JICA’s direction and challenge on Disaster Risk Management

JICA Turkey Office
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Outline of presentation

- JICA's policy on DRM
- Our strength of DRM
- Our consideration On Next generation DRM
- Our challenge on DRM
Chapter 1
JICA’s policy on DRM

An Evacuation zone were affected by tsunami, Arahama, Sendai-city
JICA’s Approach in Disaster Management

Three concepts as the objectives of disaster management

1. Contributing to the improvement of “Human Security”
2. Contributing to sustainable development in developing countries
3. Contributing to the promotion of international cooperation in the field of DRR as an advanced nation of disaster management

Development Strategy Goal

1. Building disaster-resilient communities and societies (Mitigation/Preparedness)
2. Emergency response that reaches affected people quickly and effectively (Protection of life) (Emergency response)
3. Transition and implementation of accurate recovery and reconstruction (Recovery/Reconstruction)
Disaster Management Cycle

① Preparedness / Mitigation
- Hazard mapping, evacuation drill
- Organization Reinforcement
- Establishment of Disaster Management Plan
- Development of Early Warning System

② Emergency Response/Relief
- Dispatch of Rescue team
- Provision of Rescue supply

③ Recovery
- Reconstruction and Rehabilitation of Infrastructure
- Mental Health Care
Hyogo Framework for Action

Overall Goal:
Building the resilience of nations and communities to disasters

Three Strategic Goals:

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

Priorities for Action:

- HFA1 Make Disaster Risk Reduction a Priority
- HFA2 Know the Risks and Take Action
- HFA3 Build Understanding and Awareness
- HFA4 Reduce Risk
- HFA5 Be Prepared and Ready to Act
Majority of JICA Projects up to 90’s : Structural measures from 2000 : Non structural measures

Projects by combination of structural and non-structural measures are increasing.
JICA’s target is gradually shifting to community from 90’s.
Chapter 2
Our strength of DRM
Well-prepared?

Non-Structure

Structure
Personal standpoint

One of the best-prepared country

One of the best-invested country

Tremendous damage by The Great East Japan Earthquake
Trend of casualty in Japan

- Great East Japan Eq. & Tsunami
- Hanshin-Awaji Earthquake
- Ise-wan Typhoon

Casualty numbers:
- 19137
- 6482
- 5868
- 3212
- 4897
- 6062

Years:
- 55
- 65
- 75
- 85
- 95
- 05
Our experiences on disaster

Long history of DRM

Much experience of DRM

Combination of Analog and Digital
Prominent example
(Hanshin-Awaji Big Earthquake)

Earthquakes don’t occur in Kobe.
We are proud of Japanese civil engineering.
Prominent example
(Great East Japan Earthquake)

This region is well-prepared against tsunamis based on the past experience

(Source: ASAHI SHIMBUN)
Personal standpoint

One of the best-prepared country

One of the best-invested country

Tremendous damage
For
Great East Japan Earthquake

DRM should NOT “JUST DO (One-way)”
Existing idea on Disaster Risk Management

Anticipated risk
Or
Estimated disaster scale

Target

Coastal Dyke (Structure)

Function as planned
Not function as planned
Conditions precedent of DRM

Disaster Risk Management

Uncertainty

Human psychology
RISK ASSESSMENT
Inundation Area of the tsunami (2011)
Inundation Area of the tsunami (1896 or 1933)
Estimated Inundation Area in hazard map

(Source: Research Center for Disaster Prevention in the Extended Tokyo Metropolitan Area, Gunma Univ.)
STRUCTURE MEASURE
Giant Coastal Dyke
Taro city, Iwate

<table>
<thead>
<tr>
<th>Name of disaster</th>
<th>Casualty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meiji-sanriku Eq.</td>
<td>1867/2248(83%)</td>
</tr>
<tr>
<td>Syowa-sanriku Eq.</td>
<td>911/2773(33%)</td>
</tr>
<tr>
<td>Great East Japan Eq.</td>
<td>146/2466(5%) (As of 5/15)</td>
</tr>
</tbody>
</table>

(Photo: Asahi.com)

http://blogs.yahoo.co.jp/sasaootako/91979721.html
INFORMATION DELIVERY
Disaster Center, Minami Sanriku

Source: NHK
DISASTER EDUCATION
Successful Evacuation by Students in Kamaishi City

The students started evacuation promptly and voluntarily, following their experiences of evacuation drills.

(Source: Research Center for Disaster Prevention in the Extended Tokyo Metropolitan Area, Gunma Univ.)

Sankei News (web) 2011.4.9
Tsunami from a mountain

(http://committees.jsce.or.jp/2011quake/)
KEY FACTORS FOR BETTER DRM

- Changes
  - Social aspect
  - Engineering aspect

- Uncertainty

- Limitation of DRM
  - Only by disaster section

- Continuous improvement

- Risk literacy

- Redundancy
Chapter 3
Our consideration On Next generation DRM
Example of Highway as Settle-back Levee

The far side of the highway has relatively smaller damage.

(Source: KOKUSAI KOGYO)
Road rehabilitation
toward resilient society

1st Step
Ocean
1st day

2nd Step
Ocean
4th day

3rd Step
Ocean
7th day

SMOOTH IMPLEMENTATION OF EMERGENCY RESPONSE
EFFECTIVE RECONSTRUCTION WORK
DISASTER BASE HOSPITAL

- Robust Road
- Road Connection
- Embankment
- Redundant Infrastructure
- Facility Arrangement
- BCP
HAT KOBE

Urban Planning taking account for DRM

Wide Road Network

Emergency Hospital

School as shelter

Source: City of Kobe
The Global Impact of Japanese Quake and Thailand’s Flood

2011, Japan, Guangdong (China), Thailand, and USA
Automobile production (y-o-y % change)

Source: JAMA, Statistic Bureau of Guangdong Province, TAIA, Federal Reserve Board
By courtesy of Professor Nobuaki Hamaguchi
Image of “Area-based” planning

City/Settlement
Industrial Area
Port/ Fishery harbor

Settle back levee
Coastal dike
(tsunami) Break water

Concept of “Disaster Reduction”, not “Disaster Prevention”

① From Structure measures to People-oriented measures
② From “Linear-base planning” to “Area-based planning”

Source: http://cas.go.jp/jp/fukkou/
Necessity of mainstreaming of DRM

Urbanization may involve various sectors

Urbanization may accelerate poverty

Urbanization may involve various sectors

Urbanization may trigger secondary disaster
Difficulties to realize mainstreaming DRM into sustainable development

Difficult to prove

Convince!

Better DRM!

Thoroughness

Difficult in Coordination

Disaster sector

Other sectors
Chapter 4
Our challenge on DRM

The 3\textsuperscript{rd} GPDRR (Global Platform for Disaster Risk Reduction organized by UN/ISDR (Geneva, Switzerland)
Investment effect

Investment of 1USD worth effect of 7USD

STOP OF ECONOMIC ACTIVITY
Due to direct damage → poverty

Stagnant economy
Due to indirect damage → poverty

(Source: JICA)
Investment effect

Investment of 1USD worth effect of 7USD

At least, ‘Build Back Better’ in multidisciplinary manners

Difficult to evaluate Investment effect for DRM

Hindrance to realize mainstream of DRM into sustainable development

Necessity to show the evidence from a viewpoint of economy
JICA developing Economic Model to show the effectiveness of DRR investment

- Economical Model which can measure
  - GDP change
  - income differential and Gini coefficient change in Lorenz curve
- With & Without DRR investment
- Named DR\(^2\)AD Model
Simulation example

(Source: JICA)
Conclusion

- Better DRM needs to consider (1) Continuous updating, (2) Risk Literacy and (3) Redundancy.

- There are many projects which don’t take into consideration for DRM in other sectors.

- JICA challenges discussion to convince policy makers and various sectors.

- JICA plans to set mandatory process to all project, “Disaster Risk Assessment”
THANK YOU VERY MUCH FOR YOUR ATTENTION

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The projects related to priority action 4 are increasing rapidly compared to others.
- It entails the use of structural and non-structural measures.
Initial response and the establishment of the emergency headquarters

11 March, 14:50  Established the Response Office at Prime Minister’s Office
               Convened the Emergency Response Team
15:14  Established the Extreme Disaster Management Headquarters (the first establishment after the enactment of the law)
15:37  1st meeting of the Extreme Disaster Management Headquarters (adopted a basic policy on disaster response countermeasures)
18:42  Dispatched government inspection team (to Miyagi Prefecture)
19:23  3rd meeting of the Extreme Disaster Management Headquarters (direction on relief measures for stranded commuters)

12 March 6:00  Established the Local Headquarters for Extreme Disaster Management (in Miyagi Prefecture)
Existing idea on Disaster Risk Management
~ Combination of Structure and non-structure measures~

Anticipated risk
Or
Estimated disaster scale

Target

Investment

Coastal Dyke (Structure)
Sea wall (Structure)
Disaster Education (Non-structure)
Evacuation plan/Response (Non-structure)
Population Growth

水谷(2011)
Artificial valley fills (embankments)

Sliding mass
Compression
Tension
Crack
Direction

Kamai (2011)
Recovery of Tohoku Shinkansen

A network of 97 earthquake detectors functioned 15 seconds before the quake hit the tracks on 11 March, 2011. Automatic brakes stopped the 27 bullet trains in operation without any trouble.

1,200 points were reported having small damages along 500 km tracks, but no serious damage to main structures. 8,500 engineers were deployed for rehabilitation.

(Source: International Herald Tribune Japan Edit. 29,Apr, Dr. Takahashi, Kyoto Univ., SankeiBiz)
Toward the mainstreaming of DRM

Understanding of risks by all stakeholders

Risk Literacy

Multidisciplinary approach

Redundancy

Mainstreaming Of DRM

Capacity of society To cope with disaster

Time change

KAIZEN

Sustainable Development
(Type 1) Region with urban functions located in low-lying areas entirely affected by the tsunami

Points of the type

① Relocation of core urban functions and residents to higher ground.

② Important to maintain relationships of community

③ Only such industrial functions to be located in plain or coastal area.

Source: http://cas.go.jp/jp/fukkou/
(Type 2)
Regions where low-lying areas affected by the tsunami / High ground without any damage

Points of the type

① Top priority to concentrate urban areas on high ground

② Only such industrial functions to be located in low-lying area.

Source: http://cas.go.jp/jp/fukkou/
Regions built on hills running down to the coast with few low-lying areas and settlement.

Points of the type

① Fundamental principle to relocate homes by newly creating areas on high ground in back ground.

② Only such industrial functions to be located in low-lying area.

Source: http://cas.go.jp/jp/fukkou/
Points of the type

1. Combination of construction of dike and regulation of land-use
2. Consideration to keep community relation
3. Relocation of settlement behind settle-back levee

Source: http://cas.go.jp/jp/fukkou/
KOBE MEMORIAL PARKS

Source: City of Kobe
Historical Tsunami, Infrastructure and 3.11 Tsunami

- Prepared for each zone’s probable earthquake, not only scientific approach but also refer to the historical data

Existing Wall Height
- トピ(m)
- 延安房総沖地震 (1677)

Design Wall Height
- T.P.(m)
- 青森県東方沖 (1763)

Observed Tsunami Height
- 広政宮城県沖地震 (1793)

Historical Tsunami Height
- 慶長三陸地震 (1611年)
- 安政三陸沖 (1856)

Data from MLIT
Catchment management

- To consider whole catchment/river basin
- To seek the most appropriate combination of interventions

Structural Measures
- Dam
- Dyke
- Check dam

Non-structural Measures
- Tree Planting
- Early Warning / Evacuation
- Raising Public Awareness
Mainstreaming DRR to Government Policy

$DR^2 AD$ Model

Show how Disaster Risk Reduction Investment account for Development
Disaster Risk Management Pays.
Long-period vibration