

**Climate Change Adaptation  
Good Practices  
by Japanese Private Sector**

**November 2017**

This booklet is presented as part of the “Fiscal Year 2017 Climate Change Adaptation Effect Visualization Project (Contribution visualization project of Japanese enterprises in the adaptation field in developing nations)” by the Ministry of Economy, Trade and Industry of Japan.

Adaptation to climate change (alleviating the impact of climate change and risk preparedness) forms an integral part of the global warming countermeasures in parallel with the mitigation of climate change (curbing the emission of greenhouse gas). Adaptation measures are particularly a pressing issue for developing countries that are vulnerable to the impact of climate change.

Climate change measures taken by Japanese companies have been more focused on mitigation efforts. However, promotion of adaptation efforts is essential for further facilitating climate change measures. Private companies are expected to address the risks surrounding climate change, and at the same time, leverage on climate change as a new business opportunity in fast-growing developing countries.

Under such circumstances, the Ministry of Economy, Trade and Industry has since 2012 encouraged Japanese companies to contribute to adaptation measures in developing countries by conducting studies on the perspectives of Japan’s adaptation initiatives as well as by supporting feasibility studies on how Japanese companies maximize their advanced technologies to contribute in the adaptation fields.

Besides these initiatives, the Cabinet of Japan approved the “National Plan for Adaptation to the Impacts of Climate Change” in November 2015. Since then, concerted efforts have been taken by the entire government for promotion of adaptation measures in the country.

This booklet specifically showcases the good practices of Japanese companies' adaptation business in developing countries across a range of fields, including the fruits of support by the Ministry of Economy, Trade and Industry to date.

We hope that this booklet will help grasp image of adaptation business and ultimately contribute to the development of new business by the companies seeking such opportunity in developing countries.

Lastly, we would like to extend our cordial appreciation to all the companies for their cooperation on development of this booklet.





























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Global Environment Partnership Office,  
Industrial Science and Technology Policy and Environment Bureau,  
Ministry of Economy, Trade and Industry of Japan

This booklet was compiled as part of the Ministry of Economy, Trade and Industry of Japan's "Fiscal Year 2017 Climate Change Adaptation Effect Visualization Project (Contribution visualization project of Japanese enterprises in the adaptation field in developing nations)" by Mitsubishi UFJ Morgan Stanley Securities Co., Ltd., the project consultant.

**Mitsubishi UFJ Morgan Stanley**

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# 1. Resilient Infrastructure against Natural Disasters / Climate Monitoring & Early Warning

## Examining the Earth as “Earth Doctor”

Kawasaki Geological Engineering Co., Ltd.

### 【Contribution to Adaptation Challenges】

Disasters triggered by floods and landslides on account of climate change and frail soil foundation attributable to the tropical monsoon climate bring considerable damages. Kawasaki Geological Engineering Co., Ltd. has contributed to the establishment of a disaster-resilient public infrastructure through its unique technology and knowhow that have effectively been translated into landslide disaster prevention and mitigation.



Emergency Survey and Installation of Monitoring Post for Prevention of Landslides

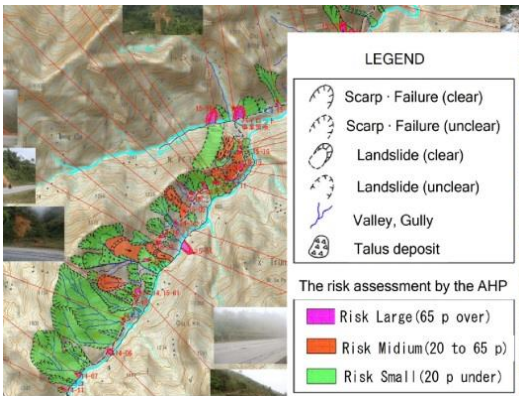


Illustration of Landslide Hazard Map

### 【Project Details】

#### <Background>

The Project was selected for the “Feasibility Study for Visualization of Contribution by Japanese Companies for Adaptation Measures in Developing Countries” by the Ministry of Economy, Trade and Industry of Japan from 2013 to 2015. Despite its initial plan to cover the entire Great Mekong Subregion which is highly vulnerable to climate change, the Project was first launched in Vietnam where the framework of project execution was established earlier than any other country.

#### <Business Model of the Project>

A local representative office was set up in 2014 for the launch of consulting services and raising awareness of the government and corporations. The Project successfully secured a deal from EVN (Electricity of Vietnam). Also Kawasaki Geological Engineering implemented a study in relation to landslides and structured the evacuation/warning arrangements and proposed landslide prevention countermeasure method in landslide-hit Dalat, a sightseeing spot in Vietnam through.

#### <Related SDGs of the Project>



### 【Product & Technology】

The Company renewed its existing technologies both in terms of hardware and software for the prevention and mitigation of incline disasters and enabled the technologies to be operated successively and sustainably in Vietnam.

**Monitoring System:** Exploration and measurement technologies, prediction technology of incline disasters, various analysis technology, prediction technology of incline disasters, assessment technology of potential outbreak of incline disasters using AHP (Analytic Hierarchy Process)

**Early Warning System:** Design technology of landslide evacuation warning system leveraged on various measurement devices

**Bundling of Disaster Prevention and Mitigation Technologies:** The technologies above bundled with helicopter laser measurement, satellite image processing and other geomorphic analysis technologies offered by its partner, Nakanihon Air Service Co., Ltd. as well as the GIS (Geographic Information System) technology for general management of the aforesaid.

### 【Key to Success & Challenges for Further Development】

Support from local construction consulting company through the relationship built on the feasibility study contributed to the successful project from EVN. It is imperative to keep on raising awareness for disaster prevention and mitigation as well as nurturing technical experts over a long period in order to overcome the challenges such as insufficient anti-disaster resources, insufficient public-private partnership structure and limited technological expertise. Several projects have been underway to counter the landslides across the Greater Mekong Subregion and the Company will extend its business to other Greater Mekong Subregion countries leveraged on the experiences in Vietnam.

### 【Profile of Project Company】

Kawasaki Geological Engineering Co., Ltd. was established in 1943 as Japan’s pioneer in geological survey. The Company upholds hands-on approach and offers a comprehensive package of survey, analysis, reporting and consulting leveraged on the geophysical exploration and field measurement technologies. Based on the corporate philosophy of “Examining the Earth (Earth Doctor)”, the Company’s business scope stretches from land surface, underground, rivers to oceans across the Earth and provides diagnosis and consulting on each symptom for the establishment of a safe and affluent society. The Company also acts as a geological consultant overseas in the fields of ocean and energy, soil and geophysical exploration, disaster prevention and environmental survey. It also conducts soil exploration and natural environmental assessment besides incline disaster prevention mainly in Vietnam.

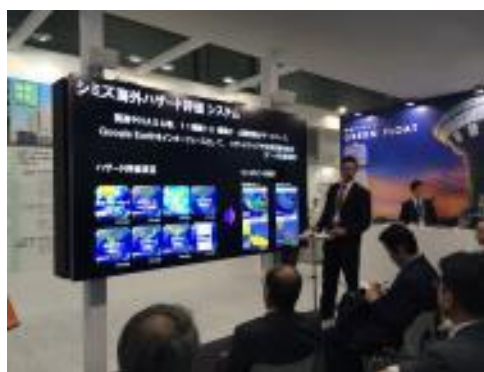
<http://www.kge.co.jp/> (Japanese text only)

## 2. Resilient Infrastructure against Natural Disasters / Climate Monitoring & Early Warning

### Protecting buildings and structures from disasters / Utilization of various hazard information SHIMIZU CORPORATION

#### 【Contribution to Adaptation Challenges】

Natural disasters associated with climate change deal a severe blow to buildings and other infrastructures and adversely affect the society and economy of developing countries including loss of social capital and damage to human life. SHIMIZU CORPORATION analyses potential disasters using its unique “Shimizu Global Hazard Evaluation System” in developing countries hit by massive disasters almost every year, based on which construction plans are drafted, designed and executed to accommodate measures against floods, torrential rain and various other disasters. Building disaster-tolerant structures serves as an adaptation measure in the field of infrastructure.



Shimizu Global Hazard Evaluation System

#### 【Project Details】

##### <Background>

SHIMIZU CORPORATION carried out a site analysis using “Shimizu Global Hazard Evaluation System” upon request from an Indonesian real estate developer based on high trust in anti-disaster technology of Shimizu developed in disaster-prone Japan. The request was part of a project of operating an office cum retail complex facility in Jakarta, Indonesia. The analysis revealed risks of torrential rain and thunderstorm in the scheduled construction site.

##### <Business Model of the Project>

The Project was proposed as BtoB model at the planning stage of a private corporate facility. The design and execution of the project incorporate measures against risks of torrential rain such as sufficient rainwater drainage system, relocation of power system above the inundation level, and installation of flood barrier against underground inundation.

##### <Related SDGs of the Project>



#### 【Product & Technology】

“Shimizu Global Hazard Evaluation System”, an integration of 16 open databases maintained by 11 world-famous research institutions, including the United Nations and the U.S. National Aeronautics and Space Administration (NASA). The System allows users to instantly view all the latest information needed for site-specific hazard assessments by selecting any location worldwide on Google Earth. Combined with the superb technology of Shimizu in construction and execution process, the system enables selection of optimal site and construction of buildings highly resilient to anticipated disaster risks.

#### 【Key to Success & Challenges for Further Development】

The Project was turned into business as a result of successful matching between the demand of target customers of the facility owner and the environmental and disaster-prevention measures materialized through the proposed technology. For further development, it is crucial to establish a business model allowing adaptation measures to generate products and services and create values.

#### 【Profile of Project Company】

SHIMIZU CORPORATION was founded in 1804 and earned high reputation in 1838 by participating in the construction of the West Wing of Edo Castle. The Company is built on several “first-ever” construction projects in Japan as a pioneer in construction of Western architecture. The Company’s business has expanded into global scenes in the third century of the company history. Embracing contribution to global society as its first management philosophy, the Company carries out various other projects for adaption to global warming including one aimed to halt a decline in harvest from dried peatland in Indonesia by introducing superb civil engineering technology such as water level control.

<http://www.shimz.co.jp/english/index.html>

### 3. Resilient Infrastructure against Natural Disasters

#### Protecting local community from threat of high tide and sea level rise

TAISEI CORPORATION

#### 【Contribution to Adaptation Challenges】

Island nations are vulnerable to high tides due to insufficient height above sea level and are at the brink of submersion due to rising sea level associated with global warming. TAISEI CORPORATION builds robust yet eco-friendly seawall in such vulnerable areas. In addition to enhancing disaster preparedness, the Company plays a key role in socioeconomic infrastructure and secure lives and assets of island people. Building robust seawall serves as an adaptation measure in the field of infrastructure.



Bird's-eye view of Male Island



Visual Illustration of Seawall

#### 【Project Details】

##### <Background>

Male Island in the Maldives has been repeatedly hit by high tides due to flat landscape which is only 1.5 meters above sea level. Unusually high tides in 1987 and 1988 wrecked existing seawall structures and residences, paralyzed government operations and the total damage was worth 6 million US dollars. The Island is also at the brink of submersion due to the sea level rise associated with global warming. The Maldives is heavily dependent on the import of construction materials and much of the concrete aggregate was delivered from neighboring Malaysia and Singapore. Water for construction and domestic use by workers came from desalinated sea water. To conserve natural environment from adverse effects of construction, the Company set out self-disciplinary principles and refrained from coral stone mining. All such efforts bore fruit at the time of major earthquake off Sumatra in December 2004 when the Island had no human casualty and very little collateral damage which significantly contributed to saving human life and maintaining key government functions.

##### <Business Model of the Project>

The Japanese government offered grant aid to support the construction of seawall. Taisei Corporation took on the construction of breakwater along the south coast of Male Island in 1987 which stretched 6 kilometers around the Island as robust seawall.

##### <Related SDGs of the Project>



#### 【Product & Technology】

- Sloped revetment using ripraps and tetra pods
- Vertical seawall using concrete blocks and caissons (large concrete or steel boxes used in construction of seawall and other underwater structures or underground structures) and others

The traditional seawall built by the government of Maldives is made of piled coral mass coated with mortar and is vulnerable to wave pressure. Thus the Company applied the above-mentioned technology to build a staunch and durable seawall for long use which helps to mitigate maintenance burden while enhancing disaster preparedness.

#### 【Key to Success & Challenges for Further Development】

High-quality infrastructure was developed through the construction of eco-friendly seawall reflecting local demand. Next focus is to improve cost-competitiveness and technological differentiation for further development.

#### 【Profile of Project Company】

TAISEI CORPORATION was founded in 1873 and established itself as one of five super general contractors, with unique strength in large-scale construction and civil engineering works including skyscrapers, airports, dams, bridges and tunnels. Its' core competence lies in technology and close-knit group structure built on its early presence overseas. The Company won the submarine tunnel project under the artificial "Palm Island" off Dubai with much credit to its groundbreaking proposal outshining European and American competitors. The Company was also highly accredited for its consideration on environmental aspects by local community (catching fish feared to be affected by construction works beforehand and releasing them upon completion, or restoration of seaweed bed).

<http://www.taisei.co.jp/english/index.html>

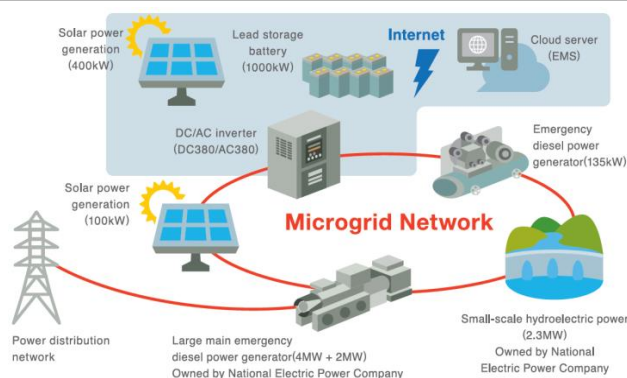
## 4. Sustainable Energy Supply

### Introducing a resilient hybrid power generation control system against environmental changes Kyudenko Corporation

#### 【Contribution to Adaptation Challenges】

Power supply in remote islands is often dependent on regional grids through diesel generators due to a lack of massive power transmission network and therefore the power supply is not stable and chronically tight. In addition, remote islands are highly vulnerable to natural disasters on account of geographical characteristics. To counter these issues, it is imperative for them to be equipped with a resilient electric power system against diverse weather conditions.

Hybrid power generation control system introduced by Kyudenko Corporation is an on-grid system that overcomes the unstable supply of solar power and enables self-sustained and stable power supply. In addition, EMS (Energy Management System) enables the optimal control of renewable energy supply while countering abrupt meteorological and environmental changes.



Overview of Microgrid Facility in Sumba Island, Indonesia

#### 【Project Details】

##### <Background>

In the western side of Sumba Island, the Agency for the Assessment and Application of Technology Indonesia (Badan Pengkajian dan Penerapan Teknologi: BPPT) carried out demonstration tests of a hybrid power generation plant comprising solar power generation facilities, redox flow cells and emergency diesel power generators, where power generation and storage failed and stable power supply for the microgrid was insufficient. Upon visit in October 2015 to the technology center of Huis Ten Bosch and microgrid developed by Kyudenko mainly leveraged on renewable energy, the officials from BPPT requested for the introduction of the plant.

In addition, the Project was selected for the “Low Carbon Technology Innovation Project 2016” by the Ministry of Environment of Japan in July 2016.

##### <Business Model of the Project>

As part of the future business strategy, the Project will be extended into an EPC project where Engineering, Procurement and Construction are carried out by a local entity upon order from power companies.

##### <Related SDGs of the Project>



#### 【Product & Technology】

By introducing EMS where technologies for the generation and storage of renewable energy power are remotely controlled, a self-sustained and stable power supply is ensured for certain duration of time and at certain volume. Further, operation & management (O&M) method will be established based on the power output and meteorological data collected. Lead cell will be used for the power storage system. Lead storage cell is affordable but short-lived as its life is less than half the life of lithium-ion storage cell, however, the Company developed a lead storage cell control system by controlling charge and discharge that doubles or more the life of lead storage cell.

#### 【Key to Success & Challenges for Further Development】

The Project owes much of its success to the existing close relationship with local government authorities that enabled the development of a customized system that suits the local environment and requirement while minimizing costs.

For the staged introduction of an on-grid hybrid power generation control system to the diesel grids in 600 sites in remote islands, the Company will obtain SNI (Indonesian National Standard) license via BPPT while approaching the presiding Ministry of Energy and Mineral Resources for the introduction of its plan. In addition, in an aim to extend its off-grid power generation control system largely leveraged on renewable energy in other islands of Indonesia, the Company also aims to introduce a system catering to areas without electricity or isolated power sources.

#### 【Profile of Project Company】

Kyudenko Corporation was established in 1944. In 1964, the Company launched air conditioning pipe installations ahead of its counterparts and thereafter aggressively diversified its management by delving into the environment, information, telecommunication and renewal services. The Company takes the environment-related services to be the 4<sup>th</sup> pillar of its businesses following power distribution, electricity and air conditioning and promotes the conventional wind power and solar power generation services while extending the business fields leveraged on its unique energy-saving technology.

In July 2015, the Company built a power generation system using solar and wind power in the premises of the technology center and villas of the HUIS TEN BOSCH in Sasebo-city, Nagasaki and developed EMS to efficiently control the supply and demand of energy. The power transmission wire of the Kyushu Electric Power Co., Inc. has been detached since February 2016 and the electricity demand from the premises of villas has partially been covered with a stable supply of renewable energy generated under EMS.

<http://www.kyudenko.co.jp/english/index.html>



## 5. Sustainable Energy Supply

### Mitigating damage to energy supply system in times of disasters

Panasonic Corporation

#### 【Contribution to Adaptation Challenges】

Increase in natural disasters associated with climate change affects people's lives significantly by damaging energy infrastructure, destabilizing supply network, and obstructing educational and medical activities. Panasonic Corporation provides stand-alone power generation for emergency utilizing environmentally-friendly renewable energy such as "Solar LED Lights", "Solar Storage" and "Power Supply Containers". It serves as adaptation measure in the field of energy to mitigate the threat to people's health and life due to the lack of access to power in times of major disasters.



Solar Storage



Brightness for Local Community (Ethiopia)

#### 【Project Details】

##### <Background>

In 2006, then Vice President of Uganda visited Japan and toured the Company's solar facility (Solar Ark by SANYO), leading to the request from the Vice President for cooperation later on. Research and development was launched using its unique strength of energy storage and energy generation technology now known as "Solar Lanterns". The Company commenced "100 Thousand Solar Lanterns Project" in February 2013 aiming at donating 100 thousand solar lanterns to developing countries by 2018 when the Company marks its 100th anniversary.

##### <Business Model of the Project>

Panasonic Corporation provides Solar Lanterns or Solar Storage to international organizations and NGOs in Myanmar, India, Kenya and Ethiopia where increase in disasters associated with climate change is feared to adversely affect life and environment of local community.

In Indonesia, "Power Supply Containers" have already been provided by the Company for remote islands through grant assistance for grassroots project by the Embassy of Japan Indonesia to support children's learning. Providing emergency power supply contributes to crime prevention and sustained education at night or blackout, or swift medical checkup and treatment in malaria-prone tropical regions.

##### <Related SDGs of the Project>



#### 【Product & Technology】

Panasonic Corporation offers an array of energy supply tools including the following.

- "Solar Lanterns", an affordable solar LED lighting for low-income household while meeting the demand of non-electrified community for greater brightness.
- "Solar Storage", a small power storage system with LED lighting using nickel-metal hydride battery with an expected life of five years and is capable of charging up to three smart phones or seven mobile phones
- "Power Supply Containers", a stand-alone photovoltaic power package capable of generating approximately 3kW of electricity.

#### 【Key to Success & Challenges for Further Development】

Next challenge is to achieve further dissemination in local market through cooperation with partners extending bulk sale projects in the target area such as international organizations and NGOs while taking under consideration the utilisation of public finance schemes.

#### 【Profile of Project Company】

Panasonic Corporation was founded in Osaka in 1918 by Konosuke Matsushita, upholding the philosophy of extending life with easy access to electricity throughout the world. Since then the Company has taken on a wide range of initiatives. The Company has encouraged adaptation efforts as part of its project in alleviating the impact of climate change through its products, services and solutions while providing support for the growth of business activities under its CSR commitments including this project. The Company won the Good Design Award 2013, IAUD Silver Award 2013 under Social Design Category and iF Product Design Award 2014 for its Solar Lanterns and the Good Design Award 2015 for its Solar Storage.

<http://panasonic.net/sustainability/en/lantern/>

## 6. Food Security & Strengthening Food Production Base

### Contributing to sustainable agriculture through “Bio-cycle”

Ajinomoto Co., Inc.

#### 【Contribution to Adaptation Challenges】

In many developing countries where agriculture plays a key role for the economy, it is feared that climate change will bring shrinkage of arable farmland and subsequently results in drop in the agricultural yield.

Ajinomoto Co., Inc. successfully improved the quality of agricultural produce and raised the profitability of farmland through the operation of its “Bio-cycle”, a resource-recycling production model. Furthermore, Ajinomoto has achieved reduction of consumption of chemical fertilizers (nitrogen-content), emission of carbon dioxide, and wastes generated during the production process.

#### 【Product & Technology】

**Bio-cycle:** A regional Co-product, left upon the isolation of amino acid from agricultural produce using resource-saving fermentation technologies, is utilized locally as fertilizer and feed. In Brazil, resource has repeatedly been recycled where Co-product derived from the process of isolating amino acid from molasses procured from sugar factory, is processed into organic feed and returned to sugarcane or grape plantation for their growth.

**Resource-saving fermentation technologies:** Resource-saving and recycling-oriented fermentation technologies that reduce the use of sugar and other ingredients as well as discharge of water using cutting-edge bio technology.

#### 【Project Details】

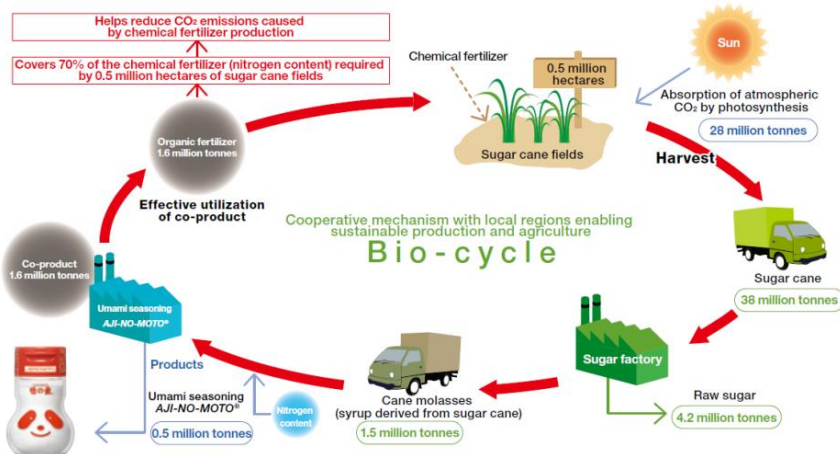
##### <Background>

Ajinomoto has implemented “Bio-cycle” in its factories worldwide since 1960’s, including the factory in Brazil, the biggest factory worldwide since the Company entered into Brazilian market, to secure the stable local procurement of ingredients for amino acid.

##### <Business Model of the Project>

“Bio-cycle” is a business model where resources are recycled for the recovery and reinforcement of natural resource capital. In Brazil, 99% of the byproduct (co-product) derived from amino acid fermentation process has successfully been recycled through the sale to local farmers as feed and organic fertilizer which will eventually be returned to farmland. In May 2012, a biomass boiler has been introduced as a step to “fuel bio-cycle” using bagasse, achieving stable procurement of energy used in the factory, approximately 40% of which is biomass fuel in 2014.

##### <Related SDGs of the Project>



##### ◀ Description of “Bio-cycle”

The chart assumes worldwide annual production of approximately 0.5 million tonnes of the umami seasoning AJI-NO-MOTO® by the Ajinomoto Group using only sugar cane.

##### ▼ A Grape Farmer in Brazil



#### 【Key to Success & Challenges for Further Development】

Bio-cycle has become a norm in Brazil, a major agricultural country, where the use of fertilizer is common and there is sufficient domestic demand for the sale of Co-product as fertilizer. Bio-cycle has also gone beyond a mere resource recycling business and generated a diverse range of community-based benefits to the entire region such as products, byproducts, employment, consumption and lifestyle.

Ajinomoto aims to achieve “a ratio of renewable energy usage of 15% and higher” and promotes the expansion of Bio-cycle to the energy field through the production of biomass fuel using nonedible parts of fermentation ingredient.

#### 【Profile of Project Company】

Ajinomoto Co., Inc. is a global food company founded in 1909. The Company has enlarged its business territory into the feed, medical and pharmaceutical, and chemical field based on amino acid and centered on bioscience and fine chemical technologies on top of condiments and processed food. It’s one of the world’s largest amino acid producers through fermentation in its 18 factories stretching over 9 countries of Asia, Europe and America. Ajinomoto has encouraged sustainable production focused on the recovery and reinforcement of natural resource capital and establishment of a supply/value chain through the introduction of “Bio-cycle” in various parts of the world since 1960’s. The Company won the “Minister’s Prize, the Ministry of Agriculture, Forestry and Fisheries” under the “Eco Products Awards” in 2016 and has throughout been selected for “FTSE4GOOD” since 2004 and “DJ Sustainability Index” since 2014.

<https://www.ajinomoto.com/en/>

## 7. Food Security & Strengthening Food Production Base

### Adapting to changing cultivation environment for traditional crops

Dari K Co., Ltd.

#### 【Contribution to Adaptation Challenges】

Irregular rainfall due to abnormal weather associated with climate change causes serious impact on agricultural products and erratic weather such as downpour and drought reduces crop yield. Dari K Co., Ltd. promotes conversion from traditional agricultural products to high-quality cacao in Indonesia which requires less water and fertilizer. It serves as an adaptation measure in terms of sustainable food supply and stronger agricultural production base to promote weather-consistent agriculture and production of value-added crops which contributes to greater income of farmers.



▲ Quality Assurance by President & CEO Keiichi Yoshino with Local Staff

▶ Checking Growth of Cacao Trees



#### 【Product & Technology】

Dari K directly imports cacao grown in Indonesia, process and sell the final chocolate products. In Indonesia, cacao beans have been shipped without undergoing the process of "fermentation" which is imperative for tasty chocolate. To produce cacao beans in Indonesia that satisfy the quality requirements of the Japanese market, Dari K started with instilling the importance of fermentation to local cacao farmers. Subsequently, Dari K provided hands-on guidance on fermentation technology and directly bought from local farmers the fermented high-quality cacao beans as part of the initiatives to improve their revenue environment. At the same time, in order to rid the negative reputation of "poor quality without fermentation" labelled on Indonesian cacao beans and to raise the public awareness as high-quality cacao beans, Dari K imports Indonesian cacao beans for its own production and sale of chocolate merchandise.

#### 【Key to Success & Challenges for Further Development】

Challenges ahead are to establish a value chain where farmers, chocolate manufacturers and consumers equally find value in. Further development will be sought through the achievement of following Triple Wins:

- (1) Farmers obtain knowledge and skill on how to grow high-quality cacao and enjoy higher income.
- (2) Dari K, as chocolate manufacturer, secures the procurement of high-quality cacao beans.
- (3) Consumers go beyond "donation" and spend on authentic high-quality products.

#### 【Profile of Project Company】

Dari K Co., Ltd. was founded in March 2011 to manufacture and sell chocolate and other cacao-related products as well as for import and wholesale of cacao beans. The Company was acknowledged by Kyoto City in April 2016 as one of the "Enterprises to sustain upcoming 1000 years" and by the Ministry of Economy, Trade and Industry of Japan in May 2016 as one of the VIBRANT (HABATAKU) Small and Medium Enterprises 300". In May 2017, Dari K won the "Engagement Award", under SDGs Business Award 2017 awarded by Kanazawa Institute of Technology and BoP Global Network Japan.

<http://www.dari-k.com/en/>

#### 【Project Details】

##### <Background>

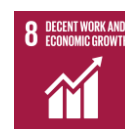
The Project was selected for the "Preparatory Survey for BOP Business\*" by Japan International Cooperation Agency (JICA) in 2014, and the "Feasibility Study for Visualization of Contribution by Japanese Companies to Adaptation Measures in Developing Countries" by the Ministry of Economy, Trade and Industry of Japan in 2015.

\* Current: Feasibility Survey for SDGs Business

##### <Business Model of the Project>

- Some regions in Indonesia are feared to suffer from reduced harvest of traditional crops due to a decline in rainfall. The Company aims to enhance adaptation capability of small farmers by encouraging conversion to cacao production which requires less water and fertilizer while mitigating vulnerability to climate change through adoption and permeation of high-value added cacao agroforestry.
- The Company takes on specific measures such as raising cacao farmers' awareness, introducing fermentation technology and securing exit through the purchase of fermented high-quality cacao beans in order to establish a framework for added value at the upstream of supply chain and greater income of farmers. Also, the Company strives to improve the negative reputation of cacao grown in Indonesia through direct import and processing to produce high-quality chocolate products.

##### <Related SDGs of the Project>



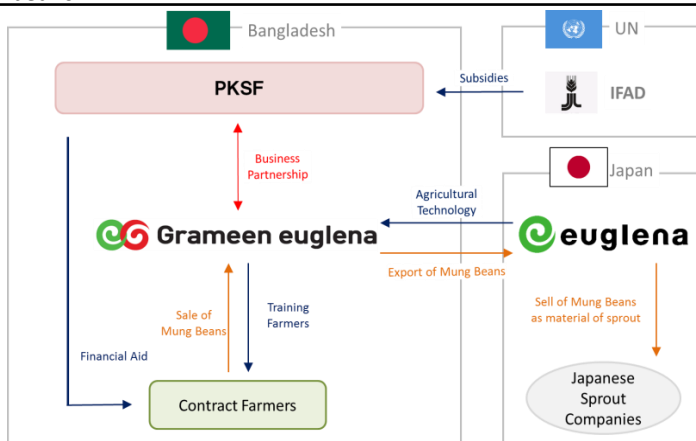
## 8. Food Security & Strengthening Food Production Base

### High quality mung beans production in salinised lands

euglena Co., Ltd.

#### 【Contribution to Adaptation Challenges】

The issue of soil salinisation due to the influx of salt water into rivers and underground water on account of the rising sea level and coastal erosion triggered by climate change are gaining significance. By engaging in mung beans production utilizing agricultural technology based on appropriate cultivation management in regions affected by soil salinisation, euglena Co., Ltd. has contributed to improving lives of local residents through reducing poverty by generating job opportunities for farmers, increasing income and enhancing nutrition with cultivation technology for better crop yield and quality of mung beans.



\* PKSF = Palli Karma-Sahayak Foundation  
IFAD = International Fund for Agricultural Development



- ◀ Sorting mung beans
- ▼ Packing mung beans



#### 【Project Details】

##### <Background>

euglena Co., Ltd. established a joint venture with Grameen Group Group (currently Grameen euglena) in 2010 after Mr. Yuko Satake, Co-CEO of Grameen euglena joined a study tour in Bangladesh as part of the training organised by “Nippon Genki Juku”, a leadership academy on innovative business to which he is a member and conducted a field survey on local villages. A trial harvest of mung beans also started in the same year. Through implementation of the “Feasibility Study for Visualization of Contribution by Japanese Companies for Adaptation Measures in Developing Countries” supported by the Ministry of Economy, Trade and Industry of Japan from 2012 to 2015, the large-scale harvest and exports to Japan have started since.

##### <Business Model of the Project>

Grameen euglena guides on harvest method to farmers, sells mung beans in Bangladesh, commercialises (sorting) mung beans for export to Japan while euglena Co., Ltd. supplies mung beans to Japanese bean sprout producers. The Project will further be expanded through business cooperation agreed in 2016 with a Bangladesh governmental development institution, PKSF. PKSF encourages farmers to participate in the Project through its extensive network mobilizing approximately 20 million farmers. IFAD, a specialized agency of the United Nations, provides financial support necessary for the activities.

##### <Related SDGs of the Project>



#### 【Product & Technology】

Desalination work: Ploughing, irrigation

Development of salt-resistant variety: Test culture in pot by the salinity, test on the testbed

Quality enhancement in mass production: Plowing, calcium fertilizer, review of seeding period

Verifying effect of rotating crop: Survey by the field and conditions, survey of root nodule bacteria by the harvest period

mung beans ▶



#### 【Key to Success & Challenges for Further Development】

Success of the Project is largely attributable to its community-based style such as the launch of a Joint venture with local partner which helped to nurture trust with the government of Bangladesh as well as the establishment of a value chain through the development of sales network in Japan. With the stable growth of mung beans production, the number of farmers involved in the Project exceeded 5,000 in 2017 and the farmland stretches over 2,400ha in total.

The Project eyes the diversification of crops and harvest areas for further growth of business while contributing to better global environment at the same time.

#### 【Profile of Project Company】

euglena Co., Ltd. was incorporated in 2005 with the corporate philosophy of “Make People and the Earth Healthy”. The Company strives to solve the global food and environmental issues through its business activities such as the research and development, production and sale of microalgae *euglena* (Japanese name: *Midori-mushi (green bug)*). The scope of business of the Company leveraged on the technology stretches from healthcare (food and cosmetics) to energy and environment (bio diesel fuel and bio jet fuel). President Mitsuru Izumo of euglena Co., Ltd. was selected as Young Global Leader 2012 by the World Economic Forum (Davos Forum) and won the Prime Minister’s Award under the First Nippon Venture Award 2015.

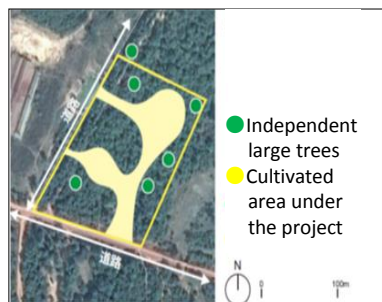
<http://www.euglena.jp/>

## 9. Food Security & Strengthening Food Production Base / Health & Sanitation

### Circular-economy business model established through organic soil afforestation to prevent flood and protect eco system from far east inc.

#### 【Contribution to Adaptation Challenges】

Frequent drought, flood, typhoon and landslide due to climate change damages the eco system and agricultural industry, which is a key industry in many developing countries. Afforestation activity with utilizing organic soil improver by *from far east inc.* serves for windbreak, prevents landslide and promotes the recovery of eco system as well as contributing to greater productivity of agricultural produce and medical/pharmaceutical ingredients.



◀ Visual Vegetation Plan

▶ Merchandize for Japan Market:  
 (Top Left) Moringa Tablet  
 (Bottom Left) Moringa Oil  
 (Right) Organic Shampoo



#### 【Project Details】

##### <Background>

The Company has operated beauty school in Cambodia since 2013. In collaboration with IKTT (Institute for Khmer Traditional Textiles) for the procurement of dye materials, it developed a comprehensive vegetation plan as adaptation project based on IKTT's forest recovery project called "Traditional Forest" to grow plants for preventing flood. The Company has expanded the business through implementation of the "Feasibility Study for Visualization of Contribution by Japanese Companies for Adaptation Measures in Developing Countries" by the Ministry of Economy, Trade and Industry of Japan from 2014 to 2016.

##### <Business Model of the Project>

The Company has established a circular economy business model in the villages of Cambodia branded "Forest Wisdom" under which afforestation using its soil improver, product development, sales in Japan market (Aeon, Tokyu Hands, etc.) as high value-added and re-investment into the environment are carried out. Stable supply of ingredients has been established through the reinvestment of profits into the expansion of afforestation areas.

##### <Related SDGs of the Project>



Business Model of the Project

#### 【Product & Technology】

For organic and stable production while reducing costs of cultivation and materials, soil improvement has been carried out using the soil improvement technology of Cosmic Limited, an established company in raising productivity through organic harvest in Japan that enabled the production of ingredients for beauty products such as shampoo, soap and hair color products. Sales have been extended to Japan market through the sales network established with major domestic retailers via company website and effective marketing strategy.

#### 【Key to Success & Challenges for Further Development】

The Company utilized its local network gained from operation of beauty school and its own know-how to establish the circular economy business model that can attract government and donor support and generate profit. For further development, localized processing and manufacturing are considered for higher income of farmers. The Project also aims to achieve a profit ratio of more than 50% through the involvement of diverse industry players such as solar power and small hydropower operators to promote the procurement of renewable power for water pumps and processors.

#### 【Profile of Project Company】

*from far east inc.* was founded in 2003 as a developer and distributor of beauty merchandize. With the management philosophy of "delivering emotional and physical happiness from Japan to the World" the Company introduces high standard technologies accumulated in the Japanese beauty industry to developing countries for the establishment of business together with local community that substantiates "environmental protection = economic development". The Company has launched through its own E-commerce website and domestic retailers in Japan the sale of natural cosmetic products under the "minnade mirai o" (together for the future) brand using the ingredients procured from "Forest Wisdom" project launched in Cambodia in 2014. The achievement of the Project was presented at COP21 held in Paris in 2015. The Project won "SDGs Business Award 2017 Grand Prize" in May 2017, the first initiative organized by the Kanazawa Institute of Technology.

<http://minnademiraio.net/> (Japanese text only)

## 10. Food Security & Strengthening Food Production Base

### Greater harvest through compost soil improver

Kawashima Co., Ltd.

#### 【Contribution to Adaptation Challenges】

Aggravating water shortage due to increasing incidents of drought has wreaked havoc on agricultural production and led to the decline of self-sufficiency ratio of the country's food supply. Many developing countries where much of the working population consists of farmers are under vulnerable environment and it is an urgent socio-political issue to raise the agricultural productivity. Through introducing Kawashima Co., Ltd.'s compost plants and assisting the establishment of an organic fertilizer supply system by producing high-quality compost processed from household waste and agricultural waste materials, will bounce the harvest while improving soil conditions and ultimately solve the issues surrounding food security and poverty.



Screw-shaped Compost Plant "RA-X"



Active Microorganism Feed "BA-X"

#### 【Project Details】

##### <Background>

Sri Lanka has been plagued by increasing household waste brought by economic development and transformed lifestyle. Household waste is dumped and left open in disposal sites, causing issues of foul smell, poor hygiene and contamination of underground water. The remaining life of disposal sites is getting shorter as well. Approximately 55% of the household waste is garbage, an organic waste material. Recycling garbage as compost through aerobic fermentation effectively reduces the volume of garbage. The Project was selected for the "Verification Survey with the Private Sector for Disseminating Japanese Technologies (SME Verification Survey)" by Japan International Cooperation Agency (JICA) in 2013 and started operation in April 2017. Since then, 9 additional plants have been procured by the government of Sri Lanka.

##### <Business Model of the Project>

Kawashima Co., Ltd. exports the equipment manufactured in Japan to local governments. Local partner companies of Kawashima provide maintenance, manage operations and supervise project execution.

##### <Related SDGs of the Project>



#### 【Product & Technology】

**Compost Plant "RA-X"**: A screw-shaped auto mixer that mixes organic waste material for even aeration and maintains aerobic fermentation at high temperature for effective production of high-quality compost. The device is affordable and easily maintained.

**"BX-1"**: An active microorganism feed that deodorizes and turns mud, sludge and animal wastes into compost. Its main ingredient is rice bran and it accelerates fermentation of compost while curbing odor during the fermentation process.

Both "RA-X" and "BX-1" are a unique technology of Kawashima and the former has been patented (Patent Number: 3607252). A project based on the both technology has been registered as Clean Development Mechanism (CDM) project in 2011.

#### 【Key to Success & Challenges for Further Development】

Support from JICA through its SME Verification Survey was imperative for a new technology to prove its past achievement which is a must-have for its introduction. The Project turned into business through the successful establishment of relationship with local government and demonstration of technological and economic superiority. The Company plans to extend the Project into Asia over a medium to long term.

#### 【Profile of Project Company】

Kawashima Co., Ltd. was established in 1987 and developed "RA-X", a compost plant in 2000. The Company manufactures and sells the plant and upholds the corporate mission to establish a recyclable society through its eco-friendly technology.

<http://www.kawashima.jp/index.html> (Japanese text only)

# 11. Food Security & Strengthening Food Production Base

## Transforming desert into farmland with Roll Planters®

Toray Industries, Inc. / Mitsukawa Co., Ltd.

### 【Contribution to Adaptation Challenges】

Desertification caused by climate change induced drought has eaten its way into farmland and triggered food shortage. Furthermore, in countries with a large mining industry, such as South Africa, mining business has left toxic chemical substances in the soil (mine dump) and dust flying from the mine dump due to rainfall scarcity and desertification are creating health threat to residents living near the mine dump and pollution of agricultural products.

“Roll Planters®”, jointly developed by Toray Industries, Inc. and a knit fabric manufacturer/distributor Mitsukawa Co., Ltd, is a roll-shaped agricultural textile that effectively transforms desert and devastated land into farmland as well as preventing dust flying from and greening of the mine dump.



◀ Roll Planters® arrayed on the mine dump

▶ Mine dump after successful greening. Roll Planters® arrayed crisscross also prevent dust flying into the air.



### 【Project Details】

#### <Background>

In response to the interest in Roll Planters® technology by embassy officials of the Republic of South Africa introduced at an exhibition in 2010, small demonstration test was carried out in the country which successfully transformed the mine dump into lush land. The Project was selected for the “Feasibility Study for Visualization of Contribution by Japanese Companies for Adaptation Measures in Developing Countries” by the Ministry of Economy, Trade and Industry of Japan in 2012 and 2013. Jointly with Mitsukawa and Netafim Japan, a drip irrigation company, Toray has worked on the development of “Business Model for Agriculture Promotion” since 2013 under the “Inclusive Market Development (IMD)” by UNDP.

#### <Business Model of the Project>

Toray has implemented demonstration cultivation using Roll Planters® in various areas of South Africa as part of the initiatives to familiarize the local community with the product. It started cultivating Sorghum in 2016 on the mine dump which is resistant to environmental stress and used as an feedstock of bio fuel. Sale of bio fuel is expected to raise the income of local residents in future. Knitting machines have been delivered to South Africa to establish local production system of Roll Planters®. Mitsukawa supervises and provides guidance on operation and maintenance of the machines for local workers.

#### <Related SDGs of the Project>



### 【Product & Technology】

**Roll Planters®:** A roll-shaped agricultural material made of Toray's polylactic acid (PLA) filaments derived from plants and woven with Mitsukawa technology. PLA fiber, with great resistance to ultraviolet rays and superb durability, is suitable for vegetation. Made of corn starch, it is ultimately biodegraded into water and carbon dioxide, leaving no environmental impacts.

Roll Planters® filled with soil and arrayed on the land will help root the seeds on it. Water and air sufficiently retained by the Roll Planters® help maintain the temperature around the root at an adequate level and enable crops to grow even on the desert, devastated land or concrete surface. Combined with drip irrigation, Roll Planters® enable efficient supply of water and fertilizer.

### 【Key to Success & Challenges for Further Development】

Roll Planters® matched the demand of local community for its function to transform futile desert and devastated land into lush farmland as well as user-friendliness. For full-fledged development of the Project in the Republic of South Africa, efforts must be continued toward the future to familiarize local governments and relevant parties with the Project while building on repeated demonstration and trial. The Company plans to expand the Project into other African nations faced with similar challenges.

### 【Profile of Project Company】

**Toray Industries, Inc.** is a chemical manufacturer started in 1926. It has extensively launched a wide range of products covering from daily sundries to chemical products for industrial purposes such as nylon, polyester, acrylic textiles, plastic, chemical and information technology materials. The Company strives to establish a group corporate reputation of “Toray's Green Innovation” through the invention of revolutionary technology and products that halt the global warming and maximize resources. Roll Planters® won the Minister's Award from Ministry of Economy, Trade and Industry of Japan under the 24th Global Environment Award.

<http://www.toray.com/>

**Mitsukawa Co., Ltd.**, established in 1973, is a knit fabric manufacturer and trader. The Company has strived towards developing its own unique new materials. In Japan, the Company is engaged in roof-top and school yard greening projects utilizing Roll Planters®, which contribute to mitigation of urban heat island effect.

<http://mitsukawa.com/> (Japanese text only)

### Mitigating impact of frequent forest fire on plants and animals

Shabondama Soap Co., Ltd.

#### 【Contribution to Adaptation Challenges】

Rise in temperature associated with climate change is said to accelerate dryness in mountainous areas and forests, making them prone to forest fire which triggers air pollution and adversely affect the health of people in a wide range. Loss of forests also aggravates the collapse of ecosystem, impairs food production base due to the impact on food chain and transformation of harvest environment as well as extinction of plants and animals as a resource for pharmaceutical supplies. Shabondama Soap Co., Ltd. developed soap-based extinguishing agent without synthetic surfactant agent, used as an eco-friendly yet high-performance fire extinguisher which is a foam mixed of water and air that performs quick fire extinction with much lesser water consumption as compared to purely water-based fire extinguisher. Curbing loss of forests associated with climate change serves as adaptation measure in the field of health & sanitation, food security & strengthening food production base.



◀ Fire extinction



▶ Project Briefing to Local Affiliates

#### 【Project Details】

##### <Background>

Forest fire in dried peat land is extremely hard to put out and lasts long due to its high content of carbon. Indonesia, where almost half the world's tropical peat land belongs to, is named "Global Powder Keg" and forest fire poses a strong threat to the country. Shabondama Soap conducted a study and demonstration project in 2013 under Japan International Cooperation Agency (JICA) program to demonstrate fire extinction agent for peat land in Indonesia.

##### <Business Model of the Project>

Its sale started in 2015 for major local supplier of fire extinction machinery and materials. Shabondama Soap conducted a market survey in Indonesia from 2016 under JICA program. The Company strives to conserve the habitat of plants and animals through the measures against peat land haze hazard caused by forest fire in dry season, and protection of forests by means of fire extinction. The Company eyes the possibility of local production in future.

##### <Related SDGs of the Project>



#### 【Product & Technology】

Soap-based extinguishing agent is mainly made of less-poisonous soap. It not only dissolves fast but is also friendly to ecosystem as its surfactant effective vanishes upon combination with naturally-abundant minerals such as calcium and magnesium. It is highly credited for fast absorption and having no need to be washed away especially in case of architectural fire incident. In 2007, the product received Minister for International Affairs and Communications Award by the Cabinet Office, Japan, for its distinguished achievement in industry-academia-government collaboration. It also attracts much attention as a prospective contributor in countering forest and peat fire in vast land of Southeast Asia, Russia and Australia.

#### 【Key to Success & Challenges for Further Development】

The soap-based product has widely been accepted in local market for its environmental friendliness and immediate effect in solving the cross-border issue of haze hazard caused by forest fire. Stronger cost-competitiveness through local production is the next challenge to achieve a greater share on local market.

#### 【Profile of Project Company】

Shabondama Soap Co., Ltd. was founded in 1910 as "Morita Hanjiro Shoten" (Shabondama Soap Co., Ltd. since 1987). Since 1974, the Company produces and sells additive-free soaps containing no chemical or synthetic additives. In 2001, upon request from regional fire department in Kitakyushu recognizing the need for fire extinguisher with consumption of less water, which was triggered by the lessons learned from the Great Hanshin Awaji Earthquake where damaged water pipelines aggravated fire disasters, the Company launched a joint development project with the University of Kitakyushu and commercialized soap-based fire extinguisher which has been in the market since 2007.

<https://www.shabon.com/english/index.html>



## 13. Health & Sanitation

### Preventing spread of infectious diseases associated with climate change

Sumitomo Chemical Company, Limited

#### 【Contribution to Adaptation Challenges】

Rise in temperature associated with climate change is feared to transform and expand the habitat of infectious disease vector and host organism, leading to the outbreak of infectious diseases in new territories and increase in the number of patients. Sumitomo Chemical Company, Limited developed “Olyset® Net”, a mesh screen to repel malaria-transmitting mosquitoes in an effort to eradicate the disease. In 2001, the “Olyset® Net” was acknowledged by WHO as the first of its kind for its long-lasting repellent effect. Containing the growth of infectious diseases associated with climate change serves as an adaptation measure in the field of health and sanitation.



Child playing with “Olyset® Net”



Manufacturing plant

Photographs © M.Hallahan

#### 【Project Details】

##### <Background>

“Olyset® Net” was developed upon series of research and development in an attempt to help contain the outbreak of malaria by applying the conventional technology used for mesh screen in factories as bug shield. The Net is made of polyethylene resin woven with insecticide agent for gradual surfacing which helps maintaining repellent effect for a long period after repeated washing. The technology was enhanced for the development of “Olyset® Plus” that effectively repels even the resistant malaria vector mosquitos.

##### <Business Model of the Project>

- The Company started local production in September 2003 through the grant of manufacturing technology to A to Z Enterprise in Tanzania. To meet the surging demand, “Olyset® Net” production company was set up as a joint venture with A to Z Enterprise, through which as large as 7000 job opportunities were generated and regional economy grew.
- In 2010, the Company built a production framework combined with Asian production bases which aggregately is capable of manufacturing as much as 60 million pieces annually. The product is now available in more than eighty countries through such international organizations as the Global Fund and UNICEF.
- In addition, the Company has launched sales to the general consumers through local supermarkets in Kenya and countries in Asia since 2011 in order to diversify channel of sales.

##### <Related SDGs of the Project>



#### 【Product & Technology】

Olyset® Net/Olyset® Plus: Mosquito net accredited by the “Sumika Sustainable Solutions” initiatives. The Products are made of polyethylene woven with the insect repellent agent of pyrethroid enhanced with the “Controlled Release” technology that gradually releases the agent up to the surface. The Products are characterized as follows:

- Durability for thick polyethylene unlike the conventional polyester mosquito net
- Insect repellent effect that lasts more than 5 years
- Good airiness for unique mesh shape that suits the hot weather in Africa

#### 【Key to Success & Challenges for Further Development】

At the initial developmental stage, the Product was first introduced to international organizations and governments of developing countries along with a proposal on its regulatory approval process in consideration for its novelty in global market. Besides application to mosquito net, the technology will further be developed into comprehensive mosquito repellent measures considering the eco system including the treatment of agents that suits each environment.

#### 【Profile of Project Company】

Sumitomo Chemical Company, Limited was founded in 1913 to manufacture fertilizers from sulfur dioxide emitted by smelting operations at the Besshi Copper Mine in Niihama, Ehime Prefecture, Japan, with the aim of alleviating the air pollution caused by the emissions. The Company, together with its over 100 group companies, currently supplies an array of products worldwide to support several industries and people’s lifestyle from its five sectors of petrochemicals & plastics, energy & functional materials, IT-related chemicals, health & crop sciences and pharmaceuticals. The Company received the GBC Health Business Action on Health Awards 2012 for its dedication for “Olyset® Net”.

(Reference) “Sumika Sustainable Solutions” Initiatives:

<https://www.sumitomo-chem.co.jp/english/csr/news/docs/20170731e.pdf>

## 14. Climate Monitoring & Early Warning

### Contributing to minimize damage caused by flood

NEC Corporation

#### 【Contribution to Adaptation Challenges】

Rise in temperature associated with climate change is said to raise the sea level which adds to evapotranspiration and frequency of downpour, resulting in water-triggered disasters including more floods and severer landslides dealing an enormous blow to residential areas, agriculture and businesses along the rivers and coasts. NEC Corporation has demonstrated effectiveness of its flood simulation system in northern Thailand in collaboration with Thailand's National Disaster Warning Center (NDWC) as part of the countermeasures against frequent floods in Thailand. The System enables prediction of flood inundation areas and maximum flood levels. It serves as an adaptation measure in the field of climate monitoring and early warning to issue warnings to threatened areas before the flooding occurs and to help reducing potential damage.



Live Simulation



Warning Function

#### 【Project Details】

##### <Background>

NEC Corporation in collaboration with Thailand's National Disaster Warning Center (NDWC) and Japanese Embassy of Thailand, has conducted a trial of its flood simulation system to predict the inundation areas in Uttaradit Province in Northern Thailand during the period from November 2015 to March 2016.

##### <Business Model of the Project>

It was the first Japan-Thailand cooperation project for Thailand's National Disaster Warning Center (NDWC) in the field of disaster reduction ICT conducted as part of the "Research and study for the development of a flooding simulator in Thailand" project commissioned by Japan's Ministry of Internal Affairs and Communications.

##### <Related SDGs of the Project>



#### 【Product & Technology】

Flood simulation system is characterized as follows.

- Simulations based on meteorological data (observed rainfall and forecast rainfall), topographical data (elevation values, land use purposes), and watercourse data (river networks, water levels, sewer systems, etc.), making it possible to predict flood inundation areas and maximum flood levels.
- Detailed simulations using a triangular mesh measuring 50m on each side, hourly-basis prediction for a period of up to seven days in advance, allowing NDWC to issue pre-warnings to threatened areas.
- Identification of areas at risk of flooding even during periods when no disaster is forecast by performing simulations using previous rainfall data, contributing to hazard mapping.

#### 【Key to Success & Challenges for Further Development】

Disaster prevention is imperative yet not always prioritized in developing countries. Despite such circumstances, NEC Corporation has achieved its disaster-prevention project by effectively making use of public finance. As the next step, the Company aims at establishing a business model through high-quality technology based on lifecycle costs with a view towards launching a business utilizing the satellite data while maintaining close cooperation with local government agencies of developing countries from the policy planning stage.

#### 【Profile of Project Company】

NEC Corporation, the first company in Japan associated with foreign capital was founded in 1899 as a joint venture with Western Electric Corporation. While focusing on social solution business, the Company has also promoted diagnosis for deterioration of social infrastructure using the cutting-edge ICT technology such as Big Data, anti-aging measures and disaster reduction. Its' upcoming initiatives include promotion of disaster reduction ICT counter floods and landslides in Thailand and also to Asian neighbors leveraging its pool of experience and expertise.

[http://www.nec.com/en/press/201605/global\\_20160523\\_01.html](http://www.nec.com/en/press/201605/global_20160523_01.html)

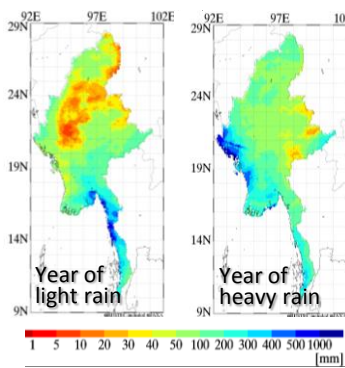
# 15. Climate Monitoring & Early Warning / Food Security & Strengthening Food Production Base

## Facilitating countermeasures against climate change through Big Data

### Remote Sensing Technology Center of Japan

#### 【Contribution to Adaptation Challenges】

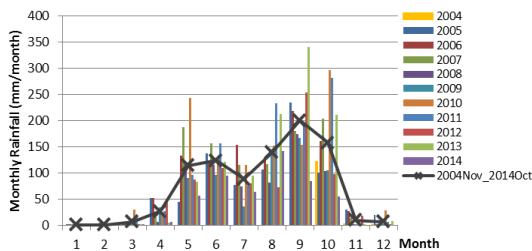
Changes in the pattern of rainfall and temperature particularly pose a serious threat to developing countries of which the economy is mostly dependent on traditional agriculture. The Remote Sensing Technology Center of Japan (RESTEC) provides solutions to users in responding to climate change mainly through the visualization and statistic processing of satellite observation data.



Satellite rainfall data are adopted for monitoring of monthly cumulative rainfall and comparative analysis with past data. Visualized results will be provided to users.

Left: Cumulative rainfall map for the month of May in Myanmar, showing the differences of year 2005 with less rainfall and year 2010 with more rainfall.

Bottom: Comparison of monthly cumulative rainfall at discretionary areas in years from 2004 to 2014, displaying the differences from the annual average rainfall of each year.



#### 【Product & Technology】

The observation equipment (sensors) loaded on satellites, applied with the remote-sensing technologies that enables remote observation of the Earth's surfaces, provides users with the data collected from satellites, aircrafts, automobiles, observation towers, ships and buoys and makes contributions across such fields as forestry management, water resource management, food safety and security, disaster observation, and national land management.

#### 【Project Details】

##### <Background>

RESTEC has operated the satellite observation for over 35 years as a remote-sensing specialist agency, ranging from receiving and processing of the Earth observation data, development, revision and verification of the ground systems and data provision for users. As international cooperation is inevitable in conducting observations on a global scale, RESTEC has been engaged in various international activities through partnership with organizations, such as the Japan Aerospace Exploration Agency (JAXA) and Asian Development Bank, including assisting Thailand for flood observation in response to the major flood that struck Bangkok in 2011 and providing information on food supply and agricultural meteorology for Asian countries. In 2014, in cooperation with Sompo Japan Nipponkoa Insurance Inc. (Sompo Japan) that had already launched "Weather Index Insurance" for farmers in Thailand, RESTEC successfully addressed the issue of poor infrastructure for weather observation and lack of historical meteorological data that had hindered the development of such insurance and developed one in Myanmar. The "Weather Index Insurance" utilising the rainfall estimates taken from satellite data is the first-of-its kind activity by a Japanese entity.

##### <Business Model of the Project>

RESTEC offers statistic processing of the rainfall data from JAXA satellites (GSMaP data) for "Weather Index Insurance" project in Myanmar by Sompo Japan (Reference: Case Number 20) and contributes to visualisation of the data. The next step is offering the a smart-phone application for local farmers.

##### <Related SDGs of the Project>



#### 【Key to Success & Challenges for Further Development】

For greater awareness across the private sector and social impact, the forthcoming initiatives will be as follows:

- Highlighting the value of remote-sensing data to the society through the extended deployment of applications which will facilitate the infrastructure incorporating both tangible and intangible elements.
- Contributing to the achievement of Society 5.0 and SDGs through a business model established on 4Cs – Customer Value, Cost, Convenience and Communication.

#### 【Profile of Project Company】

The Remote Sensing Technology Center of Japan (RESTEC) was established in 1975, and launched the operation of image analysis equipment in 1976 and satellite data distribution business in 1978. Since then, RESTEC has consistently built up a range of remote-sensing technologies ranging from the operation of satellites to the receiving, processing, and analysis of observation data. Based on these technological capabilities, RESTEC has aggressively pressed ahead with developing human resources through training and cooperating with other agencies on international projects. By providing users with the data collected from satellites, aircrafts, automobiles, observation towers, ships and buoys through the remote-sensing technologies, RESTEC strives to contribute across a range of fields including forestry management, water resource management, food safety and security, disaster observation, and national land management.

<https://www.restec.or.jp/en/>

## 16. Secure Resources & Sustainable Water Supply / Health & Sanitation

### Securing sufficient and clean water through ion exchange membrane

Asahi Glass Co., Ltd.

#### 【Contribution to Adaptation Challenges】

Issues surrounding water have increasingly become serious worldwide caused by drought and other meteorological phenomena as well as rise in salt content in underground water. At the same time, drainage regulations have been tightened to protect the surrounding environment and secure the quality of water. Asahi Glass Co., Ltd. (AGC)'s water purification system, where water is purified and desalinated using ion exchange membrane, will ensure stable supply of water suitable for agriculture and drinking and contribute to better health and sanitation of the surrounding environment and residents.



◀ Water treatment image

▼ Electro Dialysis Purification System



#### 【Project Details】

<Background>

In response to enquiry from an Israeli public organization plagued by high level of salt content in well water exceeding WHO benchmark in the late 1990's, the water purification system was installed in more than 10 sites. Subsequently the demand rose in China where drainage regulations have been tightened and the system was introduced together with ZLD (Zero Liquid Discharge) facilities to purify water and recover valuables such as sodium sulfate at industrial plants. Activities are under way for the system to be installed in India where shortage of water caused by drought and contamination of underground water are getting increasingly serious.

<Business Model of the Project>

AGC has designed the electro dialysis tank at the heart of the system and exports the core technology ion exchange membrane. The accessory units are manufactured by local engineering partners and delivered as a system to the clients such as government agencies and private companies.

<Related SDGs of the Project>



#### 【Product & Technology】

Electro Dialysis Purification System: By combination of electricity and ion exchange membrane developed by AGC called "SELEMION™", ionic substances dissolved in water are separated for desalination. Water is then ensured safe to drink or suitable for daily life and agriculture.

The system is characterized as follows:

- Energy-saving: Ion exchange resin used in soft-water equipment loses its performance upon buildup of hard substances during use. The system requires no regeneration process for the removal of hard substances to recover the performance and therefore the dosage of medical agent can be cut significantly.
- Energy-saving: Water is utilized more efficiently than the conventional RO (Reverse Osmosis) process and power consumption is less as high-voltage pump is not required.
- Countering unstable power environment: Powered by direct current and leveraged on solar panel system, the system can be installed on a site where power source is limited.

#### 【Key to Success & Challenges for Further Development】

The products have been widely accepted by local communities due to the customized system that meets the local requirements and regulations. Furthermore, the Company strives to raise cost efficiency through various measures, such as the creation of value chain in China based on the recovery of valuable materials and improvement of local production ratio which will remain a key for greater cost competitiveness for future development.

#### 【Profile of Project Company】

Asahi Glass Co., Ltd. is a glass manufacturer founded in 1907, extending an array of business globally in 4 fields of glass, electronics, chemical products and ceramics. The Company has the world's top share in float plate glass, automobile glass, quartz materials for stepper lens and fluorine resin. Upholding "Look Beyond" as the group vision, the Company strives to contribute to a "better earth and society" through all the projects and social activities under which energy-saving and energy-generating products have aggressively been developed and supplied. The Company has been incorporated into several SRI indexes such as MSCI Global Sustainability Indexes and FTSE4Good Index Series.

<http://www.agc.com/en/index.html>

## 17. Secure Resources & Sustainable Water Supply / Health & Sanitation

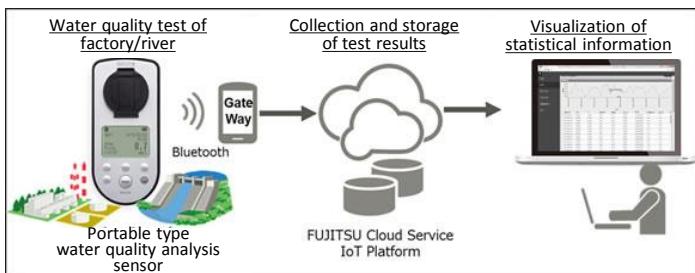
### Curbing flood damage with easy-to-use water quality analysis kit

OPTEX CO., LTD. / FUJITSU LIMITED

#### 【Contribution to Adaptation Challenges】

High incidence of floods due to increase in extreme weather events causes river overflow, inundation and contamination of water followed by damage to agricultural produce and health hazard such as infectious diseases in areas with poor sewage and drainage systems. In mining areas, the spread of heavy metal overflow from mines after heavy rain is also a serious issue.

“WATER it” developed by OPTEX is easy for anyone to handle. Combined with “FUJITSU Cloud Service IoT Platform”, it enables automatic collection of water quality data from each point for simple and swift management and analysis of the measurement information through which changes in rivers can be detected early, making it possible to take steps against expected damage.



“WATER it” System Structural Image



Measuring at river



Demonstration at school

#### 【Project Details】

##### <Background>

Visual results have been digitalized since 2015 for collection of data through collaboration of OPTEX and FUJITSU. The system has been on a test run in China since January 2016 and thereafter extended to Southeast Asia in line with the business development of partnering Japanese companies. Since 2016, a feasibility study has been conducted in Vietnam on the adoption of a simplified water quality analysis kit and automatic data collection technology for the enhancement of controlling surrounding water environment as part of the "Feasibility Survey with the Private Sector for Utilizing Japanese Technologies in ODA Projects (SME ODA F/S)" of Japan International Cooperation Agency (JICA).

##### <Business Model of the Project>

The system solution is offered mainly to official organizations through local agents.

##### <Related SDGs of the Project>



#### 【Product & Technology】

“WATER it”: A digital device measuring the substances contained in water by pouring water reacted with reagent into a portable water quality analysis sensor. The data will automatically be uploaded to “FUJITSU Cloud Service IoT Platform” to enable instant viewing and management of water quality at each measurement area from a remote location.

#### 【Key to Success & Challenges for Further Development】

By conventional method where it was necessary to bring collected water into a laboratory for measurement, it was difficult to collect wide spread data due to time and labor it consumed. WATER it successfully satisfied the demand of developing countries for affordable water quality measurement and data analysis by offering a simple and instant system. The Company will remain committed to an extensive campaign for government agencies, educational institutions and local residents to further their understanding of the system while approaching private companies that require water management for the adoption of the system.

#### 【Profile of Project Company】

**OPTEX CO., LTD.** was founded in 1979. Since the development of the world's first far-infrared sensor for automatic door in 1980, the company has demonstrated its strength by offering unique products and services in niche areas and extended the sensing business in wide areas including security and factory automation. The sensing technology has also been translated into environment and disaster-prevention products for water quality analysis, building automation and lighting at disaster evacuation sites.

<http://www.optex.co.jp/e>

**FUJITSU LIMITED** was established in 1935 as ICT service provider in various fields. The Company is also a comprehensive solution provider ranging from the development, manufacturing, and sale to servicing and operation of the latest, high-spec and high-quality products and electronic devices that underpin the ICT services. The Company is a front-runner in its own “decarbonisation” through ICT and presses ahead with mitigation of climate change and adaptation by offering the know-how on decarbonisation and its digital technology to clients and society.

<http://www.fujitsu.com/global/>

## 18. Secure Resources & Sustainable Water Supply

### Curbing flood damage and solving water shortage with rainwater storage system SEKISUI CHEMICAL CO., LTD.

#### 【Contribution to Adaptation Challenges】

Water shortage brought upon by drought due to climate change results in damage in agricultural production. At the same time, increase of extreme weather events leads to growth in flood damage. “CROSS-WAVE”, a rainwater storage system developed by SEKISUI TECHNO MOLDING CO., LTD., a subsidiary of SEKISUI CHEMICAL CO., LTD., contributes to the reduction of flood damage at heavy rain while ensuring stable water supply at scarce rain.



◀ Cross-Wave

▼ Installation of Cross-Wave



#### 【Project Details】

##### <Background>

In India, factories must be built equipped with mandatory rainwater storage facilities to counter chronic water shortage. Against such background, the Company entered into the overseas market in 2010 and achieved 8000 over deals both in the domestic and overseas markets as of 2017. Rainwater, in general, is stored in a pond created on the factory premises but CROSS-WAVE which can be installed underground of the parking space, etc. meets the demand of many project owners. The Company has also extended projects in China where recycling of rainwater absorbed in the soil is encouraged in cities for urban afforestation and disaster prevention under the “Sponge City Program” and in Taiwan where the typhoon induces serious flood damage. Vietnam is eyed as the next target.

##### <Business Model of the Project>

A local subsidiary of the Sekisui Chemical Group leads the projects in each country through collaboration with local consulting firms and sells the products through distributors. The products are manufactured locally in India and imported from Japan in other countries.

##### <Related SDGs of the Project>



#### 【Product & Technology】

**Cross-Wave** : Rainwater storage systems that enable recycling of rainwater by controlling the influx of rainwater to the sewage pipes and rivers at heavy rain, made of plastic storage materials to store rainwater in underground storage tanks for recycling or control of outflow.

The systems have following advantages as compared to the concrete storage tanks.

- Short construction period and affordable cost
- Recycled plastic materials that contribute to low emission of carbon dioxide in the product lifecycle
- Load capacity design that enables the use of land above for parking space, etc. while preventing land subsidence
- High porosity that creates underground space to retain water for the outflow control and effective use of rainwater, as well as slow release of rainwater upon temporary storage after torrential rain to prevent overflow. Rainwater in the storage can be used to water fields and flush toilets.

#### 【Key to Success & Challenges for Further Development】

The Product has successfully been adopted in India and China as a result of close cooperation with local governments at the onset of drafting standards. The Company strives to build close relationship with local governments through collaboration with consulting firm familiar with local affairs. Another reason for the Product to be readily accepted by countries is its resilience and simplicity for construction work and maintenance that originate from the product properties.

Towards further achievements, the next challenges are to streamline the standards to expand local production and to ensure the introduction of high-quality products as well as the methods for performance evaluation.

#### 【Profile of Project Company】

SEKISUI CHEMICAL CO., LTD. is a leading resin manufacturer founded in 1947, with a growing array of products ranging from daily sundries such as cellophane tape and plastic pail to pipe materials that underpin both the public and private infrastructure, high-performance materials for electronics and transport equipment, medical products and the revolutionary unit-constructed housing called “Sekisui Heim”. With prominent technology and quality, the Company heads the development as a frontier in the fields of “residential and social infrastructure creation” and “chemical solutions” under the Group Vision as part of its contribution to better lives of people and environment worldwide. The Company also advances environmental contribution as a center of business based on the SEKISUI Environmental Sustainability Vision.

<http://www.sekisuichemical.com/>

# 19. Secure Resources & Sustainable Water Supply

## Addressing water pollution caused by floods

Yamaha Motor Co., Ltd.

### 【Contribution to Adaptation Challenges】

Increase in floods associated with climate change has aggravated pollution of water source, raised the number of sick people due to poor health, and hindered socioeconomic growth. Yamaha Motor Co., Ltd. has developed “Yamaha Clean Water Supply System” as a small-sized water purifier contributing to better health of people and socioeconomic growth through new business. The System has been introduced to several places since 2010 as an adaption measure in the field of water supply through addressing water pollution associated with climate change and to improve health of people and socioeconomic environment.



◀ Water Purification (Before & After)



▶ Children gulping Clean Water (Senegal)

### 【Project Details】

#### <Background>

The first trigger to taking on water purification business was complaints received from expatriate families working in a motorcycle factory in Indonesia in 1980s. The complaints were on the murky color and rusty smell of local tap water. In response, the Company developed a tap water purifier for household and started marketing and operation tentatively in Indonesia in 2010, which became the prototype of the System at present.

#### <Business Model of the Project>

- The System has been introduced by local governments and NGOs to medical and educational facilities and rural areas in countries vulnerable to water pollution such as Indonesia, Vietnam, Senegal and Mauritania, drastically reducing the outbreak of diarrhea, fever and other illnesses.
- The System has also transformed people’s lives. Local residents are now released from the chore of pumping water from the well and they have shifted themselves to production and learning activities. Economic development in rural areas and villages has also been achieved through new businesses such as water delivery, flush cleaning and ice making.
- Eying the System as a contributor to social infrastructure development while enhancing corporate awareness at the same time, Yamaha Motor is actively introducing the System to areas with water supply but without purification technology in cooperation with other donors.

#### <Related SDGs of the Project>



### 【Product & Technology】

“Yamaha Clean Water Supply System” purifies water through “Slow Sand Filter” using sand and gravel. Physical dirt and rubbish are removed from surface water pumped through the pipe through “Filtration Tanks” embedded with sand and gravel. Photosynthesis by the algae which naturally forms inside the tanks intensify the density of oxygen dissolved in water and activate water treatment by microorganism. The System’s requiring no coagulants or membranes enables self-sustained operation and maintenance by local community without the need for advanced technology and high costs for operation and maintenance.

### 【Key to Success & Challenges for Further Development】

The Company strives to create jobs for local residents through encouraging local partners to organize a “water committee” to launch new businesses such as water sales service and mobile phone charging service in areas without electricity but equipped with solar panels. The Company has achieved a sustainable business model through the establishment of framework contributing to the overall development of regional society and economy which will further be advanced by seeking access to donor funds, shorter lead time for introduction and solution to logistics in remote areas.

### 【Profile of Project Company】

Yamaha Motor Co., Ltd. was set up in 1955 as a motorcycle manufacturer. Since then the Company aims at contributing to people’s lives worldwide through its products. Yamaha Motor was set up in 1955 as a motorcycle manufacturer. Since then the Company aims at contributing to people’s lives worldwide through its products. The Company has entered into African market in the 1960’s and launched an array of projects including motorcycle delivery of vaccines and doctors, promotion of employment through the development of motorcycle taxi business, guidance on the method of fishing and management of catch for modern fishery while introducing the outboard motor. The Company also promotes local manufacturing of fishing boats made of FRP (Fiber-Reinforced Plastics) as a replacement for wooden ones in a bid for industrial development, job creation, safe operation, and minimizing deforestation, all of which have been extended as engaged in “business for societal value” and contributed to the growth of African nations. Yamaha’s “Clean Water System” won the Good Design Award 2013.

<https://global.yamaha-motor.com/ir/annual/annual2013/sp3.html>

## 20. Climate Change Finance

### Minimizing financial losses caused by extreme weather events

Sompo Japan Nipponkoa Insurance Inc.

#### 【Contribution to Adaptation Challenges】

Numerous studies have revealed that enormous economic losses is incurred by tornado, storm, snow disaster, drought and high temperature. Even a minor rise in temperature deals a severe economic blow particularly to developing countries with little resource to confront its impacts. “Weather Index Insurance” offered by Sompo Japan Nipponkoa Insurance Inc. is an effective means of minimizing financial risk incurred by extreme weather events, and it is also adaptation measures in the field of risk finance associated with climate change.



Explanation of Weather Index Insurance (Thailand)



Preliminary survey (Myanmar)

#### 【Project Details】

##### <Background>

Sompo Japan Nipponkoa, in cooperation with Japan Bank for International Cooperation (JBIC), has carried out studies on risk finance approach to address climate change since 2007. Weather Index Insurance was launched for sale in 2010 in northeast Thailand.

##### <Business Model of the Project>

- SOMPO Thailand has solicited applications for their product through the Bank for Agriculture and Agricultural Cooperatives of Thailand (BAAC). Weather Index Insurance has widely been accepted by Thai farmers and the product's sales area has grown from one province in northeast Thailand to twenty provinces across northeast Thailand.
- In 2014, Weather Index Insurance was developed for the Philippines in addition to Myanmar. A similar product is also currently underway in Indonesia.

##### <Related SDGs of the Project>



#### 【Product & Technology】

Utilizing expertise acquired by weather derivatives products, Sompo Japan Nipponkoa, in cooperation with Japan Bank for International Cooperation (JBIC), has carried out studies on risk finance approach to address climate change since 2007. Weather Index Insurance was developed for sale in 2010, which is aimed to compensate rice farmers in northeast Thailand for shortfall in crops caused by drought. In 2014, Weather Index Insurance was launched in Myanmar as the first-ever insurance that uses rainfall estimated from satellite observation data as index.

#### 【Key to Success & Challenges for Further Development】

Sompo Japan Nipponkoa develops insurance products reflecting local demand through its initiatives to grasp the needs of each community and familiarize itself with local farmers. In launching new business, the company works in close cooperation with local governments and local offices of Japan International Cooperation Agency (JICA) as well as cooperation with local bank in order to disseminate the products widely.

#### 【Profile of Project Company】

Sompo Japan Nipponkoa Insurance Inc. was established on 1 September 2014 upon merger of Sompo Japan Insurance Inc. and Nipponkoa Insurance Co., Ltd., becoming the single largest P&C insurance company in Japan. Prior to the merger, it has undertaken weather derivatives products both in and outside Japan as an adaptation measure to climate change in an attempt to accumulate advanced financial technology and expertise. It has participated in “Pacific Catastrophe Risk Insurance Pilot Program” in January 2013, jointly initiated by the World Bank and Japanese government. The Company is actively involved in initial preparation as part of the Pacific Islands Leaders Meeting held in Hokkaido in May 2009, leading a key role in the launch of Program as a private insurer. It has been committed to the program since the launch of Program up to the present.

<http://www.sompo-hd.com/en/csr/action/community/content4/>