yen (9.8%) in Africa. As for disaster type, 25.3 billion yen (37.4%) was for flood related projects, 14.5 billion yen (21.5%) for earthquake related projects, 12.4 billion yen (18.3%) for comprehensive disaster risk reduction related projects.

Total amount of JICA implemented supervision and promotion portion of grant aid projects was 54.7 billion yen; 43.2 billion yen (78.9%) in Asia, 4.8 billion yen (8.9%) in Latin America and the Caribbean, 3.5 billion yen (6.5%) in Pacific Region. As for the type of disaster risk reduction, 22.5 billion yen (41.2%) was for flood related projects, 14.3 billion yen (26.1%) for meteorological observation projects, and 7.1 billion yen (13.1%) for comprehensive disaster risk reduction related projects.

Total amount of paid Japanese yen loan was 483.8 billion yen. As for region, overwhelming amount of 461.9 billion yen (95.5%) was in Asia and the next was 11.9 billion yen (2.5%) in Middle East, and 10.0 billion yen (2.1%) in Latin America and the Caribbean. As for the type of disaster, 204.6 billion yen (42.3%) was for flood related projects, 96.7 billion yen (20.0%) was for others, and 52.9 billion yen (10.9%) was for comprehensive disaster risk reduction related projects.

### Number of Dispatching Experts

Total number of dispatching experts in the disaster risk reduction field was 7,346. As for dispatched region, 5,638 experts (76.7%) were in Asia, 606 experts (8.2%) in Latin America and the Caribbean, 376 experts (5.1%) in Africa. As for disaster type, 2,708 experts (36.9%) were for earthquake related field, 1,381 experts (18.8%) for comprehensive disaster risk reduction field, 1,293 experts (17.6%) for flood related field.

### Number of Training participants in Japan

Total number of training participants for the disaster risk reduction training was 5,827; 3,340 participants were from Asia and were 57.3% of the total number of participants. 960 participants (16.5%) were from Latin America and the Caribbean, 526 participants (9.0%) from Middle East. As for the type of disaster, 1,663 participants (28.5%) were in earthquake related field, 1,616 participants (27.7%) in flood related field, 1,381 participants (23.7%) in comprehensive disaster risk reduction field.

Note: Total figures may not correspond to actual figures due to round off.

