JICA's Experiences of
Connecting Japanese Science & Technologies
for Disaster Risk Reduction
in Developing Countries

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Many of the Greatest Threat Issues on a Global Scale

"Climate Change"

Study on glacial lake in the Bhutan Himalayas

"Food Production"

Efficient breeding project in Vietnam

"Major Natural Disasters"

Water reuse project in Thailand

"Infectious Diseases"

Dengue Virus project in Thailand

SATREPS

Science and Technology Research Partnership for Sustainable Development

* In 2008, Japan launched a program called **"SATREPS"** as a framework for **research oriented international cooperation** in order to resolve global issues **by merging the ODA and domestic research funds.**

* SATREPS is implemented jointly by the following three agencies;

  Japan International Cooperation Agency (JICA)

  to provide an official development assistance (ODA) fund

  Japan Science and Technology Agency (JST)

  Japan Agency for Medical Research and Development (AMED)

  to provide a competitive research fund

Objectives of SATREPS

1. International Cooperation on STI

Enhancing international cooperation on science, technology and innovation between Japan and developing countries

2. Addressing Global Issues and Advancing Science

Acquiring new knowledge and technology that lead to the resolution of global issues and the advance of science and technology, and through this process, creating innovations

3. Capacity Development

Boosting self-reliant research and development capacity in developing countries through international joint research, constructing sustainable research systems that can contribute to resolving issues, coordinating networking between researchers, and training future human resources in developing countries and in Japan

4 Fields as Main Targets of SATREPS

1 **“Environment and Energy” (JICA & JST)**

1-1 Global-scale Environmental Issues

1-2 Advanced Energy Systems for Low Carbon Society

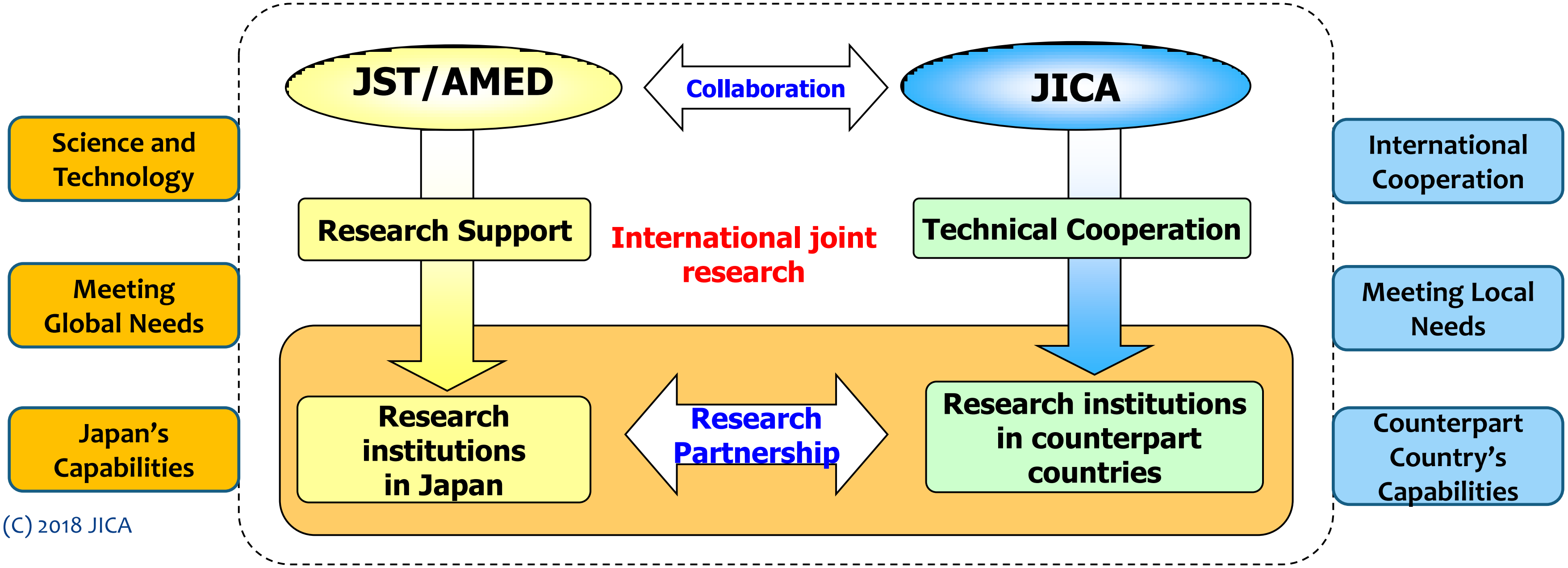
2 **“Bioresources” (JICA & JST)**

3 **“Natural Disaster Prevention and Mitigation” (JICA & JST)**

4 **“Infectious Diseases Control” (JICA & AMED)**

Framework of SATREPS

- **JICA** supports project implementation, such as dispatch of Japanese researchers, provision of equipment and training of counterpart country personnel, and research activities **in the recipient country.**
- **JST /AMED** support the Japanese research institutes for the project activities **in Japan.**



Budget of a SATREPS project

JICA provides **3 million USD** and JST/AMED provides **1.75 million USD** in **5 years.**

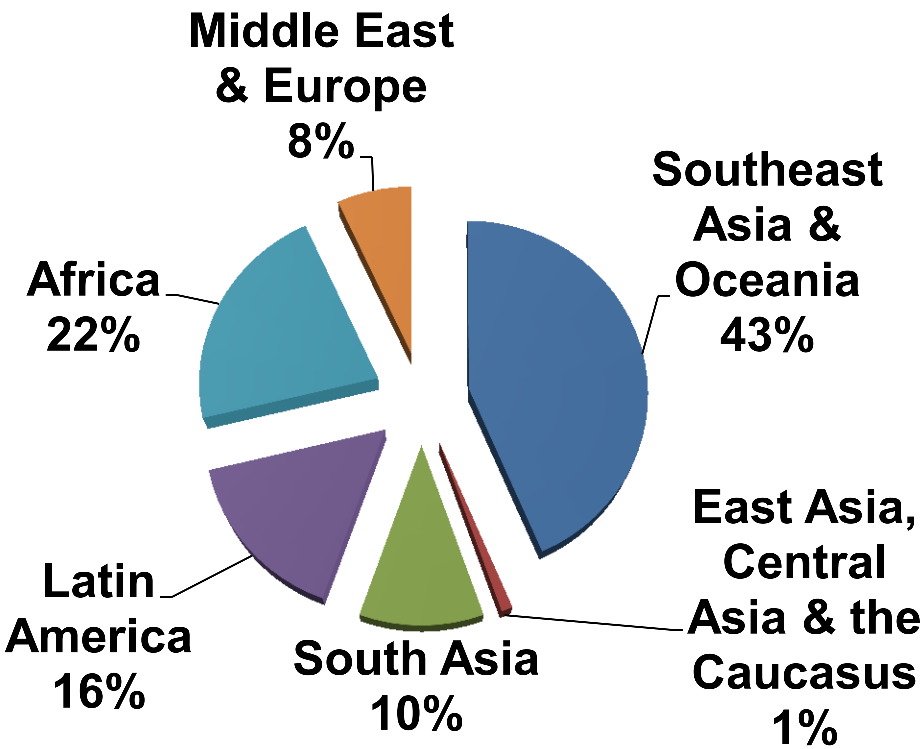
Expenses	JST/AMED	JICA
Research expenses incurred in Japan	v	
Research expenses incurred in the third countries (neither Japan nor counterpart country)	v	
Travel expenses of Japanese researchers to the counterpart country		v
Travel expenses to invite researchers from the counterpart country to Japan		v
Research expenses including equipment purchases incurred in the counterpart country		v

Number of SATREPS projects

Year	Environment & Energy			Bio-resources	Disaster Prevention	Infectious Diseases	Total
	Climate Change	Energy	Environment				
2008	4		3		**3**	2	12
2009	4		2	6	**4**	4	20
2010		4	4	5	**2**	2	17
2011		3	1	2	**2**	2	10
2012		1	2	3	**1**	1	8
2013		1	3	1	**2**	3	10
2014		2	1	2	**2**	3	10
2015		2	3	4	**3**	2	14
2016		2	4	4	**2**	2	14
2017		2	2	2	**2**	2	10
Total	8	17	25	29	**23**	23	125

Regional Distribution of SATREPS

Total Number of Projects : 125 in 47 Countries (as of 2017)



"Natural Disaster Prevention and Mitigation"

* **Clarifying the mechanisms of disasters** associated with natural phenomena such as earthquakes, tsunami, volcanic eruptions, storms, storm surges, inundation, drought and landslides
* **Development of measures to mitigate the damage** from major disasters that have become more serious with urbanization (fires, chemical plant accidents, earthquakes, flooding, damage to lifelines/transportation networks, etc.)
* **Construction and maintenance of cities** with resilient social infrastructure that can withstand natural and man-made disasters
* **Collection, processing, effective provision and utilization of disaster related information** to contribute to regional and urban disaster prevention and mitigation (including development of technology to utilize disaster observation satellites, GPS, ICT, GIS, etc.)

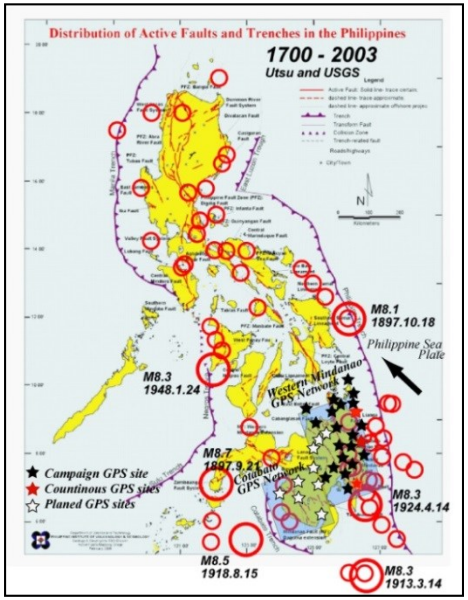
Project Examples

Project of Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines (2010-2015)

National Research Institute for Earth Science and Disaster Prevention
Philippine Institute of Volcanology and Seismology

Research Needs :

* The Philippines are in a Western Pacific Plate subduction zone. As in the case of Japan, earthquake and volcano disasters occur frequently and therefore disaster measures and prediction techniques are urgently needed.



Active faults and trenches

Project of Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines (2010-2015)

Activities :

* **Improvement of earthquake information**

  Networking of newly developed broadband and strong-motion seismometers and real-time intensity meters

  → Advanced and rapid earthquake analysis and early warning system

Project of Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines (2010-2015)

Activities :

* **Accurate evaluation of earthquake generation potential**

GPS campaign observation

Geomorphological and geological surveys

Carbon dating of geological strata

Real-time transmission and analysis system of seismic and infrasonic data

Photogrammetry by unmanned aerial vehicle

→ **New finding :**

Speed of strike-slip of faults in Mindanao

2.5 - 4.0cm/y > 1.0cm/y Japan

Mechanisms of inland and subduction earthquakes

Estimation of the return period and potential magnitude

Project of Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines (2010-2015)

Activities :

* **Integrated volcanoes monitoring**

  GPS receivers at Taal and Mayon volcanoes

  Magneto-telluric meter and total intensity magnetometer at Taal volcano

  → Real time transmission and analysis system of data

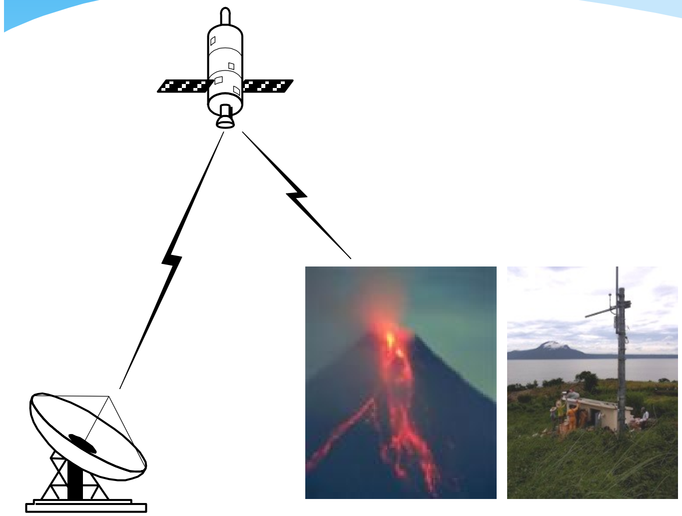
  New findings about interior structure of Taal volcano including hydrothermal activities and high-potential of phreatic explosion

* **Improved disaster mitigation information**

  A portal site to provide earthquake and volcano information and earthquake and volcano disaster mitigation information

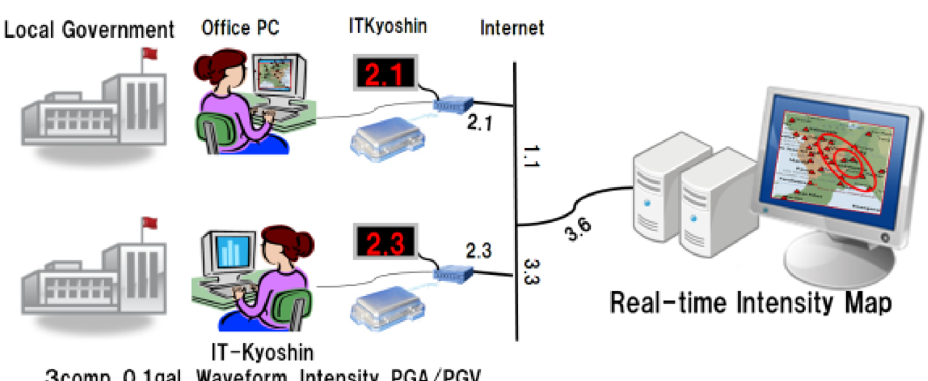
  Simple diagnostic tool for earthquake resistance of houses

Project of Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines (2010-2015)



Research Results:

* A real-time earthquake and earthquake intensity observation network were introduced to enable prompt and accurate estimates of earthquake motion distribution and damage, crustal movement observations for assessing the potential for earthquakes on the island of Mindanao, and integrated earthquake, crustal movement and electromagnetic observations of Taal and Mayon volcanoes in order to determine and predict underground magma activity.



Research Achievement of **SATREPS**

125 Projects have created


ARTICLES

An auxin-based degron system for the rapid depletion of proteins in nonplant cells

- Academic paper : 2466
- Presentation at academic conferences : 7256
- Patent application : 50

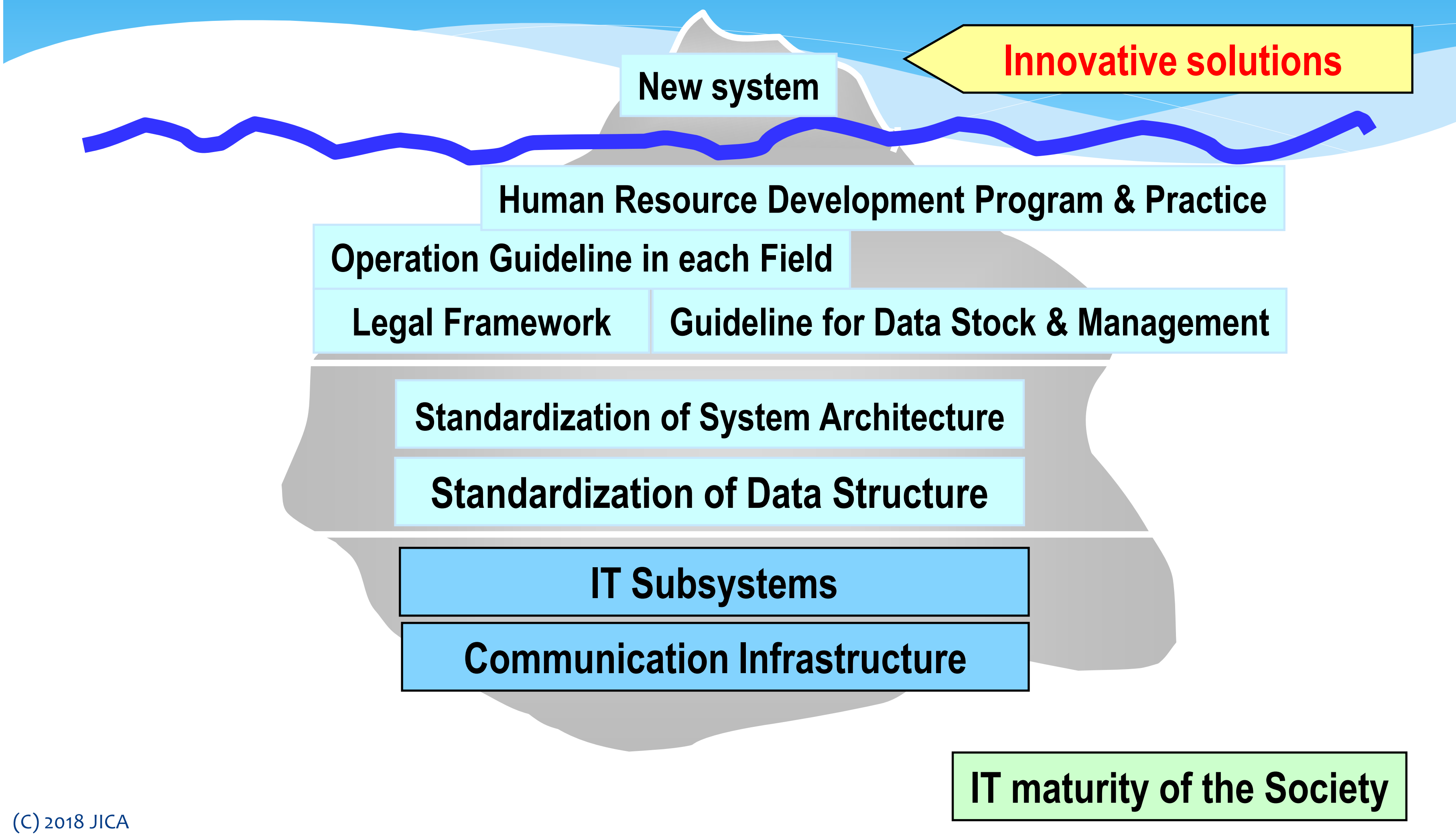
(Numbers from the 2015 reports)

Scholarship for doctor’s degree : 71 (2010-2015)

Lessons learnt

* Sustainability
* Not from supply/delivery side but from needs on the ground
* Utilization of the outcomes for the benefit of the society / Social and practical application

An example of a monitoring system



DRR in Japan is a “Package” of tools

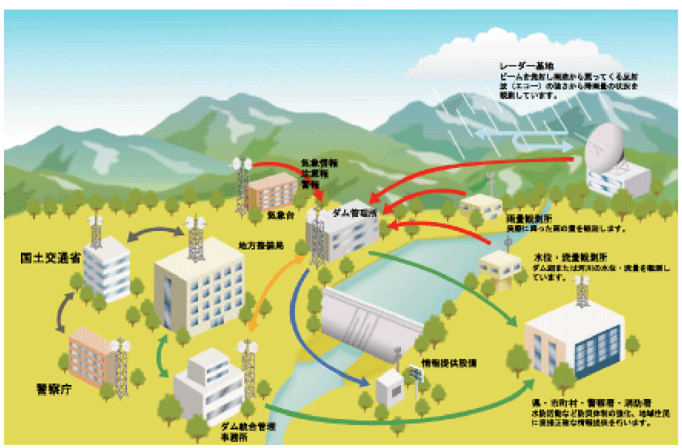
Various experiences

- Earthquakes
- Tsunamis
- Typhoons
- Volcanos

High and unique tech.

Preventive measures

Mitigation



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Laws and regulations

- Disaster Countermeasure Basic Act
- Building Standards Act
- Central Disaster Prevention Council
- Cabinet Office
- Basic Plan for Emergency Preparedness

Observation, forecast and alert

- Observation, monitoring and warning for earthquake, tsunami and flood
- Weather Radars and meteorological satellites
- Central Disaster Radio
- Comprehensive Disaster Prevention Information System
- Flood Analysis System
- Rain Basin Flooding Model

Infrastructure

- Countermeasure against floods
- Roads and Bridges
- Urban planning
- Anti-seismic device and retrofitting
- Devices for prevention of bridge collapses

DRR Culture

- DRR Awareness education
- First-aid skills in disasters

For future discussions

* “Innovative” project for the part under the water

* Projects which are difficult for bi-donors

For future discussions

* Application of satellite images for prompt PDNA
* Down scaling of climete change scenarios (ex. river basin scale)
* Accumulation of disaster statistics
* Analysis of economic effect of pre-disaster investment
* Evaluation of potential risks

Thank you for your kind attention.

Courtesy: photos of page 2 and explanations taken from JST web site.