

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





Relationship between Socioeconomic Development and Disaster Risk Reduction

National and local budgets are allocated in accordance with each country's or local government's priorities such as project to stimulate socioeconomic development, food securities, education, health sector, etc. However, in reality, any fund allocated to disaster risk reduction (DRR) is regarded as costs and the adequate portion of DRR projects is not clearly indicated in the national or local budget. In particular, this tendency is particularly noticeable in developing countries where the appropriation for DRR is often small. Consequently, the funds for disaster prevention is not used for natural disaster prevention and mitigation, and only spent on response after the disaster, such as saving lives, distributing relief supplies, and other disaster recovery activities.

Unfortunately, once a disaster does occur, society loses not only human lives but properties and assets built by individuals and private companies and precious time and chance for various new developments as well. Moreover, significantly large amount of funds will be required as emergency response, recovery and reconstruction after the disaster. In addition, a disaster such as water related hazard which has high probability of occurrence tend to hit same area and damages people repeatedly. And as a result, it deprives people of opportunities of economic growth and makes it difficult to break away from the cycle of disaster and poverty. Nevertheless, budget is not allocated sufficiently for DRR programs which could prevent damages before occurring or minimize disaster damages. Although there are many reasons for this poor allocation of the budget, namely, development priorities strategy and social as well as cultural backgrounds of each country, there is an important reason that needs to be pointed out; difficulty of setting up an index for evaluating DRR effects and targets (for example, school attendance rate or literacy rate in education field); difficulty in quantitatively showing how much prior investment for DRR projects contribute to the country's sustainable development and further to GDP figure, etc. This can be the reason that budget for prior investment for DRR which contributes to ensure the sustainable development is less likely to be allocated.

In order to make the return of prior DRR investment for DRR visible, JICA, therefore, has developed an economic simulation model (DR²AD Model, see page 9) which can quantitatively assess effect of the DRR to the growth of GDP. The DR²AD Model can quantitatively show the effect of disasters which occur at different levels of scale and frequency to the long-term economic growth. Moreover, it is designed to show that how the effect of the disaster risk is to be suppressed by investment for DRR. JICA expects that the utilization and application of the model will lead to spread the understanding about budget allocation for DRR as an investment to secure the long-term and stable growth of socio economy as well as human security rather than the cost to fill the negative impact brought by the disaster damage, thus, finally budget allocation for DRR will foster national and local government to build disaster resilient society.

Pattern Diagram of Investment for DRR and Economic Development



Disaster Management Cycle and the Importance of Prior Investment for Disaster Risk Reduction

When a disaster strikes, emergency response is taken then recovery and reconstruction work follows. Society learns lessons from the disaster and takes countermeasures for future disasters to prevent and mitigate possible damages. Then, preparedness is taken for future disaster. This cycle is called as the "disaster management cycle."

JICA visualizes this cycle as shown in the figure and takes actions not only to support recovery but also to build disaster resilient society (Build Back Better) at each step of recovery and reconstruction activities after a disaster. Furthermore, JICA provides supports to developing countries by setting up and advocating its strategies to contribute for the sustainable development of the countries and local societies by learning lessons from past disasters, widely sharing the learned lessons for future possible disasters, investing for DRR and preparing for future disasters.

JICA disseminates a concept of "Low Regret Investment" which is to make prior investment for DRR according to the assessment of disaster risk and damage in order to make regret as small as possible instead of allocating budget for recovery and reconstruction and to adapt future environment change. Based on this concept, JICA aims to minimize direct and indirect damages caused by future disasters, with prior investment for prevention and mitigation and to make expenditures for emergency response, recovery and reconstruction as small as possible.



(Source) Philippine National Disaster Risk Reduction and Management Framework

Generally, it is difficult to invest for future uncertain disaster, therefore economic infrastructure is invested with relatively higher priority. After the actual disaster happened, it is necessary to prevent the same community/place from repeatedly trapped in vulnerability, with clear strategy that disaster resilient societies only can break out from "negative spiral of disaster & poverty"

which is a fundamental condition for sustainable development. In the case of typhoon YOLANDA (Haiyan) in Philippines, the government of Philippines presents "Build Back Better" as a basic concept for recovery and reconstruction by using the disaster as a trigger to realize disaster resilient societies.

Mainstreaming Disaster Risk Reduction and Its Important Viewpoint

Recently, there is a move to accelerate "mainstreaming disaster risk reduction (DRR)" in the world. Although there is no universal definition for mainstreaming DRR, it has been summarized through the past discussions into the following three points: (i) A government positions DRR as a priority issue of the country; (ii) A perspective of DRR is to be taken into every development sector; (iii) Prior investment for DRR should be increased. JICA's project study defines "mainstreaming DRR" as a goal of protecting lives from disaster, sustainable development and poverty reduction through comprehensive, multidisciplinary, and continuous implementation and expansion of risk reduction measures against envisioned various scales of disasters at every phase in every sector of development and building disaster-resilient society.

Recently, due to the increasing occurrence of disasters in the world, people's awareness of "DRR" is rising, and the importance of the investment for DRR has been recognized. It is expected that the amount of the investment for DRR will be increased accordingly. However, JICA considers that there is a limit for building a disaster-resilient society by independently implementing a project for DRR alone or a project focusing only on DRR. Under these

circumstances, to protect lives of the people from disasters and to minimize economic losses, JICA regards it necessary to cooperate and communicate interactively with other sectors, which requires perspectives to promote DRR and integrate the viewpoint of DRR into the socioeconomic development sectors, based on risk assessment, or to implement highly sustainable project in consideration of sectors' situations.



Disaster Risk Assessment for All Development Projects

As a specific approach for the promotion of mainstreaming DRR, JICA proposed that all development projects must have a disaster risk assessment prior to their implementation.

Disaster-risk assessment is important as a first step to make appropriate efforts from the policy level, such as judgment of necessity to implement DRR

measures and allocation of budget, through the working level, such as implementation of DRR measures, to the community level, such as disaster education and community based DRR. As a leading organization involved in DRR, JICA proposes implementation of disaster risk assessment and preparation of disaster statistics to support recipient countries and, at the same time, will take the initiative to introduce disaster risk assessment in all projects.

Relationship among Disaster Risk Reduction, SDGs and HFA2

The year 2015 is the target year for the Millennium Development Goals (MDGs). It is intended to set goals beyond 2015 as a Post 2015 Development Agenda. The United Nations Conference on Sustainable Development, "Rio+20" held in June 2013 in Brazil, discussed to set up the Sustainable Development Goals (SDGs). And the viewpoints of DRR and resilience have been discussed to be considered in the wide fields of poverty reduction, gender, governance, water and sanitation, urban areas, etc.

In the field of DRR, Hyogo Frame Work for Action (HFA) was drawn up at the Second World Conference on Disaster Reduction held in January 2005 in Hyogo, Japan. At the conference, 2015 was set as the year of performance goal and agreement was reached to make efforts for the five priority actions for DRR aiming for practical reduction of human sufferings and the losses of socioeconomic and environmental resources in each country as its outcome. The Third World Conference on Disaster Reduction will be held in March 2015 in Sendai, Japan. The next guideline for DRR, i.e., HFA2, will be decided upon.

To effectively support DRR, JICA is determined to make further contribution to promote the use of JICA's research result, i.e., the economic simulation

model "DRR Investments Accounts for Development (refer to page 9 for DR²AD)", and to promote "Mainstreaming DRR" in support of developing countries. Consequently, development agenda such as Post MDGs, SDGs and DRR agenda such as HFA2, will be navigated into the same direction to materialize highly sustainable development projects and then to build resilient societies.



JICA's Cooperation Policy in Disaster Risk Reduction

HFA which was adopted in January 2005 is a guideline for disaster risk reduction (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 disaster risk reduction". 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



Development Strategic Goals focusing on Disaster Risk Reduction

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 sector 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.



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



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 disaster risk reduction 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.



Strategic "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 disaster risk reduction (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

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 DRR 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 National 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(plan), 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 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.





Distribution Map of Residential Building Damage Ratio in Tehran City, Iran

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(2006-09, 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)	2011-15		
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		
Turkey	Capacity Development toward Effective Disaster Risk Management	2013-17	Prime Ministry, Disaster and Emergency Management Presidency	White



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

Strategic 2 "Correct Understanding of Natural Disaster Risk and Promotion of Common Understanding"

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 causalities 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

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.



Teaching Materials prepared in Disaster Education 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.

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

Strategic <u>Goa</u> "Implementation of Risk Reduction Measures for Sustainable Development"

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

Flood Prevention Measures in Manila

Project Introduction: Flood Prevention Measures in Metro Manila, Philippines

Metro Manila is the center of politics, economy and culture of the Philippines with the population of 12 million (in 2010) and covers approximately one third of the country's GDP. On the other hand, Metro Manila has suffered great economic and social damages from frequent floods each year.

The Philippine government has been making continuous efforts to mitigate this problem for more than 50 years, such as the formulation of drainage and flood prevention plans and the implementation of projects based on those plans. Floods in the Pasig-Marikina River, a river in Metro Manila flowing through the highly urbanized and heavily populated area as the center of administration and economy, have inflicted tremendous amount of economic and social damages to the country.

When Tropical Storm Ondoy attacked Metro Manila in September 2009, Mangahan Floodway which was completed by JICA's cooperation project, cut off successfully the large amount of flood water up to maximum 3,000 m3/s as the planned rate of water discharge 2,400 m3/s by diverting it to Laguna Lake, and reduced the flood in the downtown area of Metro Manila located in the downstream area. Without the floodway, the downtown area would have suffered from tremendous flood damage.



Mangahan Floodway saved Downtown Manila from Flood

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 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 disaster risk reduction (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.

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.

The formulation of Integrated Flood Management Plan (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. Presently, Phase 2 of the project is being implemented.



Test Construction of Riverbank Erosion Protection Works

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.





Strategic Goa

"Speedy and Effective Preparation and Response"

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 response 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, guickly 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

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 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

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.

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 $m^{\scriptscriptstyle 3}$ 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 Ambo



Cyclone Shelter

Weather Rada

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 No. 30(international name: Typhoon Haiyan, known

as Typhoon Yolanda in the Philippines), 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)

Strategic Goal "Seamless Recovery and Reconstruction for Disaster Resilient Society"

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 disaster risk reduction 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

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.

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.



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 Disaster Risk Reduction Typhoon Yolanda Disaster Emergency Recovery and Reconstruction Assistance Project in the Philippines

Typhoon No. 30, 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.

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.

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



Reconstruction assistance on YOLANDA by the government of Philippines

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.



Japan has allocated Sufficient Budget for Disaster Risk Reduction since the Time of Developing Stage

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.



Obvious Effect of Investment for Disaster Risk Reduction

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.



Investment for Disaster Risk Reduction contributes to Economic Development

Economic Simulation Model (DR²AD) 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 (DR²AD) and is still trying to improve the model for putting it to practical use. DR²AD 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.



JICA's Approach to Mainstreaming Disaster Risk Reduction

Mainstreaming DRR refers to (i) A government places DRR as a priority issue in the policies in the country, (ii) introducing a perspective of DRR into all development sectors, and (iii) promoting the amount of investment for DRR.

Based on Japan' s experience, JICA developed an economic model (details in page 9) to show the importance of DRR investment for development, and advocating policy makers in developing countries. JICA continues to enhance

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.



DRR through implementing projects with DRR elements in various sectors. Also, JICA is in process of mainstreaming DRR in JICA operations from project preparation to implementation. Activities include pre-implementation of disaster risk assessment, as well as countermeasures for DRR during project implementation. Mainstreaming DRR aims to include DRR in every step in every field of development projects, as social and environmental consideration and mainstreaming gender, etc..

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.



Cyclone Shelter-cum-Primary School

The Project for Construction of Primary School-cum-Cyclone Shelter in the Area affected by Cyclone "Nargis" in Myanmar

Myanmar was hit by Cyclone Nargis in 2008 and suffered tremendous damages. The number of death toll and missing were approximately 138,000. Refuge facilities were not enough in affected area, and this was one of contributory factors for the high death toll. Many people were unable to evacuate from storm surge. For this reason, a special attention was given for the reconstruction of damaged school buildings. Reconstructed schools were equipped with raised floor and strong structure, to enhance safety and the function of the school as refuge facility. It restored safe and favorable educational environment as well as mitigate the storm surge damage to residents. As the building is used as a school in ordinary times, regular maintenance is provided without special arrangement, and it is possible to secure wellmaintained building during disaster.



Children in reconstructed primary school

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.

BCP/BCM contributes to the disaster risk reduction and development of all concerned parties. nt/Concerned Agencies nts/Concerned Agencies Local Governme Area BCP/BCM ed competitiven Growth ble supply of service Operator of Businesses Transportation Infrastructure Developer of Industrial complex Operator of Lifeline ual utilization by Bu: uity and quick recov Residents Secure employment / Increasing job opportunities /Vitalization of communities / Early recovery and reconstruction

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-wise 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.



JICA's Assistance at a glance

JICA's Assistance in Disaster Risk Reduction (2003 through 2012 Fiscal Years)

For the disaster risk reduction 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 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.



%1:Technical cooperation projects

% 2: JICA's implementation supervision and promotion

part of grant aid projects

*2:Including JBIC projects before

the consolidation of organization in October 2008.

development study, preliminary study for grant aid projects

The Amount of Money spent

Total amount of money spent for technical cooperation in the disaster risk reduction was 62.1 billion yen (approximately U.S. \$621 million): 37 billion yen (59.6%) in Asia, 8.1 billion yen (13.0%) in Central and South America, 5.4 billion yen (8.8%) in Middle East. As for disaster type, 23.3 billion yen (37.5%) was for flood related projects, 14.4 billion yen (23.2%) for earthquake related projects, 11.1 billion yen (17.9%) for comprehensive disaster risk reduction related projects.

Total amount of JICA implemented supervision and promotion portion of grant aid projects was 31.7 billion yen; 24.5 billion yen (77.4%) in Asia, 3.1 billion yen (9.6%) in Pacific Region, 2.3 billion yen (7.1%) in Central and South America. As for the type of disaster risk reduction, 15.9 billion yen (50.3%) was for flood related projects, 6.8 billion yen (21.5%) for meteorological observation projects, and 2.4 billion yen (7.7%) for earthquake related projects.

Total amount of paid Japanese yen loan was 413.8 billion yen. As for region, overwhelming amount of 401.9 billion yen (97.1%) was in Asia and the next was 11.9 billion yen (2.9%) in Middle East. As for the type of disaster, 204.6 billion yen (49.4%) was for flood related projects, 52.9 billion yen (12.8%) was for comprehensive disaster risk reduction related projects, and 37.5 billion yen (9.1%) was for earthquake related projects.

Number of Dispatching Experts

Total number of dispatching experts in the disaster risk reduction field was 6,418 experts. As for dispatched region, 4,836 experts (75.4%) were in Asia, 496 experts (7.7%) in Central and South America, 396 experts (6.2%) in Middle East. As for disaster type, 2,767 experts (43.1%) were for earthquake related projects, 1,125 experts (17.5%) for flood related projects, 1,087 experts (16.9%) for the comprehensive disaster risk reduction field.

Number of Training participants in Japan

Total number of training participants for the disaster risk reduction training was 5,185 participants; 2,981 participants were from Asia and were 57.5% of the total number of participants. 861 participants (16.6%) were from Central and South America, 482 participants (9.3%) from Middle East. As for the type of disaster, 1,569 participants (30.3%) were in the earthquake related field, 1,378 participants (26.6%) in the flood related field, 1,218 participants (23.5%) in the comprehensive disaster risk reduction field.



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



Legend

Grant aid projects*2

Volcanic disaster Earthquake

Meteorological observation

Flood control Sediment dis

Typho

(8) Others

Field

(B)Training

Numbers of Experts and Participants

A Experts
A

– Earthou

100 10 1

