MIC’s International Cooperation in the field of ICT for Disaster Management

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Ministry of Internal Affairs and Communications (MIC), Japan

June 6, 2016

ITU Asia Pacific Regional Development Forum 2016: ICTs for Smart Sustainable Asia-Pacific
Basic Facts and Concepts

MIC’s approach

MIC’s Cooperation in the field of ICT for Disaster Management
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Damage by disasters all over the world since 2000

- **Damage (USD)**: $1.7 trillion
- **Affected**: 2.9 billion
- **Killed**: 1.2 million

**Source**: UNISDR

- **2012**: Earthquakes caused the most economic damage - this was also the year of the Great East Japan Earthquake.
- **2011**: Earthquakes caused the most economic damage - this was also the year of the Sichuan earthquake in China.
- **2010**: Earthquakes killed the most people - this was also the year of the Haiti earthquake.
- **2009**: Storms killed the most people - this was also the year of Cyclone NARGIS.
- **2008**: Earthquakes killed the most people - this was also the year of the 2008 Sichuan earthquake.
- **2007**: Drought affected most people - this was also the year of major drought in India and China.
- **2006**: Floods affected most people - this was also the year of major flooding in south and central parts of China.
- **2005**: Storms caused the most economic damage - this was also the year of Hurricane Katrina.
- **2004**: Earthquakes caused the most economic damage - this was also the year of the Indian Ocean earthquake and tsunami.
- **2003**: Drought affected most people - this was also the year of major drought in India and China.
- **2002**: Storms killed the most people - this was also the year of Cyclone NARGIS.
- **2001**: Earthquakes killed the most people - this was also the year of the Haiti earthquake.

**Damage by disasters all over the world since 2000**

- **2012**: Earthquakes caused the most economic damage - this was also the year of the Great East Japan Earthquake.
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Japan contributes to “mainstreaming of disaster risk reduction” in the international society.

“Mainstreaming of disaster risk reduction” is to make disaster risk reduction (DRR) the most preferential subject and to introduce disaster preparedness in all development policies and projects.

International financing of disaster risk reduction (DRR) in 1991-2010
(Bilateral and multilateral donors: Total $13.5 billion)

Source: Financing Disaster Risk Reduction (2013)
The Third UN World Conference on Disaster Risk Reduction

- Date: 14-18 March 2015
- Venue: Sendai City, JAPAN
- More than 6,500 participants including heads of states government, ministers and representatives from 187 Member States, and 150,000 visitors
- Adoption of:
  - Sendai Framework for Disaster Risk Reduction 2015-2030
  - Sendai Declaration
- Sendai DRR Cooperative Initiative (by Japan)
Seven Global Targets
• Reduce mortality, disaster economic loss, etc.
• Increase countries with DRR strategy, etc.

New Perspectives
• Investment in DRR
• Build Back Better
• Focus on Stakeholders

Mainstreaming Disaster Risk Reduction
Disaster risk reduction is mainstreamed when countries define DRR as a priority issue and include DRR in all development policies and plans. By mainstreaming DRR, investment in DRR is enhanced and lead to disaster resilient country.

The 2030 Agenda for Sustainable Development
• Adopted at the UN GA in September 2015
• Clearly include DRR in their targets

COP21
• Conference in Paris in November 30th to December 11th, 2015
• Prioritize DRR as an important element of adaptation to the impact of climate change
ITU’s Initiative on Disaster Management and ICT

Smart Sustainable Development Model (SSDM)

- The ITU’s SSDM initiative pursue constructing a framework to utilize ICT by associating ICT for development (ICT4D) and ICT for disaster management (ICD4DM).
- This initiative aims at both the “development” to bridge the digital divide and the “utilization” of ICT for disaster management.

Target areas of SSDM

<table>
<thead>
<tr>
<th>Policies, regulations, and enlightenment</th>
<th>Finance, partnerships, and business models</th>
<th>Infrastructure and new technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid response for the minimization of disaster damage</td>
<td>Funding and cooperation of parties concerned</td>
<td>ICT for development (ICT4D) associated with ICT for disaster management (ICT4DM)</td>
</tr>
</tbody>
</table>
| Roles of government:  
  - Development of risk analysis and countermeasures in disaster preparation  
  - Flexible operation of the radio licensing system in times of disaster | • A funding mechanism for infrastructure development with consideration of disaster response  
• Partnerships such as those between the government, the private sector, and civil society | To link ICT4D and ICT4DM for the effective use of resources:  
• ICT utilization in response to each phase of disaster  
• A connection between the government’s disaster response plan and utilization of ICT |
|  |  | Ensuring communications infrastructure in times of disaster:  
• Relaxation of communication congestion, early recovery of communication, the utilization of satellite communication, and response to a power shortage |
Information transmission in each stage is an important element to realize more effective disaster reduction activities.

It is important to implement information transmission within and between parties concerned, that is, public organizations as well as residents and mass media; and effective and efficient disaster management through ICT based on such information transmission.

Major potential use of ICT in each stage is shown in the figure below.
Basic Facts and Concepts

MIC’s approach

MIC’s Cooperation in the field of ICT for Disaster Management
## CONCEPT “3S”: Features of ICT for DM

### 1 Seamless

<table>
<thead>
<tr>
<th>Seamless in Time</th>
<th>Seamless in Space</th>
<th>Seamless between Organizations Responsible for DRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Information Sharing among Systems in Each Phase of Prevention, Emergency</td>
<td>• Cross-regional and cross-border Information sharing</td>
<td>• Mutual Information Sharing among National Government, Local Governments and</td>
</tr>
<tr>
<td>Response, Recovery/Reconstruction</td>
<td>• ICT as Social Infrastructure</td>
<td>Communities</td>
</tr>
<tr>
<td>• Utilizing Past Disaster Information for Future Disaster Prediction</td>
<td>• Resolving Digital Divide to Realize Disaster Information Transmission not</td>
<td>• Information Sharing within Respective Organizations</td>
</tr>
<tr>
<td>• Prompt Information Sharing When Disaster Occurs</td>
<td>Restricted by Geological Conditions</td>
<td>• Information Transmission to Residents and Communities through Various Media</td>
</tr>
</tbody>
</table>

### 2 Strengthen

- To make communication networks resilient
- To enhance information security
- To utilize ICT to make social infrastructure resilient

### 3 Smart

- ICT utilization when disaster occurs to visualize disaster situation
- Sensor networks to collect big data
- Big data utilization to predict disaster with high precision
Information distribution is an important factor for disaster management.
Effective and efficient disaster management is made possible by ICT.
ICT for disaster management can be classified into 4 stages.

- **Observation / Collection**
- **Information Analysis (Centralization)**
- **Accumulation**
- **Dissemination**

- Meteorological Radar
- Sensor
- Camera
- Satellite Observation

- Data Center

- Integrated Disaster Management Information System

- Emergency alarm broadcast
- One-seg mobile terminal
- Disaster prevention administrative radio, ICT disaster prevention unit, etc.
Disaster Information Delivery to Residents (L-Alert)

**Information Provider**
- Central government
- Prefectures
- Municipal government
- Satellite Observation
- Meteorological Radar
- Sensor
- Camera

**Information Communicator**
- TV operator (Cable, Terrestrial)
- Radio operator
- Net operator
- Mobile phone operator

**Local Resident**
- Digital TV
- Radio
- Web distribution
- Mobile phone • Smartphone
- Outdoor Loudspeaker
- Home Receiver

**Municipal Disaster Radio Broadcast System**

Collection, Format conversion, and Distribution

Connected with standard format

Various types of format

※L-Alert : 832 groups including 47 prefectures are participating. (33 out of 47 prefectures distributes information in practice)
Direct information distribution without L-Alert from information provider also existed.
Background of Development of L-Alert in Japan

Communication path

<Before>
N to N model

<After>
L-Alert model

Information providers
- Municipalities
- Prefecture
- Electric power Company
- Gas Company
- Traffic-related Companies

Information Communicators
- Broadcasters
- Newspaper publisher
- Portal sites
- Mobile operators
- Cable television provider

L-Alert
Quick and Efficient

Background of Development of L-Alert in Japan
### ICT Solution Map for Disaster Management

<table>
<thead>
<tr>
<th>Terminal on-site equipment</th>
<th>Observation/Collection</th>
<th>Information analysis (Centralization)</th>
<th>Accumulation</th>
<th>Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Sensor (earthquake, water level, rainfall amount, wind speed, landslide, etc.)&lt;br&gt;· Meteorological radar&lt;br&gt;· Camera (fixed, mobile, helicopter)&lt;br&gt;· Satellite observation (image, position information)</td>
<td>· Meteorological observation information collection system&lt;br&gt;· Damage information collection system&lt;br&gt;· Safety/evacuation information collection system&lt;br&gt;· Image monitoring/analysis system</td>
<td>· Meteorological analysis system&lt;br&gt;· Geographical information system&lt;br&gt;· Shelters/evacuees management system&lt;br&gt;· Supplies management system&lt;br&gt;· Administrative operation system</td>
<td>· Damage forecasting system</td>
<td>· Broadcast reception terminal (IP announcement terminal, PC, etc.)&lt;br&gt;· One segment terminal&lt;br&gt;· Speaker&lt;br&gt;· Mini satellite earth station</td>
</tr>
</tbody>
</table>

| Application | · Meteorological observation information collection system<br>· Damage information collection system<br>· Safety/evacuation information collection system<br>· Image monitoring/analysis system | · Meteorological analysis system<br>· Geographical information system<br>· Shelters/evacuees management system<br>· Supplies management system<br>· Administrative operation system | · Damage forecasting system | · J-ALERT |

| Platform | · Sensor information collection/control infrastructure | · Comprehensive disaster prevention information system<br>· Risk management information management system<br>· Space data platform system<br>· Infrastructure management system<br>· Police/fire prevention command and control system | · Cloud platform/big data analysis | · L-ALERT |

| Communication infrastructure | · Disaster prevention administrative radio network (mobile)<br>· Satellite communications | · Disaster prevention administrative radio (broadcast reception, mobile)<br>· Satellite communications<br>· ICT Disaster Management Unit | · Emergency alarm broadcast<br>· Cell broadcast | - |

| Disaster General use | · Satellite communications<br>· Radio communications networks (FWA, WiFi, microwave, TV White Space, etc.) | · Satellite communications<br>· Submarine cable | - | - |
Basic Facts and Concepts

MIC’s approach

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Japan’s Cooperation to ASEAN region: AHA Centre

The AHA Centre handles communication and coordination activities among disaster management agencies of ASEAN countries.

(AHA Centre: ASEAN co-ordinating centre for Humanitarian Assistance on disaster management)

- **Roles of the AHA Centre**
  - At ordinary times:
    - Monitoring, Supporting training and Holding workshops
  - At the time of disaster:
    - Sharing disaster information and coordinating emergency activities

- **MIC’s Support:**
  MIC provides ICT facilities through the Japan-ASEAN Integration Fund (JAIF)

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**Phase 1:**
- Nov 2011 – Mar 2013
- **[Install ICT Facilities]**
  - Installation of emergency communication equipment
  - Establishment of backup, etc.

**Phase 2:**
- April 2013 – Mar 2015
- **[Establishment of communication networks]**
  - Introduction of information sharing system

**Phase 3:**
- (Jan 2016 - July 2017)
- **[Improvement of emergency response]**
  - Emergency communication equipment
  - Establishment of backup, etc.

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- **Phase 1-3**
  - Dispatch a Japanese ICT specialist to the AHA Centre.
  - Capacity building for AHA center staff, disaster response agencies.
ICT disaster management units are radio communications equipment mainly transported to areas stricken by disasters for the emergency restoration of communications functions. Three types of ICT disaster management units are available; units of car type and attaché case type, both of which are referred to as MDRU (Movable and Deployable ICT Resource Unit), as well as units of container.

The ICT disaster management unit incorporates functions to provide disaster management officials and disaster-affected residents of means of information and communication, such as compact portable base stations and disaster-dedicate IP phone.

- Possible to provide a minimum-required ICT environment (incorporating a compact portable base station, Wi-Fi network, and information processing server) immediately in case of disaster.
- Possible to transport easily because units of container type, car type, and attaché case type are miniaturized (and its contents are exchangeable according to needs).
- Possible to contribute to bridging the digital divide in villages not provided with electric power even in ordinary times by using solar panels.

Foreign case examples

- ITU, Ministry of Internal Affairs and Communications of Japan (MIC) and Department of Science and Technology of Philippines signed a cooperation agreement for the joint project. Following this, the feasibility study using MDRU in Philippines was deployed from December 2014 to March 2016. As a result, a municipality in Philippines (San Remigio) decided to introduce this unit.
- MIC continuously disseminate information on achievements of this study, and have been working on the introduction of ICT disaster management units all over the world including Philippines.
From Emergency management headquarters to shelter (about 500 meters), feasibility study about telephone and data communication utilizing Wi-Fi networks was deployed.
In response to the huge earthquakes that hit Kumamoto Prefecture, we transported MDRUs to Takamori Town in the Prefecture and provided an Internet-access service and a voice call service at the town office and a shelter. A branch of MIC Japan there is still ready to offer some MDRUs by requests from local governments and other organizations.

MDRU-employed Support Activities for Kumamoto Earthquake Disaster (Immediately after Disaster through Recovery Phase)

**Internet-access service**
- MDRU with NICT’s vehicle-mounted satellite base station
- MDRU with Docomo’s satellite-based mobile phones
- Residents using the Internet to collect information in a shared space

**Voice call service**
- Staff member using his smartphone to make a call via satellite at his desk
**MIC’s Measures for international cooperation**

**Issues**
- Promoting mutual understanding with partner countries
- Deepening understanding of ICT solutions
- Capacity building
- Expansion into the whole field of disaster prevention

**Measures**
- Government-level Dialogue
- F/S, Pilot Project
- Workshops for Capacity Building
- Collaboration with Relevant Agencies
Thank You!

Ministry of Internal Affairs and Communications, JAPAN

Please feel free to contact us: ict4drr-japan@ml.soumu.go.jp

HP(English):
Information Slides

1. Activities of Kumamoto Earthquake (MDRU)

2. Sendai Framework and Sendai Cooperation Initiatives (relating 3rd UN World Conference on DRR)

3. Examples of Japan’s International Contribution and Japan’s ICT solutions
Information Slides

1. Activities on Kumamoto Earthquake (utilizing MDRU)

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3. Examples of Japan’s International Contribution and Japan’s ICT solutions
MDRU-employed Support Activities for Kumamoto Earthquake Disaster (Immediately after Disaster through Recovery Phase)

1. **Background**
   - An earthquake (with a maximum seismic intensity of 7 on the Japanese seven-stage seismic scale) in Kumamoto Prefecture in early hours of Saturday, April 16, disabled fixed telephone and mobile phone services in a disaster-affected area due to the influence of power outages and the disruption of transmission paths.
   - With consideration of the situation, the Telecommunication Systems Division of the Ministry of Internal Affairs and Communications (MIC) made a request on Sunday, April 17, for the transportation of an MDRU to the disaster-affected area and support to the local government of the area in order to ensure emergency communications means for the area.
   - NTT employees in response to the request carried an MDRU and visited Takamorimachi, Aso-gun, Kumamoto Prefecture, on Monday, April 18, and conducted support activities until Thursday, April 21. (NTT employees confirmed the restoration of communications and power supply conditions and left the area, but the MDRU has been still in Kumamoto for further use, if required.)

2. **Contents of support activities**
   - For emergency communication means utilizing the MDRU, the following usage environment was constructed on the first floor of the Takamori Town Hall (staff office) and a common space (used by evacuated townspeople as well). Furthermore, smartphones and tablets were loaned for contact and information collection purposes.
     1. Internet (free Wi-Fi) connections and voice calls by the MDRU in linking with NICT on-vehicle satellite earth stations (for ultra-high-speed Internet satellite WINDS).
     2. Voice calls for staff members by the MDRU in linking with satellite mobile phones (two DoCoMo WIDESTAR II units that the Kyushu Bureau of Telecommunications provided to Kakamori-cho) for a double backup and improvements in the convenience of satellite mobile phone users.
     3. The MDRU in linking with the above satellite mobile phones constructed an environment allowing smartphone-to-smartphone calls (enabling outgoing and incoming outside line calls) between the Takamori Town Hall and a remote base (Minamiaso Village Office).

3. **Results of support activities**
   1. The peak throughput rates at the Wi-Fi access points installed on the first floor of the Town Office and the common space were both approximately 18 Mbps. It was estimated that there were approximately 30 users during peak hours, and the system contributed to the establishment of the communications environment of the Town Office and people in the shelter.
   2. Usual fixed phone call and mobile phone call (voice and data communications) services were recovered comparatively early, until when the system as an emergency communications means gained a good reputation from Takamori Town officials. (A better situation would have been expected if the MDRU had been deployed in Kyushu.)
In response to the huge earthquakes that hit Kumamoto Prefecture, we transported MDRUs to Takamori Town in the Prefecture and provided an Internet-access service and a voice call service at the town office and a shelter. A branch of MIC Japan there is still ready to offer some MDRUs by requests from local governments and other organizations.
Usual smartphones are available for satellite phone calls.

Satellite line (up to 50 Mbps)

VPN connections between the disaster-affected area and other areas.

Attaché case type ICT unit

MDRU

Portable IP-PBX

Wi-Fi Access points

Radius of approx. 50 m

Smartphone

Satellite line (up to 50 Mbps)

VPN

The disaster-affected area and NICT’s Kashima Space Technology Center are VPN connected over the satellite line.

Providing a number of external connections (utilizing Hikari Denwa Office A service, an optical IP telephone service, for eight lines) simultaneously with Internet services.

Hikari Denwa router

Connecting to the Internet and telephone network from other areas.

The Internet

Mobile phone and fixed telephone network

Mobile phone

Fixed phone
Support (2) MDRU × DoCoMo Satellite Mobile Phones

Bundles of satellite mobile phones are available to all locations (Wi-Fi areas).

Connecting to the Internet and telephone network via the satellite from the disaster-affected areas.

Data communications can be superimposed as well. (Not conducted this time.)

Internal call (Smartphone-to-smartphone calls)

Smartphone

Outside line (up)

Outside line (down)

Disaster area (1F of Takamori Town Hall)

A single satellite line allowing wide-range usage.

WIDESTAR II units (provided by the Kyushu Bureau of Telecommunications)

WIDESTAR Multi-service adapter (carried in by NTT)

Attaché case type MDRU

Portable IP-PBX

VoIP GW

External calls and data communications

The Internet

Mobile phone and fixed telephone network

Smartphones on hand are available in the users' booths or any other area on the floor of the Town Hall.
Support (3) MDRU × DoCoMo Satellite Mobile Phones
(Base-to-base Communications)

Constructed an environment allowing smartphone-to-smartphone calls (enabling outgoing and incoming outside line calls) between the Takamori Town Hall and a remote base (Minamiaso Village Office).
Situation of Passable Roads around Takamorimachi, Kumamoto Prefecture

通行可能道路

4/17(日) 23時現在

国土交通省 九州地方整備局

至曲布市（通行可）

至大分（通行可）

南阿蘇村

Takamori-machi

Tomari Town Hall

通行可（大型車含む）

注）今後の余震や降雨等により通行不能となる可能性あり
A web guide of measures for communications and broadcasting usage was released for local government and NPO use for the purpose of disaster victims' life reconstruction and the restoration of the disaster-affected area, in response to the needs of the disaster-affected area that were changing from moment to moment immediately after the earthquake disaster.

The web guide has been updated regularly to incorporate new contents in real time.

報道資料

「被災者の生活再建と被災地の復興に向けた通信・放送利用の施策Webガイド」の公表

熊本地震の発生直後から、総務省は、通信・放送の確保や避難所等でのネット利用環境整備等に取り組んできました。こうした利用環境が今後、被災者の生活再建に役立てられていくよう、地方自治体やNPO等向けに「被災者の生活再建と被災地の復興に向けた通信・放送利用の施策Webガイド」を公表しました（URL: http://www.soumu.go.jp/main_content/000410612.pdf）。

総務省自身の取組だけでなく、復旧や復興に役立つ民間事業者や団体の活動等も併せて紹介することで、被災された方々の暮らしつつ復旧、コミュニティの再生、地域経済の復興等に取り組む地域の活動を応援していきます。

本ガイドの内容は、今後随時更新し、内容の充実を図ります。
各施策の詳細については、下記の連絡先までお問い合わせください。地方自治体やNPO等からの相談、導入支援等にもできる限り応じます。

連絡先
総務省九州総合通信局被災者生活支援チーム
メール：hisaichishien-ict_atmark_ml.soumu.go.jp
※「@」を「＠」に置きかえて送信してください。
(5) MDRU-support to recovery of local government office work

* Movable and Deployable ICT Resource Unit (MDRU): A suitcase-sized set of equipment to maintain a wireless LAN communications environment regardless of the disruption of usual means of communications in times of large-scale disaster. The MDRU contributed to the communications environment of the local government office and shelter immediately after the earthquake disaster. Currently, mobile phones are widely used stably. Therefore, the MDRU is in the Kyushu Bureau of Telecommunications for further use, if required.

- MDRUs can be utilized to substitute extension telephone networks in temporary government buildings. Therefore, MIC will support the introduction and utilization of MDRUs at the request of local governments in disaster-affected areas.

Reference URL: http://www.soumu.go.jp/main_content/000416391.pdf

- In response to the Kumamoto earthquake disaster this time, the MDRU was transported to Takamorimachi, Aso-gun, Kumamoto Prefecture, to provide Internet connection and voice call services at the Town Hall and shelter. In the future, MDRUs can be utilized for the prompt construction of extension telephone networks associated with the relocation of government office buildings, for example. Presently, the MDRU is standing by at the Kyushu Bureau of Telecommunications. Contact MIC, if necessary.

Reference: MDRU in use in Takamorimachi in Kumamoto
Information Slides

1. Activities of Kumamoto Earthquake (utilizing MDRU)

2. Sendai Framework and Sendai Cooperation Initiatives (relating 3rd UN World Conference on DRR)

3. Examples of Japan’s International Contribution and Japan’s ICT solutions
Sendai Framework for Disaster Risk Reduction 2015-2030

**Expected Outcome**

The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries

**Goal**

Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience

**Priorities for Action**

Focused action at national and local level and global and regional levels

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<th>Priority 1</th>
<th>Priority 2</th>
<th>Priority 3</th>
<th>Priority 4</th>
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</thead>
<tbody>
<tr>
<td>Understanding disaster risk</td>
<td>Strengthening disaster risk governance to manage disaster risk</td>
<td>Investing in disaster risk reduction for resilience</td>
<td>Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction</td>
</tr>
</tbody>
</table>

**Roles of Stakeholders**

| Civil society, volunteers, community (women, children and youth, persons with disabilities, etc.) | Academia, scientific and research entities and network | Business, professional associations and financial institutions | Media |

**International Cooperation and Global Partnership**

| General considerations | Means of implementation | Support from international organization | Follow-up actions |

**Global Targets**

1. Mortality
2. Affected people
3. Direct economic loss
4. Damage to medical and educational facilities
5. DRR strategies
6. Support to developing countries
7. Access to early warning

**Priorities for Action**

Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience

**Expected Outcome**

① Mortality
② Affected people
③ Direct economic loss
④ Damage to medical and educational facilities
⑤ DRR strategies
⑥ Support to developing countries
⑦ Access to early warning

**Global Targets**

The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries
In plenary session of The Third UN WCDRR, Prime Minister Abe announced “Sendai Cooperation Initiative for Disaster Risk Reduction”.

Japan will provide 4 billion US dollars in total to the area related to disaster risk reduction and train 40 thousand government officials.

Descriptions related to ICT

1. Basic Policies
   ③ Utilizing Japan’s knowledge and technology
      …Japan can make a distinctive contribution to the international community by utilizing its knowledge and technology in a manner that local communities can introduce for themselves, not only by introducing the achievements of cutting-edge science and technology, such as disaster observation, analysis and prediction that utilize innovative earth and information and communication technology, …

2. Concrete measures
   (1) non-material assistance
      Technologies for disaster observation, prediction and warning (including information and communication technology, earth observation…
   (2) material assistance
      Development of satellites necessary for disaster observation, prediction and warning and of information and communication infrastructure.
      Development of …, and of information and communication facilities relating to disaster risk reduction

(3) Global and region-wide cooperation
   Assistance for efforts to build region-wide institutions and systems (Sentinel Asia, Asian Disaster Reduction Center, ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre))
Lessons from the Great East Japan Earthquake

Most important counter measures to protect community from tsunami

- Evacuate to upland as soon as possible: 51%
- Deliver tsunami and evacuation information surely even in case of...: 20%
- Enhance disaster prevention facilities such as seawalls: 6%
- Built refuge facilities such as evacuation towers for residents: 4%

Method to confirm safety of family members living together

- Telephone call by fixed-line phone: 7%
- Telephone call by mobile phone: 69%
- E-mail by mobile phone: 25%
- Direct confirmation: 17%
- Other: 1%

Source: Special Working Group of the Cabinet Office
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3. Examples of Japan’s International Contribution and Japan’s ICT solutions
International Contribution in Disaster Management

* Projects which the orders were received or supports were determined in and after FY2010. Pilot projects are not included.

- Vietnam
  - Sustainable Disaster-Prevention with ICT (2014)
  - Bridge management sensor system (2012)

- Thailand
  - Flood inundation simulation (2012)

- India
  - Meteorological radar (2014)

- Indonesia
  - Comprehensive disaster preparedness system (2013)
  - National space data infrastructure system (2014)
  - Smartphone-Based, Participatory Disaster Information-Sharing System (2015)

- Taiwan
  - Submerged cable seismograph (2012)
  - Emergency management information system (2013)

- Philippines
  - Meteorological radar (2014)
  - Wide-Area Disaster Prevention System (2014)

- Tonga
  - Disaster preparedness communication network (2013)

- Peru
  - Emergency alarm broadcasting system (2013)

- AHA Centre
  - ICT materials/equipment support (2011 -)

Source: industry survey by MIC
A bridge management sensor:

- collect information on bridge conditions in real time to understand bridge deterioration.

※Weight and car-model estimate is available only in case of steel bridges.
Solid-state (semiconductor) meteorological radars:

- realize high-accurate observation, reduction of life cycle cost, stable operation, and effective frequency use.

### Comparison of meteorological radars

<table>
<thead>
<tr>
<th>Electron tube (vacuum tube) meteorological radars</th>
<th>Solid-state (semiconductor) meteorological radars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radar waves are generated by applying a high voltage to an electron tube.</td>
<td>It is possible to produce necessary radar waves without applying high voltage.</td>
</tr>
<tr>
<td>High-output radio waves can be easily obtained.</td>
<td>It is possible to obtain high output by combining a number of elements, though the output of each individual element is low.</td>
</tr>
<tr>
<td>It is necessary to collect and process a large volume of received data to obtain sufficient accurate rainfall data.</td>
<td>Narrow variability of wave form and observation based on a small volume of received data is possible.</td>
</tr>
<tr>
<td>A big load by high-voltage causes short life span (about two years).</td>
<td>The service life is for at least 10 years.</td>
</tr>
<tr>
<td>Running cost is high. etc.</td>
<td>Running cost is low. etc.</td>
</tr>
</tbody>
</table>
Example (Analysis): ICT system for Disaster Management

ICT System for Disaster Management:
- conduct collection, analysis and delivery of disaster information
- transfer disaster information to residents promptly and securely

Government agencies (BMKG, BPBD, etc.)

Disaster Management Agency (National / Regional)

Analysis

Information gathering

Transmission / Delivery

Unifying the data format

Ministry of Communications and Information Technology

TV broadcasting

Cellular Phone

Issuance of warning from public facilities (mosques)

Issuance of warning from “Community One Seg”

Sensors, systems and seismometers, etc.
A flooding simulator:

- predict river flooding and inundation
- It enables intuitive and straightforward control offers, flexible condition settings, and allows high-speed and high-accuracy simulation.
Example (Delivery): Area Mail

Earthquake Early Warning

Area Mail System

Not delivered to other areas

Area A

Area B

Earthquake Early Warning:

Earthquake detected

Area Mail

Broadcast to specified areas

Earthquake Early Warning

Evacuation Directive

The X river is in danger of flooding...

Disaster/evacuation information

Disaster occurs

Notify by special buzzer or vibration

Tsunami Warning

People in coastal areas should evacuate to safe places such as hills immediately. (JMA)

Popup display image

** Japanese Only

* Japan Meteorological Agency

** Japanese Only
Workshops for Capacity Building

- Covering ICT for disaster management and related areas
- Developing human resources in cooperation with international organizations

<table>
<thead>
<tr>
<th>Workshop</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop on Sensor Networks</td>
<td>May 2014, supported by the ASEAN-Japan ICT Fund @Tokyo, Japan</td>
</tr>
<tr>
<td>Outline: Lectures and site visits on Japanese technologies for sensor networks</td>
<td></td>
</tr>
<tr>
<td>Participants: ASEAN member countries’ ICT ministries (18 officials in total).</td>
<td></td>
</tr>
<tr>
<td>Workshop on Disaster Management and Communications</td>
<td>June 2014, supported by the Asia-Pacific Telecommunity (APT) Voluntary Contribution @Tokyo, Japan</td>
</tr>
<tr>
<td>Outline: Lectures and site visits on Japanese technologies for emergency communication and emergency warning systems</td>
<td></td>
</tr>
<tr>
<td>Participants: APT member countries’ ICT/DM ministries (93 officials in total)</td>
<td></td>
</tr>
<tr>
<td>Workshop on ICT for Disaster Management</td>
<td>Dec. 2014, supported by the ASEAN-Japan ICT Fund @Tokyo, Japan</td>
</tr>
<tr>
<td>Outline: Lectures and site visits on Japanese ICT for disaster management</td>
<td></td>
</tr>
<tr>
<td>Participants: ASEAN member countries’ ICT ministries (13 officials in total)</td>
<td></td>
</tr>
<tr>
<td>Workshop on Disaster Management and Communications</td>
<td>July 2015, supported by the Asia-Pacific Telecommunity (APT) Voluntary Contribution @Nadi, Fiji</td>
</tr>
<tr>
<td>Outline: Lectures on Japanese ICT policy and systems for disaster management</td>
<td></td>
</tr>
<tr>
<td>Participants: APT member countries’ ICT/DM ministries (63 officials in total)</td>
<td></td>
</tr>
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</table>