SATREPS

by the Government of Japan

DATA and Reference Volume

Japan International Cooperation Agency

(JICA)

SATREPS For the Earth, For the Next Generation

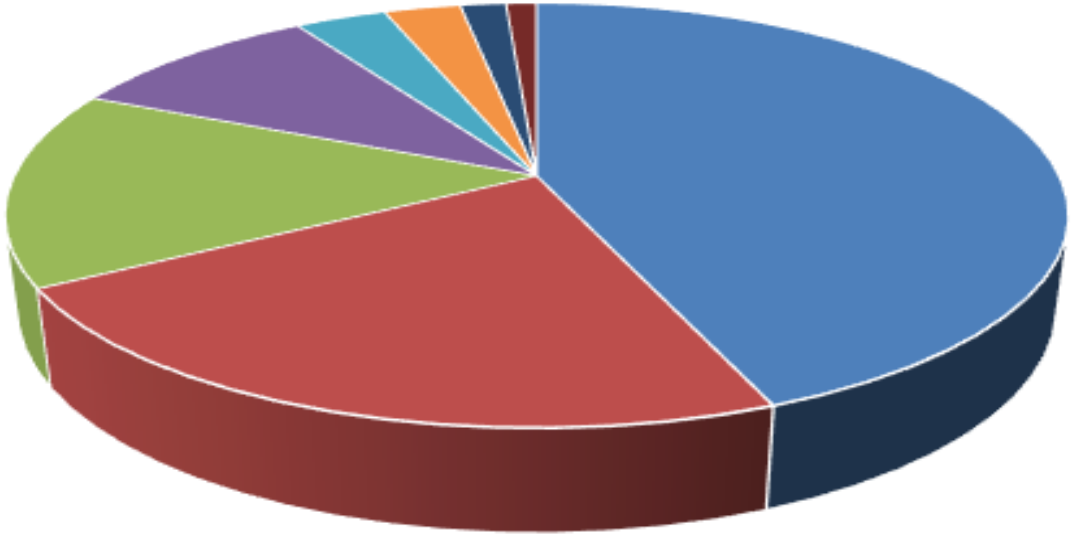
Project Statistics

Annual Project Selection of SATREPS

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	1	13
2017		2	2	2	1	2	9
2018		2	2	2	1	2	9
2019		2	3	3	2	2	12
2020		2	2	3	3	2	12
2021		2	3	3	2	2	12
2022		1	3	4	2	2	12
Total	8	26	38	44	32	32	180

Regional Distribution of SATREPS

Total Number of Projects : 180 (as of 2022)



- Southeast Asia 79 Projects 43.9%
- Africa 41 Projects 22.8%
- Latin America 27 Projects 15.0%
- South Asia 17 Projects 9.4%
- Europe 6 Projects 3.3%
- East & Central Asia 5 Projects 2.8%
- Middle East 3 Projects 1.7%
- Oceania 2 Projects 1.1%

Project Examples

“Environment and Energy”
(Global-scale Environmental Issues)

* Climate change prediction, adaptation or mitigation
* Chemical pollution and risk reduction
* Water processing and ensuring safe water supply
* Establishing a material-cycle society (including resource recovery and reuse)
* Conservation and restoration of ecosystems and biological diversity
* Urban environmental conservation (including greening) and environment creation
* Constructing pleasant cities
* Reconstruction and restoration of environments damaged by large-scale disasters
* Sustainable use of resources

Glacial lake in Bhutan

Protection of wild animals

Project for Wild Fire and Carbon Management in Peat-forest in Indonesia (2010-2014)

Hokkaido University

State Ministry of Research and Technology of Indonesia (RISTEK)

Research Needs :

* Enormous quantities of carbon are stored in peat lands in the marsh areas. When drainage channels are dug and the deposits of vegetation dry out, both hot combustion (peat fires) and cold combustion (microbial decomposition) occur, releasing large quantities of carbon into the atmosphere and resulting in a loss of the biodiversity.

* Moreover, the carbon monoxide and fine particles released would threaten the health of residents.

Large-scale fire of tropical peat

Project for Wild Fire and Carbon Management in Peat-forest in Indonesia (2010-2014)

Research Results :

* The world's only MRV (Measurement, Reporting and Verification) system capable of accurately determining carbon emissions from peatland was created by integrating ground and satellite data. This system will be used with REDD-plus to restore and maintain the tropical peatland including forests that are the earth's most important carbon sinks and treasure troves of biodiversity.

* This project developed appropriate water management to restore the forests, e.g. an early fire detection system using satellites and measures for rapidly extinguishing fires.

Observation tower

Installation of carbon observation equipment

Project for Prediction of Climate Variation and its Application in the Southern African Region in South Africa (2010-2013)

Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

Applied Center for Climate and Earth Systems Science (ACCESS)

Research Needs :

* The southern Africa region is vulnerable to abnormal weather conditions owing to its high reliance on nature-based farming methods.
* The oceanic variability in Indian Ocean plays an important role for such extreme weather conditions as droughts, heavy rains and floods.
* To improve skills of seasonal forecasting to mitigate the impacts of abnormal weather is requires for preventing or reducing of the weather risks in the region.

Farmers are vulnerable to abnormal weather

Forecasting by super computer " Earth Simulator"

Project for Prediction of Climate Variation and its Application in the Southern African Region in South Africa (2010-2013)

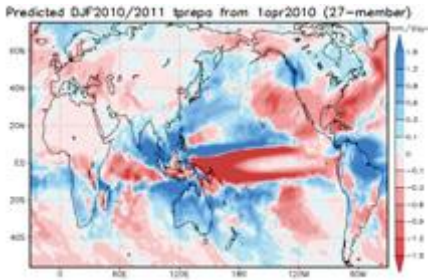
Research Results :

* A high-resolution ocean-atmosphere coupled model (SINTEX-F) (a virtual earth on the Earth Simulator supercomputer that reproduces interactions between the atmosphere and oceans) proved to predict on global climate variations up to one year in advance.

* This project clarified the mechanism of the subtropical dipole modes in the southern Indian Ocean and the South Atlantic, which induce abnormal weather in South Africa.

* It also successfully predicted heavy rainfalls during the summer of 2010-2011. In the future, this technology will be applied to agriculture, etc. in southern Africa and seasonal prediction in Japan.

Input data to the model



Prediction of oceanic condition

"Environment and Energy"
(Advanced Energy Systems for Low Carbon Society)

* Utilization of renewable and new energies (solar and solar thermal, wind, ocean energy, geothermal, biomass, etc.)
* Advanced energy-efficient utilization (including innovative clean and efficient energy utilization technology, energy saving technology utilizing strategies such as high-efficiency equipment or energy recycling, key technologies for carbon dioxide capture and storage (CCS), etc., and energy system technology, etc. for implementing low carbon approaches)
* Sustainable use of natural resources such as fossil fuels and minerals (resource cycle, urban mining development, resource recovery systems expected to contribute to reducing LCA-CO_2 emissions)
* Contributing to the creation of low carbon, resource recycling cities and regions (including smart cities, smart communities, transportation networks, and next generation infrastructure)

Project for Development of Low Carbon Society Scenarios for Asian Regions in Malaysia (2011-2016)

Kyoto University

Universiti Teknologi Malaysia (UTM)

Research Needs :

* In a special economic zone known as Iskandar Malaysia, the economy, society and technology for creating a low carbon society in 2025 will be required for five categories (power generation, industry, transportation, commercial and residential) with integrated assessment model and scenarios.

Location of " Iskandar"

Biomass to be used for biofuel

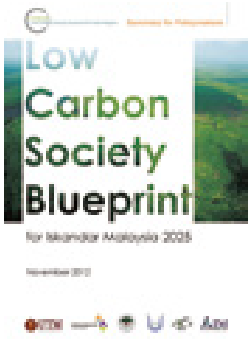
Project for Development of Low Carbon Society Scenarios for Asian Regions in Malaysia (2011-2016)

Research Results:

* The Low Carbon Society Blueprint 2025 made by the project contains 12 action plans for achieving a green economy, green community and green environment, as well as 281 initiatives focused on specific challenges. Already more than 10 of the policies cited in the Blueprint have been put into action.

* The project provided assistance in devising solutions to the problems of atmospheric pollution, waste treatment management, and poverty and other social problems in connection with the establishment of a low carbon society.

Important roles of mass-transit



Policy recommendation

“Bioresources”

* Contributing to the sustainable production and utilization of bioresources (including resource management, breeding, cultivation, propagation and culturing technology for plant, animal, marine and microbial resources and production systems)
* Contributing to the evaluation and effective utilization of bioresources (including using biodiversity for discovery and production of useful substances from bioresources, but excluding human drug development)

Managing of STRIGA “witchweed”

Incubation of yellowfin tuna

Project for the Development of Crop Genotypes for the Midlands and Mountain Areas of North Vietnam (2010-2015)

Kyusyu University

Hanoi University of Agriculture

Research Needs :

* Vietnam's northern region and other rural areas still face problems such as food shortages and income disparity. In particular, food self-sufficiency is low in the mountainous regions of the north, and people living in these regions have been suffering from chronic food shortages for many years.

* The project will be expected to contribute to ensure food production in the midlands and mountainous areas of Vietnam, eventually boosting food self-sufficiency to 90%.

Agricultural field

Rice harvest

Project for the Development of Crop Genotypes for the Midlands and Mountain Areas of North Vietnam (2010-2015)

Research Results:

* This project applied efficient breeding technology that utilize rice genomics to develop new promising lines of rice with short growing duration, high yield, and resistance to diseases and insect pests.

* The Project succeeded in identifying several gene lines of promising rice with more desirable characters. Related cultivation methods for ensuring the adaptability of the newly developed lines in the midlands and mountainous areas of northern Vietnam were established and recommended.

* The promising lines of rice developed in the project have already been registered as new varieties in Vietnam, and they are steadily being introduced to the market in these regions. It is hoped that, in addition to contributing to agricultural policy in Vietnam, these technologies will be extended to the nations of ASEAN in the future.

New variety of rice

“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.)

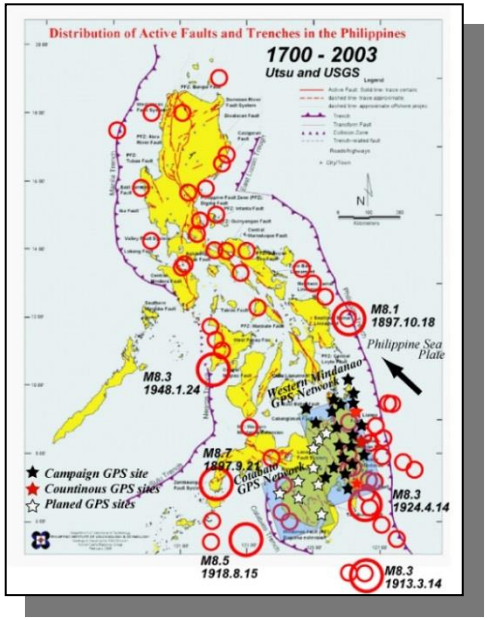
Project of Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines (2010-2015)

National Research Institute for Earth Science and Disaster Prevention

Philippine Institute of Volcanology and Seismology

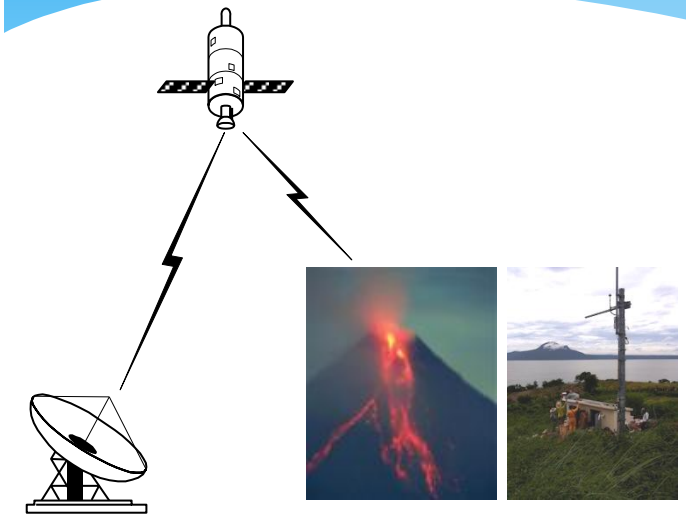
Research Needs :

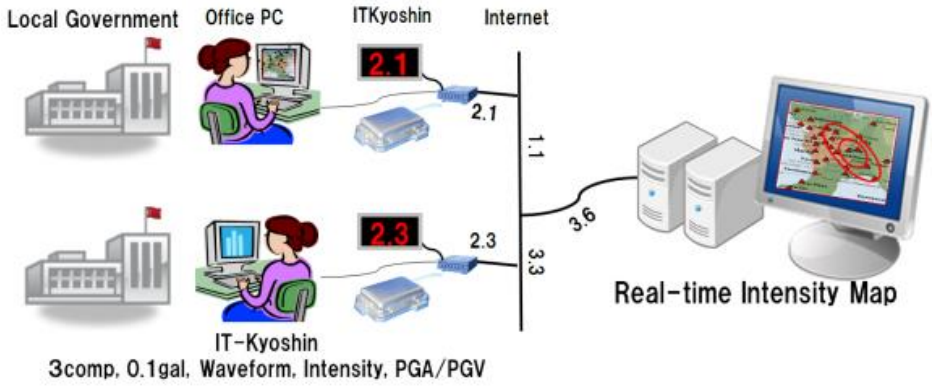
* The Philippines are in a Western Pacific Plate subduction zone. As in the case of Japan, earthquake and volcano disasters occur frequently and therefore disaster measures and prediction techniques are urgently needed.



Active faults and trenches

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





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.

Project for Enhancement of Technology to Develop Tsunami-resilient Community in Chile (2012-2016)

Port and Airport Research Institute of Japan

Pontifical Catholic University of Chile

Research Needs :

* Chile in South America is known as a particularly earthquake-prone country. The massive, M8.8 earthquake of 2010 brought the nation's problems with tsunami warnings and evacuation to the fore.

* Higher tsunamis than envisaged caused devastating damage, bringing renewed awareness of the destructive power of tsunami and the dangers of tsunami-induced debris.

2010 tsunami at town of Dichato

Port damaged by tsunami

Project for Enhancement of Technology to Develop Tsunami-resilient Community in Chile (2012-2016)

Research Results :

* A highly precise early tsunami warning systems for the prevention and mitigation of tsunami damage was developed with the estimation of damage at a pilot site.
* The project also made guidelines and resident education programs for the creation of tsunami-resilient communities.
* The tsunami-related programs have been incorporated into JICA's Disaster Risk Reduction Training Program for Latin America and the Caribbean, and are contributing to the training of personnel in Latin American countries.

Tsunami simulation

Evacuation drill

“Infectious Diseases Control”

* Development on Zoonosis such as avian influenza, rabies and others
* Development for technology related to epidemiology, diagnostics, vaccines and therapeutics for the detection and control of emerging and re-emerging infectious diseases including HIV/AIDS, malaria, Dengue fever, tuberculosis and bacteria resistant to antiboitics like carbapenem and colistin

Searching for virus

Field survey in Zambia

Project for Research and Development of Therapeutic Products against Infectious Diseases, especially Dengue Virus Infection in Thailand (2009-2013)

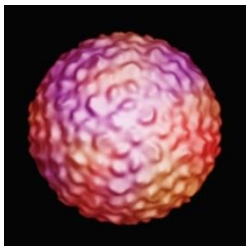
Osaka University

Ministry of Public Health, National Institute of Health (NIH)

Research Needs :

* Dengue fever is a viral disease spread by mosquitoes that infects 50 million people living in the tropics every year, with 250,000 suffering seriously as a result, but no effective therapies have yet been discovered. Microorganisms prevalent in Thailand for compounds are effective as a dengue fever treatment.

* At the same time, similar research for influenza, which is a worldwide problem, and for the botulinum toxin, which is a problem in Thailand will be conducted.



Dengue-virus

Aedes aegypti

Project for Research and Development of Therapeutic Products against Infectious Diseases, especially Dengue Virus Infection in Thailand (2009-2013)

Research Results:

* The project succeeded in creating many antibodies against the dengue virus, influenza virus and botulinum toxin. Many of those antibodies appear to be potentially effective as therapeutic agents. Next, we will perform more detailed evaluations, aiming for the development of new drugs.

Explanation by Japanese researcher

Experiment by counterpart researcher

Project for Development of Rapid Diagnostics and the Establishment of an Alert System for Outbreaks of Yellow Fever and Rift Valley Fever in Kenya (2012-2017)

Nagasaki University

Kenya Medical Research Institute (KEMRI)

Research Needs :

* Outbreaks of zoonotic arboviral diseases including yellow fever and Rift Valley fever are frequent in Kenya and other African countries.

* Affordable and rapid diagnostic kits including point-of-care (POC) test kits are needed in peripheral healthcare facilities and local communities. These kits can facilitate early identification of disease outbreaks to minimize their spreads into the other areas.

Kenya Medical Research Institute

Research in laboratory

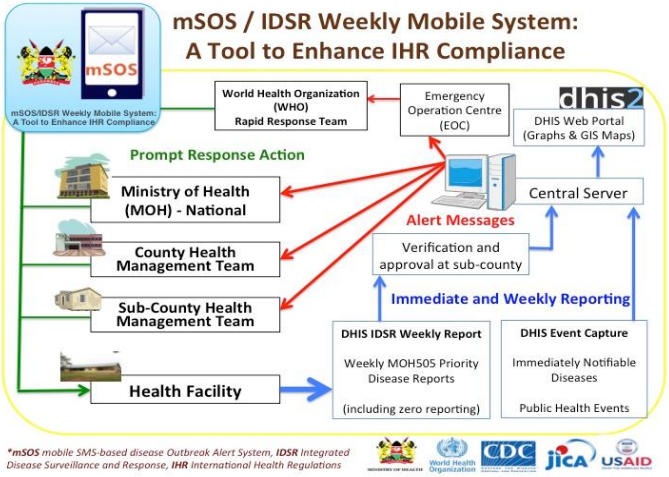
Project for Development of Rapid Diagnostics and the Establishment of an Alert System for Outbreaks of Yellow Fever and Rift Valley Fever in Kenya (2012-2017)

Research Results :

* Point-of-care test kits were developed, evaluated and tailored to local needs.

* Scientific research was carried out to assess the effectiveness of the bi-directional mobile phone outbreak alert system that connects peripheral health facilities and the central government. This system is being expanded to the rest of Kenya through collaborations with the Ministry of Health and WHO.

Developed diagnostic kits



mSOS - Mobile disease outbreak alert system

Research Achievement of SATREPS

145 Projects have created

* Academic paper : 3276
* Presentation at academic conferences : 9838
* Patent application : 91

(Numbers from the 2017 reports)

Thank you for your kind attention.

Japan International Cooperation Agency

(JICA)

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Courtesy: photos and explanations taken from JST web site.