

Fiscal Year 2021

**Visualization of Contribution to the Adaptation
By Japanese Companies in Developing Countries**

Summary Report

March 2022

Ernst & Young ShinNihon LLC

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- Attachment -

Attachment 1: Climate Change Adaptation Good Practices by Japanese Private Sector in Developing Countries (English)

Attachment 2: Presentation Materials of International Information Dissemination (Thailand)

Attachment 3: Presentation Materials of International Information Dissemination (Indonesia)

Attachment 4: Presentation Material of Japan Pavilion

Attachment 5: Presentation Material of Indonesia Pavilion

- Abbreviations -

Abbreviation	Description
ACA	Asuransi Central Asia (Indonesian) / Central Asia Insurance (English)
AE	Accredited Entity (under the GCF support scheme)
AF	Adaptation Fund
AI	Artificial Intelligence
BSC method	Biological Soil Crust method
B-to-G	Business to Government
COP	Conference of the Parties (of the United Nations Framework Convention on Climate Change)
COVID-19	Coronavirus Disease 2019
CTCN	Climate Technology Centre and Network
ESG	Environmental, Social and Governance
EY	Ernst & Young ShinNihon LLC
GCF	Green Climate Fund
GHG	Greenhouse Gas
ICT	Information and Communication Technology
IGES	Institute for Global Environmental Strategies
IoT	Internet of Things
IPCC	Intergovernmental Panel on Climate Change
METI	Ministry of Economy, Trade and Industry
MoEF	Ministry of Environment and Forestry
NbS	Nature-based Solutions
NDC	Nationally Determined Contribution
NGO	Non-governmental Organizations
NXPO	Office of National Higher Education Science Research and Innovation Policy Council
ONEP	Office of Natural Resources and Environment Policy and Planning
PR	Public Relations
Q&A	Questions and Answers
TCFD	Task Force on Climate-related Financial Disclosures
UNFCCC	United Nations Framework Convention on Climate Change

Chapter 1. Overview of the project

1.1 Background

In recent years, international negotiations on climate change issues have become more focused on international efforts in the area of adaptation to climate change impacts, in addition to mitigation. Since the decision to establish the Cancun Adaptation Framework was made in the Cancun Agreements at COP16 of the United Nations Framework Convention on Climate Change (UNFCCC) in 2010, discussions in the area of adaptation have been progressing, including the establishment of the Adaptation Committee and the formulation of national adaptation plans. In addition, Article 7 of the Paris Agreement adopted in December 2015 also mentions the need to set global targets for adaptation and adaptation actions, and it is expected that detailed discussions on the scope of adaptation and the formulation of methods to measure the effects will continue to progress. Furthermore, funding from the Green Climate Fund (GCF), a multilateral fund under the United Nations, will be distributed equally to mitigation and adaptation measures according to the decision of the Board of Directors of the GCF.

In 2020, the Paris Agreement took effect, and countries began to act toward reducing greenhouse gas (GHG) emissions and adapting to the impacts of climate change based on their Nationally Determined Contributions (NDCs). On the other hand, the report of the Working Group I of the Sixth Assessment Report released in August 2021, by the Intergovernmental Panel on Climate Change (IPCC), revealed that anthropogenic climate change is causing extreme events such as heat waves, heavy rains, droughts, and tropical cyclones worldwide. In this context, adaptation to climate change is an urgent issue. Under these circumstances, at the COP26 in November 2021, the importance of adaptation support was reaffirmed, and the final document included a call for developed countries as a whole to double their adaptation support from 2019 levels by 2025. Japan's Prime Minister Kishida also announced that about 14.8 billion USD in adaptation support would be provided by 2025.

In the trend of ESG investment, in June 2021, the Tokyo Stock Exchange revised its Corporate Governance Code, requiring companies listed on the prime market to enhance the quality and quantity of their climate change disclosure under the Task Force on Climate-related Financial Disclosures (TCFD) or equivalent international frameworks. As a result, more companies have started to comply with the TCFD, and there is a growing awareness of the importance of recognizing the risks and opportunities of climate change and incorporating them into business strategies. While many companies are working on mitigation approaches that contribute to decarbonization and carbon neutrality as a business opportunity, adaptation approaches to climate change is more of a response to the risks of climate change on their business activities. The recognition of adaptation as a business

opportunity is less advanced than that of mitigation. In Japan, which is vulnerable to the impacts of climate change, the private sector has developed a number of technologies and services that contribute to adaptation. There is great potential for the development of adaptation businesses that contribute to adaptation to climate change in developing countries through the use of these technologies, experiences, and know-how cultivated in Japan and the development and continuation of businesses that see solutions for social issues caused by climate change as a business opportunity.

The Ministry of Economy, Trade and Industry (METI) has been conducting various activities to promote Global Warming Adaptation Business, including preparation of the "Prospect of Global Warming Adaptation Business" by the committee for "Adaptation Business Revitalization", various surveys, compilation and expansion of case studies on good practices for adaptation, preparation of a global warming adaptation business guidebook for new businesses, and holding seminars in Japan and abroad.

1.2 Objective

Based on the results of the past projects, this project aims to investigate the possibility of Japan's contribution to climate change adaptation projects in developing countries and how Japan should tackle the field of climate change adaptation, in order to further stimulate climate change adaptation businesses. Table 1-1 shows the activities conducted by Ernst & Young ShinNihon LLC (hereinafter referred to as "EY") this fiscal year (FY2021) to achieve the objectives of this project.

Table 1-1 Activities of the Project

Objectives	Activities
Improving understanding and awareness of adaptation business by Japanese private sector	Update of Climate Change Adaptation Good Practice • Increase the number of cases and deepen the contents of Adaptation Good Practice from previous years • Hearing survey on current situation of the Good Practices
Improving understanding and awareness of adaptation business by Japanese private sector of developing countries and international organizations	International and domestic information dissemination of Japan's activities • Online workshop for Thailand and Indonesia • Information dissemination in COP26 side events
Promote market understanding for adaptation business promotion	Study on potential of adaptation business in developing countries • Study on adaptation needs in updated NDCs and visualization of countries and sectors where Japanese

Objectives	Activities
	companies are expected to contribute to adaptation business
Promoting understanding of international organization schemes for adaptation business	Study on trends in adaptation support schemes of international organizations • Study on adaptation support schemes of international organizations which Japanese companies can utilize
Promoting understanding of adaptation business among new demographics	PR activity for adaptation business • Distribution of electronic articles on adaptation business and its result analysis
Promoting adaptation business by support for Japanese companies in formulation of projects	Follow-up activity for the project development • Support in formulation of projects for Good Practice's companies

Source: EY

Chapter 2. Update of Climate Change Adaptation Good Practice

2.1 Update of Climate Change Adaptation Good Practice

Since FY2016, METI has been compiling the “Climate Change Adaptation Good Practice by Japanese Private Sector” (hereinafter referred to as “the Good Practice”) every year in order to disseminate and share information of adaptation business activities by Japanese companies in developing countries.

This year, three new practices were added into the Good Practice (practice number 8, 10 and 23), and two practices were withdrawn [Attachment 1: Climate Change Adaptation Good Practices by Japanese Private Sector in Developing Countries (English)].

Table 2-1 List of the Good Practice in FY2021

No.	Title	Company name	Remarks
1	Development of anti-disaster information system for utilizing forestry preservation project	Kanematsu Corporation / Hitachi Ltd.	No update
2	Examining the Earth as “Earth Doctor”	Kawasaki Geological Engineering Co., Ltd.	Updated
3	Water projects for realization of cooperative and rich society	Kubota Corporation	No update
4	Protecting society and infrastructure from slope disasters	Kokusai Kogyo Co., Ltd.	No update
5	Protecting local community from threat of high tide and sea level rise	TAISEI CORPORATION	No update
6	Methodology for prevention of soil surface erosion with soil algae (BSC methodology)	Nippon Koei Co., Ltd.	Updated
7	Disaster risk reduction by river water level alarm system	Unimation System Inc.	No update
8	Disaster prevention system through real-time image data distributed by river monitoring cameras	eTrust Co., Ltd	Newly added
9	Functional Paving Materials Made from Waste Roof Tiles and Bricks to Reduce Urban Flooding and Heat Island Effect	ECOSYSTEM Inc.	Updated
10	Waterproofing and extending the service life of buildings with concrete repair materials	ZEN Co., Ltd / Japan Prolong Limited Company	Newly added

No.	Title	Company name	Remarks
11	Introducing a resilient hybrid power generation control system against environmental changes	Kyudenko Corporation	Updated
12	Greater resilience in anti-disaster infrastructure through the world's first "Typhoon Power Generation" and communications satellite	Challenergy Inc.	Updated
13	Mitigating damage to energy supply system in times of disasters	Panasonic Corporation	No update
14	Contributing to sustainable agriculture through "Bio-cycle"	Ajinomoto Co., Inc.	No update
15	Greater harvest through compost soil improver	Kawashima Co., Ltd.	Updated
16	Greater resilience and higher income through "Agriculture sustainable for 100 years and beyond"	On The Slope Co., Ltd.	Updated
17	Circular model in the manufacture and sale of apparel added with social and environmental value of afforestation project	Sunford Co., Ltd.	No update
18	Adapting to changing cultivation environment for traditional crops	Dari K Co., Ltd.	No update
19	Generating energy and farming at one place with Solar Farm® technology	Farmdo Group	Updated
20	Circular-economy business model established through organic soil afforestation to prevent flood and protect eco system	from far east inc.	No update
21	Rejuvenation of arid areas through high-molecule film farming method	Mebiol Inc.	Updated
22	High quality mung beans production in salinized lands	euglena Co., Ltd.	No update
-	Smart agriculture achieving a cultivation system resilient to climate change	OPTiM Corporation	Withdrawn
23	Cultivation of fruit vegetable crops with optimized application of water and fertilizer using an IoT and AI based autonomous drip irrigation system	Routrek Networks, Inc.	Newly added
24	Paints for sustainable life	Kansai Paint	No update

No.	Title	Company name	Remarks
		Co., Ltd.	
25	Mitigating impact of frequent forest fire on plants and animals	Shabondama Soap Co., Ltd.	No update
26	Preventing spread of infectious diseases associated with climate change	Sumitomo Chemical Co., Ltd.	No update
27	Bicycle-type water purification system for securing a clean water supply	Nippon Basic Co., Ltd	No update
-	Curbing damage from floods through ICT	FUJITSU LIMITED	No update
28	Facilitating countermeasures against climate change through Big Data	Remote Sensing Technology Center of Japan	No update
29	The world's lightest & most compact X-band weather radar enables real-time monitoring of local extreme weather	Furuno Electric Co., Ltd.	No update
30	Securing sufficient and clean water through ion exchange membrane	AGC Inc.	Updated
31	Development of a tourism city through water treatment	Sanicon Co., Ltd. / Accrete Co., Ltd.	No update
32	Contributing to the reduction of non-revenue water and stable supply of safe water by detecting leaks from buried water pipes	Suidou Technical Service Co., Ltd	No update
33	Curbing flood damage and solving water shortage with rainwater storage system	SEKISUI CHEMICAL CO., LTD.	Updated
34	Stable supply of water with high turbidity raw water compatible water purification equipment	Tohkemy Corporation	No update
35	Securing sustainable water resources through water-saving plants	JGC Holdings Corporation	No update
36	Realization of Stable Water Treatment by Underwater Mechanical Aerator and Agitator	Hanshin Engineering Co., Ltd.	No update
37	Producing safe drinking water from saline and highly-turbid surface water	Mitsubishi Chemical Aqua Solutions Co., Ltd.	No update
38	Addressing water pollution caused by floods	Yamaha Motor Co., Ltd.	Updated
39	Minimizing financial losses caused by extreme weather events	Sompo Holdings, Inc	Updated

Source: EY

2.2 Hearing Survey on the Current Situation of the Good Practice

As a result of hearing survey on the current situation to 38 companies in the Good Practice (excluding three newly added companies), 13 cases had no progress, 10 cases have been expanding within the countries mentioned in the Good Practice, 10 cases have been expanding to other countries, and 5 cases did not answer (Figure 2-1). At the same time, main challenges or hurdles to business development and success factors were also identified through interview with these companies.

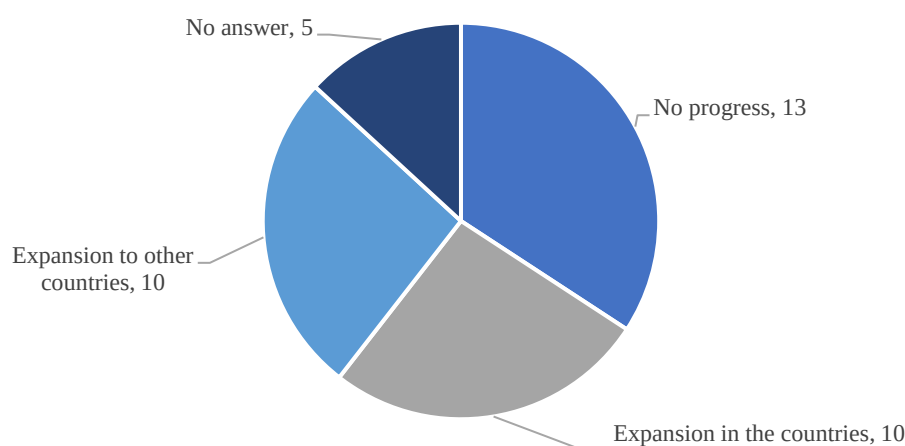


Figure 2-1 Current Situation of the Good Practices

Source: EY

The main challenges or hurdles to business development among Good Practice's companies were;

- Compliance with local laws, regulations, standards, and business practices,
- Political situation, or economic conditions (especially the impacts of COVID-19 pandemic),
- Lack of funding for feasibility study or demonstration phases (need for public assistance),
- Difficulty of visiting the countries due to COVID-19 pandemic (limitation of online follow-up)
- Cooperation with stakeholders (international organizations, local governments, companies, etc.)
- Differentiation from competing products
- (In the case of B-to-G projects) Insufficient budget for local government (adaptation projects are preventive measures, therefore budget priorities are usually low)

On the other hand, the success factors were;

- Building relationships with local stakeholders
- Collaboration with international organizations, governments, aid agencies, etc.
- Expand awareness of adaptation business
- Promote capital investment, research and development including operational aspects

Chapter 3. International and Domestic Information Dissemination of Japan's Activities

3.1 International Information Dissemination

We have conducted international communications to disseminate information on successful cases of businesses related to climate change adaptation and the Japanese government's initiatives to government officials and private companies in developing countries, in order to promote the spread of adaptation-related businesses in the future. In particular, we have narrowed down target countries and themes to those with clear adaptation needs and where Japanese companies have technologies and services that can contribute to those needs, with the aim to take the first step toward the formation of specific adaptation business cases in these countries. The information dissemination was held in the form of an online workshop which is closed to the public, providing an opportunity for opinion exchange among government officials, research institutions, and Japanese companies engaged in the target areas.

The target countries for the workshops were Thailand and Indonesia, based on the results of the survey on needs in the field of adaptation in developing countries and the countries where companies are operating in the Good Practice case studies. The respective presentation themes and target audiences were decided in advance through discussions with government agencies in charge of climate change and adaptation.

The online workshops were attended by representatives from the Climate Technology Centre and Network (CTCN) and the GCF, which are the technical and financial support mechanisms of the United Nations Framework Convention on Climate Change (UNFCCC) that provide valuable assistance in the formulation of future adaptation business cases, to introduce their respective support schemes and case studies in the field of adaptation to developing country officials and Japanese companies.

The workshops for Thailand and Indonesia were held on 29 November 2021 and 11 January 2022 respectively, with approximately 170 participants in the workshop for Thailand and nearly 100 participants in the workshop for Indonesia. Participants included government agencies, municipalities, research institutes, industry associations and private companies, and active discussions took place.

Table 3-1 Online Workshop agenda for Thailand

Time		Agenda	Presenters
Thailand	Japan		
13:00	15:00	Opening Remarks	METI and Office of Natural Resources and Environment Policy and Planning (ONEP)
13:10	15:10	METI's activities for promoting private	METI

Time		Agenda	Presenters
Thailand	Japan		
		sector participation in climate change adaptation	
13:20	15:20	Thailand's National Adaptation Plan	ONEP
13:30	15:30	After Floor in Rojana: The preventional measures against Flood	Nippon Steel Trading Corporation
13:40	15:40	Weather Radar and DANA	Furuno Electric Co., Ltd.
13:55	15:55	Remote Sensing Application on Environment Monitoring	Remote Sensing Technology Center of Japan
14:05	16:05	Digital Farming Makes Agriculture Sustainable	Routrek Networks, Inc.
14:15	16:15	Q&A	-
14:25	16:25	Introduction of CTCN's support mechanism for development of climate change adaptation project	CTCN
14:35	16:35	Introduction of Thai's experience in CTCN projects	Office of National Higher Education Science Research and Innovation Policy Council (NXPO)
14:45	16:45	Introduction of GCF's support mechanism for development of climate change adaptation project	GCF
14:55	16:55	Q&A	-
15:05	17:05	Discussion on next steps for implementation of adaptation projects through private sector's participation, and plan of follow-up activity	-
15:20	17:20	Closing Remarks	METI and ONEP

Source: EY

Table 3-2 Online workshop agenda for Indonesia

Time		Agenda	Presenters
Indonesia	Japan		
9:00	11:00	Opening Remarks	METI and Ministry of Environment and Forestry (MoEF)
9:10	11:10	METI's activities for promoting private sector participation in climate change adaptation"	METI
9:20	11:20	Key features of NDC – Adaptation	MoEF
9:30	11:30	How technology helps to adapt climate change	EY
9:40	11:40	Adaptation practices of conserving water resources in upstream areas	Yayasan Multi Bintang Indonesia
9:50	11:50	Climate-based insurance in climate smart agriculture practices	ACA Indonesia
10:00	12:00	Compact X-band weather radar and GNSS automatic displacement measurement system for water related disaster prevention	Furuno Electric Co., Ltd.

Time		Agenda	Presenters
Indonesia	Japan		
10:15	12:15	DioVISTA/Flood – Save the nation from flood by ICT	Hitachi Power Solutions, Ltd.
10:25	12:25	Contribution to Climate Change Adaptation in Indonesia with Yamaha Clean Water Supply System	Yamaha Motor Co., Ltd.
10:35	12:35	Digital Farming for Sustainable Agriculture	Routrek Networks, Inc.
10:45	12:45	Q&A	-
10:55	12:55	Introduction of CTCN's support mechanism for development of climate change adaptation project	CTCN
11:05	13:05	Introduction of GCF's support mechanism for development of climate change adaptation project	GCF
11:15	13:15	Q&A	-
11:25	13:25	Discussion on next steps for implementation of adaptation projects through private sector's participation, and plan of follow-up activity	-
11:40	13:40	Closing Remarks	METI and MoEF

Source: EY

3.2 Domestic Information Dissemination

At COP26, held from October 31, 2021 to November 13, 2021 in Glasgow, United Kingdom, information dissemination on METI's efforts in engaging the private sector in climate change adaptation was conducted for both domestic and international audiences. Specifically, at the side event (seminar) organized at the Japan Pavilion and Indonesia Pavilion, examples of adaptation projects by Japanese companies were introduced through online presentation.

At the Japan Pavilion, a seminar titled “Nature-based solutions to combat climate change and their diverse Benefits” was held on 3 November, introducing the diverse benefits of nature-based solutions (NbS) as a measure against climate change, and also best practices of climate change adaptation and their benefits among the efforts by Japan in its utilization of NbS in international collaborations. EY presented three cases from the Good Practice guidebook, namely Nippon Koei Co., Ltd., from far east inc., and Sunford Co., Ltd.

Meanwhile, at the Indonesia Pavilion, a seminar titled “Leadership on Climate Village Program (ProKlim) and collaboration opportunities” was held on 11 November, introducing activities and business cases by private companies under a local government initiative called ProKlim (Program Kampung Iklim), which is part of MoEF's efforts to support non-governmental actors become more resilient to community-level climate change. Here, EY presented three cases from the Good Practice guidebook, namely Panasonic Corporation, Dari K Co., Ltd., and Yamaha Motor Co., Ltd.

Although there was no time for discussions for both seminars, there were comments from participants on their interest in the efforts of private companies, and the Deputy Director of Climate Change, MoEF proposed to register the efforts by Japanese companies as part of ProKlim and hoped to continue collaborating with METI.

Chapter 4. Study on Potential of Adaptation Business in Developing Countries

A study was conducted to examine the potential of adaptation business in developing countries based on their NDCs and in the same manner as applied in the last year's study. A total of 120 countries, which have submitted their NDCs with adaptation contents included, were covered in the study.

The result is shown in Table 4-1. The overall trend is the same as that in the last year, but there is a significant increase in the number of countries mentioning "Health & Sanitation" needs, particularly in North Africa & the Middle East region and Eastern Europe & Central Asia region. The reason for this is not clear, but it is assumed to be due in part to the impact of COVID-19 pandemic that was spreading at an alarming rate at the time of each country's NDC update.

Table 4-1 Needs for Adaptation Measures by Region and Adaptation Business Area

Region/ Number of countries surveyed	Adaptation business area						
	Resilient Infrastructu re against Natural Disasters	Sustainable Energy Supply	Food Security & Strengthen ing Food Productive Base	Health & Sanitation	Climate Monitoring & Early Warning	Secure Resources & Sustainable Water Supply	Climate Change Finance
Asia	10	2	16	10	6	18	0
20 countries	50%	10%	80%	50%	30%	90%	0%
Eastern Europe & Central Asia	4	4	6	4	2	6	1
11 countries	36%	36%	55%	36%	18%	55%	9%
Latin America & the Caribbean	12	4	15	8	5	13	0
22 countries	55%	18%	68%	36%	23%	59%	0%
North Africa & the Middle East	4	2	9	7	0	10	0
10 countries	40%	20%	90%	70%	0%	100%	0%
Oceania	5	1	5	3	3	5	0
9 countries	56%	11%	56%	33%	33%	56%	0%
Sub-Saharan Africa	26	9	37	15	13	38	2
48 countries	54%	19%	77%	31%	27%	79%	4%

* Upper row: Number of countries that mention matters related to the area in their NDC; Lower row: Percentage

26-50%	51-75%	76-100%
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Source: EY (based on IGES NDC Database Version 7.6 and each country's NDC)

Chapter 5. Study on Trends in Adaptation Support Schemes of International Organizations

While there are many support schemes offered by international organizations that Japanese companies can utilize to promote adaptation business, this study focused on the GCF's support scheme, which, in addition to its large financial support amount, directs half of its support to the adaptation field, and analyzed the trends in this support. Out of the 190 cases of support approved by the GCF since its establishment up to the time of this study, recent 14 cases which are related to adaptation business areas of “Climate Monitoring & Early Warning” (nine cases) or “Secure Resources & Sustainable Water Supply” (five cases) were selected for analyzing the trends.

The result of the study is as follows:

- Regional distribution of projects

As shown in Table 5-1, many of the projects in the “Climate Monitoring & Early Warning” area have been implemented in Asia region. Geographically, the majority of projects (seven out of nine) have been implemented in island countries, which are promising countries for the implementation of adaptation business of this area. In the area of “Secure Resources & Sustainable Water Supply,” two out of five projects have been conducted in the Middle East region, although the number of projects covered is small.

Table 5-1 Regional Distribution of Projects

Region	Climate Monitoring & Early Warning	Secure Resources & Sustainable Water Supply	Total
Asia	4	0	4
Eastern Europe & Central Asia	1	0	1
Latin America & the Caribbean	1	1	2
North Africa & the Middle East	0	2	2
Oceania	1	1	2
Sub-Saharan Africa	2	1	3
Total	9	5	14

Source: EY (based on GCF website)

- Scale of support

Table 5-2 shows the result of classifying the scale of support of the projects according to the categories defined by the GCF. In both areas, the majority of projects are small-scale (total project

cost of 10-50 million USD). One large-scale project has been implemented, but the total cost of this project is large because the support is not only for adaptation but also for mitigation.

Table 5-2 Scale of Support

Region	Climate Monitoring & Early Warning	Secure Resources & Sustainable Water Supply	Total
Micro (-10 million USD)	0	1	1
Small (10-50 million USD)	6	3	9
Medium (50-250 million USD)	3	0	3
Large (250- million USD)	0	1	1
Total	9	5	14

Source: EY (based on GCF website)

- Classification of public/private projects, type of support, and percentage of support by GCF

Only one of the studied projects is a private project, while the other 13 are public projects. In addition, the sole private project is supported by a combination of equity and loan, while all 13 public projects are supported by grant (including in-kind donations), showing a clear difference in the type of support depending on the nature of the project. Furthermore, in the one private project, the GCF support is only 5.5% of the total project cost, while in the 13 public projects, the GCF support ranges from 24.6% to 96.6%, and in nine cases, the GCF is involved to a greater extent than 50% of the total cost.

- Schedule of project formation and implementation

The period from proposal submission to approval is approximately one year in all cases, except for one case, which took approximately five years. The implementation period for all projects ranges from 4 to 7 years.

- Classification of Accredited Entity (AE) implementing projects

AEs include international access organizations, which can operate internationally, and direct access organizations, which operate on a country- or region-specific basis. About 80% of the studied projects have been implemented by international access organizations and the remaining 20% by direct access organizations.

- Information on involvement of private companies in the projects

Of the 14 projects surveyed, although 13 are public projects, public procurement of technology

or services from the private sector is planned in the implementation of the projects. Information was identified on fields where private companies are expected to participate and on goods and services that are planned to be procured from private companies. In the “Climate Monitoring & Early Warning” area, the private sector is expected to be involved in the provision of climate information services and information and communication services to disseminate early warnings to the local population. In the case of the projects on “Secure Resources & Sustainable Water Supply,” the private sector is expected to be involved in the provision of rainwater harvesting and storage facilities, desalination plants, information and monitoring systems for water resources management, and other works related to securing water resources and distributing water.

- Status of utilization of other UNFCCC schemes

Five out of nine projects in the “Climate Monitoring & Early Warning” area have been planned to be implemented by utilizing the results of other GCF projects, indicating that multiple projects are being organized to achieve synergies. On the other hand, no cases were found where the GCF’s Readiness Support Programme or Project Preparation Facility, or CTCN’s technical assistance, which are expected to be used for project preparation activities, were utilized.

Chapter 6. PR Activity for Adaptation Business

6.1 Background and Objectives of PR Activity Implementation

While much attention has been paid to climate change impacts, decarbonization, and mitigation efforts, a lack of awareness of climate change adaptation and its business opportunities among Japanese companies has been cited as an issue in surveys conducted in previous years. So far, METI has introduced business opportunities for adaptation through its website and seminars in Japan, but visitors to the website and seminar participants tend to be limited to those in related networks.

Therefore, we decided to conduct a PR activity to promote understanding of the importance of climate change adaptation among a wider target audience, to raise awareness of opportunities and good practices in adaptation business in developing countries, and to broaden the range of players in this field. The objectives of the PR activity are as follows.

1. Raise awareness of the importance of climate change adaptation
2. Communicate the high need for climate change adaptation especially in developing countries, and potential market
3. Raise awareness of "adaptation business" opportunities
4. Introduce case studies of adaptation business to deepen understanding

6.2 PR Activity Implementation Overview

In order to achieve the four objectives described above, an article consisting of a general discussion and three business case studies was prepared.

General Discussion

To inform visitors to the website about the importance of climate change adaptation, its high needs in developing countries and its potential market, to raise awareness of opportunities for adaptation business, and to increase interests in the adaptation efforts. The information was disseminated in the form of interviews with METI officials and experts.

Business Case Studies

Keeping in mind to introduce case studies in multiple fields under a unified theme, it was decided to introduce the technologies and efforts of following three companies under the theme of ICT utilization from among the technologies listed in the Good Practice guidebook).

- Furuno Electric Co., Ltd.: Compact weather radar
- Hitachi Power Solutions, Ltd.: Real-time flood simulator
- Routrek Networks, Inc.: Smart agriculture using IoT and AI

6.3 PR Activity Implementation Results

As a result of the publication, the article was viewed 6,019 times and visited by 4,402 people from February 8 to March 7, 2022, with the average time spent on the article being 3.64 minutes (Table 6-1). This is a large number compared to the average number of tie-up articles in the Nikkei Business E-edition, indicating that the articles have attracted the interest of viewers.

Table 6-1 Results of publication

Item	Results
Total page views	6,019 PV* ¹
Number of visitors	4,402 UB* ²
Average time spent on site	3.64 minutes
Total number of clicks on the site	110 times

*1: Page views, cumulative number of pages viewed.

*2: Unique browsers, the number of devices used for browsing.

Source: Prepared by EY based on information from Nikkei BP

Analysis of the attributes of the viewers showed that, compared to the average of the media, relatively more of them were involved in the management of the company, such as the management and executive class, and department manager class. In terms of type of industry, there were relatively more viewers in the construction/real estate and manufacturing industries compared to the average of the media. In particular, the manufacturing industry had a 10% higher percentage of viewers than the average.

The content of the report, Adaptation to Climate Change and Adaptation Business, indicates a high level of interest among the management level. In addition, the construction/real estate and manufacturing industries, which are industries where adaptation to climate change is an issue and may have technologies and services related to adaptation business, are the most likely to be interested in this project, which aims to disseminate information to raise awareness of the importance of climate change adaptation and opportunities for adaptation business, and to broaden the range of players. In light of the purpose of this PR activity, it is believed that information of this project has been successfully disseminated to the target audience.

Chapter 7. Follow-up Activity for the Project Development

7.1 Providing Assistance in Formulating Projects utilizing International Organizations and Japanese Government Support Schemes

In September 2021, a document that compiled information and case studies of support tools that can be used for formulating projects utilizing support schemes by international organizations such as CTCN and Japanese government sent out to the contact persons of the 36 companies listed in the 2021 Good Practice guidebook. EY also informed to support them in formulating projects through this project. As a result, three companies expressed interest, and interviews were held with the persons in charge of each company. Although the details of the discussions cannot be disclosed in this report, advice was provided on possible support schemes and points to keep in mind, taking into consideration the details of the projects and the resources of the companies. In addition, EY had continuous meeting and discussion with each company and consulted with them via e-mail regarding discussions with the local authorities and the establishment of a framework for formulating the project.

7.2 Follow-up after International Workshop

After the workshop with Indonesia, a local organization expressed interest in the technology presented, and follow-up meetings were held between the organization, the Japanese company, and EY. The local organization expressed a strong need to apply the technology, and it was decided to continue discussions on the possibility of conducting a study utilizing the above- mentioned support schemes by international organizations and the Japanese government.

Follow-up interviews were also held with CTCN representatives after the workshops with Indonesia and Thailand. We exchanged opinions on the areas of interest of both the Indonesian and Thai governments, as well as the findings from the workshop regarding areas of interest from the participants.

Chapter 8. Issues and Proposals for Next Year and Beyond

In November 2021, COP26 was held for the first time in two years, after being postponed last year due to the COVID-19 pandemic. The Glasgow Climate Pact agreed to at the conference included the pursuit of efforts to limit the increase in global average temperature to within 1.5 degrees Celsius compared to pre-industrial levels, and it can be said that the world is now in common agreement to further strengthen efforts to reduce GHG emissions.

The Glasgow Climate Pact calls for adaptation measures and the Adaptation Fund (AF) to “emphasizes the urgency of scaling up action and support, including finance, capacity building and technology transfer, to enhance adaptive capacity, strengthen resilience and reduce vulnerability to climate change in line with the best available science, taking into account the priorities and needs of developing country Parties”, and “urges developed country Parties to urgently and significantly scale up their provision of climate finance, technology transfer and capacity-building for adaptation so as to respond to the needs of developing country Parties as part of a global effort, including for the formulation and implementation of national adaptation plans”. It is noted that the urgency of financial and technical cooperation for adaptation by developing countries is emphasized. Japan’s Prime Minister Kishida also announced at the summit-level meeting at COP26 that the government will double its support in the field of adaptation over the five years to 2025, including a total of about 14.8 billion USD in public and private sector support for adaptation.

In Japan, COP26 has triggered increased interest not only among government agencies but also among the private sector in efforts related to achieving decarbonization and carbon neutrality, and various media outlets have increased their coverage of information on climate change. In addition, some companies will be required to disclose climate change risk information in response to the TCFD starting in 2022, making it an urgent need for companies to consider measures to address climate change. For TCFD, the disclosure of opportunities is also required in addition to the disclosure of risks. As more companies consider the future impacts of climate change, as well as its risks and opportunities, it is expected that more companies will become interested in the adaptation business.

In this context, in this year's project, we have expanded the collection of good practices by adding new cases to the list, as in the previous year. In addition, with the cooperation of the Indonesian and Thai governments, more than 100 people from local governments, research institutions, NGOs, and private companies participated in the online workshops, showing strong interest in adaptation business in both countries. After the workshops, follow-up discussions were held with local organizations that had expressed interest, with the aim of developing business opportunities. Furthermore, at COP26, the project's initiatives and examples of adaptation business cases by companies listed in the Good Practice guidebook were introduced at online side events in the Japan Pavilion and the Indonesia Pavilion.

Moreover, this year, amid the increased attention paid to climate change initiatives after COP26, a PR article was published in the Nikkei Business Online to widely disseminate information on the growing needs for adaptation business and case studies of companies. Professor Yukari Takamura of the University of Tokyo, who contributed to the article, commented that with the increasing demand for companies to disclose climate-related information, investors are evaluating how well companies are responding to the effects of climate change, and that adaptation business is one of the criteria for judging corporate value. Considering this trend, there are high expectations for Japanese companies to engage in the adaptation business through their technologies and services.

With COP27 to be held in Egypt on the African continent in 2022, the importance of adaptation is expected to further increase in the future. Based on the activities to raise awareness of adaptation and adaptation business in both Japan and developing countries that have been conducted continuously so far, we believe that it will be even more important and effective to disseminate information in international forums in the coming year.

On the other hand, many of the projects listed in the Good Practice guidebook are still in the early stages of implementation, and many of them face challenges in commercializing and disseminating their activities, especially given the prolonged travel restrictions imposed by the COVID-19 pandemic. In order to disseminate successful cases of adaptation business by Japanese companies in developing countries, we believe that it is important to provide support for the establishment of projects in parallel. In this fiscal year, we have started discussions with several companies to consider new projects. It is hoped that support for the formulation of these projects will continue in the next fiscal year and beyond.

Responding to climate change has become one of the highest priority issues for the international community and corporate activities. Adaptation efforts are particularly urgent in developing countries that are vulnerable to the effects of climate change. The potential for Japanese companies to contribute to solving these issues by utilizing their technology and experience is high, and it is expected that the number of adaptation business cases will increase in the future as a new business opportunity for companies.

Attachment**Attachment 1: Climate Change Adaptation Good Practices by Japanese Private Sector in Developing Countries (English)**

- (1) Climate Change Adaptation Good Practices by Japanese Private Sector in Developing Countries
(February 2022)

Climate Change Adaptation Good Practices

by Japanese Private Sector
in Developing Countries

February 2022



METI
Ministry of Economy, Trade and Industry

This booklet was compiled as part of the Ministry of Economy, Trade and Industry of Japan's "Fiscal Year 2021 Study on Countermeasures for Issues related to Climate Change (Visualization of Contributions of Japanese Companies in Adaptation Fields in Developing Countries)" by Ernst & Young ShinNihon LLC, the project consultant.



Introduction

This booklet is presented as part of the “Fiscal Year 2020 Study on Countermeasures for Issues related to Climate Change (Visualization of Contributions of Japanese Companies in Adaptation Fields in Developing Countries)” by Ministry of Economy, Trade and Industry of Japan.

The global community has been facing more extreme and frequent weather events and natural disasters than in the past, as seen in the torrential rains, record heat and frequent wildfires, and these disasters impacting people's lives and livelihoods, economies, societies, infrastructures and other broad areas in a variety of ways. To address climate change, “measures for adaptation to climate change” are considered important as an approach to reducing the impacts of climate change which are already emerging and to preparing for potential risks, in addition to taking “mitigation measures” as an approach to curbing greenhouse gas emissions.

We believe that, for any country, engagement of the private sector in the climate change adaptation activities is necessary for its sustainable growth, and therefore we have been promoting participation of the private sector to such adaptation activities overseas. 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, Industry and Trade 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.

February 2022

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

Explanatory Notes

In this booklet, each good practice is organized into seven promising areas in which the Japanese private companies can make an international contribution in the field of adaptation. Some good practices fall into more than one field.

In addition, this booklet colors the Sustainable Development Goals (SDGs) by the United Nations that are closely related to each good practice.

7 Promising Areas of Adaptation

- Resilient Infrastructure against Natural Disasters
- Sustainable Energy Supply
- Food Security & Strengthening Food Productive Base
- Health & Sanitation
- Climate Monitoring & Early Warning
- Secure Resources & Sustainable Water Supply
- Climate Change Finance

Related SDGs



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p.	No	Business Area	Title	Company	Related SDGs
5	1	Resilient Infrastructure against Natural Disasters	Development of anti-disaster information system for utilizing forestry preservation project	Kanematsu Corporation / Hitachi Ltd.	9 12 13
7	2	Resilient Infrastructure against Natural Disasters Climate Monitoring & Early Warning	Examining the Earth as “Earth Doctor”	Kawasaki Geological Engineering Co., Ltd.	9 13
9	3	Resilient Infrastructure against Natural Disasters Food Security & Strengthening Food Production Base Health & Sanitation	Water projects for realization of cooperative and rich society	Kubota Corporation	3 6 8 11 13
11	4	Resilient Infrastructure against Natural Disasters Climate Monitoring & Early Warning	Protecting society and infrastructure from slope disasters	Kokusai Kogyo Co., Ltd.	11 13
13	5	Resilient Infrastructure against Natural Disasters	Protecting local community from threat of high tide and sea level rise	TAISEI CORPORATION	9 11 13
15	6	Resilient Infrastructure against Natural Disasters	Methodology for prevention of soil surface erosion with soil algae (BSC methodology)	Nippon Koei Co., Ltd.	6 11 13 15
17	7	Resilient Infrastructure against Natural Disasters Climate Monitoring & Early Warning	Disaster risk reduction by river water level alarm system	Unimation System Inc.	11 13
19	8	Resilient Infrastructure against Natural Disasters Climate Monitoring & Early Warning	Disaster prevention system through real-time image data distributed by river monitoring cameras	eTrust Co., Ltd.	11 13
21	9	Resilient Infrastructure against Natural Disasters	Functional paving materials made from waste roof tiles and bricks to reduce urban flooding and heat island effect	ECOSYSTEM Inc.	6 11 12 13
23	10	Resilient Infrastructure against Natural Disasters	Waterproofing and Extending the Service Life of Buildings with Concrete Repair Materials	ZEN Co., Ltd / Japan Prolong Limited Company	9 11 12 13
25	11	Sustainable Energy Supply	Introducing a resilient hybrid power generation control system against environmental changes	Kyudenko Corporation	7 13
27	12	Sustainable Energy Supply Climate Monitoring & Early Warning	Greater resilience in anti-disaster infrastructure through the world’s first “Typhoon Power Generation” and communications satellite	Challenergy Inc.	7 9 13
29	13	Sustainable Energy Supply	Mitigating damage to energy supply system in times of disasters	Panasonic Corporation	1 3 4 5 7 13
31	14	Food Security & Strengthening Food Production Base	Contributing to sustainable agriculture through “Bio-cycle”	Ajinomoto Co., Inc.	2 12 15
33	15	Food Security & Strengthening Food Production Base	Greater harvest through compost soil improver	Kawashima Co., Ltd.	2 5 12 13 15
35	16	Food Security & Strengthening Food Production Base	Greater resilience and higher income through “Agriculture sustainable for 100 years and beyond”	On The Slope Co., Ltd.	2 12 15
37	17	Food Security & Strengthening Food Production Base	Circular model in the manufacture and sale of apparel added with social and environmental value of afforestation project	Sunford Co., Ltd.	1 2 13 15
39	18	Food Security & Strengthening Food Production Base	Adapting to changing cultivation environment for traditional crops	Dari K Co., Ltd.	1 2 7 8 13 15
41	19	Food Security & Strengthening Food Production Base Sustainable Energy Supply	Generating energy and farming at one place with Solar Farm® technology	Farmdo Group	7 9 11 13
43	20	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.	13 15
45	21	Food Security & Strengthening Food Production Base Secure Resources & Sustainable Water Supply	Rejuvenation of arid areas through high-molecule film farming method	Mebiol Inc.	1 2 3 5 6 8 9 13

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p.	No	Business Area	Title	Company	Related SDGs
47	22	Food Security & Strengthening Food Production Base	High quality mung beans production in salinized lands	euglena Co., Ltd.	1 2 13
49	23	Food Security & Strengthening Food Production Base Secure Resources & Sustainable Water Supply	Cultivation of fruit vegetable crops with optimized application of water and fertilizer using an IoT and AI based autonomous drip irrigation system	Routrek Networks, Inc.	2 6 9 13 15
51	24	Health & Sanitation	Paints for sustainable life	Kansai Paint Co., Ltd.	3 13
53	25	Health & Sanitation Food Security & Strengthening Food Production Base	Mitigating impact of frequent forest fire on plants and animals	Shabondama Soap Co., Ltd.	2 13 15
55	26	Health & Sanitation	Preventing spread of infectious diseases associated with climate change	Sumitomo Chemical Co., Ltd.	3 13
57	27	Health & Sanitation Secure Resources & Sustainable Water Supply	Bicycle-type water purification system for securing a clean water supply	Nippon Basic Co., Ltd.	3 6 13
59	28	Climate Monitoring & Early Warning Food Security & Strengthening Food Production Base	Facilitating countermeasures against climate change through Big Data	Remote Sensing Technology Center of Japan	13 15
61	29	Climate Monitoring & Early Warning	The world's lightest & most compact X-band weather radar enables real-time monitoring of local extreme weather	FURUNO ELECTRIC CO., LTD.	1 11 13
63	30	Secure Resources & Sustainable Water Supply Health & Sanitation	Securing sufficient and clean water through ion exchange membrane	AGC Inc.	3 6
65	31	Secure Resources & Sustainable Water Supply Health & Sanitation	Development of a tourism city through water treatment	Sanicon Co., Ltd. / Accrete Co., Ltd.	6 11 13
67	32	Secure Resources & Sustainable Water Supply	Contributing to the reduction of non-revenue water and stable supply of safe water by detecting leaks from buried water pipes	Suidou Technical Service Co., Ltd.	3 6 9 11 13
69	33	Secure Resources & Sustainable Water Supply	Curbing flood damage and solving water shortage with rainwater storage system	SEKISUI CHEMICAL CO., LTD.	3 6 9 12
71	34	Secure Resources & Sustainable Water Supply Health & Sanitation	Stable supply of water with high turbidity raw water compatible water purification equipment	Tohkemy Corporation	1 3 6 13
73	35	Secure Resources & Sustainable Water Supply	Securing sustainable water resources through water-saving plants	JGC Holdings Corporation	6 9 12
75	36	Secure Resources & Sustainable Water Supply Health & Sanitation	Realization of stable water treatment by underwater mechanical aerator and agitator	Hanshin Engineering Co., Ltd.	3 6 12 13
77	37	Secure Resources & Sustainable Water Supply Health & Sanitation	Producing safe drinking water from saline and highly-turbid surface water	Mitsubishi Chemical Aqua Solutions Co., Ltd.	6 9 13
79	38	Secure Resources & Sustainable Water Supply Health & Sanitation	Addressing water pollution caused by floods	Yamaha Motor Co., Ltd.	3 4 5 6 8 15
81	39	Climate Change Finance	Minimizing financial losses caused by extreme weather events	Sompo Holdings, Inc.	1 13 17

Sustainable Development Goals (SDGs)

1 NO POVERTY	7 AFFORDABLE AND CLEAN ENERGY	13 CLIMATE ACTION
2 ZERO HUNGER	8 DECENT WORK AND ECONOMIC GROWTH	14 LIFE BELOW WATER
3 GOOD HEALTH AND WELL-BEING	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	15 LIFE ON LAND
4 QUALITY EDUCATION	10 REDUCED INEQUALITIES	16 PEACE, JUSTICE AND STRONG INSTITUTIONS
5 GENDER EQUALITY	11 SUSTAINABLE CITIES AND COMMUNITIES	17 PARTNERSHIPS FOR THE GOALS
6 CLEAN WATER AND SANITATION	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	

1. Development of anti-disaster information system for utilizing forestry preservation project

Kanematsu Corporation <http://www.kanematsu.co.jp/>

Hitachi Ltd. <http://www.hitachi.co.jp/>

Adaptation Challenge Frequent forest fire and decrease in forest area due to climate change such as El Nino have led to deterioration of the function of eco system and rise in disaster risks in Indonesia.

Contribution The eco system recovery through forest conservation projects by Kanematsu reinforces physical response capacity to weather events and mitigate disaster risks. In addition, disaster information system built by Hitachi utilizing a flood simulator called DioVISTA/Flood contributes to minimizing the impact of disasters on human, etc.

Project Detail

■ Background

Country | Indonesia

Kanematsu launched a project in Boalemo Prefecture, Gorontalo Province 2011 to raise profits of local farmers suffering from loss of forests caused by forest fire and thereafter shifting from corn to high-quality cacao farming. In 2015, the project was adopted as the "REDD+ Project using Joint Crediting Mechanism (JCM)" and then the pilot project was materialized, under which initiatives are taken to reduce the greenhouse gas emissions to the targeted 86,000 CO2 ton annually for the entire project. A new value chain was established where cacao beans are produced for export to Japan through agroforestry, contributing to greater adaptability of local producers by raising their income. In 2018, the project was adopted as the "Feasibility Research Project towards Overseas Development of High Quality Infrastructure" by the Ministry of Economy, Trade and Industry of Japan and initiatives were launched for introduction of a flood simulator. Combining the disaster prevention information system and REDD+ Project, the project is expected to grow as a mitigation/adaptation cross-cutting project.

■ Business Model of the Project

The project is executed in collaboration with a major local conglomerate, the Gobel Group which is a partner in the REDD+ Project. The Group helps in the sales coordination/management of disaster prevention information system to the prefectural governors and local heads of Gorontalo Province. In addition, the project is pursued through network of various partners, including, Pasco Co., Ltd, map data provider and Tokyo Food Co., Ltd. for sale of cacao in Japan.

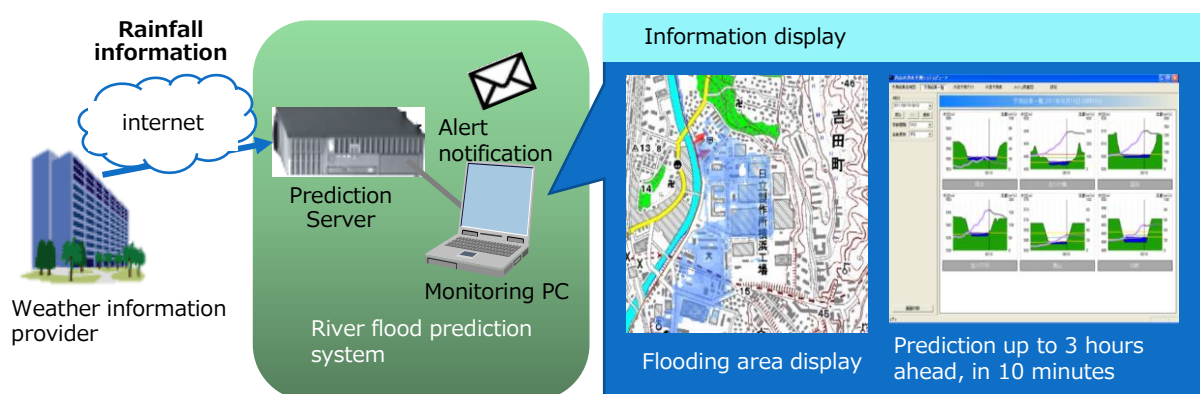


▲Implementing Agroforestry



Product & Technology

DioVISTA/Flood: A software developed by Hitachi Power Solutions Co., Ltd. for simulation of floods which is used extensively for prediction of inundation areas by local governments, preparation of flood hazard maps by the central government and prefectures, and quantification of flood risks by insurance companies. The software is equipped with user-friendly functions such as 3-dimension GIS and high-speed simulating calculation functions using the patented technology of Dynamic DDM to enable non-experts to conduct a high level of simulation.



▲DioVista/Flood System Overview

Key to Success & Challenges for Further Development

- The project is supported by a strong partnership with the local partner Gobel Group having an extensive network with public and private sector stakeholders.
- Raising awareness for disaster prevention is imperative for further growth.

Profile of Project Company

Kanematsu Corporation was founded in 1889 as a general trading firm under the motto of “Contribution to society through creation of business”. The Company strives to become a company that grows together with customers and incessantly aims for the creation of business. Setting “Environment, Society and Governance” as the key management principle, the Company considers climate change business as its management foundation and promotes REDD+ activities as part of the climate change business such as forest conservation, sustaining lives of local residents, and bio diversity conservation. In addition, the Company incorporates climate change adaptation as part of the environment policy.

Hitachi Ltd. was founded in 1910 and is one of the largest industrial electronics companies both in Japan and in the world. The Company promotes its founding strength of operation/control technology and social innovation projects incorporating IT and cutting-edge digital technology to solve social challenges and create new value. As an innovation partner in the IoT era, the Company strives for social innovation projects in areas of electricity/energy, industry/distribution/water, urban and finance/society/healthcare.

2. Examining the Earth as “Earth Doctor”

Kawasaki Geological Engineering Co., Ltd. <http://www.kge.co.jp/>

Adaptation Challenge Disasters triggered by floods and landslides on account of climate change and frail soil foundation attributable to the tropical monsoon climate bring considerable damages.

Contribution 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.

Project Detail

■ Background

Country | Vietnam

The Project was selected for the “Climate Change Adaptation Effect Visualization Project” 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). Kawasaki Geological Engineering also conducted a survey, design and construction relevant to landslides and constructed evacuation warning systems, proposed landslide prevention methods and implemented countermeasures in the landslide-hit area of Dalat, sightseeing spot in Vietnam. In the future, the Company intends to expand the business in Vietnam through technical/business tie-ups or capital alliance.



▲ Local situation where measures for landslide prevention is required

Related SDGs



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.

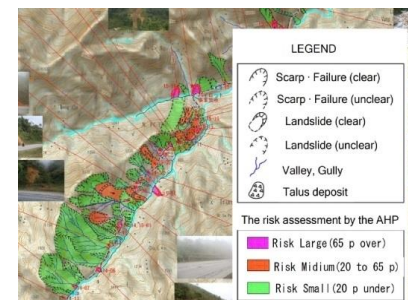
Monitoring System: Exploration and measurement technologies, prediction technology of incline disasters, various analysis technology, prediction technology of incline disasters, assessment technology of potential outbreak of incline disasters using AHP (Analytic Hierarchy Process).

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.



▲Emergency Survey and Installation of Monitoring Post for Prevention of Landslides



▲Illustration of Landslide Hazard Map

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 and City of Dalat.
- In Vietnam, demands for prevention and mitigation works have been increasing steadily.
- Going forward, while continuing its efforts of raising awareness and developing engineers on a long-term basis, the Company plans to develop the business by focusing on the service orders as well as for the outsourcing demands from other companies for employee training and technical assistance to cope with the challenges including risk management for different business practices..

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 (including renewable 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.

3. Water projects for realization of cooperative and rich society

Kubota Corporation <http://www.kubota.co.jp/>

Adaptation Challenge Frequent floods and droughts as well as water contamination due to climate change seriously affect society and economy of many developing countries that are highly vulnerable to climate change.

Contribution Kubota contributes to resilient infrastructure and supply of secure and safe water through its technologies, such as pipes used for water supply and sewage water facilities, drainage and irrigation pumps, water treatment membranes and wastewater treatment plant, which serve as adaptation measures against floods and water pollution.

Project Detail, Product & Technology

■ Background

Country | UAE (Abu Dhabi), Bangladesh, Thailand, Vietnam, Myanmar, etc.

Kubota is tackling to solve the problems of developing countries through the products and technologies developed in Japan, such as pipes, pumps, and water treatment.

■ Business Model of the Project

Kubota conducts design, construction and supply products for water related project in developing countries etc.

<Project Showcases>

Abu Dhabi: Ductile Iron Pipe that supply secure and safe water under harsh environment

In Arab countries where 70% of the land is desert, household, industrial and agricultural water depends on desalinized seawater. The highly-durable ductile iron pipes supply safely this precious desalinized water throughout the region.

Bangladesh: Dual purpose pump station for Flood and Droughts

In Bangladesh, rivers cover 10% of the land surface and the land is only 9m above sea level or below. In such environment, flooding during the rainy season and droughts during the dry season are a major problem.

Thus, a project was launched to surround a specific area by levees, Kubota pumps were installed in the pump station that drains and draws water. Since the project was launched, agricultural harvest in this area has doubled. Kubota pump is thus contributing to the infrastructure for both flood prevention and agricultural development.

Thailand: Drainage pumps that contribute to the reconstruction from the flood.

The 2011 Thailand floods that occurred mainly in the Chao Phraya River basin, Japanese government dispatched the Kubota's mobile pump trucks, and engineers of Kubota were dispatched as an international emergency disaster relief team.

The pumps can empty a 25m-pool filled with water in just 10 minutes, weighing 95% less than conventional pumps. The feature of its high mobility enabled quick recovery from flood in various parts of Thailand.



Project Detail, Product & Technology (Continued)

Vietnam: Johkasou (Wastewater treatment tank) that improve hygienic environment in developing countries.

Poor hygiene is posing serious threat to developing countries where rapid urbanization outpaces the development of sewage facilities.

Kubota contributes to the improvement of hygiene and reinforcement of urban infrastructure in developing countries utilizing Johkasou that enable the treatment of sewage on site.

Myanmar: Water Purification and Treatment Plant that environmental friendliness through comprehensive water solution.

Kubota has built water infrastructure including water purification plant, wastewater treatment plant and water supply system in the first SEZ in Myanmar, to which Kubota has exported agricultural machinery and irrigation pumps for over 60 years.

These technologies have significantly contributed to the Thilawa SEZ in terms of harmony with surrounding environment and sustainable economic growth of Myanmar.



▲ Ductile iron pipe



▲ Dual purpose pump station



▲ Drainage works by the Japan Disaster Relief Team



▲ Johkasou in hospital



▲ Water purification plant built in Zone A, industrial park in the Thilawa SEZ

Key to Success & Challenges for Further Development

- Kubota strives to explore market opportunity in areas of "food, water, environment" as the common global agenda through its long-established brand strength and close-knit network with local community.
- In Myanmar, Kubota has supported industrialization for years and been engaged in activities to build capacity in the area of water environment while supporting and training engineers.

Profile of Project Company

Established in 1890, Kubota Corporation is Japan's largest manufacturer of agricultural machinery. The product line-up also includes small construction machinery, small industrial engines, pipes, pumps and environment-related plants. Under the corporate philosophy of "Contribution to society through business", Kubota has been delivering what society truly needs in the form of products, technologies, and services including increased food production and saving labor through agricultural machinery. Kubota also upholds "For Earth, For Life" and setting SDG's, the world's common themes, as its compass. Kubota Group will keep striving to realize the abundant living environment and development of society through tackling the global challenges in the area of "Food", "Water" and "Environment". In the area of water environment, Kubota aims at solving challenges through the provision of total solution services including individual equipment to after-sale systems diagnosis services leveraged on IoT.

4. Protecting society and infrastructure from slope disasters

Kokusai Kogyo Co., Ltd. <https://www.kkc.co.jp/>

Adaptation Challenge Frequent slope disasters due to torrential rain triggered by climate change pose serious threats to socio-economic activities in many developing countries where technical know-how for measures against slope disasters is not readily available.

Contribution Kokusai Kogyo, with its expertise in disaster risk reduction utilizing geospatial information and technical slope disaster management, is contributing to the establishment of resilient infrastructure and of systems for monitoring and early warning in developing countries. These measures are the concrete countermeasures for heavy rainfall disasters caused by climate change.

Project Detail, Product & Technology

■ Background

With the increasing frequency of natural disasters in recent years many developing countries are facing these disasters. Kokusai Kogyo is providing support for the development of sustainable national infrastructure in these developing countries, utilizing its disaster risk reduction measures built on the geospatial information technology developed in Japan, which is frequently struck by natural disasters.

■ Business Model

As an example, to counter slope disasters, Kokusai Kogyo has introduced both physical infrastructure initiatives such as river works (sabo dams), and 'soft' initiatives such as real-time measurement system and hazard mapping as well as the organization of the administrative structure required for early warning/evacuation systems and the drafting of manuals. Projects in developing countries mainly consist of ODA projects by the Japan International Cooperation Agency (JICA) and other profit-aimed SDGs activities.

<Project Showcases>

Ethiopia: Measures for the management of river gorge slopes (physical and 'soft' measures)

Route 3 is a major highway in Ethiopia running through one of the country's largest granaries which also serves as a crude oil pipeline from South Sudan. The highway turns into an obstacle to economic activities during the rainy season that triggers frequent landslides along the route passing through the Abay River Gorge. Kokusai Kogyo participated in the JICA ODA project for developing countermeasures against landslides. Measures implemented include the streamlining of relevant administrative structures, preparation of handbooks, emergency countermeasures against landslides (surveys, decisions about countermeasure work and construction) and mid-to-long term countermeasures (surveys/analysis, design, construction/maintenance and management).

Country | Ethiopia, Brazil, Bhutan



▲ Expert advisors conducting a survey of Landslide points along the Abay River Gorge



▲ Local training for developing hazard maps.



Project Detail, Product & Technology (Continued)

Brazil: Support for overarching reinforcement of landslide disaster management ('soft' measures)

Damage from landside disasters is on the rise in Brazil due to the expansion of habitats into disaster-risk areas under rapid urbanization and the impact of climate change. Kokusai Kogyo participated in a technical cooperation project of JICA and implemented measures such as the assessment of landslide disaster risks in the pilot area and urban expansion planning based on the assessment, preparation of disaster prevention manuals, and the reinforcement of comprehensive disaster response built on structural measures against mudslides and rockslides. The project was awarded the United Nations Sasakawa Award for Disaster Reduction in 2017. Kokusai Kogyo currently seeks to introduce the project outside the pilot areas through manual-based training.

Bhutan: The Project for Capacity Development on Countermeasures of Slope Disaster on Roads (physical and 'soft' measures))

Bhutan is mostly made up of steep mountainous areas and most roads face steep slopes. Frequent slope disasters caused by the increasing occurrence of extreme weather events hinder economic activities. Kokusai Kogyo participated in a technical cooperation project of JICA and implemented 'soft' measures such as the inspection/diagnosis of slope disasters, establishment of a slope disaster risk reduction database and ex-ante traffic control, as well as physical measures such as countermeasures for road slope failures and debris flow disasters, resulting in the overall improvement of road slope disaster prevention technology in Bhutan.



▲ Installation of monitoring sensors for ex-ante traffic control as components of a smartphone-based road information system

Key to Success & Challenges for Further Development

- Contributing factors to growth in business include growing the demand for disaster risk reduction measures in the target countries, recognition of high quality disaster risk reduction technologies from Japan, the effects of slope disaster countermeasures that are easy-to-visualize, and the implementation of ODA projects.
- Inefficient communication due to the lack of coordination among relevant government agencies in the target countries was improved by supporting relationship building through the clarification of tasks, regular meetings, technology transfer among groups and organized training in Japan.
- In June 2018, a joint venture was established with a Taiwanese local partner. Through the localization of business, Kokusai Kogyo strives for profit-aimed SDGs activities with the key focus on local communities, mainly in Southeast Asia.

Profile of Project Company

Kokusai Kogyo Co., Ltd. is the core subsidiary of the Japan Asia Group. Since its establishment in 1947, Kokusai Kogyo has utilized its geospatial information technology in the fields of construction consultancy, geological/marine survey, disaster risk reduction/mitigation, and environmental energy. Under the Group Mission of "Save the Earth, Make Communities Green" and regarding climate change as a solution for social challenges, Kokusai Kogyo is engaged in various adaptation and mitigation activities, including disaster risk reduction and social infrastructure. Kokusai Kogyo is a member of the United Nations Global Compact (UNGC) since 2013 and a private sector group of the United Nations Office for Disaster Risk Reduction (UNDRR) since its inception in 2011.

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

TAISEI CORPORATION <http://www.taisei.co.jp/>

Adaptation Challenge 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.

Contribution 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.

Project Detail

Country | Maldives

■ 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.



▲ Bird's-eye view of Male Island



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.



▲Visual Illustration of Seawall

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). Under the group philosophy of "Creating a Vibrant Environment for All Members of Society", TAISEI CORPORATION, through its construction activities, strives for the development of high-quality social infrastructure and improvement of the living environment in harmony with nature. The company recognizes "the realization of a sustainable and environment friendly society" as a material ESG initiative.

6. Methodology for prevention of soil surface erosion with soil algae (BSC methodology)

Nippon Koei Co., Ltd. <https://www.n-koei.co.jp/>

Adaptation Challenge Nippon Koei (NK), in collaboration with Public Works Research Institute (PWRI), has developed a technology for protection of slope surface erosion with soil algae in order to control sediment of red soil into the rivers and coasts in the Southwest Islands of Japan.

Contribution NK developed a technology to prevent surface erosion by using soil algae in collaboration with the PWRI, in the course of a research on countermeasure to the red soil problem that was polluting the rivers and coasts of the southwestern islands.

Project Detail

Background

Country | Nepal

In the course of a research on prevention of sediment discharge from mountains into rivers and coasts in Okinawa prefecture of Japan, the following two findings were identified and a patent was issued to NK and PWRI in 2009 based on the research results: (1) observation at the site found out the soil sediment from slope with developed soil algae is limited, and (2) based on (1), in collaboration with PWRI, it was demonstrated that sediment yield from a field covered by soil algae reduced by 1/10~1/20 of the one from a field without soil algae. After issuance of the patent, in collaboration with Nikken Sohonsa Corporation, based in Gifu prefecture, which has technology of cultivation of algae, commercialization of the products. Furthermore, the trial implementation of this technology was conducted in Nepal through the JICA project "Collaboration Program with the Private Sector for Disseminating Japanese Technology for Environment-Friendly Slope Restoration with Soil Algae in Nepal", implemented by the Joint Venture (JV) between Nikken Sohonsa Corporation and NK based on the contract with JICA (from February 2019 to March 2021). Through demonstrations, monitoring and seminars, the JV members aimed to promote understanding of the usefulness of Biological Soil Crust (BSC) method to Nepal.

Business Model of the Project

Planning and implementation service including production and sales of algae material (BSC-1), site evaluation etc.



Just After Spray
After 3 Months



▲BSC material▶



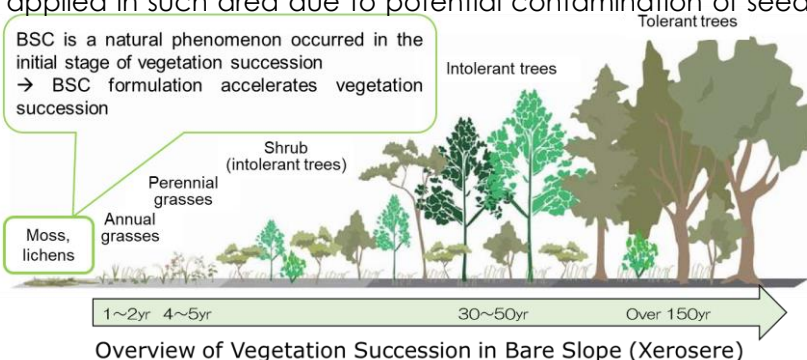


Product & Technology

1) In the initial stage of vegetation succession, soil surface is covered by a sheet of algae, moss and lichens, namely Biological Soil Crust (BSC). This formulated BSC makes soil condition preferable for vegetation growth. It can be observed that grasses and trees come out, following formulation of BSC. BSC method applies this phenomenon by spraying BSC material (BSC-1), mixed with water onto slopes, and it enables to shorten time period of formulation of BSC by two weeks to one month and accelerate natural vegetation succession.

2) Soil algae applied in this methodology is cosmopolitan species, habituating globally from the north to south pole. Besides, since it is hermaphrodite and increases by clonal proliferation, this methodology has no risk of hybridization and genetic disturbance. Thus, it can be applied in those areas which do not accept intrusion of invasive species such as nature parks, although the conventional methodology for slope protection and vegetation recovery such as seed spray methodology is not allowed to be applied in such area due to potential contamination of seeds of invasive species.

3) This methodology does not need to cast cement on slopes nor to put up a wire lath net, but need only to spray liquid of soil algae on the slope surface using conventional spraying equipment, which is easier than the conventional methodologies.



Key to Success & Challenges for Further Development

After a joint research with PWRI in Japan, a collaboration with Nikken Sohonsa Corporation which has technology of algae cultivation has been started for mass production of soil algae materials. The result of the collaboration was to reduce the product cost lower than the conventional methodologies in a certain growth condition. This methodology does not utilize invasive species nor cement, but cosmopolitan soil algae. Hence, it can be applied even in areas which do not accept the conventional methodologies such as nature parks. Besides, this methodology has advantage in the cases requiring rapid vegetation recovery and slope restoration. The demonstration of this methodology in Nepal for slope protection along a road that NK has been supported in construction and management over decades has been completed in March 2021.

Challenges: (1) Increasing of field trials in the target countries, (2) Collaboration with existing methods (sheet/matt covering, hydroseeding, etc.), (3) Cost saving.

Profile of Project Company

Since its establishment in 1946, in over the 160 countries and regions, NK has provided engineering consulting services on development and construction, as well as technology evaluation, design and construction of varieties of infrastructures, production and sales of machinery for electricity generation systems. NK is composed of 5 segments: domestic consulting, overseas consulting, electricity engineering, Urban & Spatial Development Division established since 2017, and Energy Business Division since 2019. Various projects related with adaptation and mitigation of climate change have been implemented both in Japan and overseas.

7. Disaster risk reduction by river water level alarm system

Unimation System Inc.

<https://www.unimation.co.jp/index.html>

Adaptation Challenge In Philippines, measures to prevent or reduce disaster is an urgent issue because Philippines is affected by climate events such as typhoons. Especially, frequent occurrence of river water flooding due to undeveloped sewage system and lack of technology and institutional capacity for disaster management cause serious disaster risk.

Contribution River Water Level Alarm System of Unimation System Inc. can send alert of occurrence of river water flooding to local people, collect information of river water level, and control/forecast occurrence of flooding for wide area in high disaster risk area. The Alarm System of Unimation System Inc. contributes to prevention of disaster and reduction of disaster risk for local residents even though it is worried that typhoon becomes larger with higher frequency due to climate change.

Project Detail

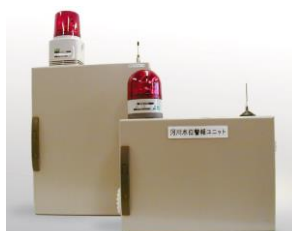
Background

Country | Philippines

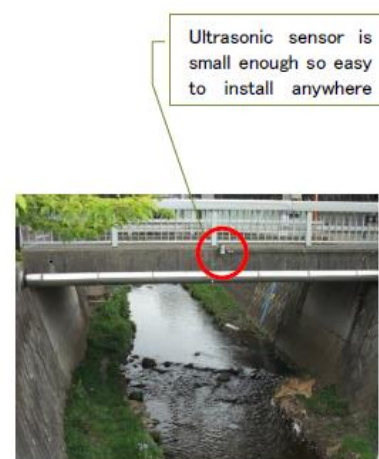
Unimation System Inc. (herein after Unimation) is a specialized company dealing in equipment for disaster prevention such as River Water Level Alarm System, Flood Warning Unit for Road, and Flood Warning System and has been selling the equipment in Japan. After the major flood disaster in Thailand in 2011, Unimation found that its technology and products are in need in countries outside Japan, and hence started thinking about developing its business abroad. Afterward, they has joined Grassroots Technical Cooperation Project (City of Iloilo, Philippines) using JICA Business Model Formulation Survey and JICA Verification Survey ("Establishment of Disaster Prevention System using River Water Level Alarm System in Philippines" in Cebu City and Talisay City etc. in Metro Cebu) and examined their business development in developing countries where seriously causing disaster such as flooding.

Business Model of the Project

Unimation implemented the Project in cooperation with concerned government staff and other stakeholders through JICA scheme. Unimation aims at expanding services in Southeast Asia from Metro Cebu in Philippines with consideration for advantages for sales promotion such as large population, strong initiative for inviting foreign investment, and rather short distance from Japan.



▲ River Water Level Alarm System



▲ Image of Setting of Alarm System

Related SDGs



Product & Technology

River Water Level Alarm System: The equipment continuously monitors water level of river and when a preset trigger level (6 levels of water level can be set) is reached, warning signals are instantaneously released by rotating warning lights, sirens and speakers, as well as by emails sent to pre-registered email addresses. Lead time of alarm can drastically shorten because the equipment sounds the alarm by itself. Moreover, the system lower cost than other alarm system because server is not necessary for the system.

Flood Warning Unit for Road: The equipment uses a the sensor which can be installed in narrow place such as side of road and can call attention in the place where water is retained easily such as under path, elevator pit, and drainage ditch. Even if communication system stops due to disaster, the system can detect current water level and increasing water level of current location and display, warning signals, and alarm can be activated and pedestrians and cars can be alerted.



▲Flood Warning Unit for Road

By installation of the abovementioned equipment, alarm of flooding and evacuation signal are given and human damage can be minimized. Moreover, required maintenance for the equipment is only cleaning its cover. The cost for establishment of disaster prevention system tends to be lower than other large scale systems.



▲Installation of Alarm Unit (City of Iloilo)



▲Installed Alarm Unit (City of Iloilo)

Key to Success & Challenges for Further Development

- To promote development of the business in Philippines, Unimation installs River Water Level Alarm System and also cooperate with another company (company skilled at radio wireless) and is able to propose more effective solution for needs in the site. It's effective to cooperate with another company for developing business in developing countries because integrated solution including various equipment and technology is often required.
- In developing countries, needs of disaster prevention is bigger, however, installation of equipment is often difficult because of cost. Initial and maintenance cost of Unimation's equipment is lower than other company's. However, to develop sales channel in Southeast Asia, it's necessary to produce equipment in Philippines and develop low cost model.

Profile of Project Company

Since the foundation of the company in 1979, Unimation specializing in disaster prevention products, has manufactured, sold, and developed its flood early warning system, and also developed a website related to flood early warning system along with management services. Unimation sells and produces River Water Level Alarm System, Flood Warning Unit for Road, Flood Warning Sensor, ultrasonic sensor etc. and contributes for prevention and reduction of disaster in local areas in Japan.

8. Disaster prevention system through real-time image data distributed by river monitoring cameras

eTrust Co., Ltd. <https://www.etrust.ne.jp>

Adaptation Challenge Typhoons, hurricanes, and torrential rains, which are becoming more severe due to climate change, can cause river overflows and floods, putting human lives and infrastructure at risk.

Contribution eTrust's disaster prevention system using river monitoring cameras can help reduce the risk of disaster by providing real-time information on river conditions to local residents and others, thereby identifying the risk of overflows and floods in advance.

Project Details

■ Background

Country | Philippines, Bangladesh, Brazil, etc.

The disaster prevention system using river monitoring cameras introduced in Nagaoka City, Niigata Prefecture, Japan, has been well received. The company is considering disseminating the system to developing countries from a low price range. Starting with the Philippines, the company has introduced disaster prevention systems to Bangladesh, Myanmar, and Brazil.

■ Business Model of the Project

Philippines: Local economy-based disaster prevention system for farming villages around the lake

In order to monitor changes in tributaries flowing into Laguna Lake, the largest lake in the country, a total of six river monitoring cameras and water level gauges were installed in three surrounding areas through JICA's Grassroots Technical Cooperation Project. A disaster prevention workshop was held to strengthen the flood risk management operation capacity of local disaster prevention staffs, and lectures were given on system operation and management methods.

Bangladesh: Disaster prevention system using solar power and wireless communication

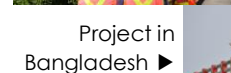
Through a feasibility study under the then Ministry of Foreign Affairs of Japan's Official Development Assistance Overseas Economic Cooperation Project, cameras and water level gauges were installed in three locations along the Meghna River in northeastern Bangladesh. The system operates using solar power and cellular phone lines, demonstrating that it is possible to collect and transmit river information even in an environment where infrastructure such as power and communication lines are not yet in place.

Brazil: Disaster prevention system using network infrastructure

As part of a research project commissioned by the Ministry of Internal Affairs and Communications Japan, three smartphone cameras and one water level gauge were installed in the lower reaches of the Iguaçu River. The acquired data was transmitted to the local disaster prevention bureau and fire department via a cloud server. When the water level reaches a dangerous level, an alert e-mail is sent to the person in charge, supporting the prompt provision of disaster prevention information and issuance of evacuation warnings to locals.



◀ Project in
Philippines



Project in
Bangladesh ▶



◀ Project in
Brazil



Product & Technology

Cloud-based disaster prevention monitoring system STAND GUARD:

By using solar panels as the power source for the river monitoring cameras, the system can be installed in off-grid areas. The system is completely wireless, and its high-performance cameras allow for clear vision of river conditions even at night. By automatically capturing images of the river at regular intervals and transferring the data to the cloud through cellular phone lines, it is possible to provide real-time and past photos of the river on a dedicated management screen or website. The basic equipment consists of a small camera, a solar panel, and a power supply box. By installing a water level gauge and an anemometer, environmental data can also be measured. In addition to river monitoring, the system can be used to monitor coastal areas, mountainous areas, construction sites, mega solar power plants, and illegal dumping.

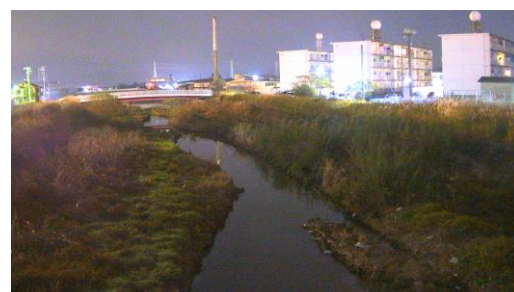


▲ Equipment configuration



▲ Website and smartphone screens

Clear images can be seen even at night ►



Key to Success & Challenges for Further Development

- This is a disaster prevention system developed in-house in response to the needs of Japanese municipalities, and is less expensive than products from major manufacturers, making it easy to introduce to developing countries.
- Technical know-how is required for the installation of river monitoring camera systems, and it is important to establish a local maintenance and management system.

Profile of Project Company

Established in 1935 as a motor repair business in Nagaoka City, Niigata Prefecture. Since establishment, the company has made it a management policy to continue to be "a presence needed by society" and has developed its business activities centering on the telecommunication industry. Since the 2004 Chuetsu Earthquake and flood damage, together with Nagaoka City, the company began developing a disaster prevention monitoring system for the city called Nagaoka Disaster Prevention Information System, and has continued to develop disaster prevention systems ever since.

9. Functional paving materials made from waste roof tiles and bricks to reduce urban flooding and heat island effect

ECOSYSTEM Inc. http://eco-system.ne.jp/index_eng.html

Adaptation Challenge Torrential rains, typhoons and hurricanes have been occurring more frequently due to climate change. In urban areas, ground surfaces are paved with asphalt and concrete, making it difficult for water to seep into the ground and be absorbed. Therefore, urban flooding occurs when rainfall and water levels exceed sewage treatment capacity. Moreover, rising temperatures will exacerbate the heat island effect, causing health problems and ecological changes.

Contribution ECOSYSTEM contributes to reducing urban flooding and the heat island effect by paving the ground with waste roof tiles and bricks that have permeability and water retention properties.

Project Details

Background

Country | Vietnam

Ceramic products such as roof tiles and fired bricks, which are used as raw materials for pavement, are found in many parts of the world, especially in Europe, Southeast Asia, and South America. In order to capture this market, ECOSYSTEM is considering expanding overseas. In Vietnam, it is conducting a feasibility study and demonstration project with support from the Ministry of the Environment, Japan.

Business Model of the Project

In Vietnam, construction waste materials and substandard products from tile and brick factories are disposed of as industrial waste in landfills or illegally dumped. However, local partners will contract with ECOSYSTEM to purchase plants manufacturing paving materials, procure waste tiles and bricks, reuse them, and sell them to private companies and public organizations. Since plants manufacturing paving materials can be assembled locally, ECOSYSTEM plans to contract with a local company for local plant assembly and maintenance in the future.



▲Discarded roof tiles and bricks



▲Waste roof tiles and bricks

Photo credit: SATREPS Vietnam Project
(Dr. Kawamoto, Saitama University)



Product & Technology

Waste roof tiles and bricks are crushed by crushers to produce gravel and sand products, which are then used as gardening materials, tile chips, and paving materials. Since tiles and bricks are porous, water-permeable and water-retentive pavement materials using these materials can reduce urban flooding and the heat island effect. In addition, a ready-mixed concrete plant is usually required for pavement construction, but since it is expensive, ECOSYSTEM developed a low-cost, mobile, vehicle-mounted manufacturing plant called Mobacon. Because paving material needs to be applied before it hardens, paving material produced at fixed ready-mixed concrete plants can only be used within a radius of 1.5 hours. However, Mobacon makes it possible to manufacture paving material at the same location where it is used, thus eliminating limitations on the work area.



▲ Waste roof tiles and bricks



▲ Vehicle-mounted manufacturing plant (Mobacon)



▲ Road paved with waste roof tiles and bricks

Key to Success & Challenges for Further Development

- Although it is common to recycle construction waste into paving material, using waste tiles and bricks adds value by producing porous material with water-permeable and water-retentive properties, in addition to enhancing the landscape.
- Tiles and bricks are heavy materials and are manufactured by local manufacturers for local consumption. However, considering that manufacturing techniques vary among manufacturers, it is important to distinguish the level of local products to be recycled.

Profile of Project Company

Established in 1994, ECOSYSTEM started its recycling business in 1997 when the company reused contaminated sea sand as paving material in the Nakhodka oil spill. ECOSYSTEM, with a corporate philosophy under which it aims to create ecosystems, has a wealth of knowledge and experience in the recycling of roof tiles and bricks, including tile chips. In Japan, the company is engaged in the disposal of waste roof tiles (intermediate industrial waste disposal business), roof tile paving, franchising of Mobacon, and internet sales of roof tile chips and others.

In 2018, ECOSYSTEM won the Grand Prize at the SDGs Business Contest, Global Innovator Award at the SDGs Business Awards, and Grand Prize at the Ishikawa Eco Design Awards.

10. Waterproofing and Extending the Service Life of Buildings with Concrete Repair Materials

ZEN Co., Ltd <https://zen-kaisyu.jp/>

Japan Prolong Limited Company <http://everprolong.jp/everprolong.net/>

Adaptation Challenge With the increase of wind damage, floods, and storm surges caused by climate change, concrete gradually erodes from the surface and deteriorates due to neutralization and salt damage caused by contact with CO₂ in the air and water. Deteriorated concrete develops voids and cracks, which not only cause water leakage but also lead to the weakening and shortening of the service life of buildings.

Contribution The Ever Prolong method, developed by ZEN and Japan Prolong, densifies the concrete surface by penetrating it with Ever Prolong material. By densifying, the concrete structure becomes waterproof and its surface protection function is strengthened, thus extending the service life of buildings.

Project Details

Background

Country | Philippines

In the Philippines, the construction industry has become a major industry due to construction rush associated with urbanization and population growth. In urban areas, many buildings are made of reinforced concrete, many of which are more than 20 years old and have become decrepit. In addition, high precipitation throughout the year results in water leakage damage due to cracks in concrete, in houses, schools, hospitals, commercial facilities and so on. ZEN and Japan Prolong have been developing a business in the Philippines to solve this problem using the Ever Prolong method. In 2019, the project was selected for the small and medium-sized enterprise (SME) partnership promotion survey under JICA's private-sector collaboration scheme, and a market survey was conducted locally. In the future, the project will be commercialized through on-site demonstration activities.

Business Model of the Project

Concrete repair materials (Ever Prolong) are planned to be exported and sold to local construction companies. In addition, training and guidance (supervising) on construction techniques are planned to be provided to these companies.



▲ Applying Ever Prolong



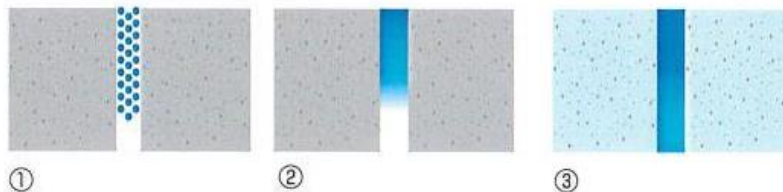
▲ Cracks on a building roof (Philippines)



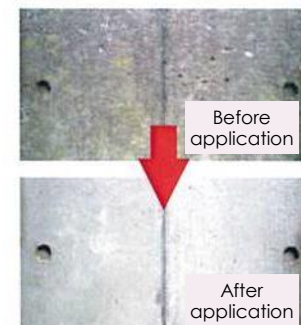
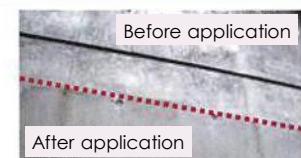
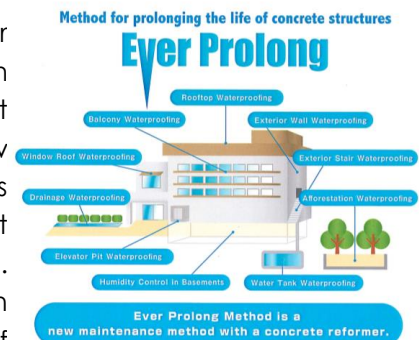
Product & Technology

Ever Prolong: An odorless and harmless concrete modifier (repair material) consisting of a silicate-alkali mixture. When diluted with water and applied or sprayed on the concrete surface, it penetrates and fills the pores of the surface layer of a few centimeters to form a dense protective layer. It closes small cracks in the concrete and allows moisture inside to escape to prevent freezing, while exhibiting waterproof performance against rain. The densification of the concrete surface also prevents adhesion of dust, mold, moss, and algae. It can be used for a wide range of purposes such as waterproofing of rooftops, exterior walls, exterior stages and elevator pits, simple balcony waterproofing, moisture control of basements, and can be applied to all types of concrete.

- ① Ever Prolong is applied to the concrete surface and penetrates by capillary action.
- ② Reactive gel with stable structure is produced.
- ③ Reacts with suspended Ca to produce stable alkali calcium silicate, forming an adhesive protective layer



▲ Mechanism of Ever Prolong



20 years after construction
▲ Application Examples

Key to Success & Challenges for Further Development

- Low initial cost, and the price is set to ensure market superiority in developing countries.
- Installation method is simple and easy to handle. In addition, concrete applied with Ever Prolong is maintenance-free, with a durability of 10 to 20 years after a single application, so there is no need to establish a local maintenance system.

Profile of Project Company

ZEN Co., Ltd: Established in May 2002. ZEN's main business is the renovation of condominiums and commercial buildings. ZEN has completed more than 10,000 projects in Japan, and is committed to environmental conservation and efficient use of natural resources, based on the principles of "gratitude, inspiration, trust". In order to extend the service life of buildings and to further develop the concrete technology in frame waterproofing, ZEN is working with Japan Prolong on the application, technical studies, and research on relevant technologies of Ever Prolong.

Japan Prolong Limited Company: Established in January 2013, Japan Prolong has been mainly engaging in research and development, domestic manufacturing and sales of Ever Prolong, focusing on the fields of concrete life extension and waterproofing of building frames. Ever Prolong was adopted in the New Technology Information System (NETIS) of the Ministry of Land, Infrastructure, Transport and Tourism in 2018.

11. Introducing a resilient hybrid renewable energy power generation control system against environmental changes

Kyudenko Corporation <http://www.kyudenko.co.jp/>

Adaptation Challenge Power supply in remote islands is often dependent on regional grids through diesel generators due to a lack of main 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.

Contribution Hybrid power generation control system introduced by Kyudenko Corporation is an on-grid system that overcomes the unstable supply of renewable energy 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.

Project Detail

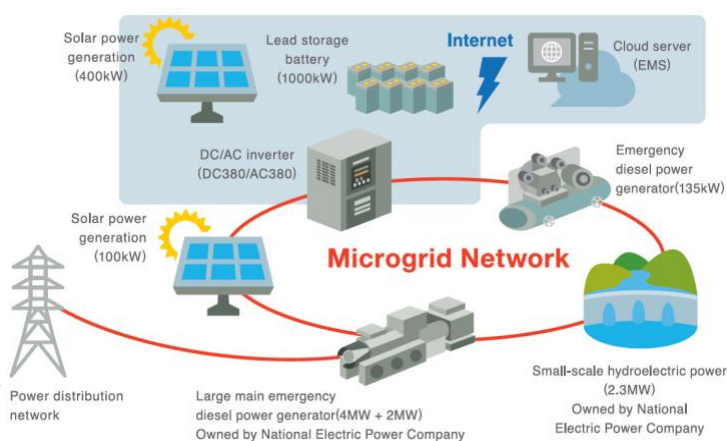
Background

Country | Indonesia

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 battery and emergency diesel power generators, where power generation and storage had difficulties 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 and demonstration project was conducted for 3 years. Based on local experience in power distribution and transmission, the company is working on the commercialization of the Project.

Business Model of the Project

An EPC project is being established, where Engineering, Procurement and Construction are carried out by a local entity upon order from power companies. Additionally, looking ahead to the IPP (Independent Power Producer) business in the future, the company is conducting a feasibility study to introduce biomass-solar hybrid power generation facilities on several remote islands in Indonesia.



▲ Overview of Microgrid Facility in Sumba Island, Indonesia



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.

Power storage system: Lead-acid batteries will be used. Lead-acid battery is affordable but short-lived as its life is less than half the life of lithium-ion battery, however, the Company developed its own control system by controlling charge and discharge that doubles or more the life of lead-acid battery.



▲ Demonstration facility in Sumba Island, Indonesia

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.
- At present, the company is working on improvements for existing renewable energy power plants, as well as large-scale power generation projects using renewable energy as the core power source in several locations in Indonesia.
- Biomass power generation is considered as the core power source for microgrid. Study is being conducted on the environmental impact of raw materials that are not effectively used locally (EFB: empty fruit bunches of coconuts, abandoned wood, etc.), the possibility of local production and consumption, as well as long-term stable procurement.

Profile of Project Company

Kyudenko Corporation was established in 1944. In 1964, the Company launched air conditioning and piping 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 4th business field of its businesses following power distribution, electric facilities construction and air conditioning and piping construction. The Company also 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 commercial power supply line has been detached since February 2016 and the electricity demand within the premises of villas has partially been covered with a stable supply of renewable energy generated under EMS.

12. Greater resilience in anti-disaster infrastructure through the world's first "Typhoon Power Generation" and communications satellite

Challenergy Inc. <https://challenergy.com/>

Adaptation Challenge The Philippines is an island country in the Southwestern Pacific and is one of the most vulnerable countries to climate change, experiencing severe typhoons every year. In remote islands, delays in dissemination of disaster information and disaster recovery is a serious issue coupled with shutdown of power supply and communications after typhoons.

Contribution It is urgently needed to establish resilient infrastructure, stable energy supply, weather monitoring and early warning system. The Project in combination of the Magnus Wind Turbine and satellite communication serves as an adaptation in the field of energy and communication.

Project Detail

Background

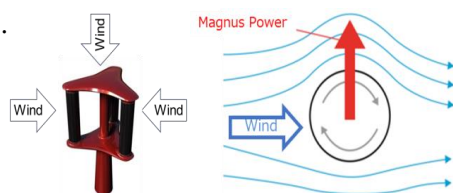
Country | Philippines

Challenergy Inc. has, since its inception targeted island countries in the Pacific where severe typhoon damage is/will be feared due to climate change, and mountainous countries where installation of the conventional wind power generators is difficult. In 2018, the Company launched field tests of its 10kW prototype in the Ishigaki Island. In 2017, a feasibility study in the Philippines in collaboration with SKY Perfect JSAT Corporation under the "Climate Change Adaptation Effect Visualization Project" funded by the Ministry of Economy, Trade and Industry of Japan (METI) in 2017 was conducted. A joint venture company in the Philippines was launched in January 2019. Technology demonstration in Batanes Island, the north-most island of the country, and mass production of 10kW models is scheduled in 2021.

Business Model of the Project

The project mainly targets areas where electricity and communications infrastructure are poor and provides sustainable energy and reliable communication system in combination with highly resilient, environmentally friendly and affordable wind power generation with satellite communication. The project has been executed in collaboration with the following partners.

- Communications satellite, disaster communications infrastructure: SKY Perfect JSAT Corporation
- Philippines' joint venture partner: Natures Renewable Energy Development (NAREDCO)
- Marketing partner: State-run power company, public oil company, real estate development company, etc.



▲ Magnus x Vertical Axis Wind Turbine (left) and Magnus Effect (right)



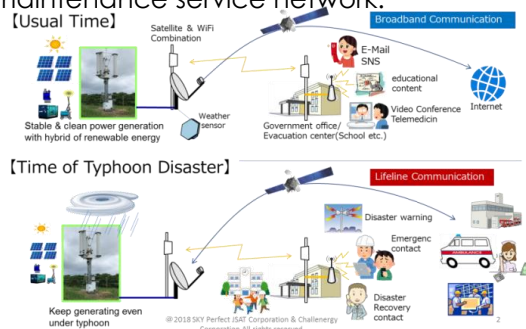
▲ Power generation experience at a maximum instantaneous wind speed of 30.4m/s.



Product & Technology

Magnus x Vertical Axis Wind Turbine (Challenergy): The product rotates using the “Magnus force” generated at the time of turbine rotation in the currents, as opposed to the conventional “Horizontal Axis Propeller Style” widespread in other areas, especially Europe. The turbine rotates even with mild wind and will not over-rotate even with typhoon and thus the turbine achieves the wind speed suitable for power generation. Power can be generated with wind from all directions. Magnus turbine is capable of producing power in times of strong or turbulent wind, leading to low failure rate, thereby improving capacity utilization rate.

Satellite Communications Technology (SKY Perfect JSAT): The technology is widely utilized as a communication infrastructure in digitally-divided areas due to its wide coverage and consistency in the broadcast of data and as a communication service in disaster-hit areas due to its flexibility and durability. The operation status and servicing/maintenance timing of the magnus wind turbine will be monitored real time using satellite communications for the establishment of a maintenance service network.



◀ Magnus x Vertical Axis Wind Turbine 10kW Demo Unit (Batanes, Philippines)

Key to Success & Challenges for Further Development

- Magnus wind turbine is characterized by greater power generation capacity under different wind speed situations and low breakdown ratio. These specifications differentiate it from conventional wind power and solar power generators and establishes itself as a remote power generation tool in remote islands and mountainous areas that are not connected to the main transmission grid making power supply difficult. The challenges are how to visualize the merits in life cycle costs to rationalize its prices as compared to existing wind and solar power technologies.
- The technology will be marketed overseas as a package of energy and communication services in consideration of limited public funds for disaster-related services.

Profile of Project Company

Challenergy Inc. was founded in 2014 as a start-up under the vision of “Innovating wind power generation for supply of safe and secure electricity for all humans”. The Company strived for the development of the “Magnus x Vertical Axis Wind Turbine” without propellers that can generate power even in strong wind of typhoons and is in the midst of field tests in Okinawa with an aim to launch mass production models for sale in 2020. In 2018, the company was selected as a “J-Startup” company, which is a support program for Japanese startup under METI. In 2018 and 2019, it has exhibited its technology in COP 24 and 25 as an innovative measure of adaptation and mitigation in Japan Pavilion. And also the Project was introduced in the G20 Ministerial Meeting on Energy Transitions and Global Environment for Sustainable Growth in Karuizawa, Japan in 2019. Mass production of 10kW models is scheduled in 2021.

13. Mitigating damage to energy supply system in times of disasters

Panasonic Corporation <https://www.panasonic.com/jp/home.html>

Adaptation Challenge 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.

Contribution 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 an 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.

Project Detail

Country | Uganda

■ Background

In 2006, then Uganda's Minister of State for the Vice President's Office 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. Since the project's inception, a total of 102,716 solar lanterns have been donated to 30 countries of regions mainly in Asia and Africa.

■ Business Model of the Project

Panasonic Corporation provides Solar Lanterns or Solar Storage to be utilized for the programs by international organizations and NGOs in Asia and Africa 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 been provided by the Company for remote islands through grant assistance for grassroots project by the Embassy of Japan in Indonesia to support children's education. 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.



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.



▲Solar Storage



▲Brightness for Local Community (Ethiopia)

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 areas such as international organizations and NGOs while taking under consideration the utilization 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 based on its corporate philosophy, “Make contributions to the progress of society and the well-being of people through our business activities” which has been committed since its foundation. 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.

14. Contributing to sustainable agriculture through “Bio-cycle”

Ajinomoto Co., Inc. <https://www.ajinomoto.com/>

Adaptation Challenge Frequent forest fire and decrease in forest area due to climate change such as El Nino have led to deterioration of the function of eco system and rise in disaster risks in Indonesia.

Contribution The eco system recovery through forest conservation projects by Kanematsu reinforces physical response capacity to weather events and mitigate disaster risks. In addition, disaster information system built by Hitachi utilizing a flood simulator called DioVISTA/Flood contributes to minimizing the impact of disasters on human, etc.

Project Detail

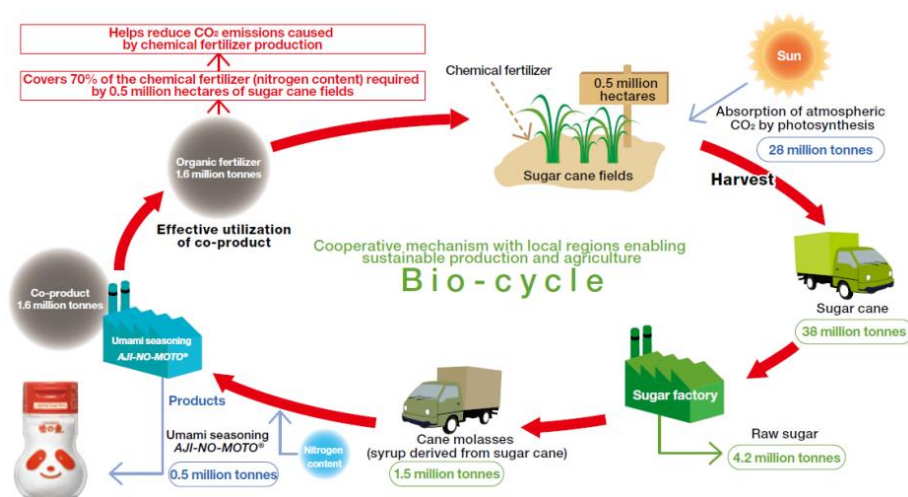
Background

Country | Brazil

The Ajinomoto Group 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.



▲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.



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. The Company has expended this scheme to coffee farms since 2016.

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.



▲A Grape Farmer in Brazil



▲Coffee farm

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.
- The Ajinomoto Group 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. The Ajinomoto Group 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. “Bio-cycle” is positioned as a business activity contributing to preserve “Food Resources and Biodiversity”, a core of the group's long-term environmental vision. 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.

15. Greater harvest through compost soil improver

Kawashima Co., Ltd. <http://www.kawashima.jp/>

Adaptation Challenge 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.

Contribution 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.

Project Detail

Background

Country | Sri Lanka

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 plants were delivered to the government of Sri Lanka in the first phase of construction, and additional second phase of construction has been promoted in 2020.

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.



▲ Compost plant



▲ 9 system are under construction



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.



▲Screw-shaped Compost Plant “RA-X”



▲Vegetable cultivated using compost

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.
- In the installation of the initial compost plants, Japanese construction company gave technical guidance to local installers.
- Kawashima implemented capacity building programs for local counterparts through the relationships with various partners including Kawasaki City Government, which provided guidance in the food waste sorting, successfully building up a supply chain for recycling food wastes.
- Compost plant business has increased local employment of women and contributed to solving the issues of poverty of women, which facilitates its local acceptance.
- 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.

16. Greater resilience and higher income through “Agriculture sustainable for 100 years and beyond”

On The Slope Co., Ltd. <https://www.on-the-slope.com/>

Adaptation Challenge Agricultural output in the Southeast Asia is feared to dip 5 to 30% by 2050 due to climate change. In Lao Republic, it is an impending challenge for agriculture to gain more resilience which accounts for approximately 30% of its GDP and is principle livelihoods of more than 65% of its nationals.

Contribution On the recognition that “insufficient knowledge and technology on agricultural system” and “lack of objective information regarding vulnerability assessment” are adaptation challenges to vulnerable countries, On The Slope Co., Ltd. strives for a business model to ensure long-term agricultural sustainability in local community through local production utilizing climate resilient species and guidance on harvest method while ensuring the stable profit return through domestic and overseas marketing channels.

Project Detail

■ Background

Country | Uganda, Lao Republic, Myanmar, Philippines, Nepal

The Company with an aim at business in developing countries since its inception, launched the “Uganda Organic Project” in 2012. Under the project, the crops extend from locally produced “Shea butter” to sesame in dry regions as well as “Vanilla beans” through agroforestry. In 2016, the Company launched the “Mekong Organic Project” which was supported as the “Climate Change Adaptation Effect Visualization Project” by the Ministry of Economy, Trade and Industry (METI) of Japan and subsequently the Company promoted the coffee production system through agroforestry instead of traditional forest burning by ethnic tribes in the mountains. As the Company launched the “Beyond the Sea Coffee” project, the project area is expanding since 2018 to Myanmar, Philippines and Nepal.

■ Business Model of the Project

The project focuses on the sales of merchandizes that maintain both environmental contribution and quality, produced based on environmentally-friendly, small-scale agricultural system that accommodates local climate, soil quality, historic and cultural context and thus contributes to the adaptation to climate change. The marketing channels extend from the Internet retail sales to wholesale of raw beans to roasters. Saffron Coffee was appointed as local partner in 2016 which is the sole company in the project area equipped with coffee refinery and processing facilities as well as export license.



◀ Laos Forest Coffee



◀ Coffee Beans



Product & Technology

Production technology: Organic farming, agroforestry: Under the project, Japan's high and versatile crop related technology is transferred through close-knit communication with producers. The technology is selected from a viewpoint of effective utilization of regional resources and applicability to different species while understanding the level of technology and knowledge of local farmers, regional soil environment and varying climate conditions.

Example: Agro-forest management (pruning method to accommodate change in the rainfall pattern and temperature, and shading), measures against pests, technology guidance on fertilization that raises soil water retention and productivity, and cultivation of new farm land.

Marketing system: "Farm to Table": Under the system, agricultural products will be marketed for export to Japan as merchandizes that maintain both environmental contribution and quality. The system aims to secure stable sales by constant purchase by consumers with whom a relationship has been built upon understanding of the "Story of production sites and producers" through detailed explanations.



▲ Coffee Plantation in Forests



▲ Cultivation as Part of Life



▲ Guidance for Local Farmers

Key to Success & Challenges for Further Development

- The project contributes to greater income of farmers based on close communication with farmers and preliminary research for the selection of crops and cultivation technology that accommodate regional conditions and by aiming at producing higher quality products through detailed cultivation guidance.
- Collaboration with influential farmers is expected to generate ripple effect.
- In production, the project is in pursuit of collaboration with private sectors and research institutions for the establishment of a quantitative benchmark for the judgment of fermentation and maturity level.
- The project successfully diversified the range of merchandize by transforming the coffee bean flesh that is usually wasted into dried "Cascara" in syrup.
- In developing sales network, the project has built relationships that encourage constant purchase of highly value-added merchandize by appealing to consumers and raising their awareness of the "Story" of production sites and producers.

Profile of Project Company

Founded in 2009. With the company concept of "agriculture sustainable for 100 years and beyond", the company aims to create sustainable agriculture and realize sustainable society. Considering the merits and demerits of not using pesticides and fertilizers, the company sells agricultural products that are grown without environmental burden, and also provides the support to new farmers who want to engage in such type of farming. In addition, the company develops various business both in Japan and overseas, including the operation of the restaurant named "OyOy" which serves dishes with its own vegetables, and "Beyond the Sea Coffee" which provides coffee cultivation advice, imports and sells in Asia. In 2018, the company was selected as a Regional Future Driving Company by the Ministry of Economy, Trade and Industry.

17.

Circular model in the manufacture and sale of apparel added with social and environmental value of afforestation project

Sunford Co., Ltd. <http://www.sunrallygroup.co.jp/group/sunford/>

Adaptation Challenge Anti-flood measures are imperative for addressing frequent serious damages from floods and typhoons caused by climate change in Cambodia where forest cover dropped from 73% in 1965 to 54% in 2015, and vulnerability to floods is growing.

Contribution Sunford Co., Ltd. as a member of the afforestation project initiated by from far east inc. (Reference: Case Number 17), strives to curb floods through afforestation as part of agroforestry, prevent wind damage, curb land disasters and revive the eco system in order to contribute to greater production capacity of agricultural crops.

Project Detail

■ Background

Country | Cambodia

Sunford Co., Ltd. joined the “Forest Wisdom” project consortium led by from far east inc. in 2016. Under the plan to launch afforestation and organic cotton farming in Cambodia, the Company successfully planted 1,000 cotton plants in an area of 0.5 ha collaboration with far east inc. Survey started in 2017 under the “Climate Change Adaptation Effect Visualization Project” by the Ministry of Economy, Trade and Industry of Japan and pilot marketing was launched in 2018. Non-woven fabric product will be produced in 2020 and will be full-fledged from 2022 together with cotton spun fabric products.

■ Business Model of the Project

The project revolves around afforestation of the land for curbing floods while cultivating organic cotton through agroforestry. Clothing made from the cotton will be marketed in Japan with added social and environmental values regarding safety and support for SDGs/Climate Change Adaptation Measures. Profits will be re-invested into afforestation and this circular business model will be established. Afforestation and cotton cultivation will be carried out by Institute for Khmer Traditional Textiles (IKTT) which also contributes its dying skills. The Company also collaborates with far east inc. for the sale of clothing utilizing their “minna de mirai o (Together for the Future)” brand. In addition, in order to market Company’s own brand “AXF”, a new technology “IFMC.” developed in collaboration with Teikoku Pharmaceutical Co., Ltd. and Tokyo City University, intensive marketing initiatives are launched in sports apparel as to achieve higher added value.



▲Growth of Cotton in the Fields



▲Cotton before Harvest



Product & Technology

Agroforestry: A method of afforestation and developing a forest while cultivating agricultural crops. Not only the root of woods keep soil from flowing out, but fallen leaves create a nutrition cycle which, as a result leads to greater crops. Flood curbing effect and business feasibility are concurrently achieved.

Organic products (Organic soil improvement technology, natural dye color skills): Agricultural productivity was enhanced through the technology to improve the organic soil adopted by the consortium. Further, introduction of sophisticated dying skills using natural dye color in traditional Khmer textile technology creates competitive edge in terms of quality of the organic cotton products.

Branding of social and environmental value and recycling business model: Sale in Japan after adding social value to the products and profits generated will be re-invested into afforestation.



◀ Seeds Removal from Cotton Harvest (Left)

◀ “minna de mirai o” Brand T-shirts for Pilot Marketing (Right)



Twisted yarn by ASANONENSHI (Left) ▶

Non-woven fabric by pearl stick (Right) ▶

Key to Success & Challenges for Further Development

- After the successful production of raw material, technical collaboration with ASANONENSHI CO.,LTD for spun yarn and Pearl Stick Co., Ltd. for non-woven fabric is being promoted. We aim at contributing to the SDGs with companies in Gifu Prefecture.
- Sales of miscellaneous goods starts in 2020 and commercialization is planned in 2022. Thus processing, product development, expansion of cultivation land, and cooperation with the local government is planned in 2020.

Profile of Project Company

Sunford Co., Ltd. was founded in 1984 as a core company under the Sunrally Group, an apparel manufacturing and sales company in Gifu. Sunford Co., Ltd., upon spin-off, focused on business targeting teenagers. Under the strategic theme in its mid-term plan of “Contribution to SDGs through fashion”, the Company strives to contribute to SDGs by utilizing nationwide distribution network through major apparel distributor. The primary focus is on “promoting consumers’ health” and “climate change adaptation measures”.

18. Adapting to changing cultivation environment for traditional crops

Dari K Co., Ltd. <http://www.dari-k.com/>

Adaptation Challenge 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.

Contribution 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.

Project Detail

■ Background

Country | Indonesia

The Project was selected for the “Preparatory Survey for BOP Business*” by Japan International Cooperation Agency (JICA) in 2014, and the “Climate Change Adaptation Effect Visualization Project” 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. Having established a local subsidiary, PT. Kakao Indonesia Cemerlang (KIC) in 2016, 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.



▲ Local farmers



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. In addition, Dari K has started to hire Indonesian women actively for sorting operation of cacao beans, and also has promoted primary producers' diversification into processing and distribution (sixth sector industrialization). Furthermore, Dari K has been trying biogas generating system by using cacao husk.



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



▲Checking Growth of Cacao Trees

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.

19. Generating energy and farming at one place with Solar Farm® technology

Farmdo Group <https://farmdo.com/farmland.html>

Adaptation Challenge In the agricultural sector, climate change causes (1) production instability, (2) shifting of suitable production areas, (3) soil degradation due to flooding and salinity increase, (4) water shortage, etc. Farmdo Group supports the adaptation to climate change by deploying the Solar Farm® technology internationally which was developed in Japan.

Contribution In a project in Mongolia, local farmers, including many women, have been trained for cultivation both in Japan and in Mongolia. Farmdo Group also contributes to the capacity building of local people through regular technical training on the operation of solar power plant.

Project Detail

■ Background

Country | Mongolia, Chile

Farmdo Group has been developing stores to sell agricultural products directly to processing and delivery systems, and profitable cultivation systems to increase farmers' income and revitalize local economies. As a solution to the growing number of abandoned agricultural land in Japan, Farmland, a members of the group, has owned approximately 180 solar PV sites including about 80 Solar Farm® as of September 2020. International business is currently being expanded to the following two countries, and also being discussed towards business development in other Asian countries such as Malaysia and India.

[Mongolia] Established a joint venture in 2013; Conducted the 5th JICA Preparatory Survey (BoP Business Promotion Survey) in 2013, and was adopted twice in 2015 and 2016 for JCM model project. Its construction was completed. It operates a 10.4MW Solar Farm® with a total of 28 ha.

[Chile] Established a joint venture in 2019; 3MW solar power plant in Nuble adopted for the JCM Equipment Subsidy in 2019, and began power sales in June 2021. In 2020, a second 3MW solar power plant was adopted for the JCM equipment subsidy. The company is also working with Ministry of Agriculture Chile to build a pilot plant of the Solar Farm®, both under construction. In 2021, a third 3MW solar power plant project was applied as a JCM model project. In Chile, there is a potential demand for farm-based solar power generation for export crops (cherries, berries, etc.), and after the completion of the pilot plant, we hope to make efforts to promote Solar Farm® in Chile.

■ Business Model of the Project

Farmdo Group will invest and transfer technology through education and training, and develop solar PV sites with value-added agricultural practices. The profit of the project is distributed to the farmers and the local communities.

▼ 1・2 : Mongolia
10.4MW Solar Power Plant
& Solar Farm®



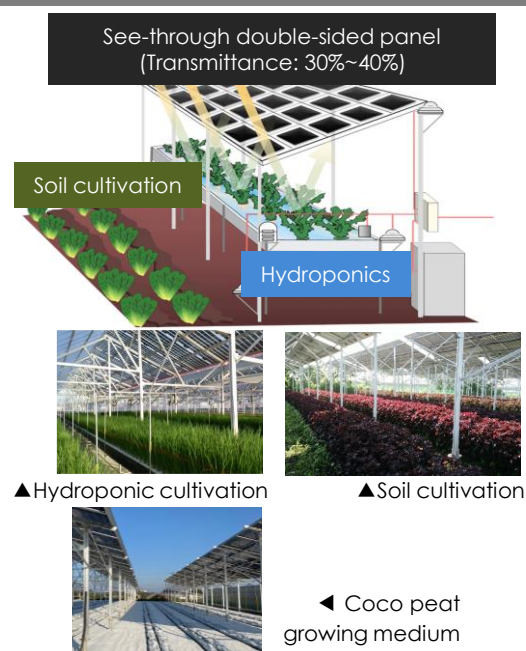
▲ 3 : Chile First Solar Power Plant
Power sales started in June 2021

Related SDGs



Product & Technology

The combination of agriculture and solar Generation by Solar Farm®, or “Hybrid Agriculture” contribute to renewable energy supply, local agriculture production and sales, and food self-sufficiency ratio. Development of solar panels that can maximize the power generation by appropriate transmittance and double-sided power generation. Use of IoT and sensors for controlling farming that can adapt to climate change in regions with different climates. Hydroponics is effective in places where topsoil is lost due to heavy rainfall or where salinization has occurred, and water-saving agriculture can be pursued. The company is also practicing a labor-saving agricultural method in Japan by combining drop irrigation system, coco peat growing medium (solar growbag), and weed prevention sheets, and seek to diffuse this technology overseas.



Key to Success & Challenges for Further Development

- Keys to success are follows:
 - Sustainable system that contributes to local economy by local production for consumption
 - Technology that can produce highly value-added agricultural products, such as safe, fresh, and tasty vegetables, with efficient sales channel
 - Capacity building of local residents by creating local employment and education and training opportunities
 - Deep commitment to business implementation by self-investment
- Challenges for further development are (1) establishment of a price-competitive cultivation management system in each region, climatic conditions and climate change, and (2) business model with the investment partner for the extension of solar farms.

Profile of Project Company

In Farmdo Group, Farmdo Co., Ltd. (development of agricultural products direct sales office and sales of agricultural materials), Farmclub Co., Ltd. (produce and sale of agricultural products and tourist farm), Farm Land Co., Ltd. (development of solar power generation and Solar Farm®) implement each business and have a corporate philosophy of contributing to the improvement of farmers' income through the effort of all group companies. Established local subsidiaries in Mongolia in 2013 and Chile in 2019. In particular, we are aiming to support adaptation to climate change with Solar Farm® internationally. Solar Farm® technology is patented in Japan, USA, China and Taiwan. In 2013, selected as a regional future leader by the Ministry of Economy, Trade and Industry. In 2017, President Iwai received the polar star order of Mongolia. The activities in Mongolia was highlighted in Annual Report on the Environment in Japan 2019 (White Paper). Utilizing the Joint Crediting Mechanism, Solar Farm® has been promoted in Mongolia and Chile, with the goal of expanding to 30 sites in 10 countries in 20 years.

20. Circular-economy business model established through organic soil afforestation to prevent flood and protect eco system

from far east inc. <http://minnademiraio.net/>

Adaptation Challenge 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.

Contribution 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.

Project Detail

Background

Country | Cambodia

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 "Climate Change Adaptation Effect Visualization Project" 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, product development, sales in Japan market (through about 700 shops of 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.



▲Business Model of the Project



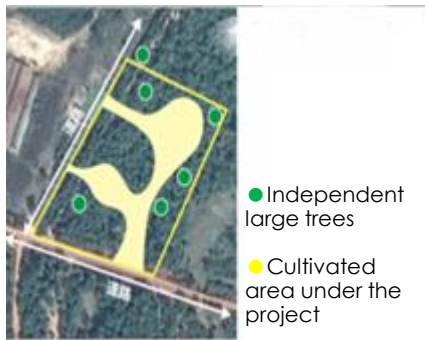
◀Products for Japan Market:
(Top Left) Moringa Tablet
(Bottom Left) Moringa Oil
(Right) Organic Shampoo

▲Vegetation in the project



Product & Technology

- The Company produces beauty merchandize including cosmetics and hair coloring products. Via its corporate website and effective marketing strategy, distribution network of about 700 shops has been established with major domestic retailers.
- The Company has started selling overseas mainly in China.



◀ Vegetation plan



◀ Afforestation



◀ Cultivation



◀ Cultivated plants



◀ Oil extraction

Key to Success & Challenges for Further Development

- The Company utilized IKTT's local network and its own expertise as well as the relationship through the MOU entered into with Angkor Thom County to establish circular economy business model that provides local assistance with profits generating.
- While a part of the ingredient processing has been localized, it intends to introduce distillers to the local operation to produce high value-added products leading to higher income of farmers and further development.
- It has expanded planted area through cultivating part of the crop fields along with Sunford Co., Ltd. (Reference: Case Number 15).

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 and BoP Global Network Japan.

21. Rejuvenation of arid areas through high-molecule film farming method

Mebiol Inc. <https://www.mebiol.co.jp>

Adaptation Challenge Shortage of water and soil degradation triggered by climate change affect the stable food supply and food quality.

Contribution Mebiol Inc. developed a high-molecule film farming method called “Imec®” that enables the production of highly-nutritious agricultural crops under harsh environment as well as creating jobs for local community. The technology serves as an adaptation measure by contributing to greater economic capacity for stable food supply and stronger production base.

Project Detail

■ Background

Country | UAE, China, etc.

The Company was founded in 1995 by Dr. Yuichi Mori who engaged in research and development of membrane/hydro-gel materials used for dialysis and other medical and pharmaceutical products in an attempt for application to agriculture. Approximately ten years were spent for the development of “Imec®”, a film farming method to produce safe and highly nutritious agricultural crops. The business in Japan expanded mainly among new agricultural ventures and new entrant farmers. “Imec®” that enables “Agriculture by anyone, anywhere” is increasingly recognized to meet the demand of farmers for recovery and rejuvenation of their farms severely hit by major earthquakes in Japan, or to meet the demand of areas overseas not suitable for farming. The method is accredited for its water-saving effect in desert areas of Middle East and is also becoming popular in China where soil/water contamination is a major concern.

■ Business Model of the Project

The Company is a fabless company with a key business focus on R&D and marketing, sourcing revenues from royalty payments for the patented “Imec®” technology with patent registered in 130 countries. For overseas business, “Imec®” is exported from Japan and farm facilities are procured locally. Sales and cultivation advices are provided by local agents.



▲ Tomato farming by local people



▲ Tomato farm in Dubai Desert



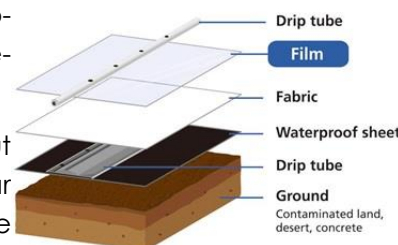
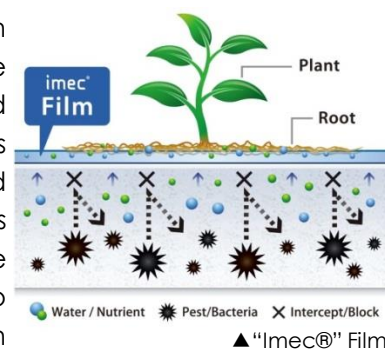
▲ Chairman Dr. Mori with “Imec®”



Product & Technology

“Imec®”: A sustainable agricultural technology for the production of safe and highly nutritious agricultural crops by applying the membrane and hydro-gel technology developed for medical and pharmaceutical purposes into agriculture. High-molecule films enable the cultivation of diverse agricultural crops such as fruits and leaf vegetables on the films. In March 2018, the technology was newly registered as the “Sustainable Film Farming” on the Sustainable Technology Promotion Platform (STePP) of the Tokyo Office of the United Nations Industrial Development Organization (UNIDO). The main features of Imec® are as follows.

- No-soil farming: Only water and nutrients penetrate the nano-sized pores on the films and thus the infiltration of disease-causing germs and viruses will be prevented while saving water.
- High water retention: The films, retaining ample water but keeping dry surface, control the nutrition value (sugar concentration, etc.) of vegetables. Water and fertilizers are much saved as compared to conventional farming methods as the anti-seeping sheets help retain the water and fertilizer supplied from seeping externally.



▲Simple and Affordable “Imec®” System consisting of fluid supply equipment and Cultivation Bed

Key to Success & Challenges for Further Development

Simple and versatile technology

- The technology can be introduced so long as water and power source are provided, and compared to conventional hydroponic culture, it greatly curbs the consumption of water, fertilizer, electricity, heavy oil and labor costs, leading to low-cost and highly profitable farming business.
- The technology can be marketed throughout the world regardless of business environment.
- Despite the need for installation of a water purification equipment along with the technology, the technology well maintains profitability due to low water consumption.

Profile of Project Company

Mebioli Inc. was founded in 1995 as a R&D venture for the purpose of utilizing hydro-gel materials in the agricultural field. In the domestic market, cultivation of high-quality tomato is in a full-fledged operation using “Imec®” which enables high profitability, and the total cultivation area stretches to 40 hectares. In overseas markets, the company launched business in the Middle East, China, Brazil and so on. The company was awarded the “Special Mention Award” of the “University-originated Venture Award - Award for Academic Startups -” by Japan Science and Technology Agency (JST) in 2016, the “Small and Medium Enterprise Agency Director-General’s Award” of the Japan Venture Award by SME Support Japan in 2017, the “Japan Techno-Economics Society Chairman’s Award” by the Japan Techno-Economics Society in 2018, “The International Award: Innovative Ideas and Technologies in Agribusiness” by UNIDO ITPO Italy in 2019, and “Green Sustainable Chemistry Award” by Japan Association for Chemical Innovation in 2021.

22. High quality mung beans production in salinized lands

euglena Co., Ltd. <http://www.euglena.jp/>

Adaptation Challenge The issue of soil salinization 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.

Contribution By engaging in mung beans production utilizing agricultural technology based on appropriate cultivation management in regions affected by soil salinization, 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.

Project Detail

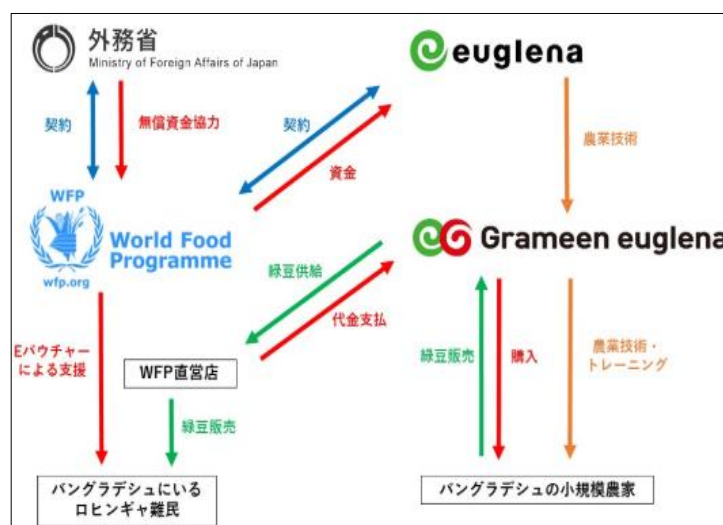
Background

Country | Bangladesh

In Bangladesh, euglena Co., Ltd. established a joint venture (currently Grameen euglena) with Grameen Group in 2010. The trigger of business creation was that Mr. Yukoh Satake, Co-CEO of Grameen euglena visited to village area of Bangladesh by study tour and conducted a field survey there. A trial cultivation of mung beans also started in the same year. Through implementation of the "Climate Change Adaptation Effect Visualization Project" supported by the Ministry of Economy, Trade and Industry of Japan from 2012 to 2015, the large-scale cultivations and exports to Japan have started since 2012.

Business Model of the Project

Grameen euglena guides farmers on cultivation method, sells mung beans in Bangladesh, and sorts mung beans to meet required quality in Japan to supply mung beans to Japanese bean sprout producers. The project has also started a food support for Rohingya refugees inflowing from Myanmar to Bangladesh through the collaboration with World Food Programme (WFP). Grameen euglena purchases mung beans from contract farmers and utilize the products for food support to Rohingya refugee. The necessary activity costs will use a portion of the grant provided by WFP agreed with Ministry of Foreign Affairs of Japan.



▲Business model



Product & Technology

- Business model: Sowing seed, Plowing, calcium fertilizer, review of seeding period
- Technical training for process of harvested crop: Drying method by farmer, Sorting method
- Verifying effect of rotating crop: Survey by the field and conditions, survey of root nodule bacteria by the harvest period



▲Sorting mung beans



▲Packing 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.
- The number of contract farmers involved in the Project exceeded 8,600 in 2019 with stable growth. The harvested products have been also utilized for food support to Rohingya refugees since 2019.
- 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). Mung bean project in Bangladesh is one of the businesses which represents its aim of sustainable development of human and the earth. 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 as well as the Minister of Education, Culture, Sports, Science and Technology under the Sixth Technology Management and Innovation Award.

23.

Cultivation of fruit vegetable crops with optimized application of water and fertilizer using an IoT and AI based autonomous drip irrigation system

Routrek Networks, Inc. <https://www.routrek.co.jp/>

Adaptation Challenge The impact of climate change on agriculture is significant, including water shortages for agriculture due to decreasing water resources and poor crop growth due to changes in weather.

Contribution Routrek Networks' ZeRo.agri® is an autonomous drip irrigation system that utilizes IoT and AI to reduce and optimize the use of water and fertilizer. In addition, AI analyzes environmental data on soil and solar radiation as well as weather forecasts to adjust the concentration of liquid fertilizer and other factors on extremely hot days, thereby contributing to improved yield and quality.

Project Details

■ Background

Country | Vietnam

Routrek Networks has been planning to expand business in the Asian monsoon region, which has similar climatic conditions to Japan, and conducted demonstration experiments in China (Shanghai), Thailand, and Vietnam, all of which were successful in cultivation. Among them, Dalat highland of Vietnam was selected as the first overseas project site, in terms of climatic conditions, proximity to agricultural consumption areas, and ease of branding. In 2017, the company conducted a JICA feasibility survey and succeeded in multiple cropping using ZeRo.agri® (cultivation of four varieties with one ZeRo.agri® unit). Currently, the company is preparing for commercialization.

■ Business Model of the Project

Towards deployment in developing countries, hardware is planned to be procured locally to reduce costs. Software is expected to be licensed and license fees will be collected from local business partners (sales agents). Promotional activities are also considered, to enable farmers in Vietnam to use ZeRo.agri® to grasp the harvest amount and timing, and provide information to the distribution market, thereby adding value (increased unit sales price) to their crops.



▲ A farm in Vietnam



▲ ZeRo.agri® in a farm in Vietnam

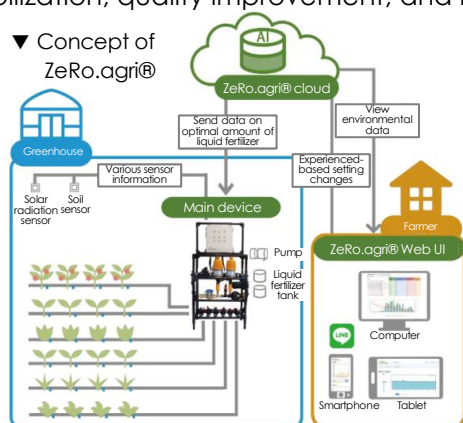


▲ Cultivation example (melon)



Product & Technology

ZeRo.agri®: A drip irrigation system that automatically controls irrigation and fertilizer management by acquiring soil moisture and solar radiation data, using IoT and AI. The system consists of the ZeRo.agri® main device combined with various sensors, and a Web UI where one can check the irrigation and fertilization status as well as sensor information. An AI-based cloud system connects the main device and Web UI, and optimizes the supply amount and concentration of liquid fertilizer. Based on the information acquired by the environmental sensors, the AI estimates the daily transpiration amount required by the crops, and irrigates and fertilizes through the drip tube, enabling highly accurate management that is difficult to achieve manually, and minimizing the amount of water and fertilizer used. (Target values for automatic control can also be manually set based on the farmer's own experience, and the history of these setting changes will lead to further improvements in the accuracy of AI.) Automatic control using AI will also contribute to yield stabilization, quality improvement, and labor saving.



◀ ▲ ZeRo.agri®

Key to Success & Challenges for Further Development

- Since it is different from conventional farming methods, it is necessary to provide farmers with careful explanations and training on how to use the technology. In addition, when transitioning from conventional farming methods, (1) backing up the technology with production data (cultivation results) from ZeRo.agri® in each region, (2) developing a local support system for farmers, and (3) supportive measures from the government, local authorities, etc. will be key to the dissemination of the technology.

Profile of Project Company

Established in August 2005, with the aim to realize a sustainable society through M2M (now IoT) technology which connects devices to devices via the Internet. The company entered the agricultural sector in 2011 and launched a full-scale digital farming business in 2015. The AI irrigation and fertilization system ZeRo.agri® and related services have been developed, and about 300 units have been introduced throughout Japan (as of September 2021). In 2018, the company received the 4th Nippon Venture Awards (Agriculture Venture Business Award, Minister of Agriculture, Forestry and Fisheries Award). In the same year, the company was selected as a J-Startup company by the Ministry of Economy, Trade and Industry and as one of the representing innovations in Japan on the "Innovation Japan" website by the Prime Minister's Office. In addition, the company is aiming to accelerate its smart agriculture business by raising Series C funds in 2020.

24. Paints for sustainable life

Kansai Paint Co., Ltd. <https://www.kansai.co.jp/>

Adaptation Challenge Malaria poses serious threats to society and economy in Africa and in Zambia where 33% of the population contracts malaria, it is feared to proliferate with the rise in temperature due to climate change.

Contribution While it is a national goal of the government of Zambia eradicate malaria by 2021, "KANSAI ANTI-MOSQUITO PAINT" developed by Kansai Paint Co., Ltd. is expected to reinforce its prevention as an effective tool of vector control (elimination of pests that transmit infectious diseases). Prevention of growing infectious diseases due to climate change is an adaptation measure, contributing to protecting people's lives, enhancing safety and security in society as well as creating healthy economy.

Project Detail

■ Background

Country | Malaysia, Indonesia, Zambia etc.

In 2013, the Company's subsidiary in South Africa developed and sold anti-mosquito paint leveraged on the tendency of mosquitos to stay on walls and ceilings. The product was subsequently launched in Malaysia and Indonesia in 2014 and 2015 respectively where dengue fever posed serious social threats. In 2017, a field research was launched in Zambia supported by Japan International Cooperation Agency (JICA) with a view towards market penetration in the future. Upon approval of the US Environmental Protection Agency (EPA) in April 2018, the Company has been set to meet global demand. In September 2018, the product obtained an approval by the Zambian government and was sold for the first time in Africa. The Company could start to sale in Uganda also from Jan. 2019, where a government approval was already obtained as well as Kenya and Tanzania as part of the global growth initiatives in the future.

■ Business Model of the Project

The Project is based on public-private partnership with the local government agencies of Zambia, supporting organizations such as JICA and other stakeholders. The Paint was developed taking advantage of the nursery environment and behavioral characteristics of mosquitos. Through the public-private partnership, its effectiveness has been demonstrated to gain greater trust. The Paint was launched for sale as a solution to social challenges upon approval of the governing authorities.



▲Conducting Workshop



Product & Technology

“KANSAI ANTI-MOSQUITO PAINT” is a product to counter infectious diseases spread by mosquitos. Synthetic pyrethroid ingredient contained in the Paint acts on the nerve system of mosquitos and maintains insecticide effect. The Paint forms anti-mosquito coating once painted on the walls and acts on mosquitos staying on the surface. The anti-mosquito effect stays for at least 2 years. Safety is not a concern as humans and most mammals are able to digest and discharge the ingredient, and therefore the Paint is suitable for most places such as residential, public and commercial estates. The product is expected as a new item to prevent infectious diseases in addition to the conventional vector control such as mosquito net, preventive medicine and application of insecticide. Availability of color choices will facilitate the expansion into interior decoration market, and further into global market.



▲ Workmen on training

Key to Success & Challenges for Further Development

- The Company's approach revolves around the pursuit of solution to social challenges faced by many people.
- The product is safe and sustainable in a sense that it simply adds anti - mosquito function to indoor walls.
- The Company has built partnership with local governments, global organizations, NGOs and supporting groups.
- The Company has also established a business model that is compatible to local background.

Profile of Project Company

Kansai Paint Co., Ltd. was founded in 1918 as a manufacturer and seller of diverse range of paints. The Company is ranked 8th largest worldwide for the entire range of paints, and is one of the 5 leading companies in the field of automotive paints. As the second pillar following automotive paints, the Company strives for the reinforcement of construction paints and one of its products for the domestic market named “ALES MUSHIYOKO CLEAN” was awarded the “Best Nikkei Sangyo Shimbun Award” in 2015 which, organized by Nikkei, is accorded to superb products and services. The Company has accelerated its overseas marketing with key focus on Asia, Middle East and Africa where demand for construction paints is growing among the mass target zone of emerging mid-income consumers and it has secured the largest market share in Africa. Under the corporate philosophy of “Supporting human and social development through products and services by fully utilizing technology and human assets built on the paint business”, the Company aims at maintaining sustainable contribution to society through its business.

25. Mitigating impact of frequent forest fire on plants and animals

Shabondama Soap Co., Ltd. <https://www.shabon.com/>

Adaptation Challenge 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.

Contribution Shabondama Soap Co., Ltd. developed soap-based extinguishing agent without synthetic surfactant agent, used as an eco-friendly yet high-performance fire extinguishing agent 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.

Project Detail

■ Background

Country | Indonesia

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 extinguishing 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



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.



▲ Soap-based extinguishing agent



▲ Fire extinction



▲ Project Briefing to Local Affiliates

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 1975). Since 1974, through its efforts to develop products that are kind to both people and the environment, the Company produce and sell 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 extinguishing agent which has been in the market since 2007. Soap-based foam extinguishing agent business in Indonesia meets its corporate philosophy of contributing to society and conservation of planet's environment through its business activities.

26. Preventing spread of infectious disease associated with climate change

Sumitomo Chemical Co., Ltd. <https://www.sumitomo-chem.co.jp/>

Adaptation Challenge Rising 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 and increase in the number of patients in new territories.

Contribution Sumitomo Chemical Co., Ltd.'s "Integrated Vector Management (vector pest eradication)" based on the strong technology of the Company serves as adaptation measure in the field of health and sanitation.

Project Detail

Background

Country | Tanzania

"Olyset® Net", a mesh screen woven with insecticide agent against malaria, was developed in an attempt to help contain the serious outbreak of malaria in Africa by applying the conventional technology used for mesh screen in factories as bug shield. In response to the World Health Organization (WHO) recommendation of mosquito net woven with insecticide agent as opposed to its conventional approach of encouraging diffusion of insecticide agent, the Company filed the product with WHOPES, an evaluation scheme under the WHO group in 2000, and was granted its recommendation as the world's first mosquito net with long-lasting effect. Since then, the product developed into an integrated solution as the "Integrated Vector Management" in collaboration with a range of technologies including space dissemination and larva prevention, etc.

Business Model of the Project

Collaboration with public bodies: Based on recommendation by international organizations, such as WHO and developing country governments, "Olyset® Net" is supplied to more than 80 countries through international organizations including the Global Fund and United Nations Children's Fund (UNICEF). Production is carried out locally near consumers through collaboration with overseas companies. The product produced locally by a joint venture with a Tanzanian company and has contributed to the development of local economy through the creation of job opportunities backed by maintaining production capacity to meet global demand together with the production base in Asia.





Product & Technology

Mosquito-repelling net with long-lasting effect (Olyset® series): To counter malaria, the net is made of polyethylene woven with pyrethroid insecticide that gradually releases agent through “Control-Release” technology, which is more durable than polyester and the repellent effect lasts more than three years. The product includes Olyset® Net to Olyset® Plus with intensified effect.

New active residual diffusion agent (SumiShield® 50WG): To counter malaria, the product is a residual diffusion agent for indoor use that contains clothianidin as the effective agent. The product effectively works on malaria vector mosquito which is resistant to the conventional pyrethroid or carbamate-type residual diffusion agent with great residual effect.

Spray agent (SumiPro®EW): To counter dengue and Zika, the product is composed of metofluthrin, a highly-active agent to knock down mosquitos (Eminence®/SumiOne®) and cyphenothrin with a strong fatal effect (Gokilaht®-S) as well as PBO, a synergist for augmented effect. The product is suitable for dense and small spraying or smoking, and far reaching.

Larva prevention agent with long-lasting residual effect (SumiLarv®2MR): To counter dengue and Zika, the product has an effect to prevent mosquitos to emerge from pupas. It has a long-lasting residual effect compared to conventional products.



◀ Child elated with “Olyset® Net”

Photographs
© M.Hallahan



◀ Manufacturing
Factory of
“Olyset® Net”

Photographs
© M.Hallahan

Key to Success & Challenges for Further Development

- Extensive introduction of Olyset® Net was achieved by promptly responding to the policy change of WHO as part of the anti-malaria measures and swiftly obtaining its recommendation, as well as by making proposals to the developing country governments including its approval process.
- Top management commitment enabled “Local first” principle which led to mass production structure through cooperation with local companies that led to the creation of a unique distribution structure.
- Despite the difficulty in the effective protection of products with patent due to competing products, the Company aims at a greater market share under the Sumitomo Chemical brand by exerting a range of technologies based on the accumulated data on ecosystem and environment in each region.

Profile of Project Company

Sumitomo Chemical was founded in 1913 for the purpose of mitigating impacts of pollution by producing fertilizer from sulfur dioxide, a byproduct of copper refinery process. Since then, the Company has been working to create economic value and social value in an integrated manner. The Company and its over 100 group companies currently supply an array of products worldwide to support many industries and people's lives and is the world's largest supplier household pesticide ingredients. The Company is engaged in “Sumika Sustainable Solutions”, the in-house product certification scheme to recognize environmental contribution including adaptation and is a recipient of the GBC Health Business Action on Health Awards 2012 and the Minister of Foreign Affairs' Award under the Japan SDGs Award 2018 for its dedication to social and environmental activities including “Olyset® Net”.

27. Bicycle-type water purification system for securing a clean water supply

Nippon Basic Co., Ltd <http://www.nipponbasic.ecnet.jp/>

Adaptation Challenge Due to the impact of climate change, it is becoming increasingly difficult to obtain drinking water. At the same time, there is a greater awareness about the importance of washing hands with clean water to reduce the spread of viruses.

Contribution Nippon Basic's bicycle-type water purification system contributes to securing a clean water supply by purifying river water. The equipment is operated without the use of electric power, thus providing access to safe water even in areas where power is not supplied.

Project Details

Background

Country | Bangladesh

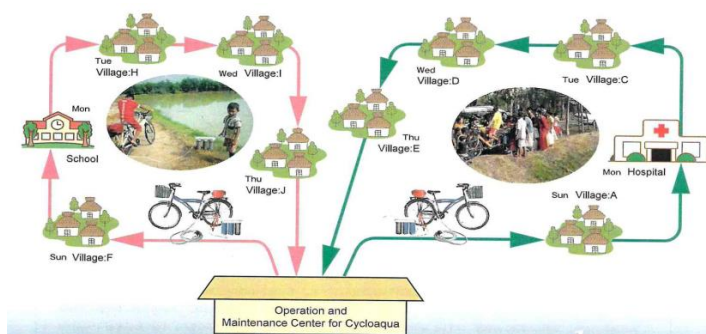
To secure drinking water for emergencies, Nippon Basic previously produced a bicycle-type water purification system (Cycloclean) in Japan; however, as the company's manufacturing staff grew older, domestic production became difficult. After its product was adopted for JICA's BOP business promotion survey and a program for supporting overseas expansion of SMEs, the company launched a survey in Bangladesh and disclosed its techniques to a local bicycle manufacturer. With the support of a fund, Nippon Basic began local production of Cycloaqua to export products to Japan.

Business Model of the Project

Currently, Nippon Basic is involved only in the production side in Bangladesh; however, it also plans to sell its product locally in the future. The company aims to first sell the system, and then replacement filters consisting of 3 layers (pre-filter, hybrid carbon filter, and MF hollow fiber membrane filter) on a regular basis. The company imports MF hollow fiber membrane filter from Japan since it cannot be procured locally. Because the filters are expensive for local residents, Nippon Basic aims to teach locals how to maintain filters by cleaning them with a detergent specially developed by its local partner to extend the useful life of the filters.



▲Cycloaqua



▲Operation diagram of Cycloaqua



Product & Technology

To purify water with Cycloaqua, a bicycle mounted with the product is pedaled, causing a pump in the box on the backseat to draw river water and filter it into drinking water. Bicycles with built-in pump boxes are produced in Bangladesh. Nippon Basic succeeded in lowering the cost of production of the Bangladesh model by 75-80% by downgrading the pump.

The water purification element consists of 3 layers (pre-filter, hybrid carbon filter, and MF hollow fiber membrane filter) and is able to purify 20-30 tons of river water per unit.



▲ Cycloclean (former product name) purifying water for distribution among local residents affected by flooding

Key to Success & Challenges for Further Development

- Business is being developed with trusted local business partners.
- People will recognize the value of the product by using it, but it is difficult to encourage people to make the initial purchase, so a free trial is needed. Another challenge is funding.
- The company believes that product development from the viewpoint of locals is key, and accordingly targets local production for local consumption. It may also be necessary to downgrade the product to allow for low-cost development.

Profile of Project Company

Nippon Basic was established in 2005. Its main products are a compact water purification system and compact desalination system. Domestic customers (e.g., apartment managers and gyms) buy bicycle-type water purification systems to secure drinking water in the case of an emergency. The company is now shifting its business focus to developing countries with limited access to drinking water.

The company also sold its compact desalination system (Desaliclean 9000) to Oxfam, and that product supported local residents in securing drinking water in the southernmost point of Bangladesh, where sea water entered the river due to global warming. In addition, Nippon Basic collaborates with Oxfam to teach proper handwashing techniques to local people with water purified using Cycloaqua to prevent the spread of COVID-19.

28. Facilitating countermeasures against climate change through Big Data

Remote Sensing Technology Center of Japan <https://www.restec.or.jp/>

Adaptation Challenge 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.

Contribution The eco system recovery through forest conservation projects by Kanematsu reinforces physical response capacity to weather events and mitigate disaster risks. In addition, disaster information system built by Hitachi utilizing a flood simulator called DioVISTA/Flood contributes to minimizing the impact of disasters on human, etc.

Project Detail

■ Background

Country | Thailand, Myanmar

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 Sampo Holdings, Inc (Reference: Case Number 34) 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

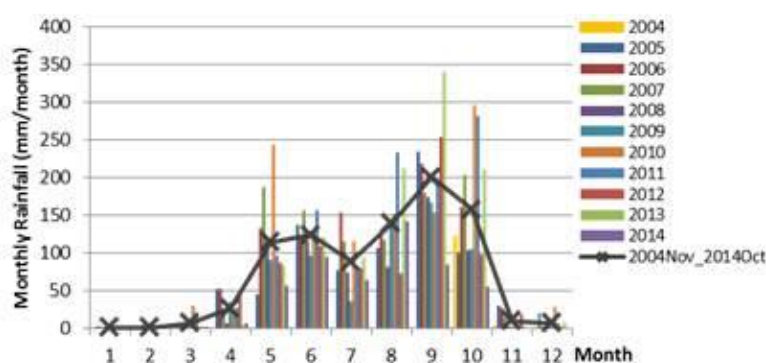
RESTEC offers statistic processing of the rainfall data from JAXA satellites (GSMaP data) for "Weather Index Insurance" project in Myanmar by Sampo Japan and contributes to visualisation of the data. The next step is offering the a smart-phone application for local farmers.

Related SDGs

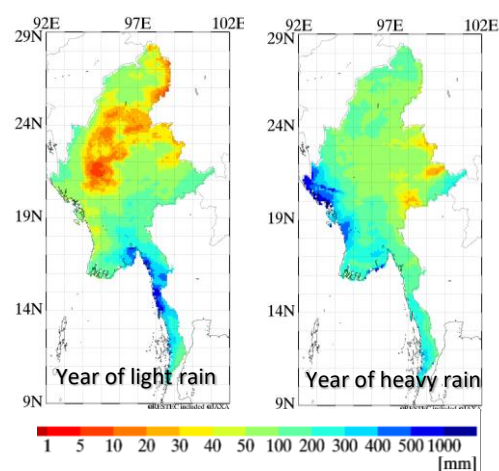


Product & Technology

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.



▲ 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.



▲ 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

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

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

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.

29.

The world's lightest & most compact X-band weather radar enables real-time monitoring of local extreme weather

FURUNO ELECTRIC CO.,LTD. <https://www.furuno.com>

Adaptation Challenge Due to the impact of climate change, localized weather disasters are becoming more frequent and extreme in many parts of the world. Intense urban precipitation, river flooding, and landslides are causing greater harm to humans, infrastructure and industry, as well as negatively impacting the economy.

Contribution Furuno's compact X-band weather radar can quickly and precisely detect local weather changes that have been difficult to observe with conventional large radar systems, contributing to reducing the damage caused by localized heavy rainfall disasters. In addition, the low-cost and lower-power consumption design of the radar will enable use in developing countries and municipalities that have had difficulty in introducing weather radars.

Project Details

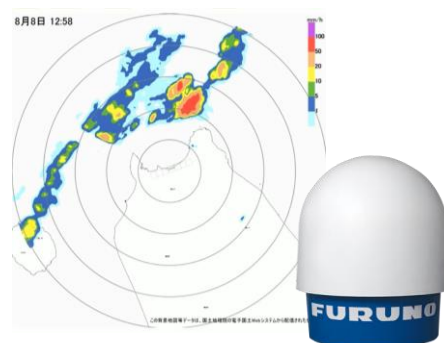
■ Background

Country | Vietnam, Indonesia, Singapore, etc.

Since Furuno successfully commercialized the world's first practical fish finder in 1948, it has maintained the leading global market share in marine radar technology. In 2008, sudden and localized torrential rain caused the Tsuga River in Kobe to rise sharply, resulting in a water-related accident. To prepare for such disasters, Furuno started R&D of a compact radar in 2009. Since its launch in 2013, around 90 units have been in operation in Japan and abroad as of 2020.

■ Business Model of the Project

Sudden floods and landslides caused by short-term localized heavy rains are a frequent occurrence in developing countries located in the tropics. Furuno will promote the introduction of compact X-band radars and provide weather observation and disaster prevention monitoring solutions to governments and municipalities in developing countries that have had difficulties in introducing conventional large radars due to the costs. It will create new markets and applications by enabling simple, low-cost installation and operation.



▲ Meteorological monitoring system



Product & Technology

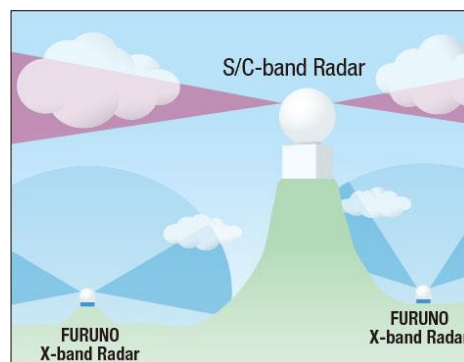
Furuno's compact X-band weather radar is the world's smallest and lightest weather radars at about 1 m in diameter and 68 kg. Not only does it save space and allow for installation by hand in existing buildings, but it also significantly reduces installation costs and construction time. Unlike conventional C-band radars, it allows for precise observation of rainfall in a narrow observation area. It can be installed in urban and mountainous areas and enables responses to local disasters such as torrential rains. In addition, the low-cost, low-power consumption design will allow it to be introduced to governments, municipalities, research institutes, and private companies in developing countries.



▲Installation by hand



▲Installation example (Vietnam)



▲Comparison with large radar

Key to Success & Challenges for Further Development

- Furuno's compact X-band weather radar is advantageous over other products due to its small size, light weight, and a design that allows for easy installation and maintenance.
- The product has a potential market in developing countries due to its low-cost and low-power consumption design and ability to be operated using household power sources.
- Although the cost is lower than conventional products, governments of developing countries and local governments have limited financial resources.

Profile of Project Company

Since being the first in the world to commercialize a fish finder in 1948, Furuno has provided many world-first and Japan-first products in the field of marine electronics based on its unique ultrasonic and electronic technologies. With sales offices in more than 80 countries around the world, the company has built a solid position and brand as a comprehensive manufacturer of marine electronics equipment on a global scale. Furuno integrates the knowledge, experience, skills, and know-how cultivated in its business with the three core technologies of sensing, signal processing, and information and communication technologies to provide solutions not only for the marine industry, but also for various industrial sectors.

Furuno's Meteorological Observation System won the Best Resilience Award in the corporate and industrial category at the 2017 Japan Resilience Awards, which is sponsored by the Resilience Japan Promotion Council.

30. Securing sufficient and clean water through ion exchange membrane

AGC Inc. <http://www.agc.com/>

Adaptation Challenge Issues surrounding water have increasingly become serious worldwide caused by water shortages due to 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.

Contribution AGC Inc.'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.

Project Detail

■ Background

Country | Israel, China, India

In response to enquiry from an Israeli public organization plagued by high level of salt content in well water exceeding World Health Organization (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 dialyzer at the heart of the system and exports the core technology ion exchange membrane. The electro dialyzer and accessory units are manufactured by local engineering partners and delivered as a system to the clients such as government agencies and private companies.



◀ Electro Dialysis Purification System



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:

- Resource-saving: Ion exchange resin used in soft-water equipment usually requires regular regeneration process to remove hard substances built up during use, to recover performance. This process is not needed in this system, 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.



▲ Water treatment image

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.
- 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

The AGC Group operates globally in approximately 30 countries and regions with AGC Inc. as its core.

Backed by the strengths of world-class technology and know-how cultivated over many years, the Company provides building materials, automotive materials, display glasses, electronic components, chemical products, pharmaceutical & agrochemical related products and services and ceramics to customers in a wide range of industries.

31. Development of a tourism city through water treatment

Sanicon Co., Ltd. <http://www.sanicon-group.com/>

Accrete Co., Ltd. <https://www.accrete-inc.com>

Adaptation Challenge Water pollution and its shortage frequently caused by climate change pose threats to regional water resources and industrial development.

Contribution Water purification technology of Sanicon and Accrete contributes to the provision of safe and secure water by maximizing the underground water resources of each region.

Project Detail

Background

Country | Vietnam

Sakai City and Binh Dinh Province of Vietnam have enjoyed a long-term exchange, such as interaction between local companies and student exchange through Consulate-General of Vietnam in Osaka. The Provincial delegation, with perspectives to develop economically while protecting environment, visited the water purification and treatment facilities that Sakai City-based Sanicon Group has planned, designed, installed and maintained, which led to the provision of guidance on maintenance and operation in the Province. Among them, CONSTRUCTION JOINT STOCK COMPANY 47 (CC47), a major local company in the growing tourism industry was planning a water purification project for well water in their hotel premises to ensure the supply of safe water at their own hotels, and was keen to introduce the technology of Sanicon. Thereafter in May 2017, well-water purification facilities were introduced to Seagull Hotel by leveraging on the water supply knowhow of Sanicon and water purification technology of its group company Accrete, which enabled the supply of safe and secure water for tourists and paved a way for sustainable development of the local economy. Based on this experience, the local community has begun to consider the use of water purification system in general hospitals and schools.

Business Model of the Project

Upon site visit in Vietnam by a mission consisting of the Osaka Chamber of Commerce and Industry, the Kansai Bureau of Economy, Trade and Industry (METI-KANSAI) and Sakai City, a local entity was established in Ho Chi Minh City in 2008 aimed at business with Japanese companies operating in Vietnam. In 2014, a wholly-owned local entity of Sanicon was established in Hanoi and in 2017, another wholly-owned local entity was established in Qui Nhon City, Binh Dinh Province for import of core technology from Japan and delivery of equipment to Seagull Hotel, as well as providing guidance on construction, maintenance and management. Engineers are dispatched regularly from Japan for sales promotion and providing technology guidance.



▲The view of the area with rising sea level



▲Seagull Hotel along beautiful coast line



Product & Technology

UF membrane (Ultrafiltration membrane) water treatment: The treatment successfully eliminates germs and viruses. By creating parallel flow to the membrane surface, turbid substances and colloids in the water supplied to the membrane are reduced to prevent them from accumulation on the membrane surface while being filtered which is called the cross flow filtration method. As compared to more common and affordable RO membrane (reverse osmosis membrane), the method enables reuse of 95% of the water to be filtered with greater power efficiency of the pumps and longer durability and thus is fit for use in developing countries. Also, UF membrane is capable of leaving hardness and ion levels at the optimum level so local flavor is maintained while safety is assured, as opposed to RO membrane that removes salt and ion to the extreme.

Guidance on maintenance and management method: A comprehensive flow of construction, ordinary maintenance and operation is based on the Japanese method for sustainable supply of safe water including orderly maintenance around the septic tank and water supply facility, opening/closing of covers, existing water receiving tank and resin coating of the inner surface of the elevated water tank, etc.



▲ Water purification equipment



▲ Team of Japanese and Vietnamese engineers

Key to Success & Challenges for Further Development

- Strong connection with Binh Dinh Province established through a long-term exchange between the Province and Sakai City facilitated the establishment of local entity and granting of license. In addition, acceptance of technology was mainly because of the construction, maintenance and management guidance provided at the same time.
- In Binh Dinh Province, demand for water infrastructure is rising for large resort facilities and village areas but the key for water purification technology to gain awareness is to raise awareness for the need of water treatment technology, maintenance and management. The project is focused on the sale of equipment system that accompanies a contract of maintenance and management simultaneously.

Profile of Project Company

Sanicon Co., Ltd. was established in 1972 upon reorganization of the former Kansai Water Treatment Plant Management Center founded in 1970 as part of the expansion of their business, and started construction, maintenance and management of water supply and treatment facilities as its main business. The Company launched technology cooperation with Vietnam in 1997. In 2006, Accrete Co., Ltd. was established as a subsidiary which focuses on development of optimal system making use of various water treatment technologies. Under the corporate motto of pursuing the optimal solution for securing, purifying and recycling limited water resources which is imperative for life while aiming for the preservation of sustainable global environment, the Company strives to protect human health, and seek security and safety of people's living through its projects both in and outside Japan.

32. Contributing to the reduction of non-revenue water and stable supply of safe water by detecting leaks from buried water pipes

Suidou Technical Service Co., Ltd <http://www.suidou-tec.co.jp/>

Adaptation Challenge Technology and products on water leakage inspection by Suidou Technical Service Co. Ltd (STS) enable to inspect and identify water leakage on the buried water pipe which is main cause of Non-revenue Water (NRW). Improvement of the NRW contributes to adaptation for reduction and deterioration of the water resource due to the climate change.

In the case of low water pressure or hurly water supply, leakage hole of the water pipe can take up alien substances and cause tap water contamination. In addition, underground leakage can cause secondary disasters such as road collapse.

Contribution Contribute to the stable management of water utilities and the supply of safe and secure water to users.

Project Detail

■ Background

Country | India, Vietnam

India: By utilizing the JICA Project Formulation and Dissemination/Demonstration scheme between 2013 and 2017, it has contributed to reduction of water leakage rate, improvement of water supply service, soundness of water supply business for Bangalore Water Supply and Sewerage Board as counterpart organization. After the end of the project, a NRW countermeasure department was set up within the department. Subsequently, in 2017, with the support of the JETRO Specialized Program and JETRO Bangalore Office, STS received a direct contract from the Karnataka State Government to conduct training on water leakage surveys for the staff of the Waterworks Bureau. Currently, STS aims to expand its business in India in partnership with a local infrastructure company.

Vietnam: From 2013 to 2016, through a public-private partnership between JICA and Yokohama City Waterworks Bureau, STS participated in the "Safe Water Supply Project in Vietnam with Private Technology in Yokohama" and implemented a project for Hue Water Corporation in Vietnam. The corporation highly valued STS's leak detection technology and concluded an MOU with STS. STS is currently providing training on water leakage surveys to other water utilities in Vietnam in cooperation with Hue Water Supply Corporation, to improve the operation of water utilities by reducing non-revenue water, and to ensure safety and security in provision of water in Vietnam.

■ Business Model of the Project

The following three businesses related to water leakage investigation are core overseas businesses; (1) Provision of on-site water leakage investigation service by STS investigators, (2) Conducting training for measure on non-revenue water for water utilities, and (3) Sales of "L-sign", a water leakage monitoring device. In addition to the above two countries, it has been exhibited at domestic and overseas exhibitions.



Product & Technology

- Water leakage survey including detection and location of potential leaks from buried pipes by sound hearing using water leak survey equipment by investigators
- Training for human resources development to reduce non-revenue water, including technology transfer of water leakage investigation
- Provision of L-sign & L-Chaser, water leakage monitoring equipment In the adaptation business in developing countries, the focus is on technology transfer of intangible assets, such as knowledge, sound hearing technology, know-how, and processes for actually detecting leaks locally, rather than providing equipment. If local staff can acquire STS's survey technology, NRW due to water leakage can be reduced. NRW reduction is equivalent to additional water resources development, which not only makes efficient use of water resources but also minimizes environmental impact. Energy efficiency in water intake, water treatment and water transfer can be improved, which can contribute to mitigating climate change.



▲ Water leakage monitoring equipment L-sign / L-chaser



▲ Water leakage survey training



▲ Identified water leakage point

Key to Success & Challenges for Further Development

- First of all, utilizing subsidy schemes of government agencies and local governments such as JICA, JETRO, IDEC, and the Yokohama City Waterworks Bureau, they implemented projects internationally and built trusting relationships with government agencies of partner countries.
- In addition, it has taken an approach to collaborate with local private companies and work toward continuous project formulation for water utilities. Utilizing the Ministry of Economy, Trade and Industry's internationalization internship project, the company accepted an intern from Indonesia in 2019 for further development. The intern will be hired from 2020 to expand business in Indonesia. Aiming for diversity management.

Profile of Project Company

Suido Technical Service Co., Ltd. was established in 2002 as a specialized company for water leakage investigation. Its goal is to create a sustainable society where everyone can receive the benefits of water with peace of mind by contributing to the sustainable supply of safe and secure water through our business activities. Its mission is to provide a stable supply of safe water through prevention from water leakage.

In 2018, STS was selected by the Ministry of Economy, Trade and Industry's Small and Medium Enterprise Agency as "300 small and medium-sized enterprises and small businesses in 2018."

33. Curbing flood damage and solving water shortage with rainwater storage system

SEKISUI CHEMICAL CO., LTD. <https://www.sekisui.co.jp/>

Adaptation Challenge 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.

Contribution "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. In addition, a rainwater storage stores rainwater and is used as a rainwater tank.

Project Detail

■ Background

Country | India

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 10,000 over deals both in the domestic and overseas markets as of 2020. 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 overseas countries such as Taiwan and Indonesia where the typhoon induces serious flood damage. ASEAN 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.



▲ Installation of CROSS-WAVE



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, used as plastic 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.



▲ CROSS-WAVE

Key to Success & Challenges for Further Development

- The Product has successfully been adopted in India 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. CROSS-WAVE is internally certified as “Products to Enhance Sustainability” which facilitates the adaptation to climate changes as well as to intensification of natural disasters. The Company has been selected as one of “Most Sustainable Corporations in the World Index (Global 100)” for four consecutive years since 2018, for which the World Economic Forum (WEF) ranks 8,080 major companies around the world.

34. Stable supply of water with high turbidity raw water compatible water purification equipment

Tohkemy Corporation <http://www.tohkemy.co.jp/index.html>

Adaptation Challenge In developing countries where water supply facilities are not provided, rainwater, river (surface water), groundwater, etc., which are not treated for water purification, are used as domestic water, and are exposed to health hazards such as diarrhea and conjunctivitis. In addition, there is a concern that the increase in turbidity due to the increase in rainfall or the depletion of water resources due to the decrease in rainfall will become more severe due to the effects of climate change.

Contribution Tohkemy's high-turbidity raw water-compatible water purification system can purify ultra-highly turbid water stably and efficiently, providing a stable supply of domestic water and improving the health and sanitation of residents by improving water quality.

Project Detail

■ Background

From 2015 to 2018, JICA promoted, demonstrated, and commercialized the project (support for small and medium-sized enterprises). Demonstration Project for Spreading and Demonstrating Water Purifiers for Raw Water. The purpose of this project was to provide a stable supply of safe water, correct regional differences in water supply services, and purify stable and inexpensive surface water, which becomes extremely turbid in rainy weather. Through this project, Tohkemy's high turbidity compatible water purification system (1000m³ / day: equivalent to about 6,600 people) has been installed and is operating as a tap water supply system in Paksan City.

Country | Laos



▲Children are happy with purified water



▲River water with high turbidity



▲Paksan district water purification system building



▲High turbidity raw water compatible type water purification equipment

■ Business Model of the Project

This is a public-private partnership with the Lao government, Lao government officials, JICA, and other stakeholders. The government will promote the standardization of reasonable equipment that meets local needs while utilizing public funding schemes such as JICA, and will consider business development in Laos and other developing countries in the future.



Product & Technology

Tohkemy's high-turbidity raw water-purifying water purification system consists of a fiber filtration system (Acti Fiber) and a sand filtration system. With this device, it is possible to purify river water with a turbidity of more than 1000 NTU, which is often found in areas with a rainy season, to a WHO standard of 5 NTU or less.

The features of the high turbidity raw water compatible water purifier are as follows.

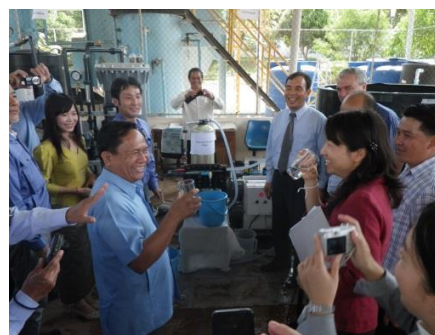
- Fiber filtration technology for small and high turbidity (patented)
- Reduces desalination cost to about 1/3 compared to coagulation sedimentation facility
- Installation space is compact and on-site installation time is shortened



◀ High turbidity raw water compatible type water purification equipment



▲ High turbidity raw water compatible type water purification equipment



▲ Stakeholders drinking water purified by the device

Key to Success & Challenges for Further Development

- Established Lapon Company Limited in Laos in 2011 as a local partner company. It is possible to cooperate for the smooth implementation of projects in Laos.
- Demand for water treatment technology is increasing in areas where water services are not yet established. In particular, securing and stable supply of domestic water for residents is an urgent issue, and the need for high-turbidity raw water-compatible water purification equipment is increasing, especially in developing countries.
- In the future, we will not only utilize public funding schemes such as ODA, but also expand our sales channels in Laos and other developing countries as our own business.

Profile of Project Company

Tohkemy Co., Ltd. (Headquarters: Osaka City) is a manufacturer and distributor of water treatment materials and equipment, including filter materials for water treatment, chemical injection pumps, stirrers, control equipment, and small equipment. Since its establishment in August 1965, the company has manufactured and sold filtration media and water treatment unit products, as well as constructed and maintained water purification plants, etc. in Japan. In addition to Laos, South Korea, Taiwan, China, Indonesia, Thailand, Malaysia, India, Brazil, Russia, the Philippines, Vietnam, etc. have been delivered products (including delivery via plant manufacturers or trading companies).

35. Securing sustainable water resources through water-saving plants

JGC Holdings Corporation <https://www.jgc.com/en/>

Adaptation Challenge In regions where there is expected to be less rainfall and longer dry seasons in the future due to climate change, it is becoming a challenge to cope with declining freshwater resources such as river water and groundwater. Moreover, in closed water areas with minimal ocean currents, over-dependence on seawater will lead to increased seawater temperature and salinity.

Contribution JGC is proposing a water-saving plant that combines the selection of service water, waste water, cooling water and heat transfer systems with the reuse of waste water to reduce water intake and drainage, taking into account constraints on water sources and the overall water balance of the plant.

Project Details

■ Background

Country | Oman, Saudi Arabia, Indonesia, etc.

JGC Group builds plants and facilities around the world in a wide range of fields, including oil & gas, energy infrastructure such as power plants and steel & metal plants, industrial infrastructure, and social infrastructure such as hospitals and environmental facilities.

In areas where there are concerns about future restrictions on water resources and the risk of depletion, client needs for water conservation are high and the concept of a water-saving plant reduces the long-term impact on the surrounding water environment, helping clients to realize their capital investment plans. Water treatment is an energy-intensive process in plants and is an important factor when designing a plant.

■ Business Model of the Project

JGC provided FEED (Front End Engineering Design) and EPC (Engineering, Procurement, Construction) services for an oil refinery plant in Oman. The plant treats waste water generated during the oil refining process to bring it below discharge water quality standards, and partially reuses it as irrigation water for the plant. JGC also provided water-saving plants in Saudi Arabia and Indonesia. Many of the clients are state-owned companies and private oil majors.



▲Oil refinery plant in Oman

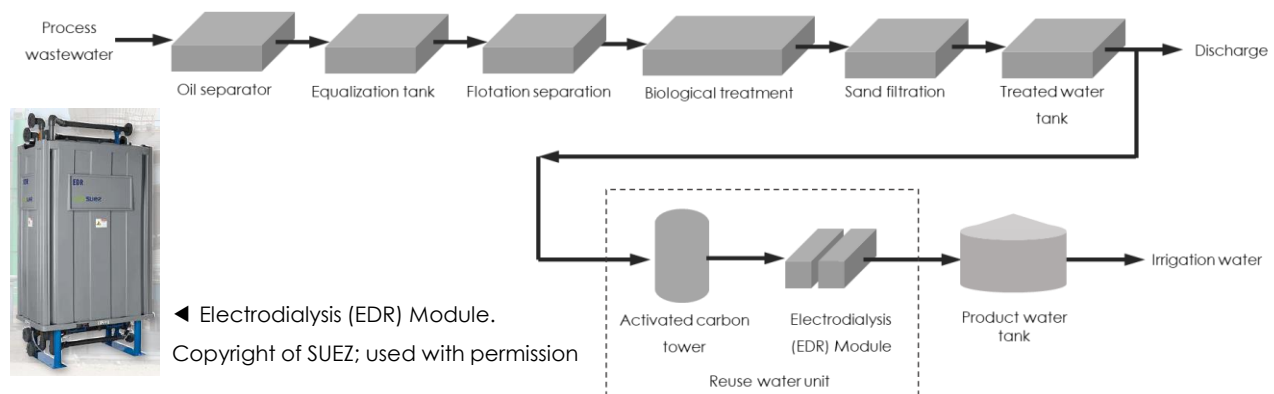
Related SDGs



Product & Technology

In the oil refinery plant in Oman, advanced removal of organic compounds such as phenol and soluble salts such as sodium and chlorides are required in order to reuse the waste water from the oil refining process for irrigating the plant's green areas. For this purpose, a reuse water unit consisting of an activated carbon adsorption tower and electro dialysis module was installed. This advanced treatment allows 30-40% of the planned wastewater to be reused as irrigation water for the plant. The installation of this water reuse system also contributes to the use of sustainable water resources by reducing the amount of seawater intake and waste water discharge required for water desalination.

System flow of wastewater treatment



Key to Success & Challenges for Further Development

- In addition to water conservation to reduce the impact on the environment, JGC also provides clients with economic benefits such as reducing water treatment costs.
- As the risk of climate change becomes more apparent, it is expected that there will be greater awareness about the need to secure and sustainably use water resources, and the need to conserve water and reuse wastewater.

Profile of Project Company

Since its establishment in 1928 as Japan's first engineering company, JGC has expanded its business domain from oil and gas to infrastructure, and has conducted more than 20,000 projects in over 80 countries around the world. JGC is now engaged in comprehensive engineering, functional materials, and consulting businesses, mainly in the fields of energy, society and lifestyle, and industry. Under the corporate slogan of "MISSION DRIVEN," JGC aims to solve sophisticated and complex issues in order to achieve a sustainable society. Based on the idea that engineering is essentially a business activity that contributes to environmental conservation, JGC is contributing to reducing environmental impacts, manufacturing low-carbon and environmentally-friendly high-performance materials, and commercializing environment-related technologies.

36. Realization of stable water treatment by underwater mechanical aerator and agitator

Hanshin Engineering Co., Ltd. <http://www.hanshin-pm.co.jp/>

Adaptation Challenge Exhaustion of water resource due to expansion of the desertification and drought under climate change is a serious issue worldwide.

Contribution Hanshin Engineering realizes high efficient and stable water treatment through technology of underwater mechanical aerator and stirrer. Especially, by introducing the technology in developing countries with serious climate change impact, the technology supports securing water resources and stable provision of water as well as improvement of regional living environment and health / sanitation.

Project Detail

■ Background

Country | Malaysia, Indonesia, Philippines, etc.

Hanshin Engineering Co., Ltd. provides water treatment technology such as underwater mechanical aerator and stirrer in the public works of Japan. The underwater mechanical aerator and stirrer has been installed at some 1,000 locations with some 11,000 facilities, which is approximately half of the water treatment plants in Japan. Also, since the market in Japan became matured, business started in 2010 in Southeast Asian countries where are expected for economic growth in near future. So far, the underwater mechanical aerator and stirrer have been installed in the wastewater treatment facilities in China, Taipei, Thailand, Malaysia, Indonesia, the Philippines.

(1) Advanced waste water treatment and resource recycling in palm oil factory in Malaysia in Malaysia

The underwater mechanical aerator and stirrer was introduced in the wastewater treatment plant of the palm oil factory in Malaysia by utilizing the Pilot Project under FY2013 Supplementary Budget Scheme for the Small and Medium Enterprises Overseas Expansion Support Project. The technology accomplished treated water quality at BOD20mg/L. In addition to upgrading the wastewater treatment, it was contributed to carbonization of sludge, conversion to fuel, and composting for resource recycling.



▲ Wastewater treatment plant in palm oil factory in Malaysia

(2) Activities in rubber glove manufacturing plant in Malaysia and aquaculture facilities in Thailand

"Development of energy-saving underwater mechanical aerator and agitator for the wastewater treatment system in ASEAN region" was implemented under the Subsidy Scheme for Carbon Dioxide Emission Control (Project for Creating Innovation of Low-carbon Technology for Developing Countries) in FY2017 and FY2018. Under the project, the following are examined; improvement of performance of the products, which is the improvement of transfer performance of oxygen as air supply function, long life of the products through improvement of motor bearing and development of motor cooling mechanism, and stable use of the products with development of alien substance entrapment prevention mechanism.

■ Business Model of the Project

Profitable network is structured through cooperation with local governments, private companies and other stakeholders. Also, approaches to end users in both overseas and Japan are promoted by cooperating with an engineering company who well knows the situation of local water treatment.

Related SDGs



Product & Technology

Underwater mechanical aerator and stirrer “Aquarator®” are functionable for both aerobic and anaerobic tanks. In the aeration process, the air which is supplied from blower is refined through the proprietary structure and gas-liquid mixing solution is spread all over the reaction tank. Some features are shown below.

- High efficiency of oxygen dissolution and high energy efficiency (Energy-saving at max. 30% is realized by renewing from existing air diffuser to the Aquarator®).
- Since the sludge does not remain at the bottom of tank with good condition, wastewater treatment process become stable.
- Less maintenance activity. No clean up activity by removing the sludge in the water tank.



▲Aquarator® by Hanshin Engineering Co., Ltd.



▲before aeration



▲just after aeration



▲under aeration

Key to Success & Challenges for Further Development

- Unique quality service can be provided with high precision product development based on technology and know-how, and abundant achievements and experiences in Japan, which have been accumulated for more than half a century.
- Demand of water treatment technology is increasing in the developing countries due to serious depletion of water resources with effect of climate change. Highly efficient and stable water treatment technology like Aquarator® can respond to such demand.
- International business is successfully utilizing the support project by Team E-Kansai in addition to public financial scheme such as commissioned projects of JICA project and subsidiary scheme of GEC.
- Accumulation of experience with public schemes, effects of promotion and networks structured though frequent site visits are huge advantages.
- Hanshin Engineering will extend sales network by structuring personal connections further and improve sales and production system so as to provide high-quality products, technologies and services.

Profile of Project Company

Hanshin Engineering was established in Nov. 1950. Head office is located in Osaka City. Manufacture and sales of gear reducers, equipment for river facilities, equipment for water treatment, and equipment for industrial equipment. After the underwater mechanical aerator and stirrer “Aquarator®” was developed in 1975 first in the world, its manufacturing and sales were started. A number of the “Aquarator®” have been installed in Japan, and currently there are distributors in China, Taipei, Malaysia, Thailand, and Indonesia.

Hanshin Engineering recognizes that conservation of global environment is the most significant issue common to mankind; therefore, many of our corporate activities aim to protect the global environment and contribute to society on environment. Especially, Hanshin Engineering contributes to the environmental measure toward the climate change through development and sales of water treatment and water regulation machinery.

Hanshin Engineering will deepen cooperation with local partner companies, improve production system such as increase of production amount and shortening of production duration, and actively promote international business.

37. Producing safe drinking water from saline and highly-turbid surface water

Mitsubishi Chemical Aqua Solutions Co., Ltd. <https://www.mcas.co.jp/>

Adaptation Challenge In several counties in South-east Asia such as Myanmar and Vietnam, reversal of sea water (salt intrusion into river surface water) has become increasingly serious during the dry season due to low water level in rivers caused by climate change. In addition, surface water becomes extremely turbid during a prolonged rainy season and is not suitable for drinking without treatment.

Contribution The water purification technology of Wellthy Corporation leveraged on available water sources enables the provision of safe drinking water and serves as an adaptation measure in the field of secure resources and stable water supply.

Project Detail

■ Background

Country | Myanmar

In Myanmar, where salt intrusion into surface water has become a serious issue, surface water must be used as tap water in future due to water stress caused by urbanization and growing restrictions on the use of well water in Yangon and other urban areas. Considering such situation, Mitsubishi Chemical Aqua Solutions Co., Ltd. has conducted a pilot utilizing the Company's water treatment technology. The Company has introduced a water treatment system addressing the issue of both highly turbid river water during the rainy season and saline water during the dry season so that safe drinking water is provided throughout the year. The system is loaded with "WeLLDAS", a remote monitoring system developed by the Company which enables the monitoring of system operation and water quality both from Japan and Myanmar. Upon a year-long pilot, it is confirmed that drinking water can be provided throughout the year.

■ Business Model of the Project

The Company established a joint venture in 2017 named "MW Aqua Solutions Co., Ltd." to provide services in Myanmar with a key focus on water treatment engineering (EPC), water quality analysis and environmental consulting. Water quality analysis is conducted utilizing the expertise and technology as a water quality analysis agency certified by the Ministry of Health, Labor and Welfare of Japan and by dispatching experts in water quality analysis from Japan who train and guide local personnel on a daily basis. Not only internally, but the Company also contributes to building up the capacity of local government officers who are engaged in water quality analysis work.



MW AQUA SOLUTIONS



▲ Training on water quality analysis was given to a public water analysis lab in Myanmar

Related SDGs



Product & Technology

Water treatment System: The system is characterized by a customized design in combination of appropriate pre-treatment technology and membrane filtering technology according to the quality of raw water to enable safe drinking water to be secured irrespective of water source.

Remote monitoring system "WeLLDAS": The system is loaded in the water treatment system and contributes to the optimization of maintenance and management operations by checking operation of the water treatment system, responding to changes in water quality, and utilizing accumulated data.

Consistent management structure: The technology enables consistent operation ranging from the water quality analysis to maintenance and management. The same operation structure has also been established in Myanmar.



▲ Water treatment system introduced to Myanmar



▲ Visualizing local situation through remote monitoring system



▲ Water quality analysis lab operating in Myanmar

Key to Success & Challenges for Further Development

- Stable collection of data on equipment operation and water quality for about a year in Myanmar through field tests using the water treatment system became great asset in launching operation in Myanmar.
- Experts were dispatched and facilities were introduced from Japan in the establishment of a joint venture company where daily operation is currently run together with 11 local personnel.
- Experts were dispatched and facilities were introduced from Japan in the establishment of a joint venture company where daily operation is currently run together with nine local personnel.
- The next stage is to explore new customers and markets for further growth in addition to water treatment projects using high-salinity surface water.

Profile of Project Company

Being a group company of the Mitsubishi Chemical Holdings Group, the Company plays a key role as a total solution provider in the field of water resource issues. The Company strives for the realization of a sustainable society through the development and provision of diverse solutions on water resources. The Company aims at establishing a resilient social infrastructure by providing safe water to cater to individual demand through its long-established water treatment technology to treat groundwater, etc. The Mitsubishi Chemical Holdings Group promotes corporate activities under a unique management method of "Management of Sustainability (MOS)" that ranges from the development of technology and provision of products and services that contribute to sustainability to the improvement in production technology, and promoting water treatment projects in Myanmar as sustainability projects are considered as one of our business strategies.

38. Addressing “water pollution caused by floods” and “decrease in water resources”

Yamaha Motor Co., Ltd. <https://global.yamaha-motor.com/>

Adaptation Challenge 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.

Contribution Introducing “Yamaha Clean Water Supply System”, a small-sized water purifier developed by Yamaha Motor Co., Ltd. as an adaptation measure in villages of Asia and Africa will contribute to supporting resilience building of the regions.

Project Detail

■ Background

Country | Indonesia, Madagascar, Senegal, Benin etc.

Based on the home water purification system developed by Yamaha Motors Co., Ltd. In the 1980s following the complaints from the company’s expatriate families that “tap water was murky and had rusty smell”, the prototype of the present system, was sold and operated on experimental basis. Thereafter, the company developed the system suitable for villages and has introduced it to various regions in Asia and Africa.

■ 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, Madagascar, Senegal and Benin, drastically reducing the outbreak of diarrhea, fever and other illnesses. The system has freed residents of their water drawing labor and enabled them to shift their activities toward production and learning. The system has led to creation of new business , such as water delivery and ice making in some cases.



▲ Yamaha Clean Water Supply System

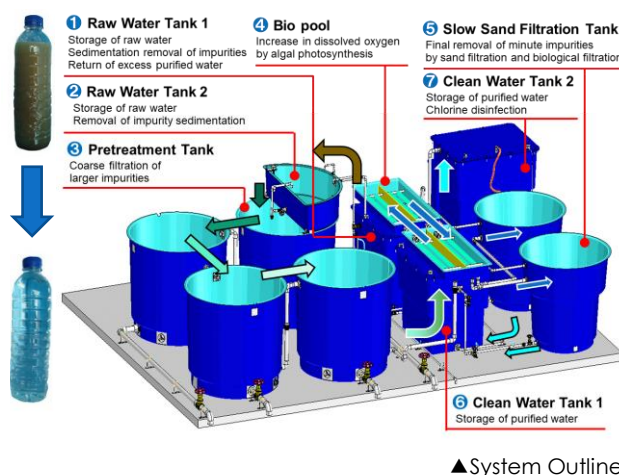


▲ A happy child



Product & Technology

“Yamaha Clean Water Supply System” purifies water through “Slow Sand Filtration” using sand and gravel. Physical dirt and rubbish in the surface water pumped up are removed through “Pretreatment Tanks” filled with sand and gravel. Photosynthesis by the algae which naturally forms inside the tanks increases the density of oxygen dissolved in the water and enhances 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 barriers to introduction is overcome by advance education on sanitation and maintenance procedure in addition to realizing low running cost and easy maintenance.
- Realizing co-benefit by encouraging self operation by local partners through setting up “water committees”. The committee would contribute to creating local jobs through launching new businesses such as water sales business and mobile phone charging service in areas with no grid 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.

Profile of Project Company

Yamaha Motor Co., Ltd. was set up in 1955 as a motorcycle manufacturer. Since then the company not only pursues values in existing markets, but it has engaged in “Social Value Creation Business”, represented by Yamaha Clean Water Supply System, which creates new markets through effort to resolve social issues taking sustainable economic growth and environmental preservation into consideration. The company has entered into African market in the 1960s 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 outboard motors. 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 contributed to the development of African nations. “Yamaha Clean Water Supply System” won the Good Design Award 2013. Our work to encourage the use of safe water at villages with a Yamaha Clean Water Supply System using *kamishibai* storytelling (Japanese-style storytelling using picture cards) was recognized with an award from the committee of judges at the 8th Good Life Awards put on by Japan’s Ministry of the Environment.

39. Minimizing financial losses caused by extreme weather events

Sompo Holdings, Inc. <https://www.sompo-hd.com>

Adaptation Challenge The insurance product is an effective mean of minimizing financial risks and also an adaptation measure in the field of risk finance associated with climate change.

Contribution Sompo Holdings, Inc. has been providing the Weather Index Insurance aiming at reducing agricultural business risks associated with extreme weather in Southeast Asian countries, where agriculture is a key industry that is vulnerable to climate change.

Project Detail

■ Background

Country | Thailand

The Sompo Group, 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

Weather Index Insurance is an insurance product that pays out a contractually predetermined insurance amount when a weather index – such as temperature, wind speed, rainfall, or hours of sunshine – fulfills certain conditions regardless of actual losses. It enables a rapid claim handling and contributes to an immediate disaster restoration without a site investigation for a loss assessment.

In addition, it lowers the costs of loss assessment and realizes affordable insurance products for local farmers. Therefore, the product is highly evaluated as an effective mean for small farmers in terms of rapid claim handlings and clear liabilities.





Product & Technology

Utilizing expertise acquired by weather derivatives products, the Sampo Group, in cooperation with JBIC, has carried out studies on risk finance approach to address climate change since 2007. Weather Index Insurance was launched in 2010, which is aimed to compensate rice farmers in Northeast Thailand for shortfall in crops caused by drought.

Sampo International Holdings Ltd., which is responsible for the group's overseas insurance business, launched the AgriSampo initiatives as an integrated platform to offer agriculture insurance globally in 2017. Sampo Holdings Group launched a parametric weather insurance program for longan fruit farmers in Chiang Mai, Thailand in 2019, and expanded its sales area to Lampang and Nan in 2020. (Longan fruit is one of the major Thai agricultural exports.) This insurance program was developed using satellite data with technology provided through AgriSampo.



▲Hearing survey (Myanmar)



▲Briefing session (Thailand)

Key to Success & Challenges for Further Development

The Sampo Group develops insurance products and services through engagements and collaborations with various stakeholders. In 2018, the group participated in a pilot project for a development of weather index insurance in Myanmar as a technical advisor and continues to hold dialogs with local farmers, Myanmar Agricultural Development Bank, and local agriculture bureaus on local weather situation and demands for insurance.

Profile of Project Company

Sampo Holdings, Inc. was established on 1 April 2010 as a holding company with a merger of Sampo Japan Insurance Inc. and Nipponkoa Insurance Co., Ltd., developing a range of businesses centered on the domestic P&C insurance, overseas insurance and reinsurance, domestic life insurance, nursing care and senior, digital, and healthcare business.

The Sampo Group incorporates the social challenges, strategies, and actions that the Group is tackling into our management framework, and is working to achieve Sampo's Purpose, which is expressed as "With 'A Theme Park for Security, Health and Wellbeing', create a society in which every person can live a healthy, prosperous and happy life in one's own way".

**Attachment 2: Presentation Materials of International Information Dissemination
(Thailand)**

- (1) METI / METI's activities for promoting private sector participation in climate change adaptation
- (2) ONEP, MoNRE / Thailand's Climate Change Adaptation Policies and Plans
- (3) Nippon Steel Trading Corporation / After Flood in Rojana: The preventional measures against Flood
- (4) Furuno Electric Co., Ltd. / Weather Radar and DANA
- (5) Remote Sensing Technology Center of Japan / Remote Sensing Application on Environment Monitoring
- (6) Routrek Networks, Inc. / Digital Farming Makes Agriculture Sustainable: Private Sector Contribution to Climate Change Adaptation in Thailand
- (7) CTCN / CTCN's support mechanism
- (8) NXPO / Introduction of Thai's experience in CTCN projects
- (9) GCF / Introduction to the GCF

Note 1: (5) is not open to the public.

METI's activities for promoting private sector participation in climate change adaptation

November 2021

Ministry of Economy, Trade and Industry

Japan's Climate Policy under the Paris Agreement

- **Paris Agreement:** Calling for “Increasing the ability to adapt to the adverse impact of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production”
- **IPCC WG I (2021) :** Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since AR5.
- Japan submitted Japan's updated NDC, the Long-term Strategy and adaptation communication to the UNFCCC. In adaptation communication, Japan promotes overseas development and international cooperation by the government and the private sector

Overseas Disasters caused by Climate Changes

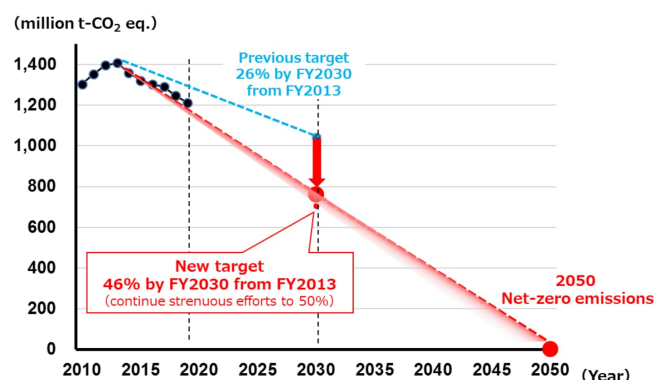


Flood in Rojana Industrial Park
(Thailand, Oct. ~Nov. 2011)

*Source: Ministry of Land, Infrastructure, Transport and Tourism, Japan

Japan's new 2030 emissions reduction target

Japan aims to reduce its GHG emissions by 46% in FY2030 from FY2013 levels, setting an ambitious target that is aligned with the long-term goal of achieving net-zero emissions by 2050.



*Source: Ministry of Foreign Affairs, Japan

Japan's new commitment at COP26

- Prime Minister Kishida announced that Japan will double the assistance for adaptation to climate change by 2025.

COP26 World Leader's Summit Statement (2021/11/2)

For adaptation to climate change, Japan will double our assistance to approximately 14.8 billion USD, such as in the area of disaster risk reduction.

Concerning global forestry conservation, I hereby announce that Japan will provide financial assistance worth approximately 240 million USD, utilizing advanced technologies and working in collaboration with the international organizations.



Source of photo: Prime minister of Japan and His Cabinet

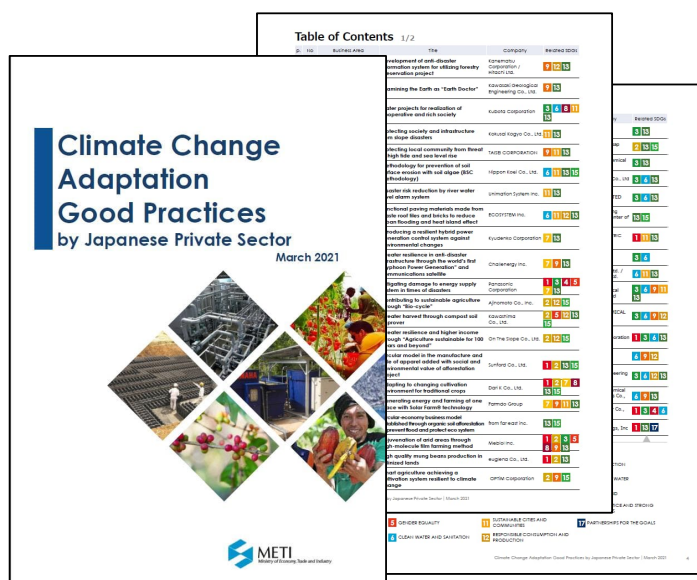
2

METI's efforts to promote adaptation business

- METI aims to ensure opportunities for international cooperation and collaboration, and promote adaptation business of Japanese companies.

Good Practices

METI publishes leaflets to share efforts of Japanese companies that are implementing adaptation business, and the activities of Japanese companies that have adaptation technologies.



Workshop/ Seminar

METI holds workshops and seminars abroad or in Japan to explain the advantages of Japanese companies in the field of adaptation business.



3

COP26 Side events

- METI participated in Japan Pavilion seminar and Indonesia Pavilion seminar, and appealed **the promising adaptation business technologies** of Japanese companies.

Japan Pavilion seminar

- METI participated in Nature-based-Solution seminar at Japan Pavilion and introduced some examples of adaptation business of Japanese companies.
- Ex) Methodology for prevention of soil surface erosion with soil algae (Nippon koei Co., Ltd)
- Ex) Circular model in the manufacture and sale of apparel (Sunford Co., Ltd) etc

Indonesia Pavilion seminar

- METI participated in Indonesia Pavilion and exchanged views with Indonesia government on adaptation efforts by private companies and local communities.
- Ex) Mitigation damage to energy supply system (Panasonic Corporation)
- Ex) Adapting to changing cultivation environment for traditional crops (Dari K Co., Ltd)





Thailand's Climate Change Adaptation Policies and Plans

Policy and Strategy Section

Climate Change Management and Coordination Division

Office of Natural Resources and Environmental Policy and Planning

Ministry of Natural Resources and Environment

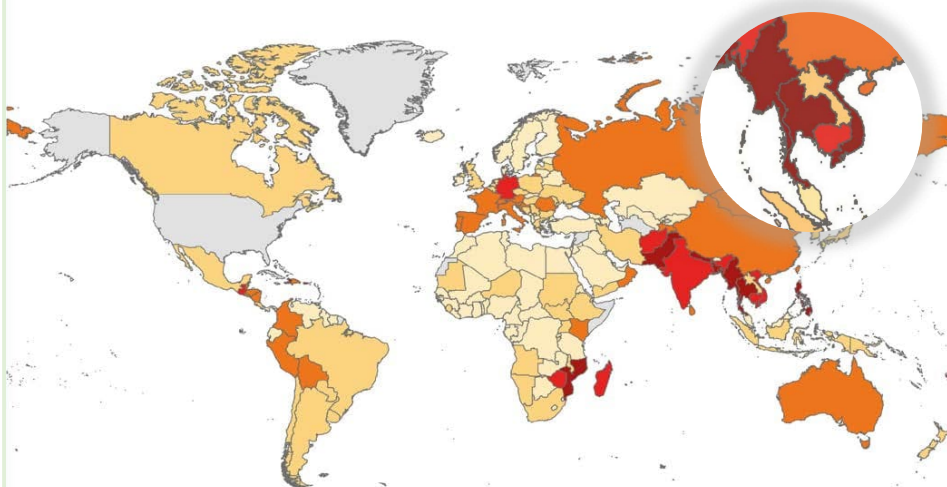


The Global Climate Risk Index 2021

Countries most
affected by extreme
weather events
(2000-2019)

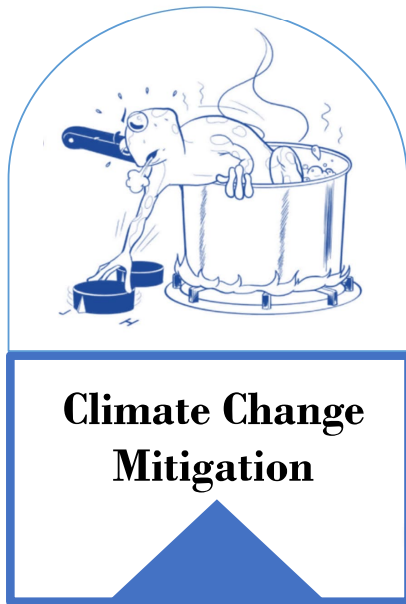
1	Puerto Rico
2	Myanmar
3	Haiti
4	Philippines
5	Mozambique
6	The Bahamas
7	Bangladesh
8	Pakistan
9	Thailand 
10	Nepal

World Map of the Global Climate Risk Index 2021

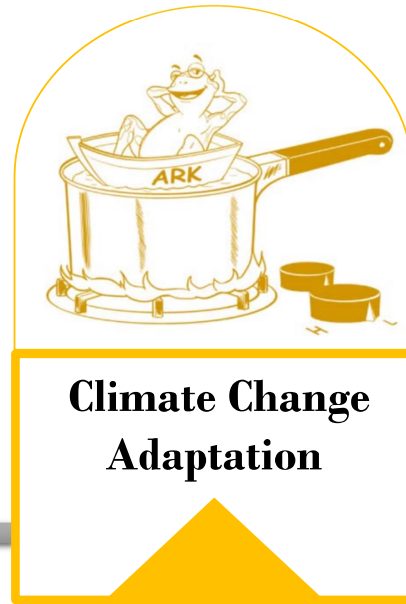


Risk Index: Assessed by the number of deaths and damage

Responding to Climate Change



Reducing the emission of greenhouse gases and heighten our ability to manage additional mean global temperature rise



Reducing climate risk and vulnerability and adapting to the changes that are already, or will occur in order to enhancing climate resilience

Climate Change Policy and Plan

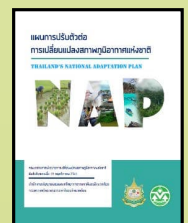
Climate Change Master Plan 2015-2050 (CCMP)



Long-term national framework for climate change implementation in order to develop mechanisms and tools to effectively address climate change problems

National Adaptation Plan (NAP)

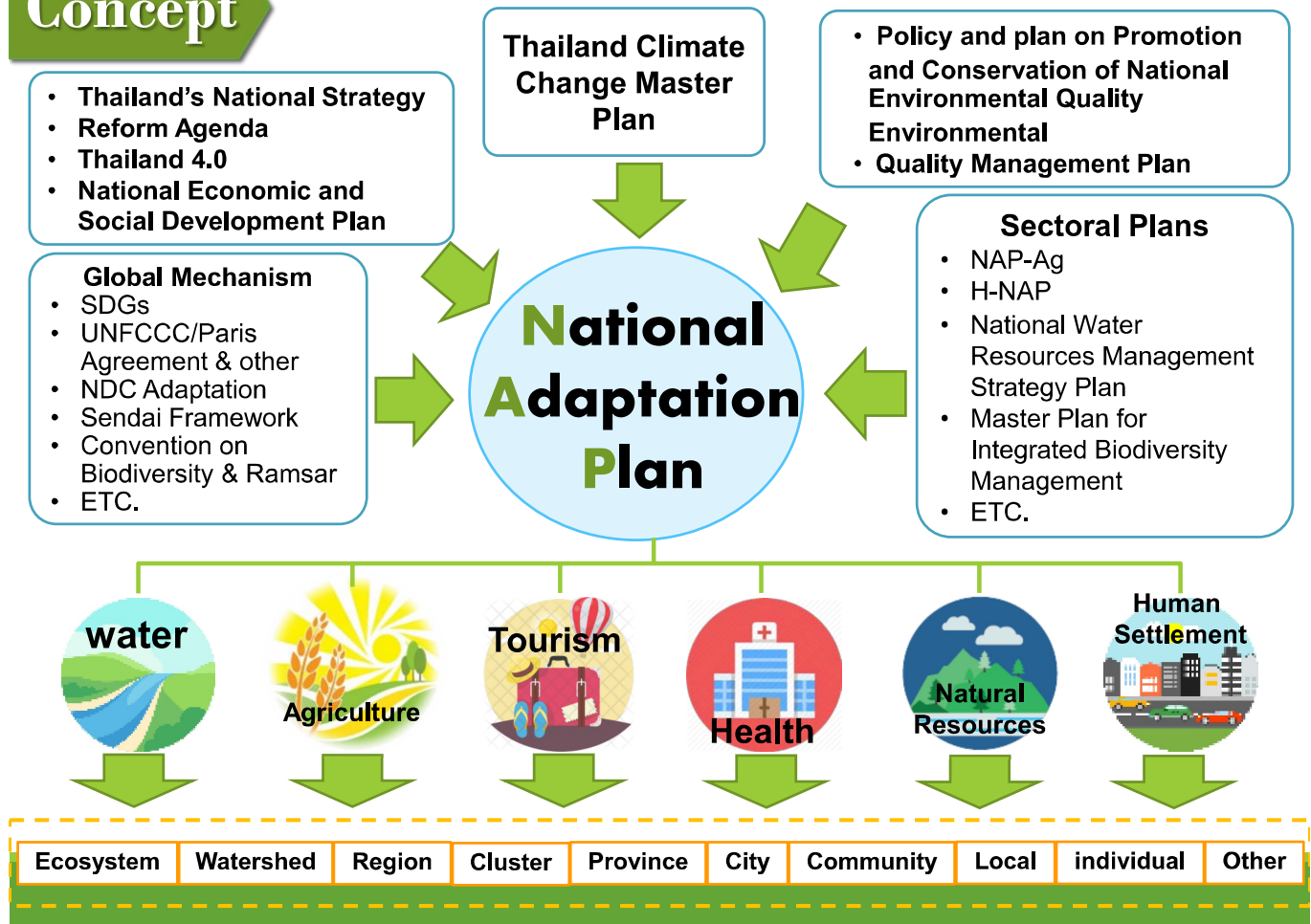
National implementation framework toward Climate Change Resilience and Adaptation, and Guideline for integrating Adaptation into sectoral and area-based plans



6 Sectors



Concept



National Adaptation Plan

Vision

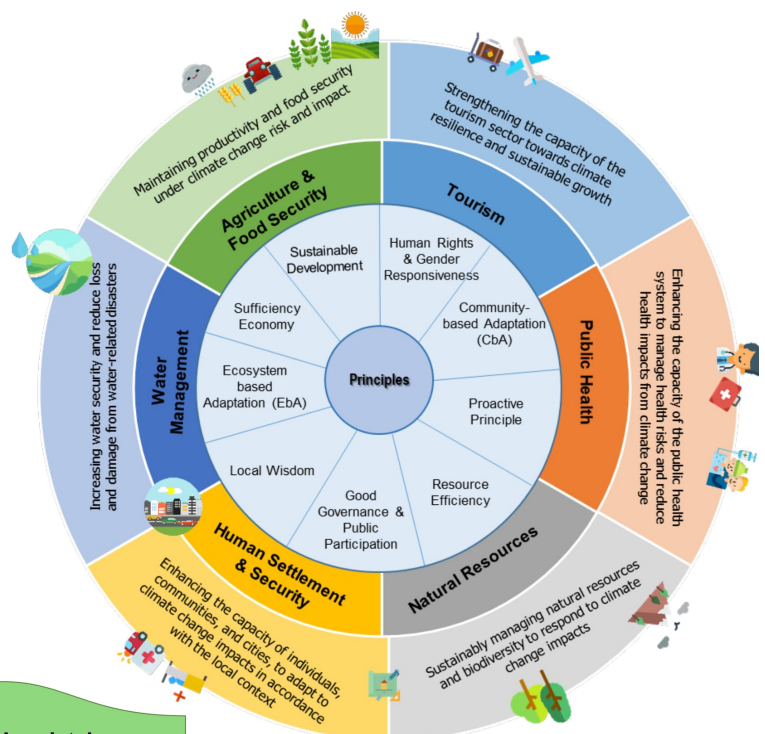
“Thailand is resilient with adaptive capacity to climate change impacts, and moves towards sustainable development”

Mission

1
Establish the climate resilience into the national development

2
Enhance capacities and awareness at all level

3
Develop database, research, knowledge, and technology





Approaches



water

1. Upstream
3. Downstream

2. Midstream & Downstream
4. Support mechanisms



Agriculture

1. Cropland
3. Fisheries and aquaculture

2. livestock farm
4. Support mechanisms



Tourism

1. Natural attractions
3. Support mechanisms

2. Man-made attractions



Health

1. Prevention of climate change impacts on health
2. Support mechanisms



Natural Resources

1. Terrestrial ecosystems
3. Marine and coastal ecosystems

2. Wetland ecosystems
4. Support mechanisms



Human Settlement

1. Metropolises & Cities
3. Support mechanisms

2. Towns & communities

Sectoral Integration



Development of the Climate Technology Roadmap and Database: Adaptation under Thai-German Climate Program – Policy (TGCP-Policy)



giz

Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH



Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety
of the Federal Republic of Germany



Ramkhamhaeng University
Center of Regional Climate Change
and Renewable Energy



Objective

- To develop climate change adaptation technology roadmap and database for 6 priority sectors
- To develop full proposal of selected technologies for policy sandbox implementation



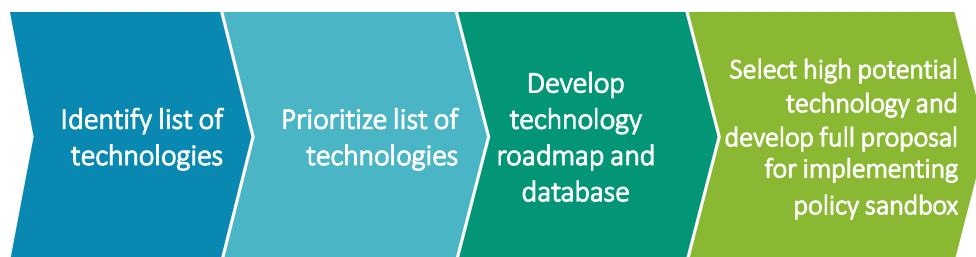
Timeline

Oct 2019 – Dec 2021



Climate Change Adaptation Technology Roadmap

Implementation



Agriculture and food security



- Precision farming
- Agricultural early warning system
- Marker-assisted selection

Water management



- Water forecasting and early warning system
- Water and flood retention
- Water management system



After Flood in Rojana

The preventional measures against Flood

NIPPON STEEL TRADING CORPORATION (NST)

Company Name	NIPPON STEEL TRADING CORPORATION
Established	in 1979
Revenue/Net Profit	abt. 20 billion USD / abt. 150 Million USD (in 2020)
Business	Steel / Infrastructure / Textile / Food

STEEL



INDUSTRIAL SUPPLY & INFRASTRUCTURE



TEXTILES



FOODSTUFFS



Partnership between Rojana and NST

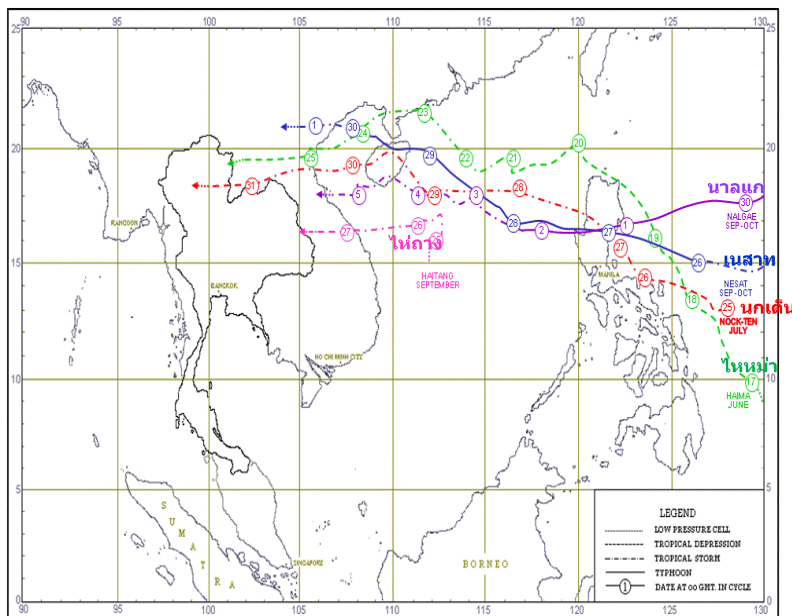
- Rojana Industrial Park was established in Thailand in 1988 by Rojana and NST
(The current shareholding ratio : 20.74% by NST)
- Rojana has developed 7 industrial parks in Thailand.
In addition, Rojana has developed co-generation power plants,
solar power plants and water treatment plants.
- NST has been dispatching several personnel to Rojana in order to support Rojana business
- Rojana Ayuttaya was flooded and damaged heavily in 2011.
However Rojana has overcome the flood by our strong partnership.

Historical big flood hit
Rojana Ayutthaya
in 2011.



All of factories inside
Rojana were
damaged.

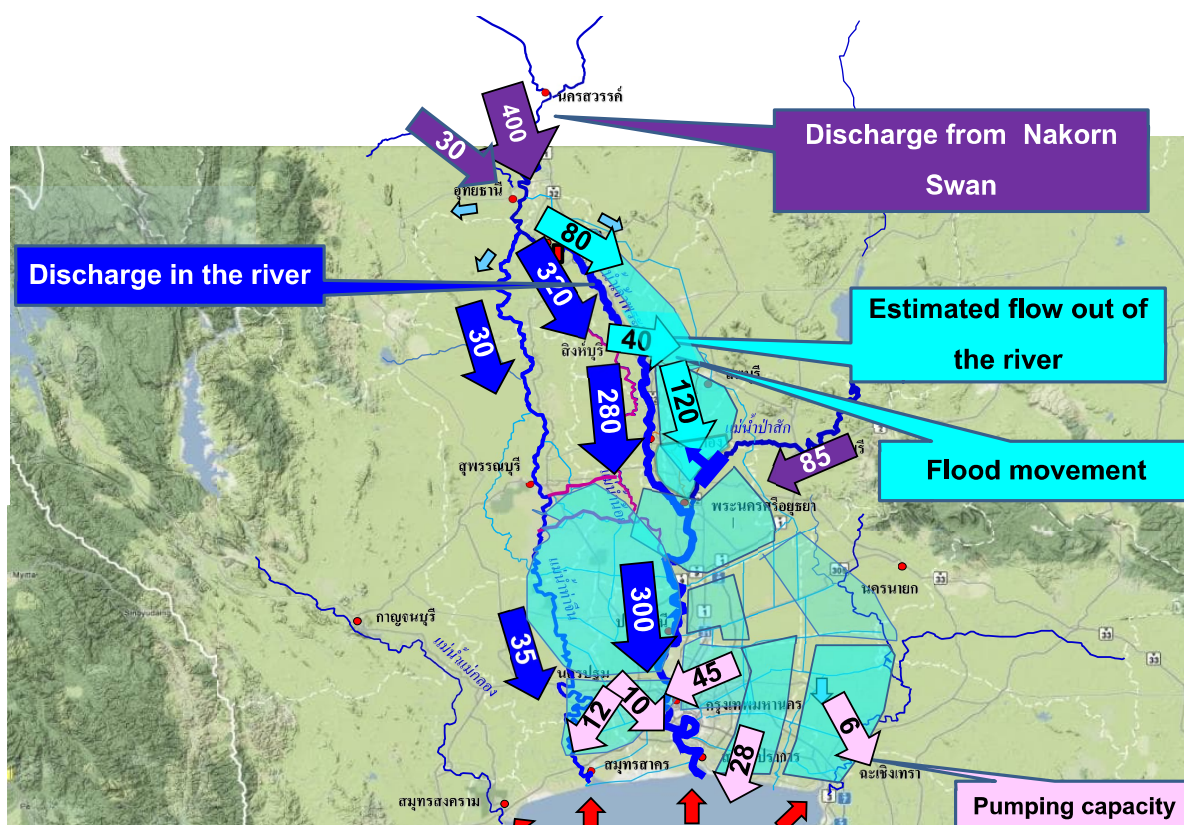
Cause of Flood



Chao Phraya River Basin normally has 2 or 3 storms every year. However, there were unexpectedly 5 storms in 2011. That was a prime factor of flood in 2011.

1. HaiMa 25, June.
2. Nook-Ten 30 July
3. Hai Tang 28 Sep.
4. Nesat 1 Oct.
5. Nalgae 5 Oct.

5



6

Damage by Flood

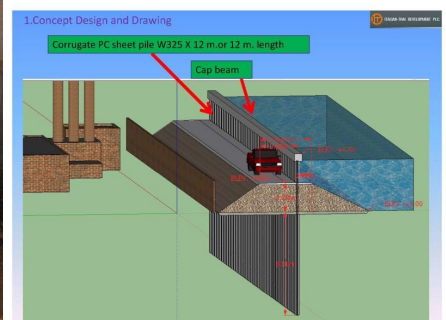
- ◆ Production stop
- ◆ Machine damage
- ◆ Stock desposal
- ◆ Traffic congestion
- ◆ Supply chain disfunction



Preventional Measures by Rojana



Rojana raised up dyke height by concrete wall. Around industrial park about 70km.

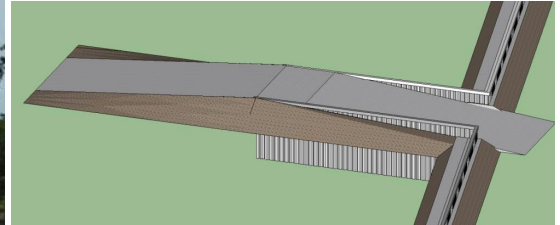


Preventional Measures by Rojana

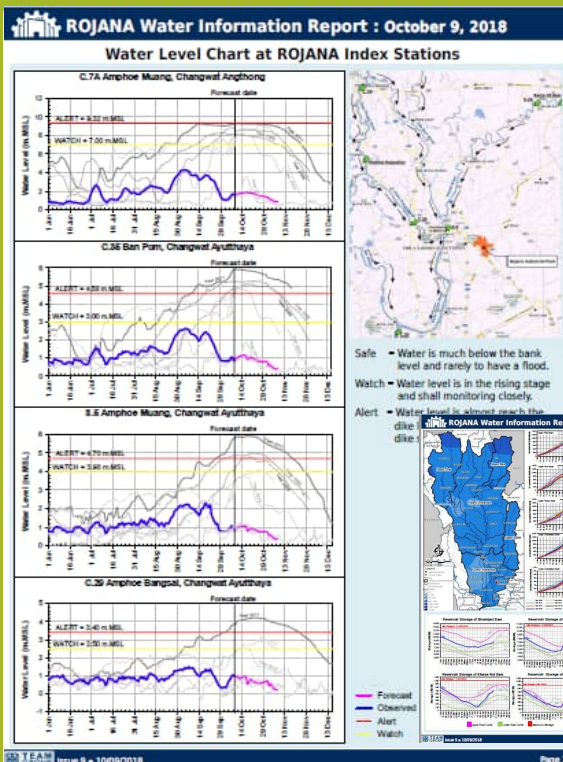
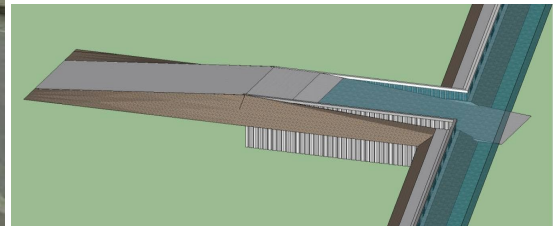


- Rojana raised up entrance road

<Normal>



<Flood>



Preventional Measures by Rojana

Rojana Provides Water Level forecast report calculated by Team.

Factories inside Rojana can prepare before water comes.

Summary of Calculated Water Level (m.MSL) at ROJANA index stations.

Key Index Station	WATCH ALERT	Forecast date		Forecast period							
		10/08	10/09	10/10	10/11	10/12	10/14	10/16	10/24	10/30	11/08
C.7A	7.00 3.32	1.66	1.60	1.65	1.71	1.75	1.81	1.86	1.64	1.42	0.86
C.35	3.00 4.58	0.97	0.87	0.99	1.04	1.07	1.14	1.16	0.93	0.82	0.40
C.29	2.50 3.40	1.05	0.96	0.97	0.93	0.88	0.91	0.96	0.63	0.66	0.23
S.5	3.98 4.70	0.97	0.84	0.96	0.99	1.01	1.06	1.07	0.84	0.77	0.36
ROJANA Industrial Park	4.60 6.05	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE

SAFE Water is much below the bank level and rarely to have a flood.

WATCH Water level is in the rising stage and shall monitoring closely.

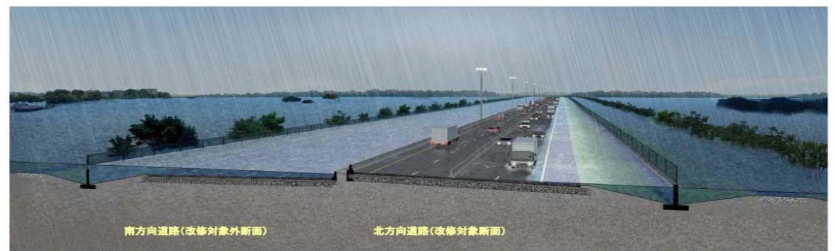
ALERT Water level is almost reach the dike level and could spill over the dike soon.

Preventional Measures by Thai Government

Thai Government refreshed highway road against flood.
Even during flood situation new highway can secure traffic.



完成予想図（通常時交通流）



完成予想図（洪水時交通流）

Preventional Measures by Japanese Government

Japanese Government constructed new water gate.
During flood situation new water gate can protect industrial park from water.



Required more measures

Advanced Alert system → Previous system does not include detailed landscape and weather forecast data.

More Preventional measures by Thai government

- Plantation in Northern area ,
- Construction of new dams
- Prepare more Monkey cheeks

Review flood manual → It has already passed 10 years since flood, know-how succession should be done.



Thank you !

Weather Radar and DANA



November 2021
Yusuke Mizutani
System Solutions Business Unit
FURUNO ELECTRIC CO., LTD.



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Features

FURUNO

- ◆ Compact and light weight (1 m/65 kg)
- ◆ Easy installation
- ◆ Real time observation for localized weather
- ◆ Competitive costs of installation and operation (Suitable to build multiple radars network)
- ◆ Low power consumption (Household power)



World compact/light weight
Weather radar



Compact size enable to install on top of existing building and to
save costs and period for installation



FURUNO

- No heavy machinery, tower, building for radar installation
- Solid State technology

C-band radar

- Building/Tower with control room
- Big size Antenna Radome
- Klystron and Solid State technology

Antenna radome

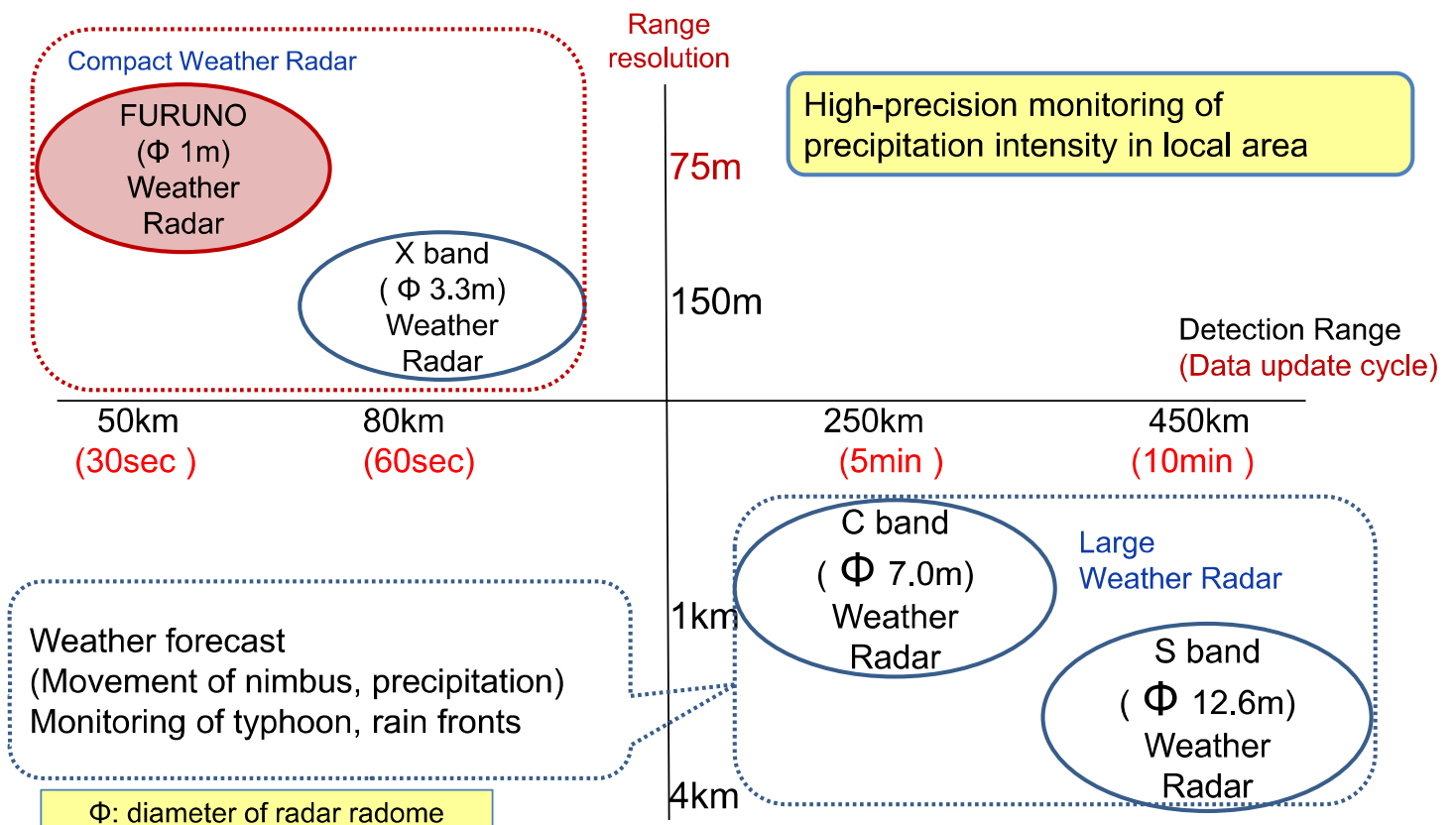


Signal Processing Unit



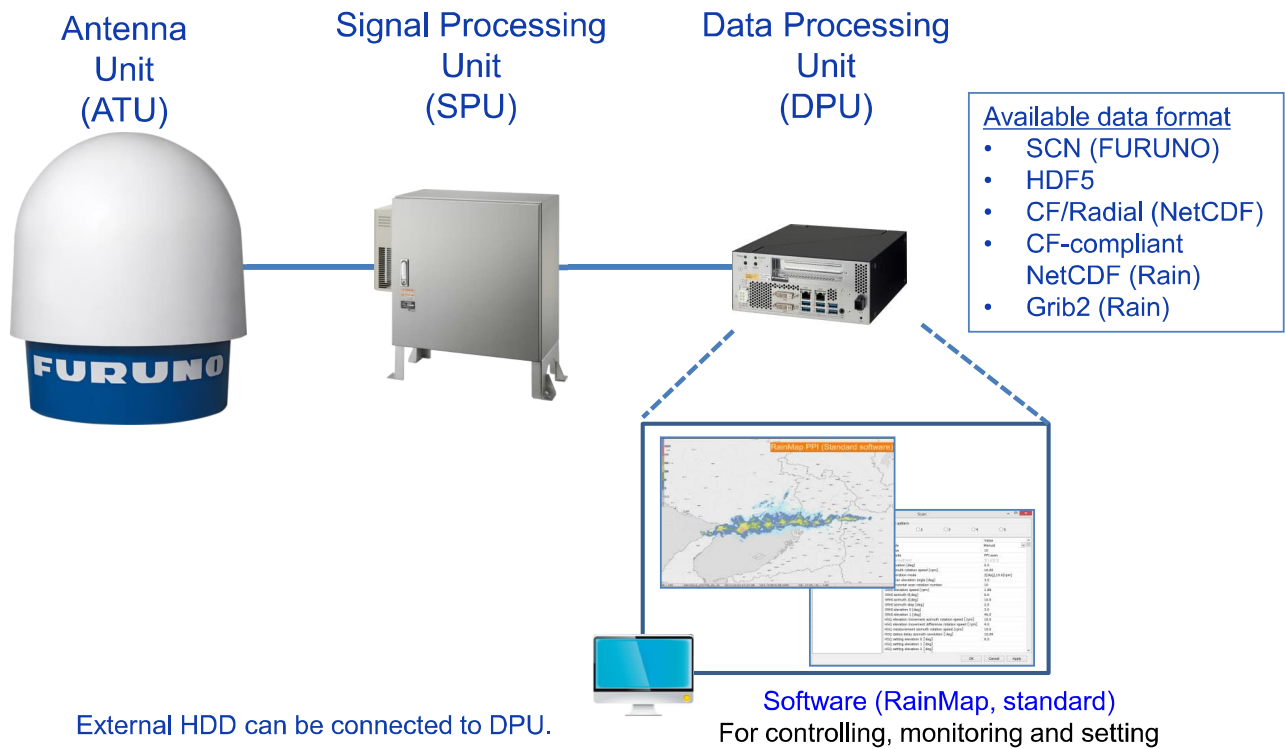
Typical C-band radar

Comparison conventional radar & FURUNO **FURUNO**



Standard Configurations (WR2120)

FURUNO

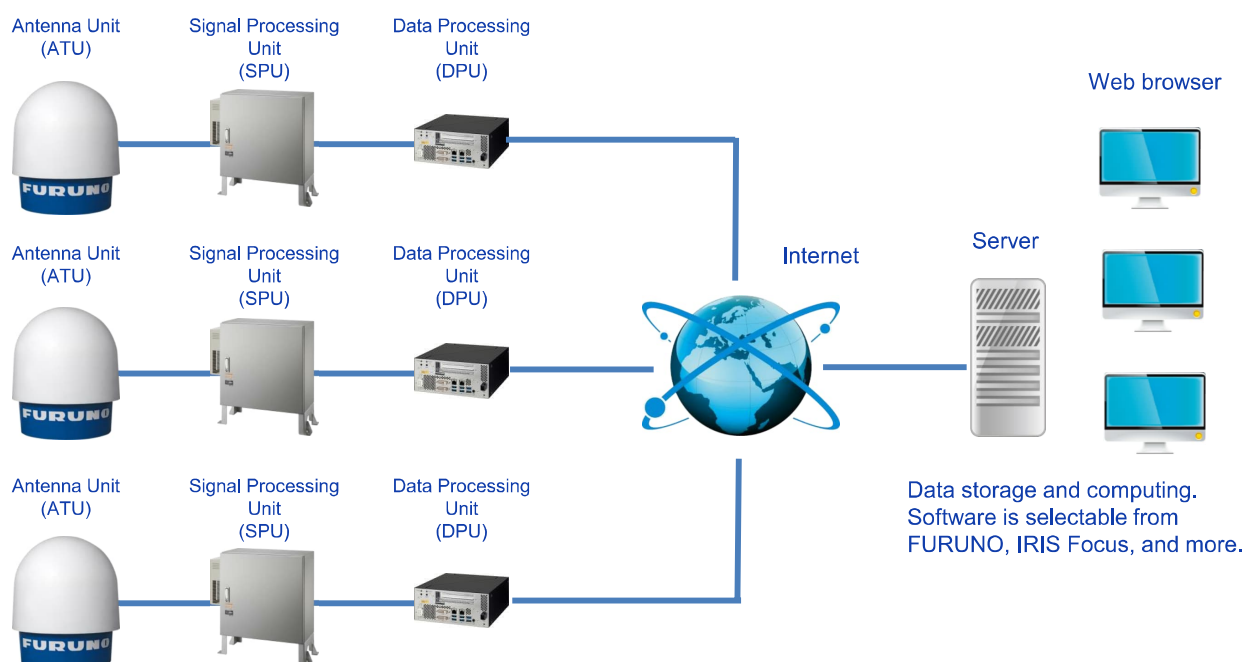


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Multiple-radar Configurations (WR2120)

FURUNO



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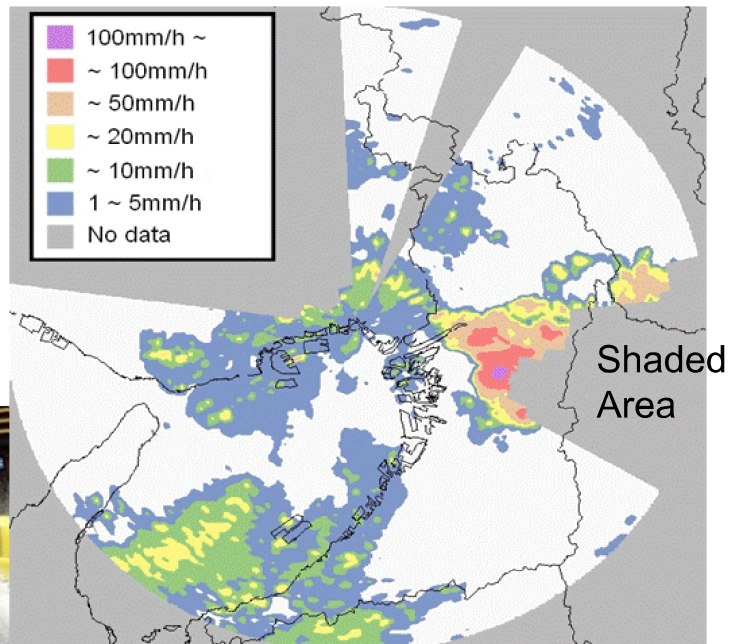
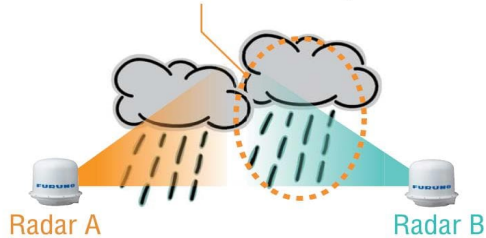
5

Heavy rain will block transmitted signals behind the area.

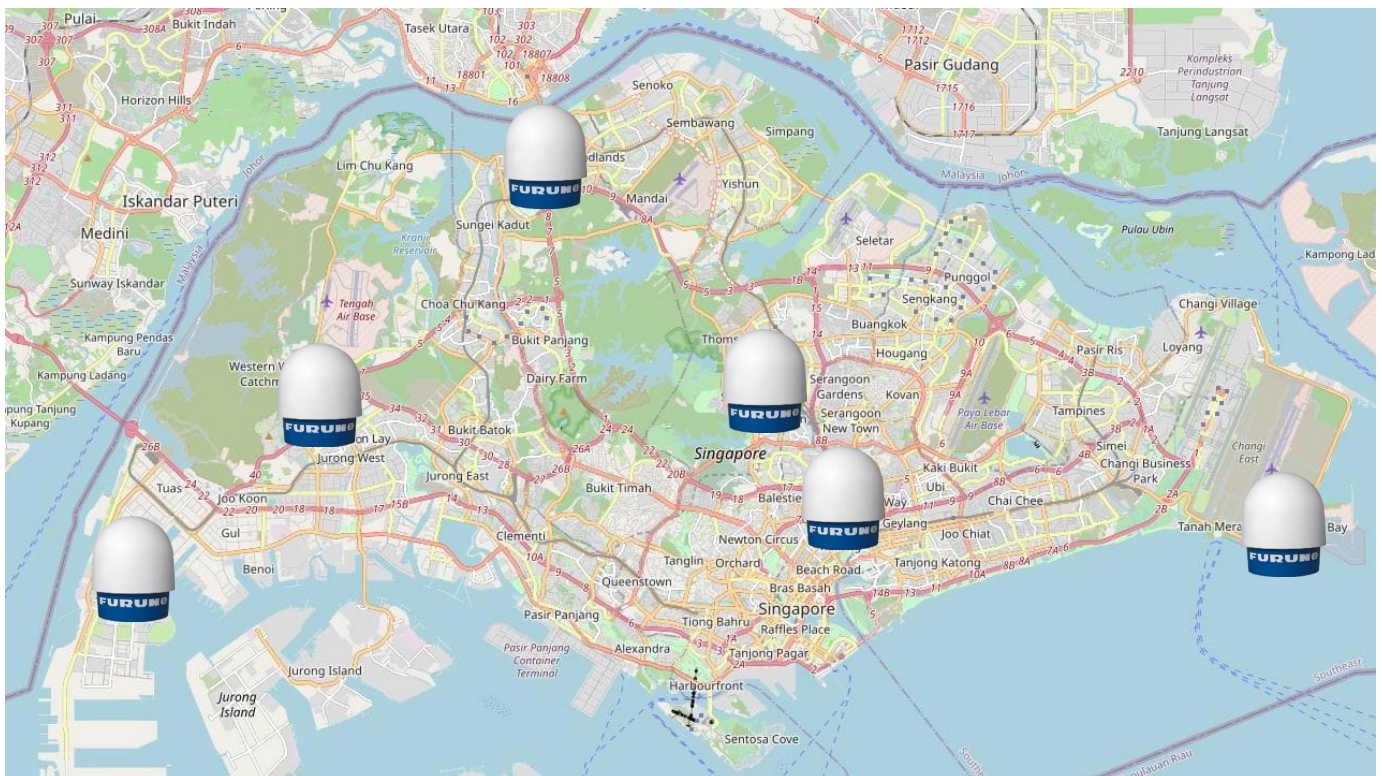
→Need other radars to cover the blind area

Blind area of Radar A

Signal power attenuation due to heavy rain
(Radar B covers the blind area)



Usage example in Singapore





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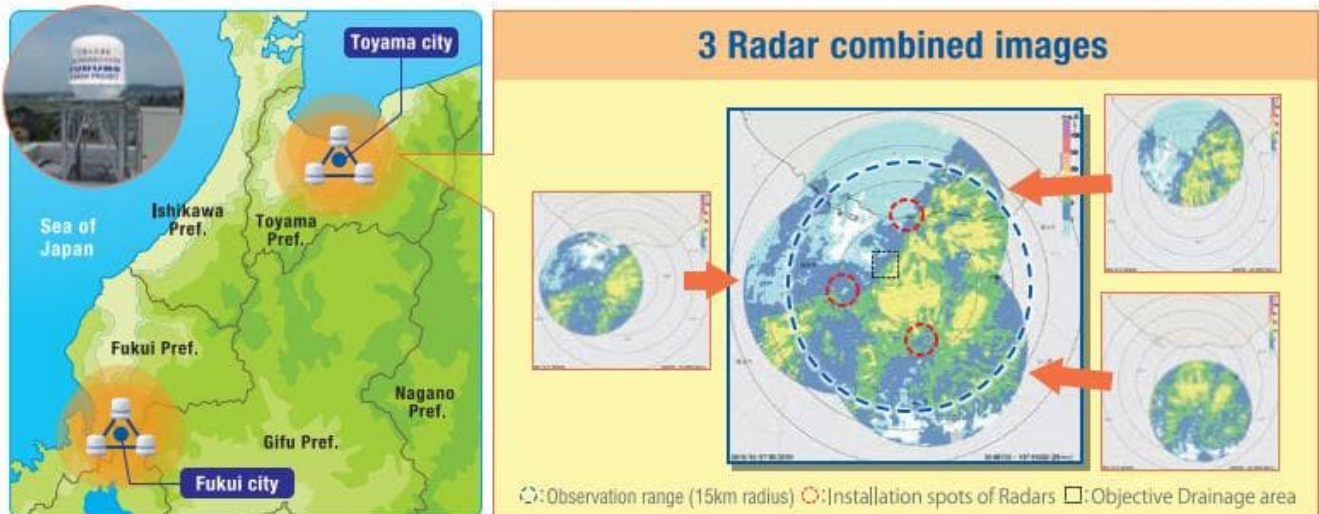
Ref: Public Utilities Board (PUB)
<https://www.pub.gov.sg/news/FeaturedStories/07022001>

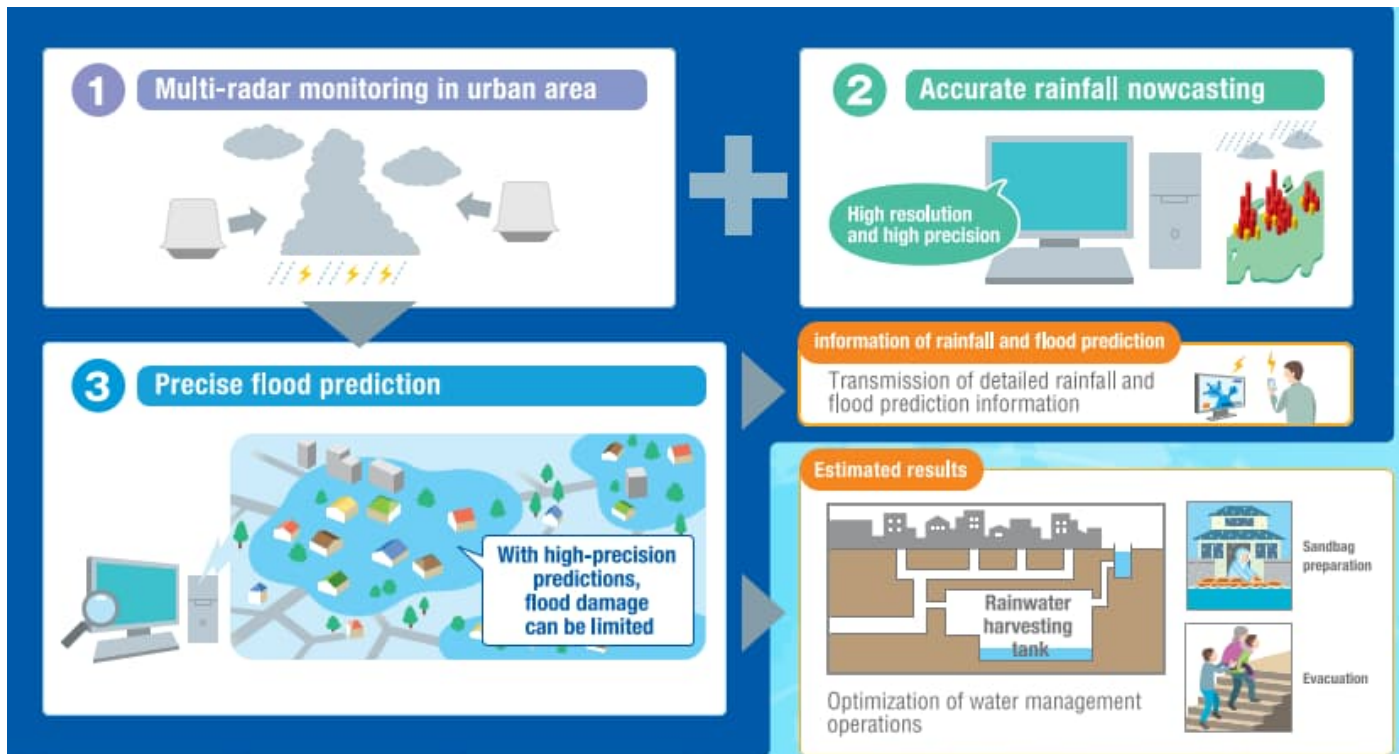
8

Usage example in Japan

FURUNO's Multi-radar system

- In the Japanese cities of Fukui and Toyama, set of 3 Radars have been installed

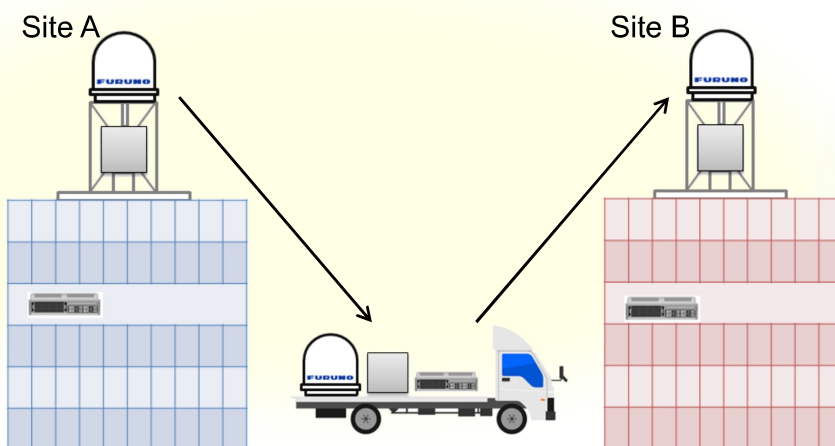




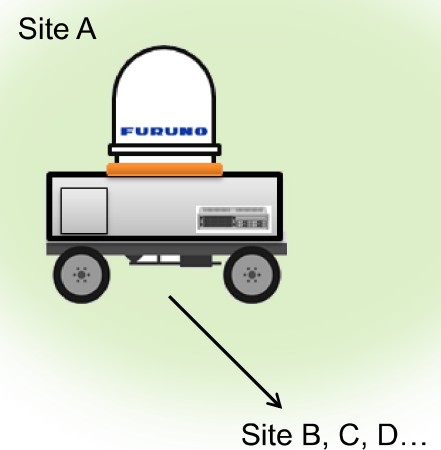
Transportability

- ◆ Ruggedized design
- ◆ Quick release cable
- ◆ Isolation vibrator (for ATU and SPU)
 - Meets MIL-STD-810G Test Method 514.7 ANNEX C Category 4 Secured Cargo, Common carrier (US highway truck vibration exposure) Test1
- ◆ Case for transportation (for ATU and SPU)

Relocation



Transportable platform



DANA

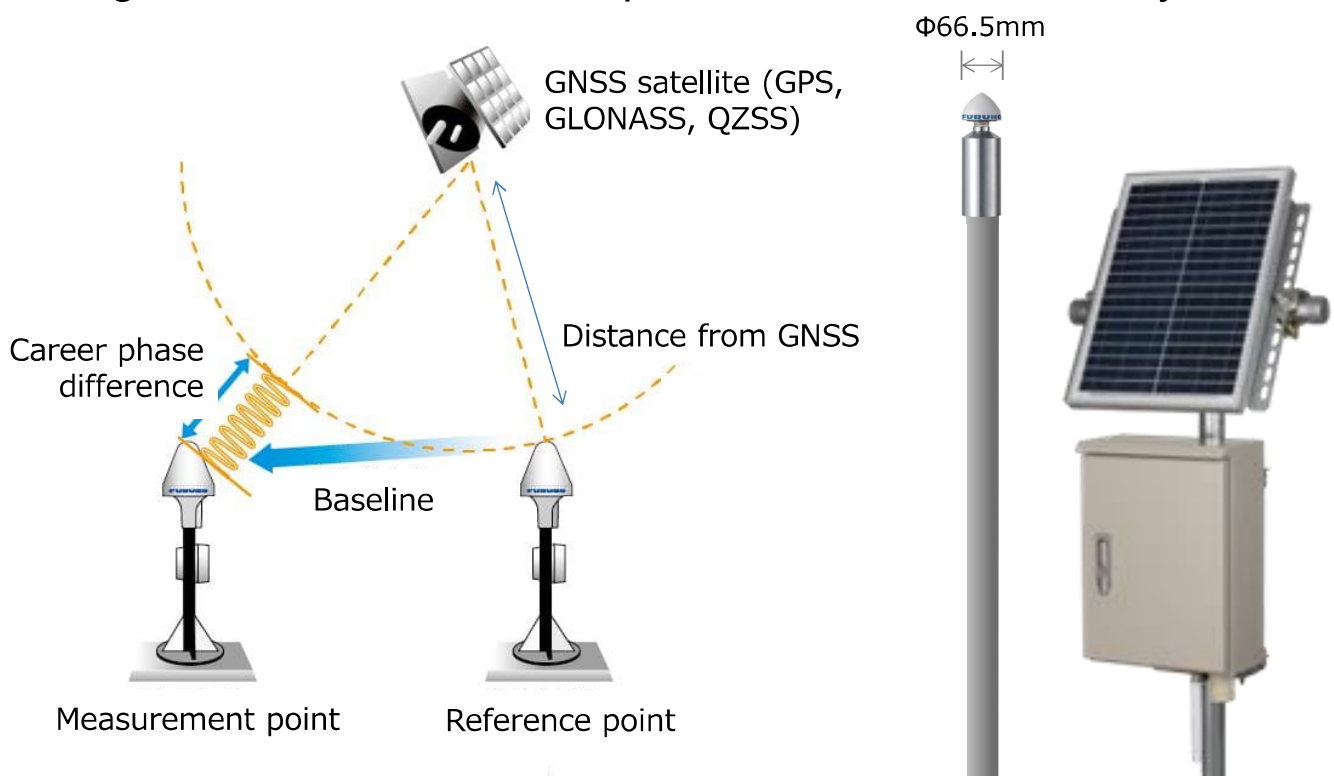
GNSS Automatic Displacement Measurement System

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What is DANA?

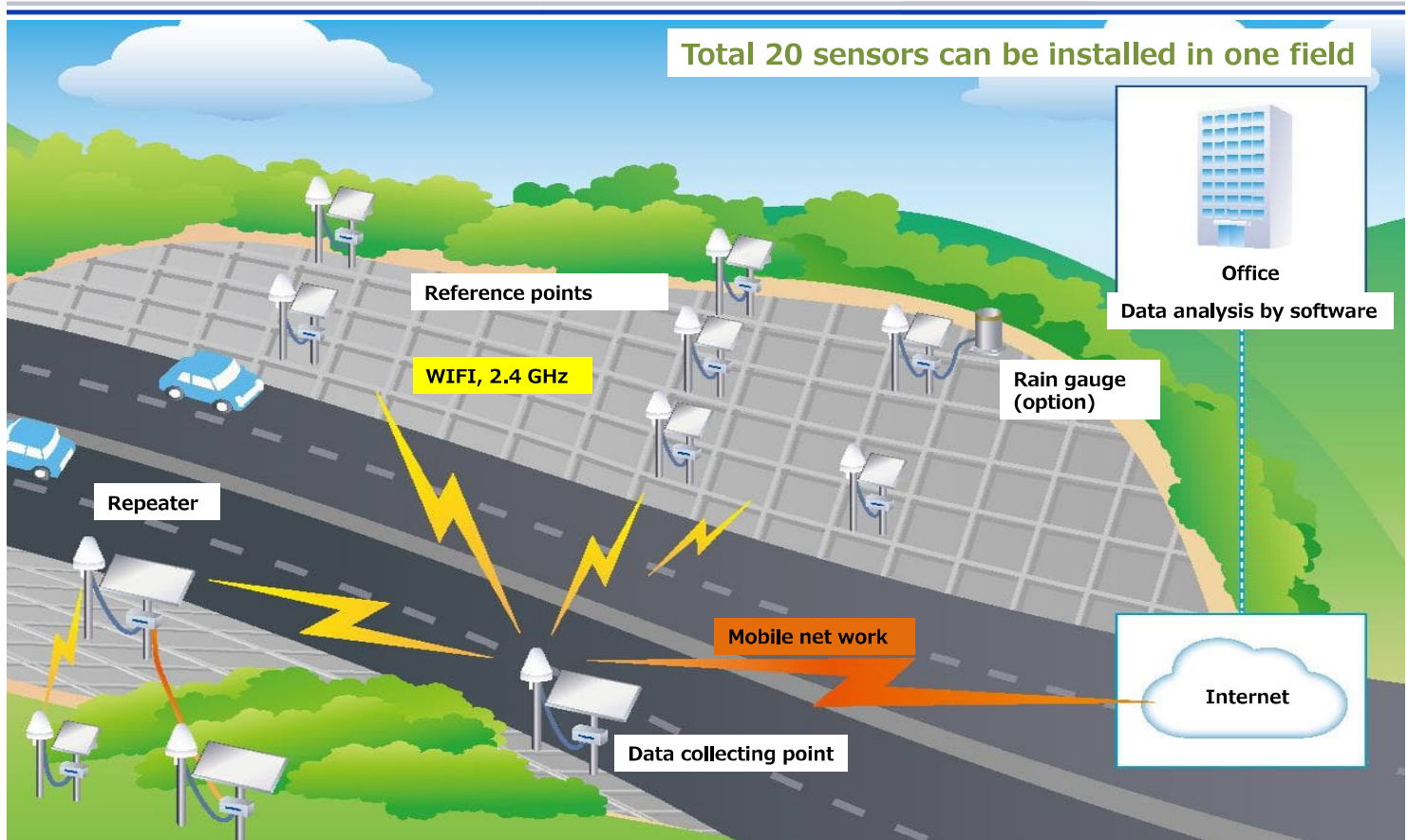
FURUNO

3D ground and structures displacement measurement system



System overview

FURUNO

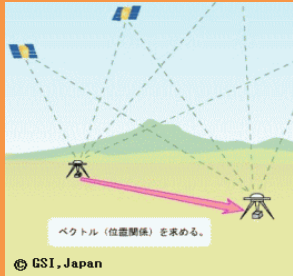


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Comparison Traditional method and Furuno

FURUNO

Method	GNSS sensor	Analog method	Total station
			
Observation range	Wide area with GNSS signal	Narrow / Pinpoint area *Predicted collapse area should be identified in advance	Narrow area
Data type	•3D data •Static data (Data processing is needed after data collection)	•1D or 2D data	•3D data
Operation	•24/7 operation in any weather condition •Data transmission by wireless network •Automatic data collection	•24/7 operation in any weather condition.	•Data is available only when visiting site with equipment. •Bad weather condition such as rainfall, fog is not allowed.
Maintenance	•Less maintenance / No calibration	•Maintenance & Calibration are mandatory	•Maintenance & Calibration are mandatory

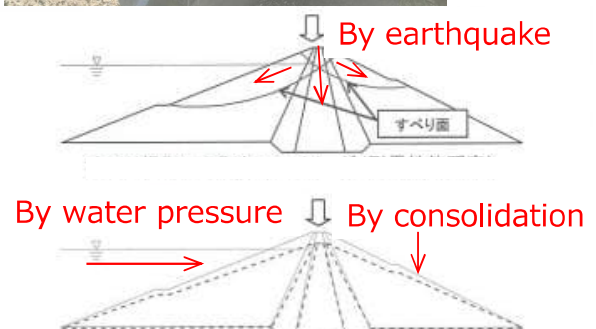
Surface Extensometer (solexperts.com)
 High Reliability and High Quality - Daedong Instruments Co., Ltd. [GEOGAGE]
<http://www.sizkk-net.or.jp>

5

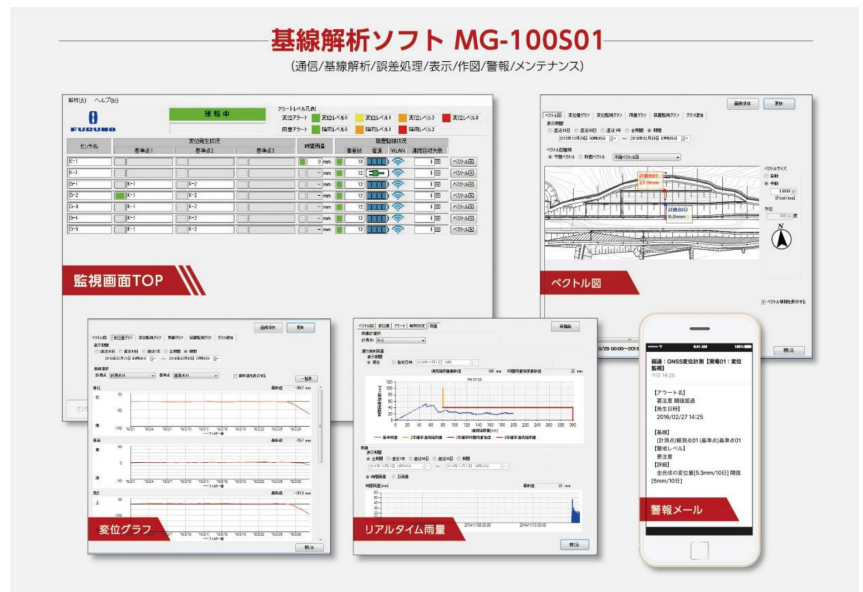
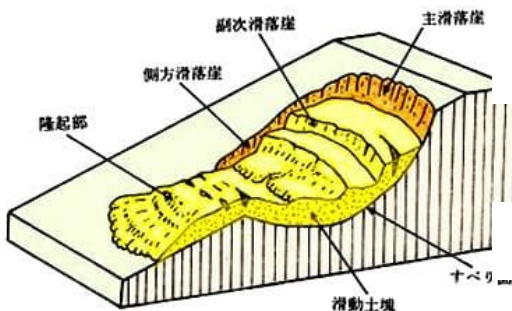
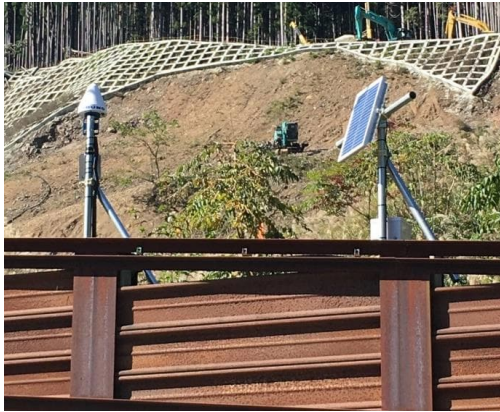


16

Dam / Usage example in Japan



17



SMALL WONDER

Contact:

E-mail: wr-business@furuno.co.jp

Phone: +81 (0)798 63 1270

Web:

[FURUNO's meteorological monitoring and analysing system | System Solution | FURUNO](#)

[GNSS Automatic Displacement Measurement System | System Solution | FURUNO](#)



Digital Farming Makes Agriculture Sustainable

Private Sector Contribution to Climate Change
Adaptation in Thailand”

29 November 2021



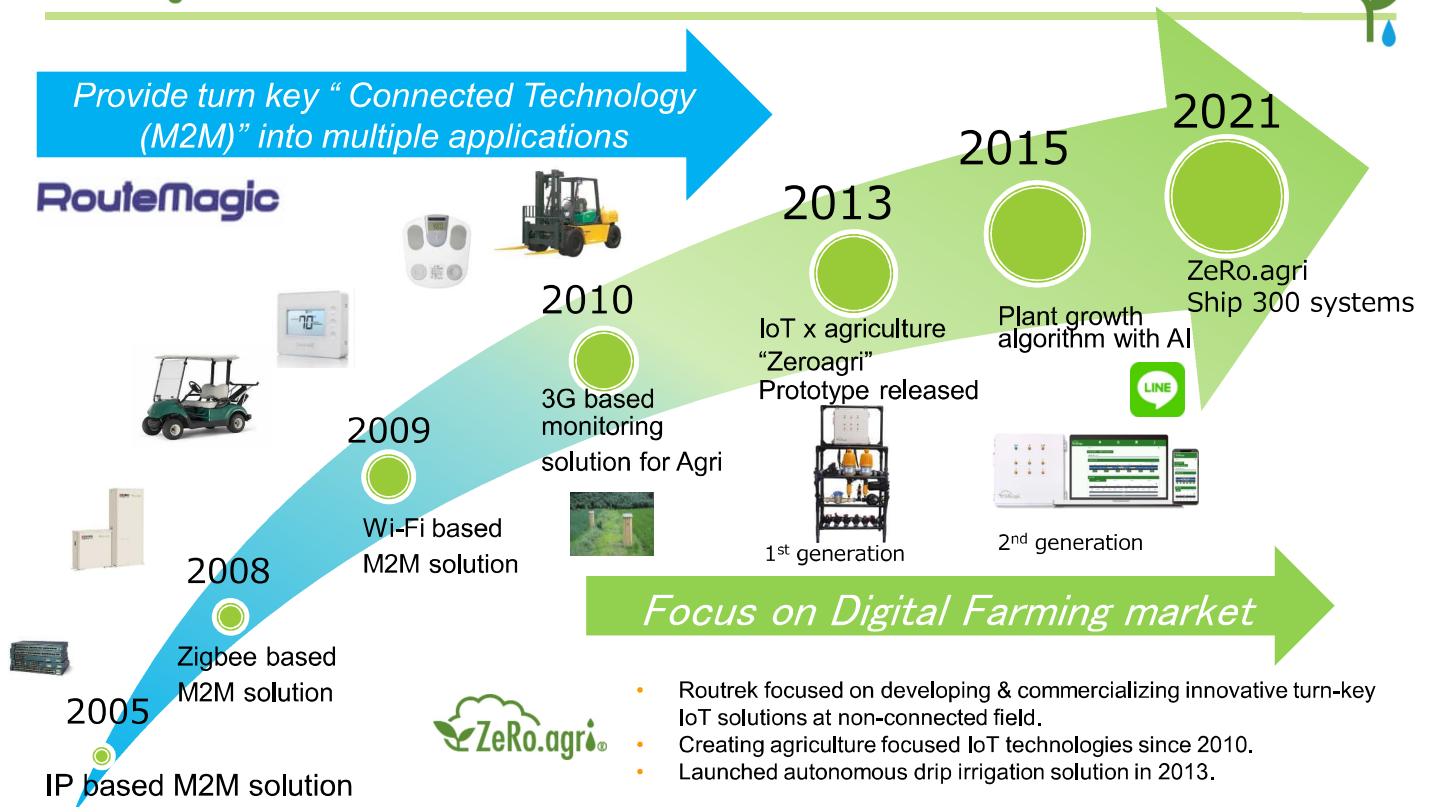
Routrek Networks, Inc.
Leader in connected technology



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Start M2M technology, and focusing Digital farming field with our unique IoT & AI technology since 2015



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Many awards won in the area of innovative start up in Japan



"IoT Acceleration Lab Award
the 2nd place Grand Prix
Ministry of Economy, Trade
and Industry of Japan

"Innovation Award"
Ministry of Internal Affairs and
Communications



"Japan venture Grand Prize"
Agriculture sector

Certified J-Start up
By Ministry of Economy,
Trade and Industry of
Japan

"JEITA venture award"
Japan Electronics and
Information Technology
Industries Association

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2

Turning point of farming to data-driven from age-old experienced farming to avoid food insecurity



Domestic issues:

- Aging and decreasing farming population
- Low productivities of young new farmer
- Price competitiveness with imported crop
- Adaptation of environmental problem

Asian issues:

- Increasing food demand by population grows
- Water shortage (39% shortage in 2030)
- Environment pollution by chemical fertilizer
- Low productivities of cultivating technology



New farming support



Expand cultivation scale



Better quality

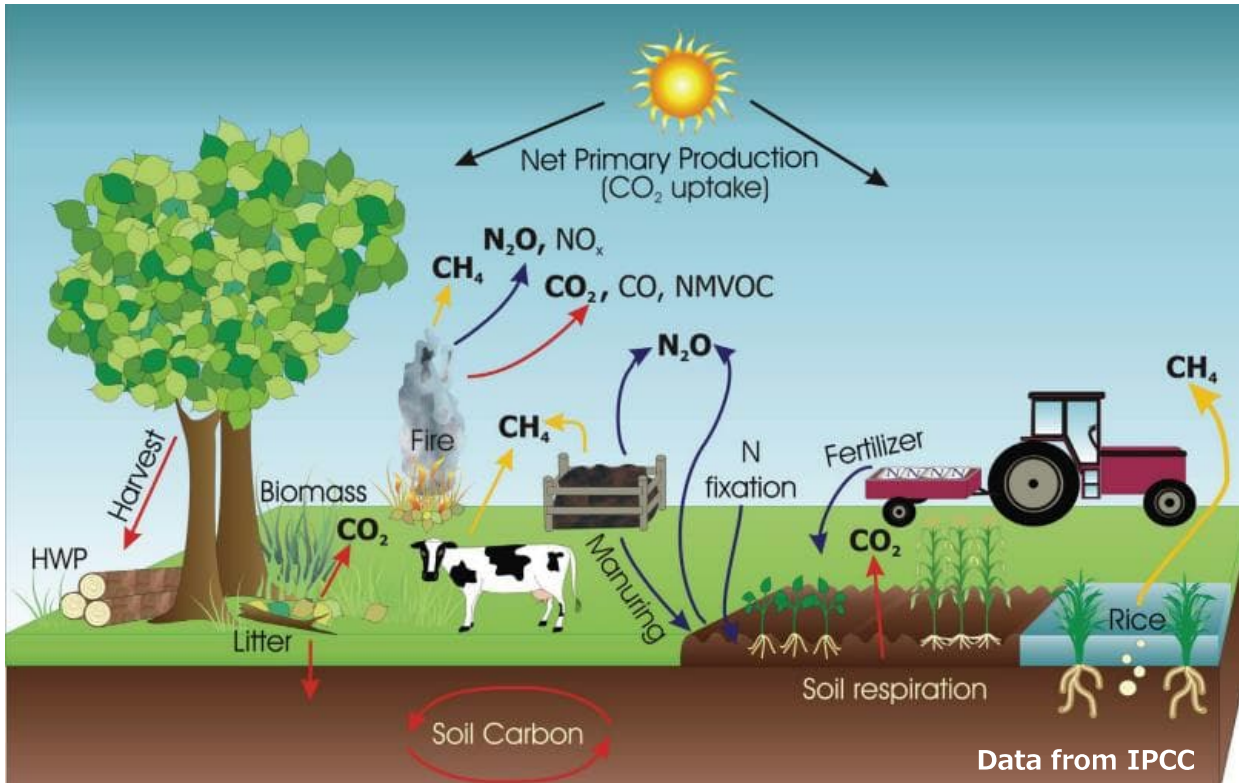


Higher Yield



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3



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4



Patented technology at USA, Israel and Japan, and patent pending at other countries

ZeRo.agri is;

- The remote fertigation (irrigation & fertilizer) control system for soil & soilless environment at green house
- Integrated unique IoT and AI technologies by joint research with Routrek Networks, Meiji University and Netafim.

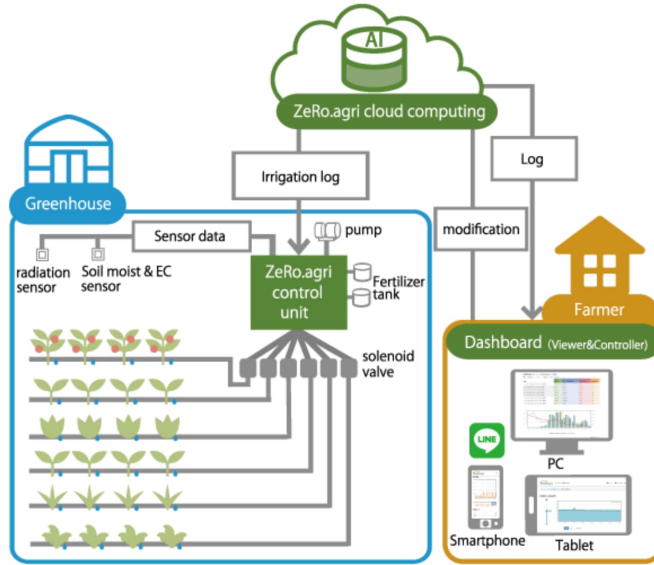


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5

ZeRo.agri system overview

How to determine amount of soil moisture and fertilizer



Autonomous algorithm with IoT/AI based computing system

- 1st: Monitoring and solar & soil moisture/EC via IOT sensors
- 2nd: Calculating and predicting value of moisture and fertilizer inside soil
- 3rd: Dynamically controlling water and fertilizer valve for dripping tube
- 4th: Able to adjust soil moisture and fertilize simply with a farmer's experience

300 units of 20kinds of fruit vegetables in 40 prefecture at green house in Japan



ASPARAGUS



EGGPLANT



CUCUMBER



Hokkaido
melon

Aomori
tomato

Yamagata
melon

Gunma
tomato
mini-tomato

Okayama
strawberry

Yamaguchi
tomato

Hiroshima
cucumber
tomato

Kumamoto
Tomato
Melon

Okinawa
eggplant
Bell
pepper
Goya
Spinach

Saga
cucumber
tomato

Tokushima
cucumber

Nara
melon
watermelon

Miyazaki
bell pepper

Kochi
tomato

Ibaraki
strawberry

Saitama
tomato

Kanagawa
tomato
cucumber
eggplant

Fukuoka
tomato
asparagus
strawberry
balloon flower
bell pepper



TOMATO



STRAWBERRY



GREEN PEPPER



<Grower Information>

Prefecture Aizu wakamatsu,
Fukushima prefecture

Cultivated Crop Big Ball Tomato

Type of Cultivation May~October

Area under Cultivation 17a (1700m²)

Farming history 10years

Effect on Increase Productivity

Effects

Before 12.4 t/10a ▶ After ZeRo.agri 13.7 t/10a **10.4% increase**

Quality Effect

Region average 33% ▶ ZeRo.agri 60% **27Point increase**
Grade A Grade A

Sales Total

35% increase

Reason

Better quality with almost same yield



<Grower Information>

Prefecture Yatusiro, Kumamoto prefecture

Cultivated Crop Big Ball Tomato

Type of Cultivation August~June

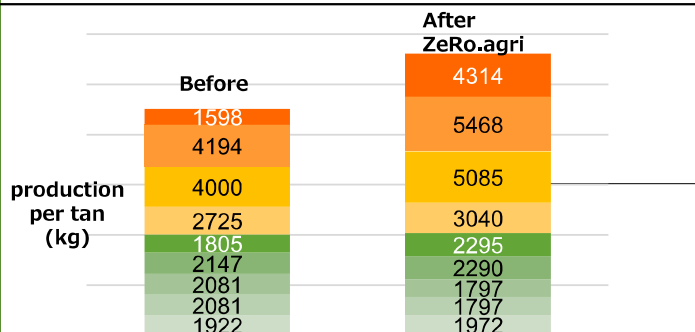
Area under Cultivation 170a (1.7ha)

Farming history 7years

Effect on Increase Productivity

Effects

Traditionally 22,553 kg ▶ ZeRo.agri 28,058 kg **24% increase**



Reason

Measuring and controlling collectry moisture and EC by ZeRo.agri



<Grower Information>

Prefecture	Yastusiro, Kumamoto prefecture
Cultivated Crop	Big Ball Tomato
Type of Cultivation	August~June
Area under Cultivation	40a (4000m ²)
Farming history	10years

Effect of saving time

Traditionally
7
hour/week



ZeRo.agri
0.5
hour/week

90%
decrease

Cultivation scale

Before
40a
4000m²

After
ZeRo.agri
70a
7000m²

75%
increase

Reason

Able to expand cultivation scale because of decrease irrigation time

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10

Feasibility survey and system demonstration at Dalat Japan International Cooperation Agency (JICA) project in 2017



- Prototyping project to prove the effectiveness of ZeRo.agri algorithm in Vietnam for local soil and crops.
- Dalat Highlands has a concentration of high yield crops such as fruits and flowers using greenhouses.



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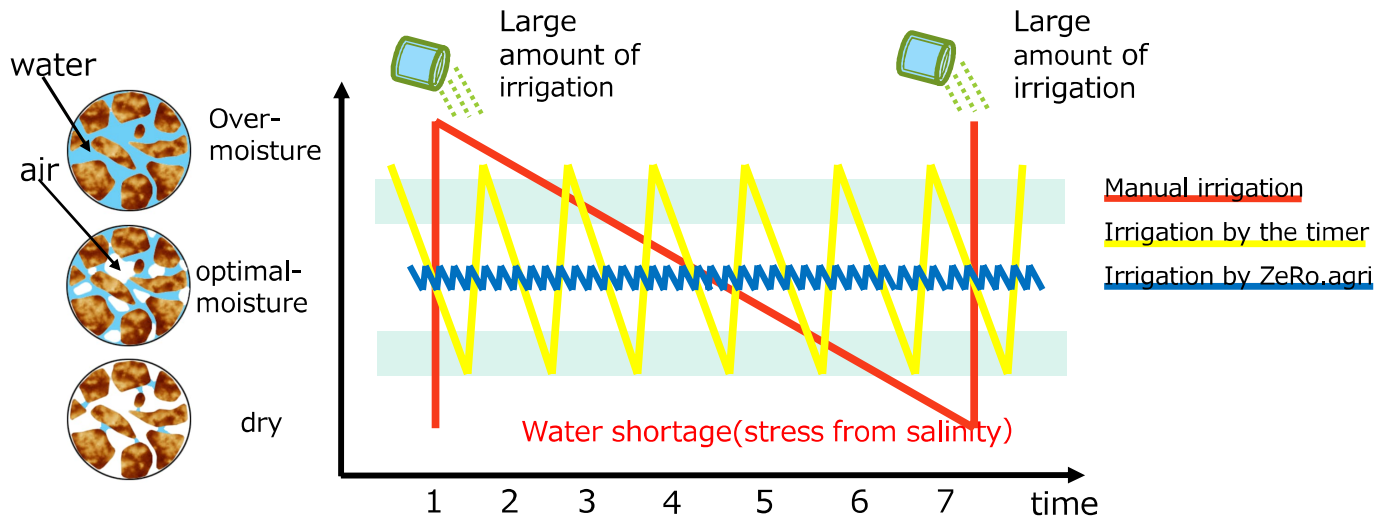
11

【Key function of autonomous irrigation control】

Realize a high accuracy "irrigation" which difficulty by hand



Small amount and high frequency drip irrigation and fertilizer makes maximize of potential of crop

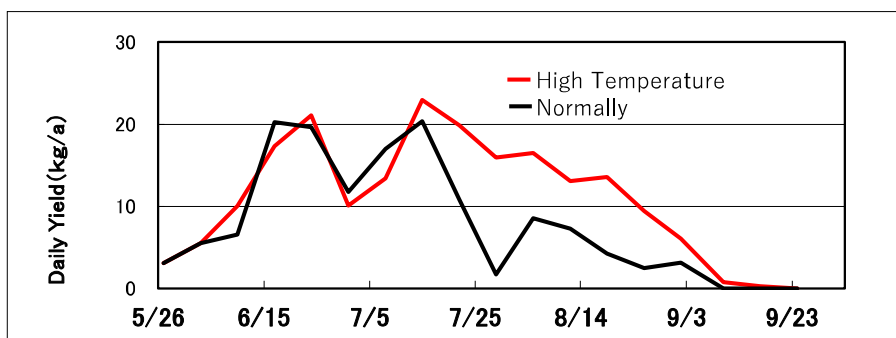


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12

【Key function for climate change】

Autonomous adjustment of liquid fertilizer concentration as temperature change



**Result 40%
increase yield**

time (hour)	8	9	10	11	12	13	14	15	16	17	18	19
Liquid fertilizer supply	Normal concentration			Low concentration			Recovery concentration					

Using the nature that "High concentrated liquid fertilizer is difficult for root to absorb" ZeRo.agri enable automatically control concentration of liquid fertilizer, supply low concentration when temperature is extremely high and let the root absorb enough water, and then supply high concentration when the temperature is low
⇒ Cultivate during extremely hot days, prevent crop from water shortage

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13



Problem of Agriculture

Mission

Market Value

Profitability

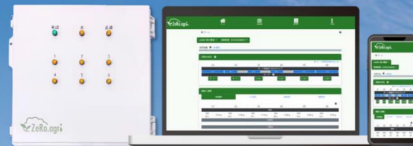
Climate change

Water shortage

Soil environment

Carbon Neutrality

Technology makes agriculture sustainable



**+20%
Income**

**-50%
Amount of
water/fertilizer**

**-90%
Irrigation time**

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14

Contributing SDG's in the area of water, climate change, pollution of fertilizer and out of poverty



SUSTAINABLE DEVELOPMENT GOALS



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15

Contributing to the sustainable life for next generation of children with technology

Routrek Networks

Digital Farming makes Agriculture Sustainable



<https://www.japan.go.jp/technology/innovation/digitalfarming.html>

CTCN

CTCN's support mechanism

Clara Landeiro

CTCN Regional Manager, Asia-Pacific

Workshop "Private Sector Contribution to Climate Change Adaptation in Thailand", 29 November 2021

CTCN

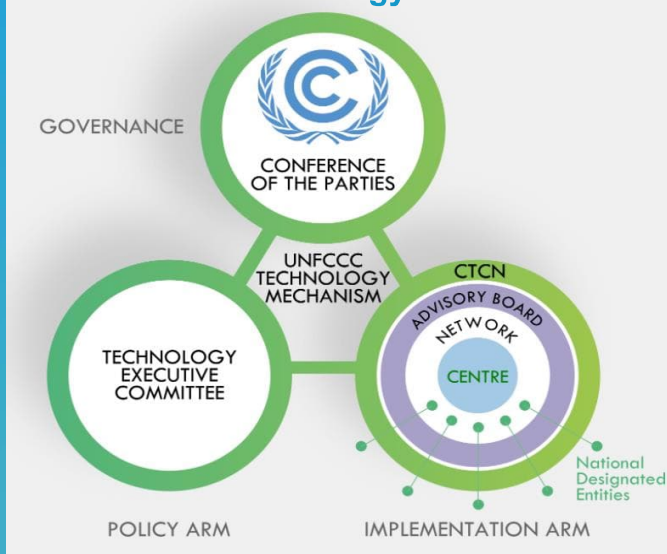
UNFCCC Climate Technology Centre & Network

UN environment
programme

UNFCCC

UNIDO

UNFCCC Technology Mechanism



mission..

to promote the accelerated development and transfer of climate technologies for energy-efficient, low-carbon and climate-resilient development, at the request of developing countries



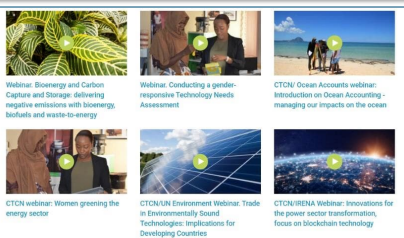
Innovation, Collaboration, Networking, Capacity Building & Knowledge Sharing



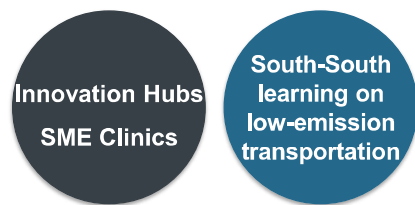
CTCN Regional Forum for NDEs



Webinars



Capacity building initiatives



Matchmaking events

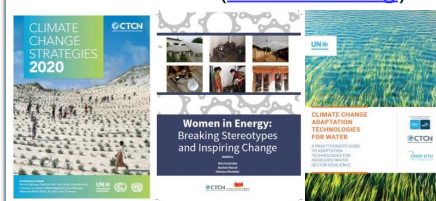


Newsletter / Bulletin / Website



Publications

CTCN website (www.ctc-n.org)



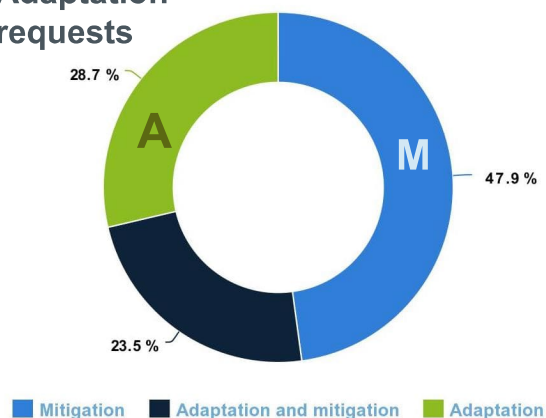
Countries Receiving Technical Assistance



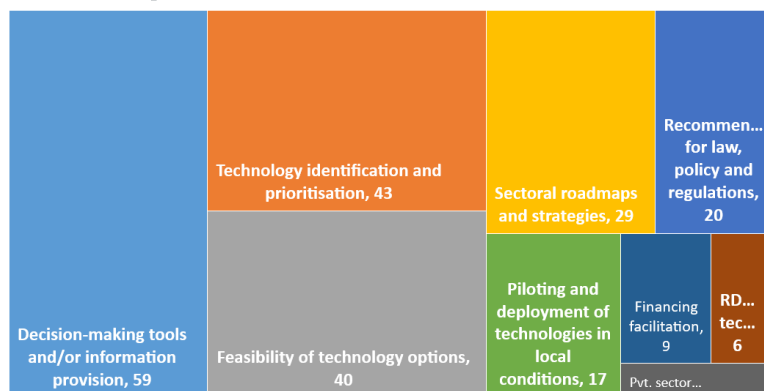
CTCN Technical assistance portfolio

Demand from developing countries..

Mitigation/ Adaptation requests



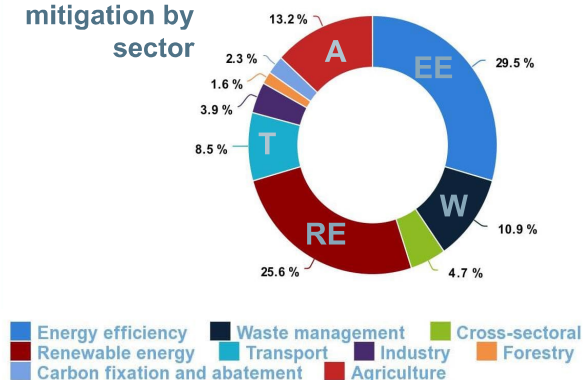
Type of TA requests



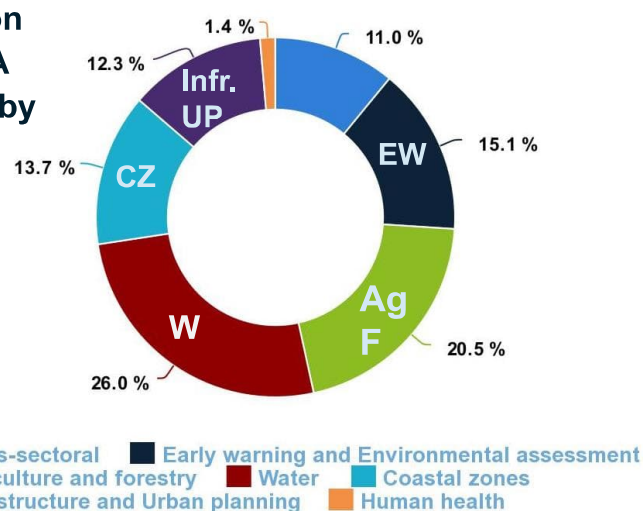
CTCN Technical assistance portfolio

Demand from developing countries..

TA requests related to mitigation by sector



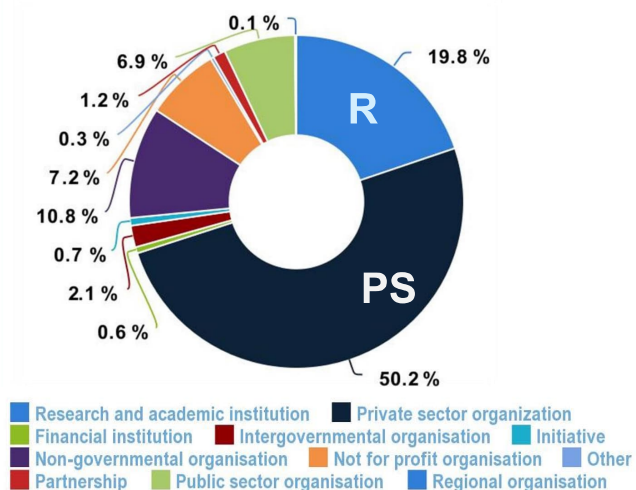
Adaptation related TA requests by Sector



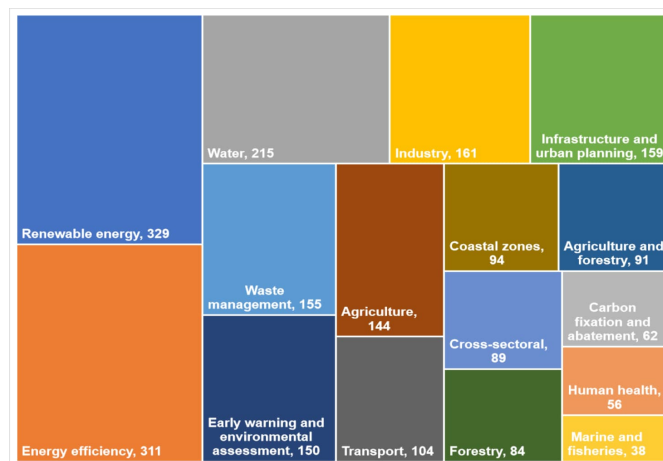
CTCN Network Members

650

Technology companies and organisations work with the CTCN (as of Sep 2021)



a wide range of expertise



Accessing CTCN Technical Assistance (TA)



Interested parties in developing countries contact their national focal point (National Designated Entity, NDE) to **request TA**.

The **NDE confirms the alignment** of the request with its national climate priorities and passes it along to the CTCN.

The CTCN collaborates with the NDE and applicants to develop a **tailored technology transfer plan**.

The Climate Technology Centre **selects a Network Member** to implement the technology solution.

Submission of
TA request

Appraisal of TA
request

Development of
TA response plan

Implementation of
TA response plan

Up to USD 250,000

Up to 12 months

Accessing CTCN TA: *other opportunities*



CTCN/UNEP **AFCIA** - Adaptation Fund Climate Innovation Accelerator



ADAPTATION FUND

- **Objective:** Support developing countries to test, evaluate, rollout and scale up innovative adaptation practices, products and technologies
- **5-yr Budget:** USD 5 million (AF) + USD 1 million (CTCN)
- **Knowledge sharing**
- **Implementation: 25 TA projects**
(up to USD 250,000 each; up to 18 months)
- **Who can apply?** Governments, NGOs, Private Sector, and other groups from developing countries without direct access to AF funds (eg Thailand)
- **Need endorsement:** NDE and AF Designated Authority
- **PP cannot be the implementer** (IP: CTCN Network Member)

What is UNEP-CTCN AFCIA looking for in applications?

- Propose to test or scale up innovative climate technologies in their specific contexts
- Contribute to national adaptation priorities (NDC/NAP)
- Well-defined problem, clearly linked to CC
- Potential for replication/ scale-up
- Potential to leverage additional support

Access directly AFCIA via the link:

<https://www.ctc-n.org/afcia>

3rd Call for applications : Q1 2022

Accessing CTCN TA: *other opportunities*



PRO BONO CTCN TA



CTCN TA Pro bono portfolios from Japan and Korea

Engagement of Japan with CTCN

- **Support of CTCN operations**, including TA (Japan is the 2nd largest donor country of CTCN)
- **Pro bono support** (Ministry of Economy, Trade and Industry, METI)
 - Benchmarking Energy & GHGs Intensity in Metal Industry of Thailand (Feb 2017 - Jun 2018)
 - Technical Capability Enhancement to Promote Waste-to-Energy Technology in Vietnam (Aug 2021-..)
- **Japanese Network Members** participate as **implementers** of CTCN TA
 - E.g. Ocean energy technical pre-feasibility study (Nauru) - OECC
- **Japanese Network Members** contribute to **information sharing** on climate technologies via the CTCN knowledge platform

Network Members in Japan



CTCN Pro-bono supported Technical Assistance

Pro Bono Support from Japan

- **Benchmarking Energy & GHGs Intensity in Metal Industry of Thailand**

-Completed (Feb 2017 to June 2018)

Conducted baseline of energy consumption and GHG emissions for Iron and Steel industry in Thailand.
Developed a list of low carbon measures and supporting financing options for steel industry with appropriate manuals for capacity building.



- **Technical Capability Enhancement to Promote Waste-to-Energy technology in Viet Nam** – under implementation since Aug 2021

The TA aims to enhance the relevant stakeholder capacities to establish the Waste to Energy Technology assessment criteria to promote appropriate waste management practices in Viet Nam. National Standards on Waste to Energy will be developed.

11

CTCN leveraging impacts through Technical Assistance

- **City Climate Vulnerability Assessment and Identification of Ecosystem-based Adaptation Intervention in Laos** (2017-2018)

Identified the vulnerability of people and ecosystems in each of the six cities and identified the overall costing of EbA interventions that would be required to respond for reducing climate risks.

Leveraged USD 11.5 million (GCF grant + Gov Laos in-kind)



- TA/FTA were the 1st step for a national scale assessment and mapping of climate change vulnerability

6 VAs (2017) → 145 VAs (2021) *The National Vulnerability Assessment Report was endorsed by MONRE in 2021 and is being distributed to all relevant sectors*

- They built the foundation for work in other sectors (e.g. GEF proposals IWRM, C. Finance)

GEF proposals being finalized on Integrated Water Resource Management and Ecosystem-based Adaptation in the Xe Bang Hieng river basin and Luang Prabang city, and on Piloting innovative financing for medium-sized cities (the CTCN GEF challenge program)

- They were instrumental in leveraging financing to implement adaptation measures

\$ 270 K → \$11.5 Million *GCF project to build resilience in 4 city populations with ecosystem-based solutions.*

>> CTCN support has been catalytic, transformational, and has helped leverage larger financing

Explore opportunities..

Contact us..



► Contact Thailand NDE with your ideas for potential TA requests/support..

Consider leveraging CTCN support (regular TA, FTA, Pro bono TA, GCF Readiness, special programs) to support technology needs for NAP / NDC implementation

► Do not miss the opportunity to tap into AFCIA support to innovative adaptation technologies.. 3rd call in Q1 2022 <https://www.ctc-n.org/afcia>

► Find out more: Climate technology knowledge portal <https://www.ctc-n.org>

The website hosts nearly 17,000 publications, case studies, tools and webinars on climate change adaptation and mitigation, women and gender, etc.

Technology Sectors

Sectors

Adaptation



Agriculture and forestry



Coastal zones



Early warning and environmental assessment



Water

Recorded webinars



CTCN Virtual Regional Meetings: Forum for Annex I NDEs (video)



Highlights from the UNFCCC Technology Mechanism event: Together we can recover better (video)



CTCN Virtual Regional Meetings: Forum for the NDEs in Pacific (video)



Thank you

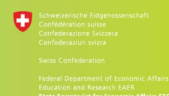
Email: h.chon@unido.org

CTCN Secretariat
UN City, Marmorvej 51
DK-2100 Copenhagen, Denmark
www.ctc-n.org
ctcn@un.org

UNFCCC_CTCN

UNFCCC.CTCN

Supported by



Introduction of Thai's experience in CTCN projects

Dr.Surachai Sathitkunarat

Thailand NDE Focal Point

Assistant to the President, Office of National Higher Education, Science, Research and Innovation Policy Council (NXPO)

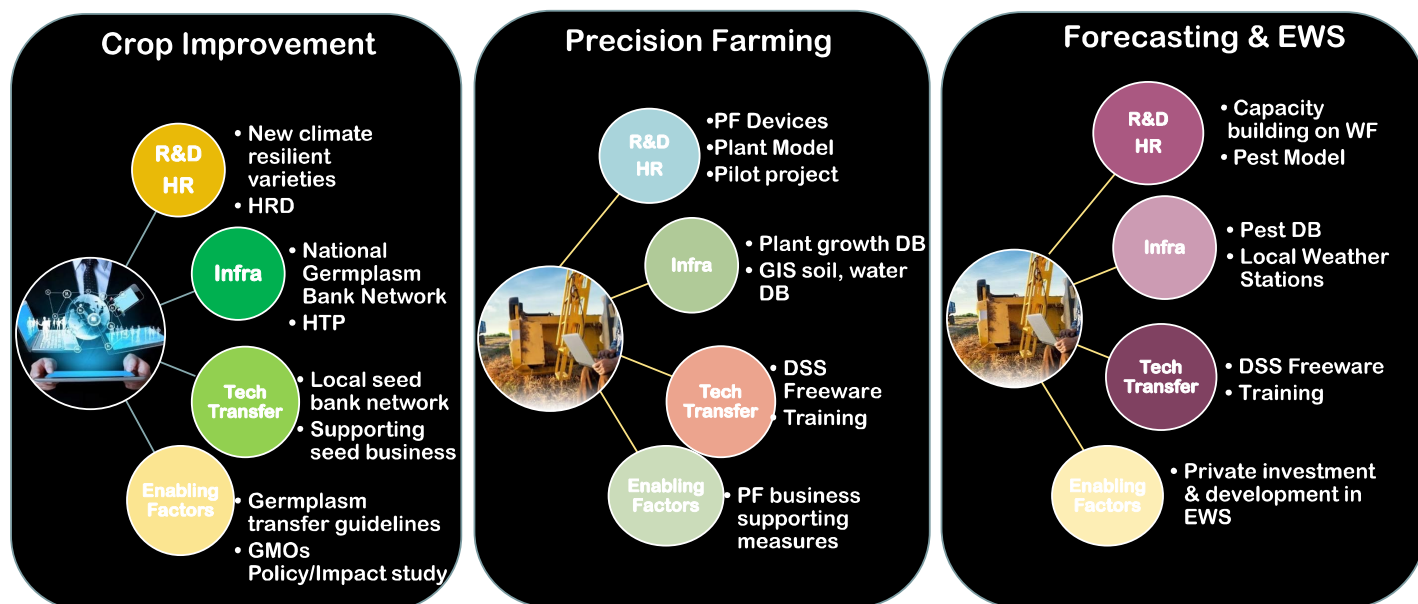
Staff to the Minister of Higher Education, Science, Research and Innovation

Workshop on Private Sector Contribution to Climate Change Adaptation in Thailand, 29 Nov 2021

Technology Needs Assessment (TNA)



Technology Action Plan (TAP) : Agriculture



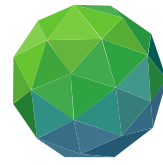
CTCN Technology Assistance to Thailand

MITIGATION

No	Title	Project Proponents	Sectors	Implementer	Implementation Phase
1	Fostering Green Buildings in Thailand Towards Low Carbon Society Enabling readiness for up scaling investments in Building Energy Efficiency for achieving NDC goals in Thailand (GCF Readiness)	King Mongkut's University of Technology Thonburi (KMUTT)	Building, Energy efficiency	- NREL - GIZ - IIEC (GCF Readiness)	Completed Work in progress
2	Benchmarking Energy & GHGs Intensity in Metal Industry of Thailand	Iron and Steel Institute of Thailand (ISIT)	Industry	NEDO (Pro Bono)	Completed
3	Assessment of energy efficient street lighting technologies and financing models for Thai municipalities	Provincial Electricity Authority of Thailand (PEA)	Energy use	TERI	Completed

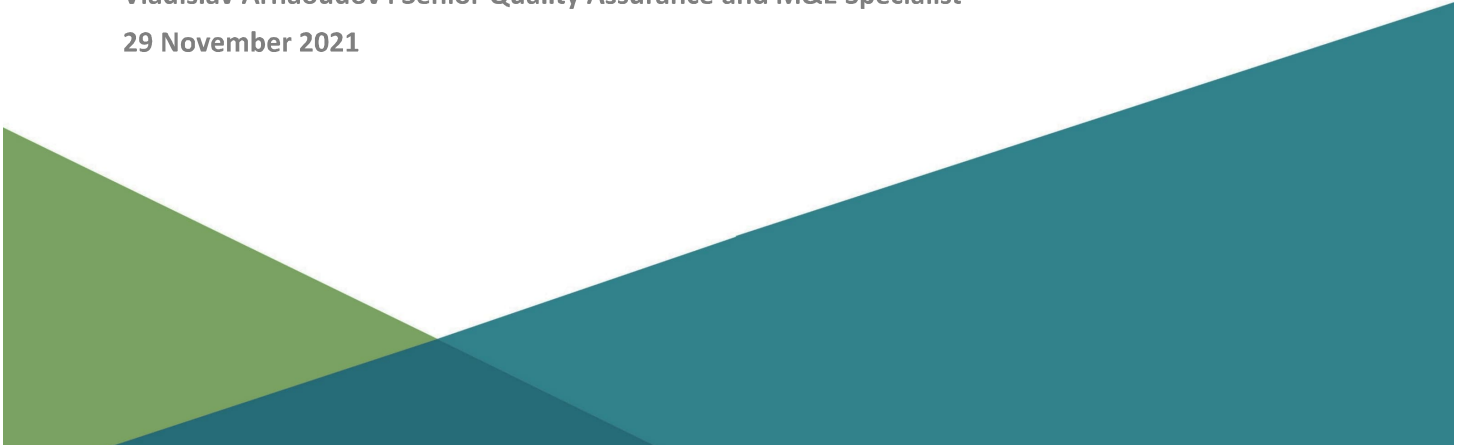
No	Title	Project Proponents	Sectors	Implementer	Implementation Phase
1	Capacity Building on Technology Development for Efficient Use of Resources in Agriculture Sector	National Science and Technology Development Agency (NSTDA)	Agriculture	• AIT	Completed
2	High resolution regional climate model projections for Thailand	Chiang Mai University	Early warning and Env. assessment	• Technical University of Denmark (DTU)	Work in progress
3	Strengthening Bangkok's Early Warning System to respond to climate induced flooding	Bangkok Metropolitan Administration (BMA)	Early warning	• UNEP-DHI	Completed

INTRODUCTION TO THE GCF



GREEN
CLIMATE
FUND

Vladislav Arnaoudov | Senior Quality Assurance and M&E Specialist
29 November 2021



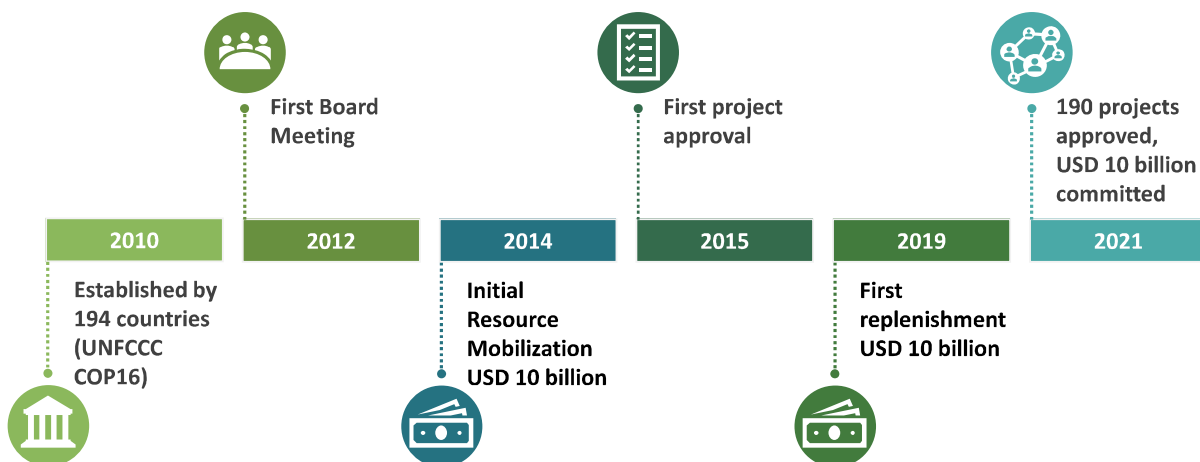
GREEN
CLIMATE
FUND

1 | GREEN CLIMATE FUND





HISTORY OF THE GCF

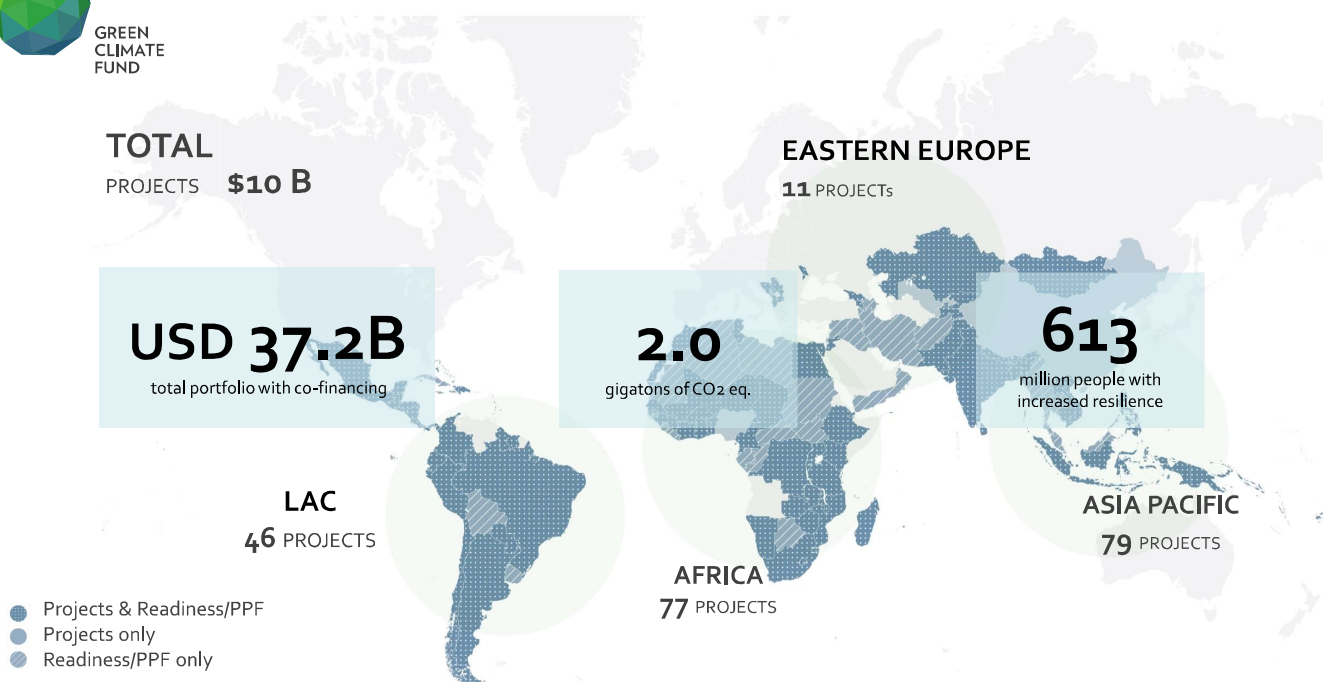


The largest specialized climate fund. Part of the UNFCCC financial mechanism. Supports countries to achieve paradigm shift toward low emission and resilient development

3



OUR PORTFOLIO

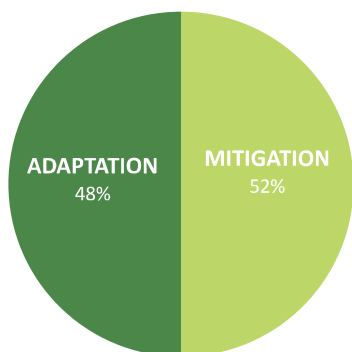


Source: Green Climate Fund (September 2020)

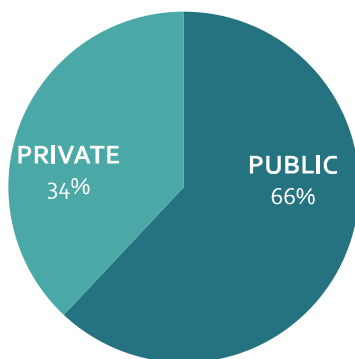
4

OUR PORTFOLIO

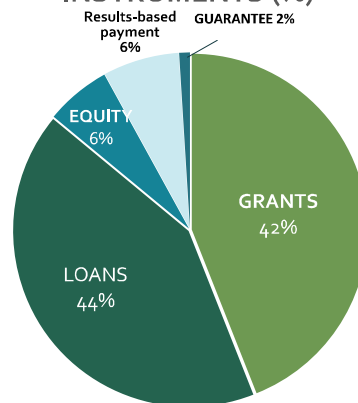
AREAS
(Grant equivalent terms)



PUBLIC AND PRIVATE SECTOR



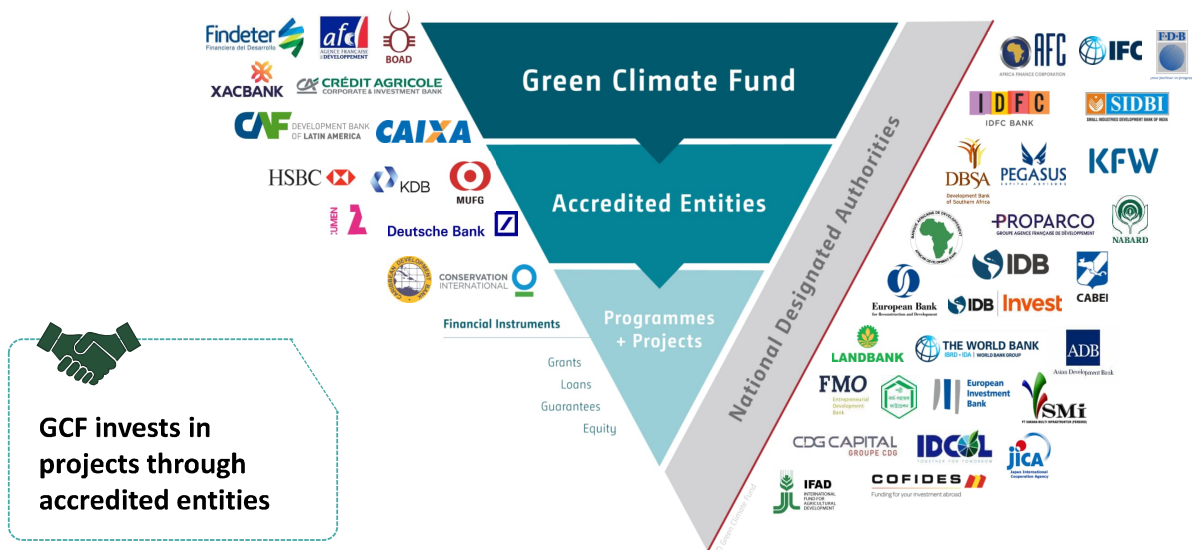
FINANCIAL INSTRUMENTS (%)



5

WHAT WE LOOK FOR

Additionality of GCF Funding - Why GCF? - Projects must crowd-in additional financing on top of GCF	Strong Climate Rationale - Climate Impact of investment is key - Scientific evidence to provided	8 Results Areas  Energy  Transport  Buildings, Cities, Industries  Ecosystems  Livelihoods of people & comm.  Health, food and water security  Forests and land use  Infrastructure	Compliance with GCF Policies - Fiduciary standards - Risk Management - ESS - M&E Criteria - Gender Policy - Legal Standards
Country Driven Approach - Alignment with NDCs - Early country (NDA) engagement - No-objection letter	Six Investment Criteria - Impact Potential - Paradigm Shift Potential - Sustainable development potential - Recipient needs - Country ownership - Efficiency & effectiveness		Completeness of documentation - Feasibility study - Financial Model - Project Timetable - Gender Analysis - Environmental studies - No-objection letter



2 PROJECT EXAMPLES



Adaptation Project

Enhancing climate resilience in Thailand through effective water management and sustainable agriculture

Country	GCF financing	Accredited entity	Financial instrument
Thailand	USD 17.5 million	UNDP	Grant

- Improve water management, food security, and the agricultural livelihoods of inhabitants in the Yom and Nam sub-river basins of Chao Phraya River in Thailand
- Enhanced climate and risk planning by generating tailored climate information for improved water and agricultural planning
- More than 500,000 beneficiaries reached



Co-Financing
In kind **USD 16.3 M**



9



**Raising
ambition.
Empowering
action.**

**Attachment 3: Presentation Materials of International Information Dissemination
(Indonesia)**

- (1) METI / METI's activities for promoting private sector participation in climate change adaptation
- (2) Directorate of Climate Change Adaptation, MoEF / Key Features of NDC-Adaptation
- (3) Yayasan Multi Bintang Indonesia / Adaptation practices of conserving water resources in upstream areas
- (4) ACA Indonesia / Climate-based insurance in climate smart agricultural practices: A Sample of Ecosystem-based Disaster Risk Reduction (Eco-DRR) in Agriculture
- (5) Furuno Electric Co., Ltd. / Weather Radar and DANA
- (6) Hitachi Power Solutions, Ltd. / DioVISTA/Flood: Save the nation from flood by ICT
- (7) Yamaha Motor Co., Ltd. / Contribution to Climate Change Adaptation in Indonesia with Yamaha Clean Water Supply System
- (8) Routrek Networks, Inc. / Digital Farming Makes Agriculture Sustainable: Private Sector Contribution to Climate Change Adaptation in Indonesia
- (9) CTCN / CTCN's support mechanism
- (10) GCF / Introduction to the GCF

Note 1: The contents of (5) and (8) are the same as (4) and (6) respectively in "Attachment 2: Presentation Materials of International Information Dissemination (Thailand)", therefore the attachments were omitted.

Note 2: (6) is not open to the public.

METI's activities for promoting private sector participation in climate change adaptation

January 2022

Ministry of Economy, Trade and Industry

Japan's Climate Policy under the Paris Agreement

- **Paris Agreement:** Calling for “Increasing the ability to adapt to the adverse impact of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production”
- **IPCC WG I (2021) :** Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since AR5.
- Japan submitted Japan's updated NDC, the Long-term Strategy and adaptation communication to the UNFCCC. In adaptation communication, Japan promotes overseas development and international cooperation by the government and the private sector

Overseas Disasters caused by Climate Changes

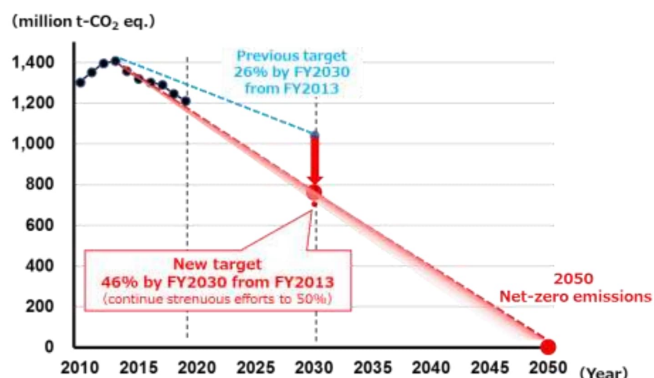


Flood in Rojana Industrial Park
(Thailand, Oct. ~ Nov. 2011)

*Source: Ministry of Land, Infrastructure, Transport and Tourism, Japan

Japan's new 2030 emissions reduction target

Japan aims to reduce its GHG emissions by 46% in FY2030 from FY2013 levels, setting an ambitious target that is aligned with the long-term goal of achieving net-zero emissions by 2050.



*Source: Ministry of Foreign Affairs, Japan

Japan's new commitment at COP26

- Prime Minister Kishida announced that Japan will double the assistance for adaptation to climate change by 2025.

COP26 World Leader' s Summit Statement (2021/11/2)

For adaptation to climate change, Japan will double our assistance to approximately 14.8 billion USD such as in the area of disaster risk reduction.

Concerning global forestry conservation, I hereby announce that Japan will provide financial assistance worth approximately 240 million USD, utilizing advanced technologies and working in collaboration with the international organizations.



Source of photo: Prime minister of Japan and His Cabinet

2

METI's efforts to promote adaptation business

- METI aims to ensure opportunities for international cooperation and collaboration, and promote adaptation business of Japanese companies.

Good Practices

METI publishes leaflets to share efforts of Japanese companies that are implementing adaptation business, and the activities of Japanese companies that have adaptation technologies.



Workshop / Seminar

METI holds workshops and seminars abroad or in Japan to explain the advantages of Japanese companies in the field of adaptation business.



◀SDGs form 2019 (2019/Japan)

COP25 ▶ (2019/ Madrid)



3

COP26 Side events

- METI participated in Japan Pavilion seminar and Indonesia Pavilion seminar, and appealed **the promising adaptation business technologies** of Japanese companies.

Japan Pavilion seminar

- METI participated in Nature-based-Solution seminar at Japan Pavilion and introduced some examples of adaptation business of Japanese companies.
- Ex) Methodology for prevention of soil surface erosion with soil algae (Nippon koei Co., Ltd)
- Ex) Circular model in the manufacture and sale of apparel (Sunford Co., Ltd) etc

Indonesia Pavilion seminar

- METI participated in Indonesia Pavilion and exchanged views with Indonesia government on adaptation efforts by private companies and local communities.
- Ex) Mitigation damage to energy supply system (Panasonic Corporation)
- Ex) Adapting to changing cultivation environment for traditional crops (Dari K Co., Ltd)



Key Features of NDC-ADAPTATION

By
Arif Wibowo
Policy Analyst

Directorate of Climate Change Adaptation



Directorate of Climate Change Adaptation
Ministry of Environment and Forestry



NDC Adaptation

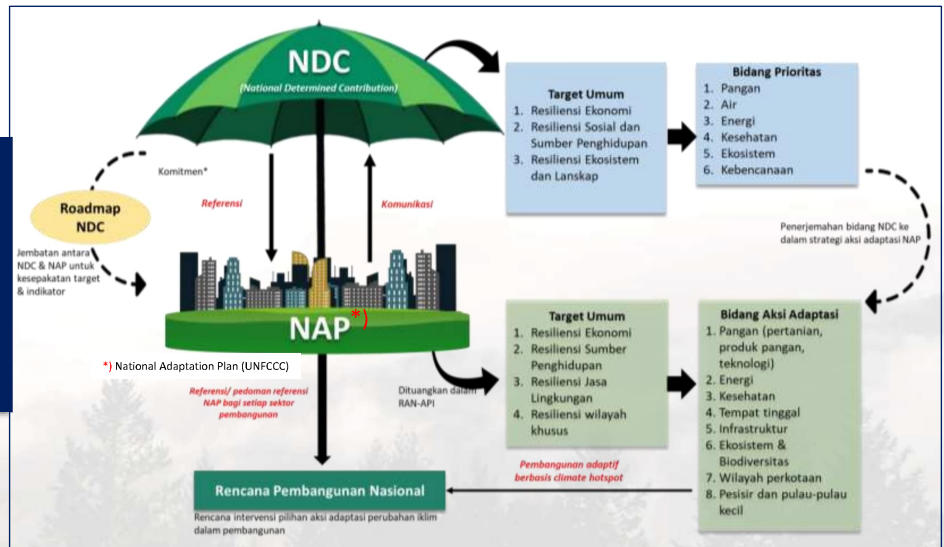
TARGET

The objectives of Indonesia's climate change adaptation strategy are to **reduce risk, increase adaptive capacity, strengthen resilience, and reduce vulnerability** to climate change in all development sectors by **2030** through increasing climate literacy, strengthening local capacities, **improving knowledge management, convergent policies on climate change adaptation and disaster risk reduction, and the application of adaptive technologies.**

PROCESS

NDC ≠ NAP

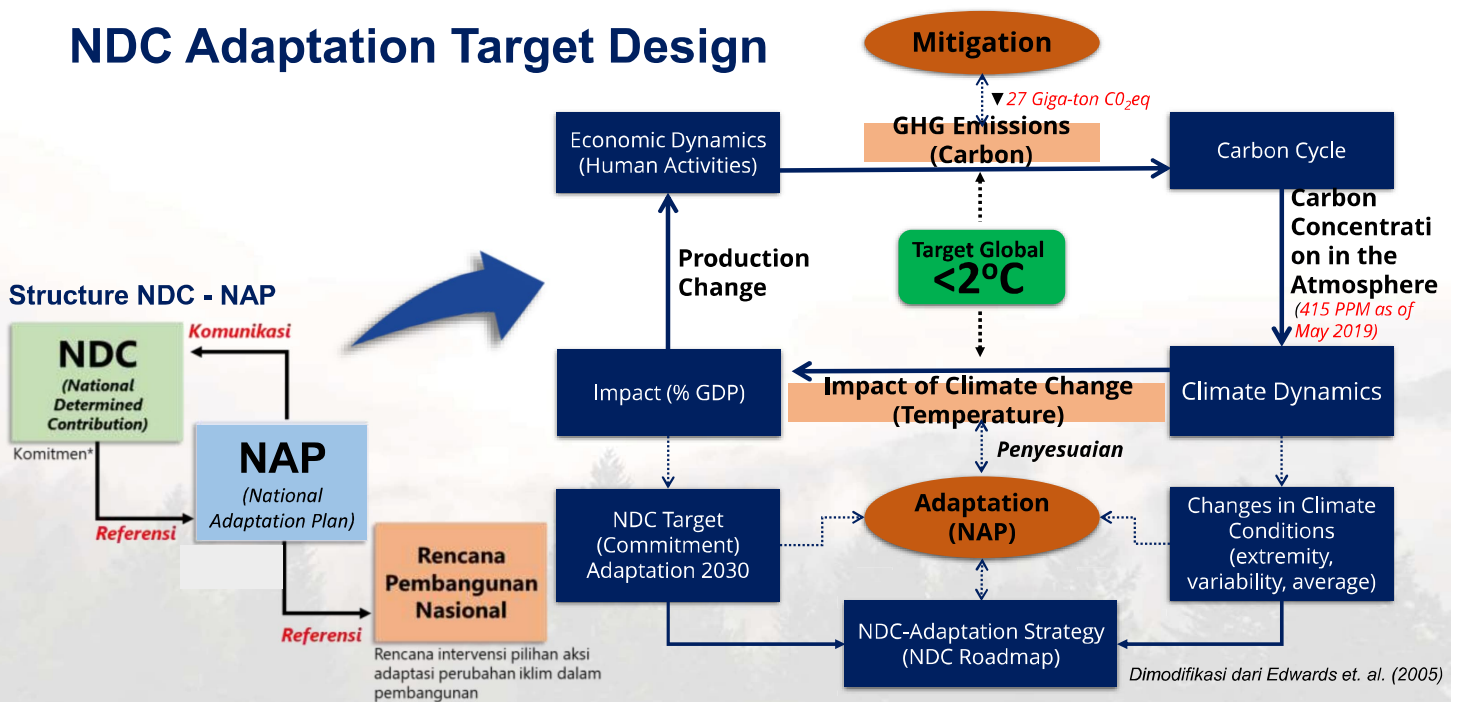
The NDC Roadmap provides a reference for targets and implementation strategies that need to be carried out to design, implement, and report on adaptation, **not** directed at developing adaptation options for each sector or sector (NAP).



Sumber: Dimodifikasi dari Fransen et al. (2019) based on Dagnet et al. 2018

3

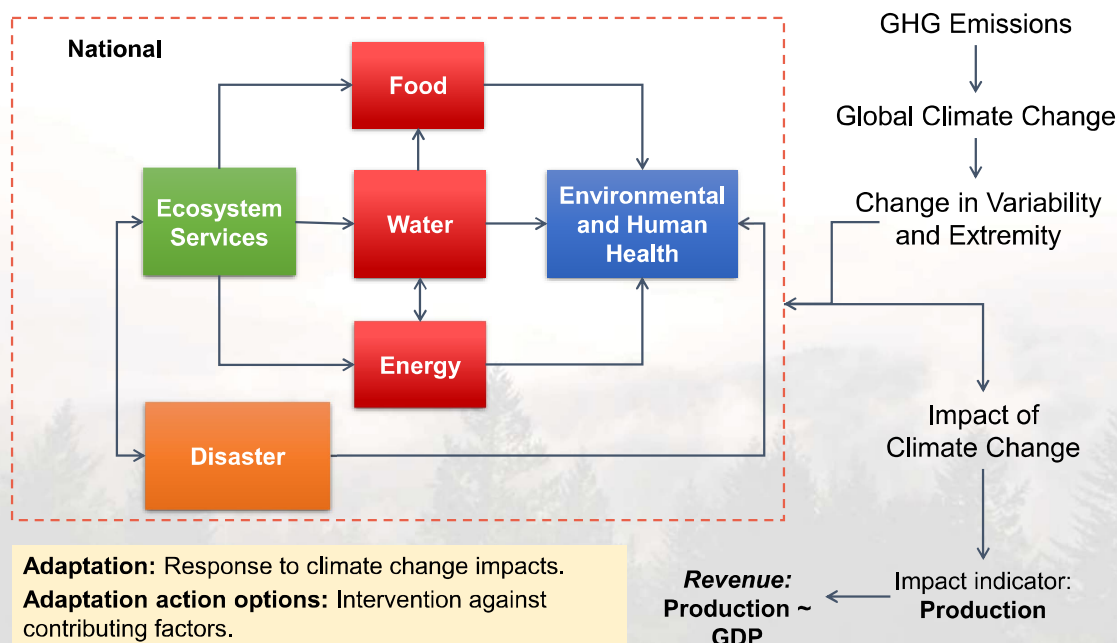
NDC Adaptation Target Design



Dimodifikasi dari Fransen et al. (2019) based on Dagnet et al. (2018)

4

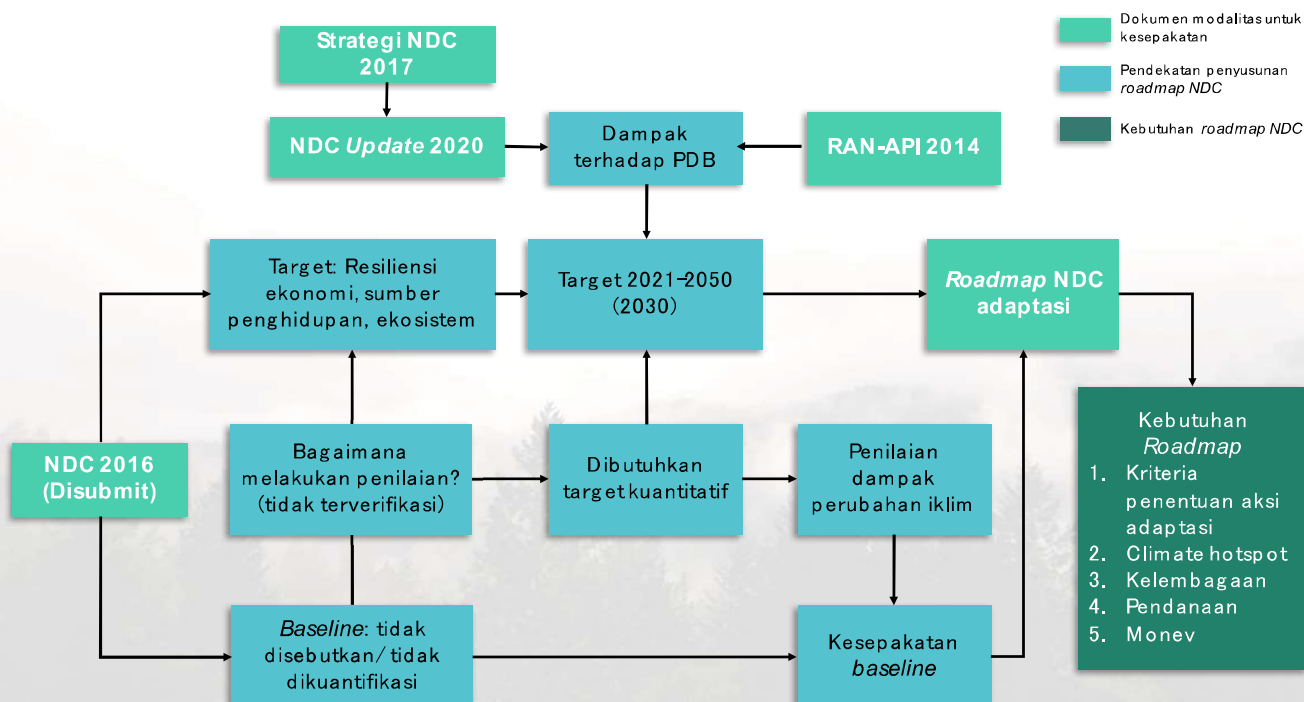
Framework for Agreement on Preparation of NDC Roadmap



Ilustrasi: Perdinan et al. (2020)

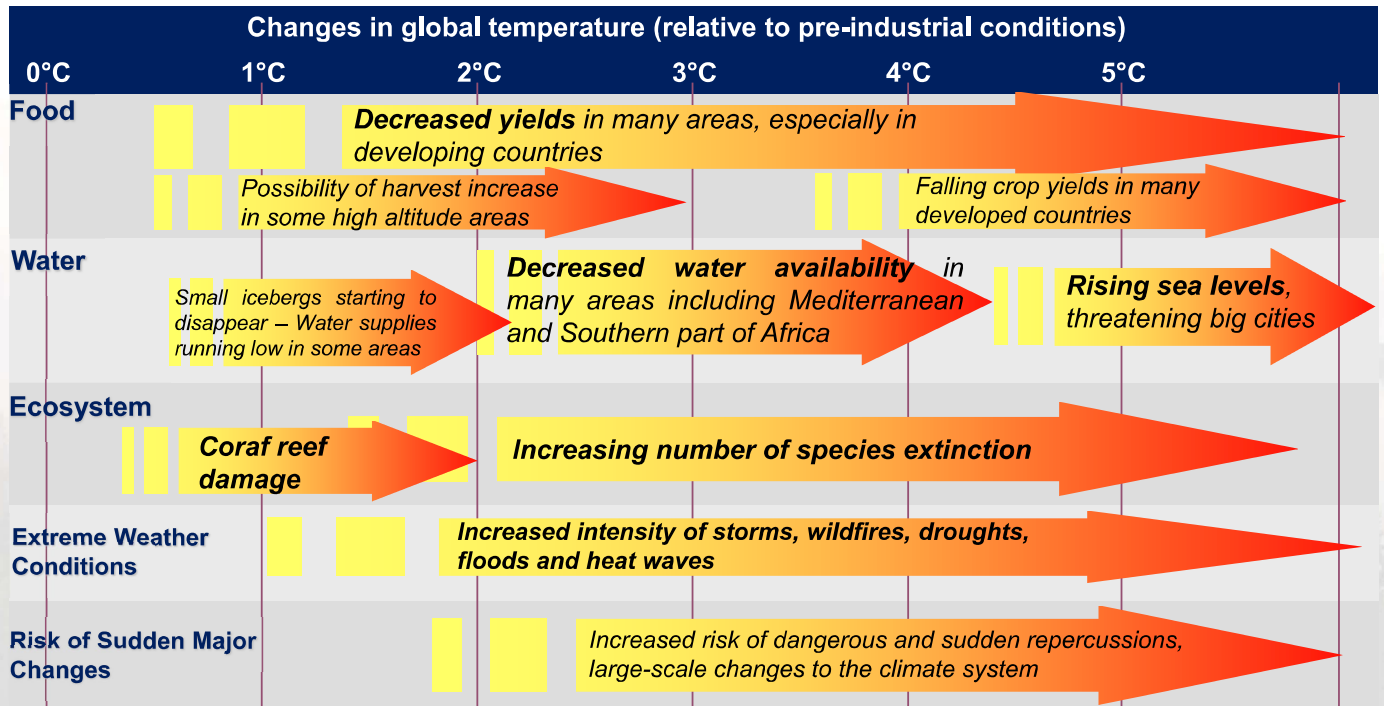
5

NDC Adaptation Target Deal Review



6

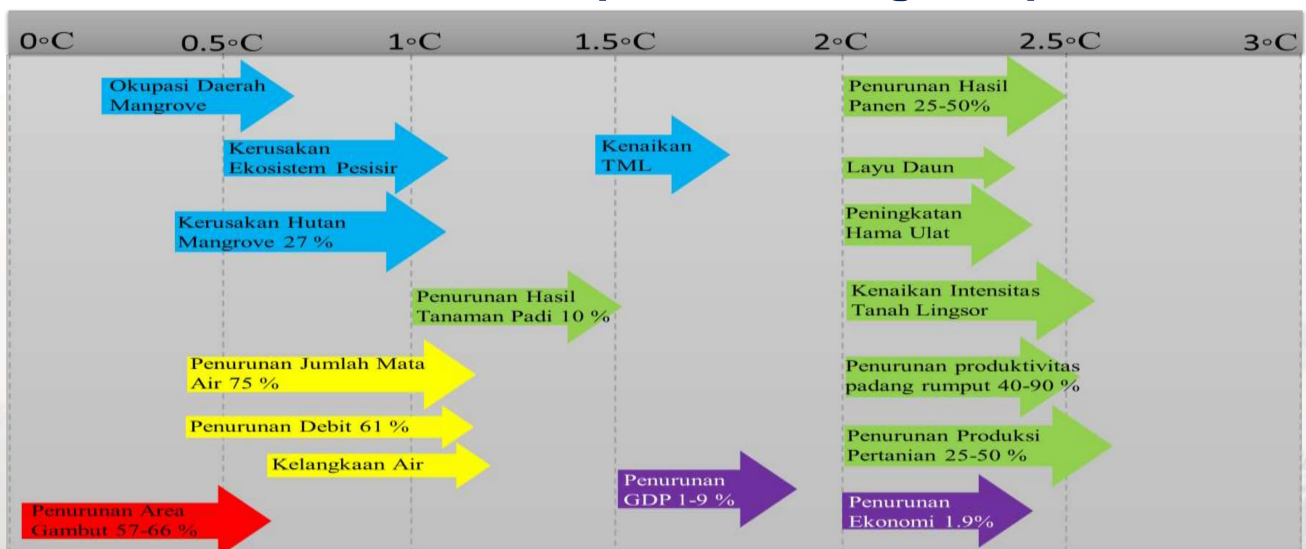
Potential Impact of Air Temperature Rise



Sumber: Stern (2007)

7

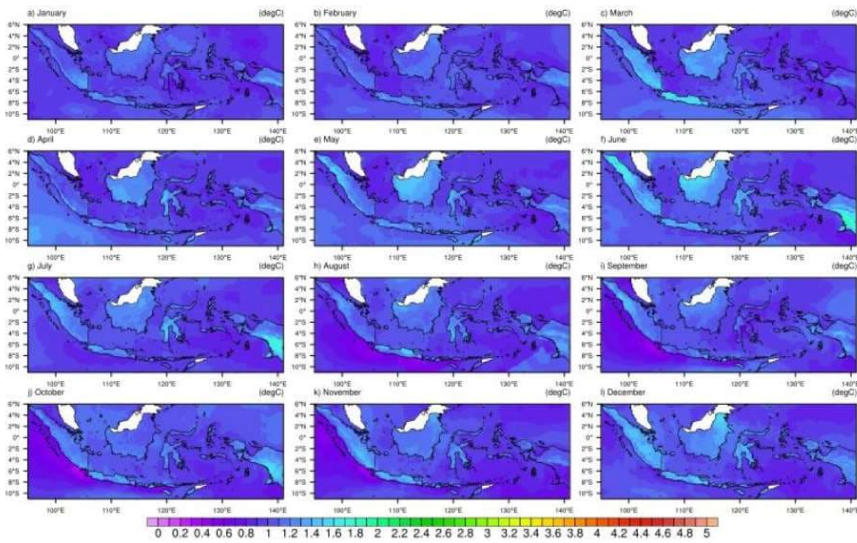
Identification of the Impact of Rising Temperature



Identification of the impact of rising temperatures based on the CCVIA's collection of studies in Indonesia. Different colored arrows indicate specific sectors, namely: Marine and Fisheries (blue), Agriculture (green), Water Resources (yellow), Urban (purple), and Forestry (red). Source: CCVIA study collection in Indonesia.

Temperature Projection 2030

Future Temperature Change (RCP4.5, 2026-2050)

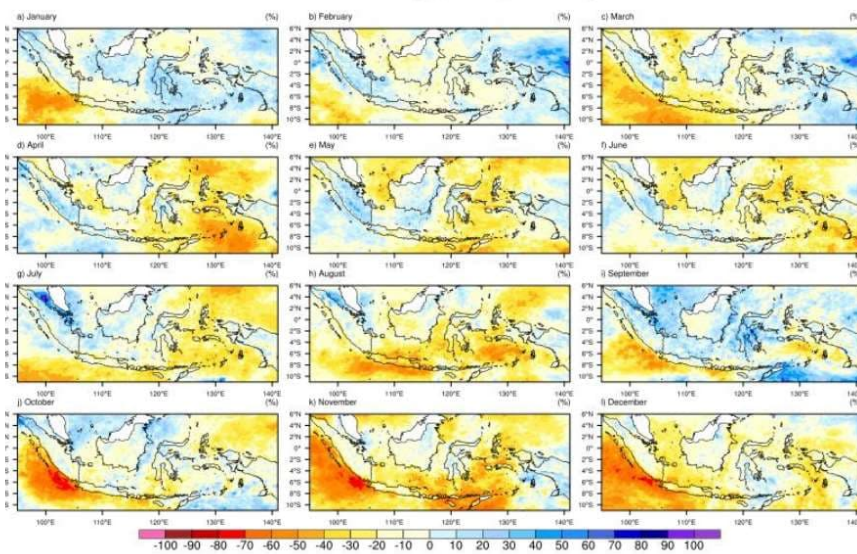


Lokasi	Suhu Rata-Rata (°C)	Suhu Maksimum (°C)	Suhu Minimum (°C)
Sumatera & Jawa	↗ 0.6 – 1	↗ 0.75 – 2.25	↗ 0.2 – 1
Kalimantan & Sulawesi	↗ 0.2 – 0.9	↗ 0.5 – 2.25	↗ 0.2 – 1
Bali & Nusa Tenggara	↗ 1.6 – 2	↗ 0.5 – 2.25	↗ 0.2 – 1
Maluku & Papua	↗ 1.1	↗ 0.5 – 2.25	↗ 0.2 – 1

Sumber: Climate Outlooks (2019)

Rainfall Projection 2030

Future Rainfall Change (RCP4.5, 2026-2050)



Lokasi	Tahunan	Kondisi Musiman			
		DJF	MAM	JJA	SON
Sumatera	↗ 5%	↘ 10%	-	↘	-
Jawa	↘ 5%	↘ 20% - 40%	↘ 4%	↘	↘ 8%
Kalimantan	↗ 5%	↗ 20%	-	↘	↗
Sulawesi	↘ 5%	↘ 8% - 30%	↗ 11- 30 %	↘	-
Bali & Nusa Tenggara	↘ 5%	↘ 20%	-	-	-
Maluku	↗ 5%	↘ 10%	-	-	-
Papua	↗ 10%	↗ 10% - 20%	-	-	-

Sumber: Climate Outlooks (2019)

Projected Increase in SST and SL



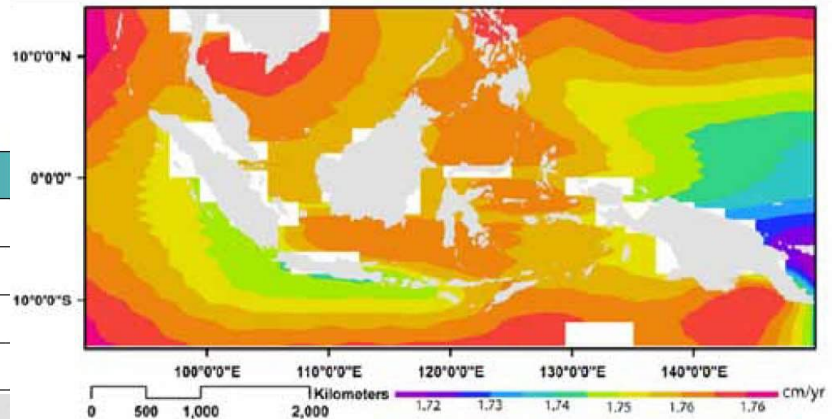
Sea Surface Temperature (SST) $\nearrow$ 1 – 1.2°C in 2050 relative to 2010, with an average sea level rise around the islands of Sumatera, Jawa, dan Sulawesi around 0.2 – 0.3°C / decade.



Sea Level (SL) $\nearrow$ 35 – 40 cm in 2050 relative to 2010, with an average increase of 0.6 – 0.8 cm per year.

Projected Increase in Average SST in Indonesian Waters without the addition of Dynamic Ice Melting (Bappenas, 2014)

Periode	Proyeksi SLR	Tingkat kepercayaan
2030	22.5±1.5cm	Sedang
2050	37.5±2.5cm	Sedang
2080	60.0±4.0cm	Tinggi
2100	80.0±5.0cm	Tinggi



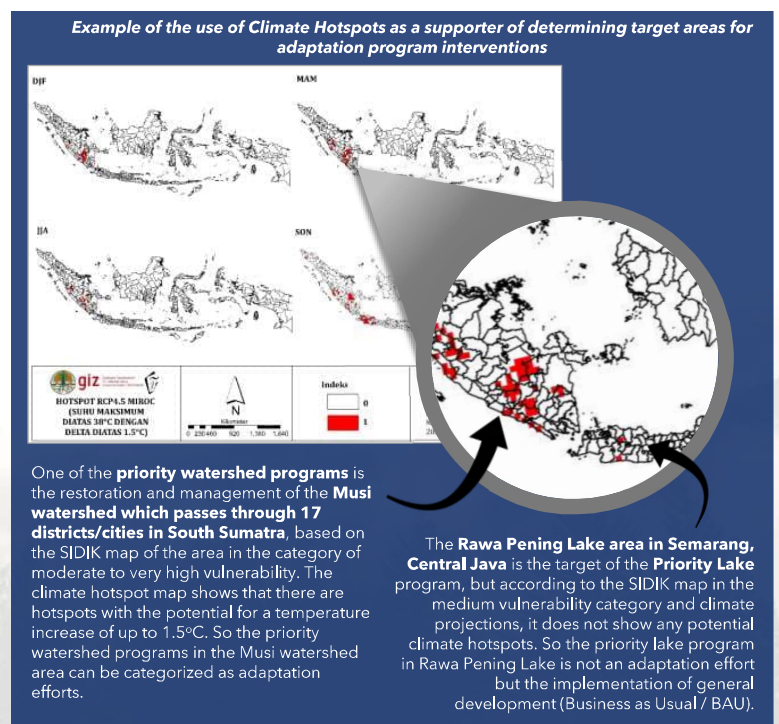
Estimasi Laju Kenaikan TML di Indonesia berdasarkan model dengan penambahan Dynamic Ice Melting (Bappenas, 2014)

Climate Hotspot – Target Area of Intervention

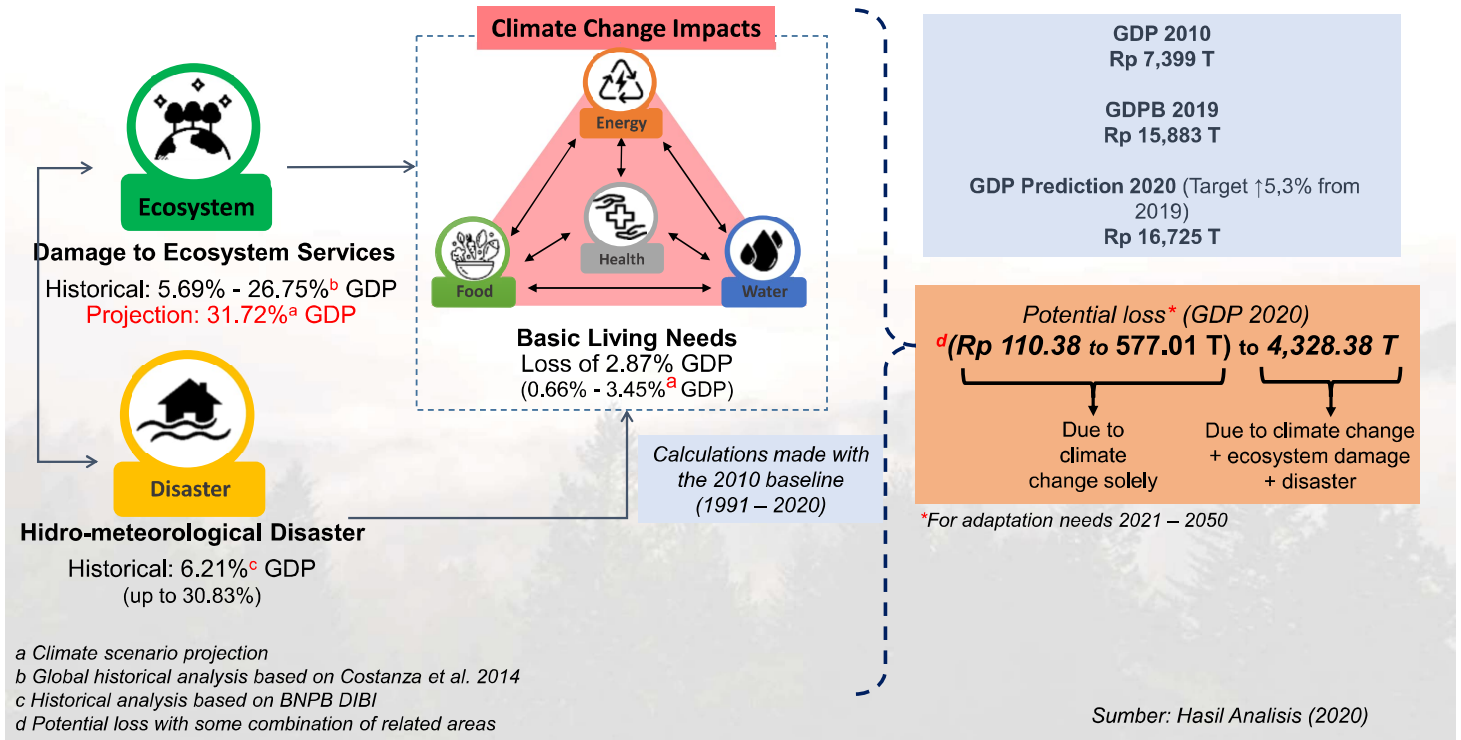
Climate Hotspots are areas characterized by high vulnerability and exposure/responsiveness to climate change (IPCC, 2014)

Potential areas with an increase in temperature of 0.75 – 2°C from baseline conditions so that the air temperature in the future will reach >35°C and >38°C

Climate hotspots can be an **indicator** in determining the **target area for intervention** in the planning and implementation of **adaptation programs**, as well as supporting existing maps (i.e. vulnerability maps, disaster risk maps).



NDC 2030 Targets – Projected Climate Change Impacts (2021-2050)



Proposed NDC Adaptation Roadmap Strategy



Catatan:

- Usulan 8 poin di atas merupakan strategi roadmap NDC focus adaptasi yang dikembangkan dari target NDC dalam mencapai resiliensi ekonomi, sosial & sumber penghidupan, dan ekosistem & lanskap
- Angka persentase pada setiap strategi mengacu pada target total pengurangan risiko kerugian sebesar 2.87% GDP Nasional
- Indikator ketercapaian masing-masing butir dapat dilihat pada lampiran dokumen roadmap NDC

The diagram illustrates the NDC Adaptation Roadmap 2020-2030, structured around eight pillars (a-h) and their implementation timeline from 2020 to 2030.

Pillars and Key Actions:

- a. Kebijakan (0.68 T):**
 - 1. Membangun kesepakatan antar multi-stakeholder dan lintas generasi (2020-2021)
 - 2. Membangun koherensi kebijakan yang kondusif (*enabling environment*) (2021-2023)
 - 3. Kebijakan satu data perubahan iklim (2022-2025)
 - 4. Koordinasi komunikasi dalam perumusan dan komunikasi kebijakan (2020-2026)
- b. Perencanaan (2.08 T):**
 - 1. Integrasi kebijakan, rencana, dan program (KRP) (2021-2023)
 - 2. Mekanisme pembiayaan multi-pihak (2021-2022)
 - 3. Investasi usaha berbasis kode risiko di berbagai wilayah strategis ekonomi (2022-2030)
 - 4. Meningkatkan pendanaan adaptasi co-benefit mitigasi (2022-2030)
 - 5. Pengarusutamaan adaptasi perubahan iklim ke dalam sector strategis (2023-2030)
- c. Literasi (2.07 T):**
 - 1. Menumbuhkan pemahaman komunal tindakan berbasis kerentanan dan risiko perubahan iklim (2020-2030)
 - 2. Penentuan standar kriteria aksi adaptasi perubahan iklim pada berbagai kegiatan pembangunan (2022-2024)
 - 3. Penentuan standar risiko lingkungan pada berbagai kegiatan pembangunan (2022-2024)
 - 4. Mendorong penelitian dan publikasi dari praktik terbaik (2022-2030)
- d. Tata Ruang/ Lanskap (2.65 T):**
 - 1. Integrasi kebijakan pembangunan tata ruang darat dan tata ruang pesisir dan laut (2021-2023)
 - 2. Pengembangan mekanisme skema investasi pembangunan berbasis kode risiko perubahan iklim (2022-2025)
 - 3. Menghindari konversi lahan produktif untuk penggunaan lain serta rehabilitasi lahan kritis (2022-2026)
- e. Kapasitas (2.8 T):**
 - 1. Membangun komunitas resiliensi iklim yang terintegrasi dalam berbagai program ketangguhan (2021-2030)
 - 2. Pengembangan kapasitas sumber daya manusia berbasis gender (2022-2030)
 - 3. Penguatan budaya Nusantara dalam praktik adaptasi perubahan iklim (2023-2030)
 - 4. Peningkatan kapasitas social ekonomi dan mata pencaharian (2022-2030)
 - 5. Peningkatan kapasitas masyarakat dalam mengelola sumber daya (2022-2030)
- f. Manajemen (0.3 T):**
 - 1. Membangun sistem layanan informasi berbasis lanskap dan administrasi (2020-2023)
 - 2. Integrasi informasi dan data terkait risiko iklim dan kebencanaan (Inarisk, SIDIK) secara sistemik (2020-2021)
 - 3. Integrasi sistem pelaporan aksi adaptasi dengan kode risiko (2023-2026)
 - 4. Penyusunan panduan pemantauan dan review (2022-2026)
- g. Partisipasi (0.52 T):**
 - 1. Membangun mekanisme multi-stakeholder platform dalam pendekatan "no one left behind" hingga tingkat tapak (2020-2023)
 - 2. Membangun sinergitas multi-stakeholder dan lintas sektor dalam pelaksanaan adaptasi perubahan iklim di tingkat tapak (2022-2027)
 - 3. Membangun kerangka kerja dan jaringan komunikasi multi-stakeholder untuk mencapai efektivitas dan efisiensi implementasi (2022-2027)
 - 4. Meningkatkan kesadaran semua pemangku kepentingan terkait adaptasi (2023-2030)
- h. Teknologi (3.48 T):**
 - 1. Membangun standarisasi teknologi adaptif (2022-2023)
 - 2. Penerapan teknologi cerdas adaptif dalam upaya meminimalisir risiko pembangunan (2022-2030)
 - 3. Implementasi, pemantauan dan review penerapan teknologi adaptif (2022-2030)
 - 4. Meningkatkan teknologi adaptif yang memiliki co-benefit mitigasi (2023-2030)

Implementation Timeline (2020-2030):

- a. Instrumen kebijakan adaptasi perubahan iklim dan pengurangan risiko bencana** (2020-2022)
- b. Integrasi ke dalam perencanaan pembangunan & mekanisme keuangan** (2020-2022)
- c. Peningkatan literasi iklim tentang kerentanan dan risiko** (2020-2022)
- d. Pendekatan berbasis lanskap untuk pemahaman komprehensif** (2020-2022)
- e. Penguatan kapasitas lokal pada praktik terbaik** (2020-2022)
- f. Peningkatan manajemen pengetahuan** (2020-2022)
- g. Partisipasi pemangku kepentingan** (2020-2022)
- h. Penerapan teknologi adaptif** (2020-2022)

Outcomes (2020-2030):

1. Terwujudnya resiliensi ekonomi melalui transformasi ekonomi rendah karbon dan resiliensi dalam sistem pangan, air, dan energi.
2. Tercapainya resiliensi sosial dan perikehidupan melalui peningkatan kapasitas dalam berbagai sistem kehidupan
3. Meningkatnya resiliensi ekosistem dan lanskap melalui pendekatan berbasis lanskap terintegrasi dalam manajemen ekosistem darat, laut, dan pesisir

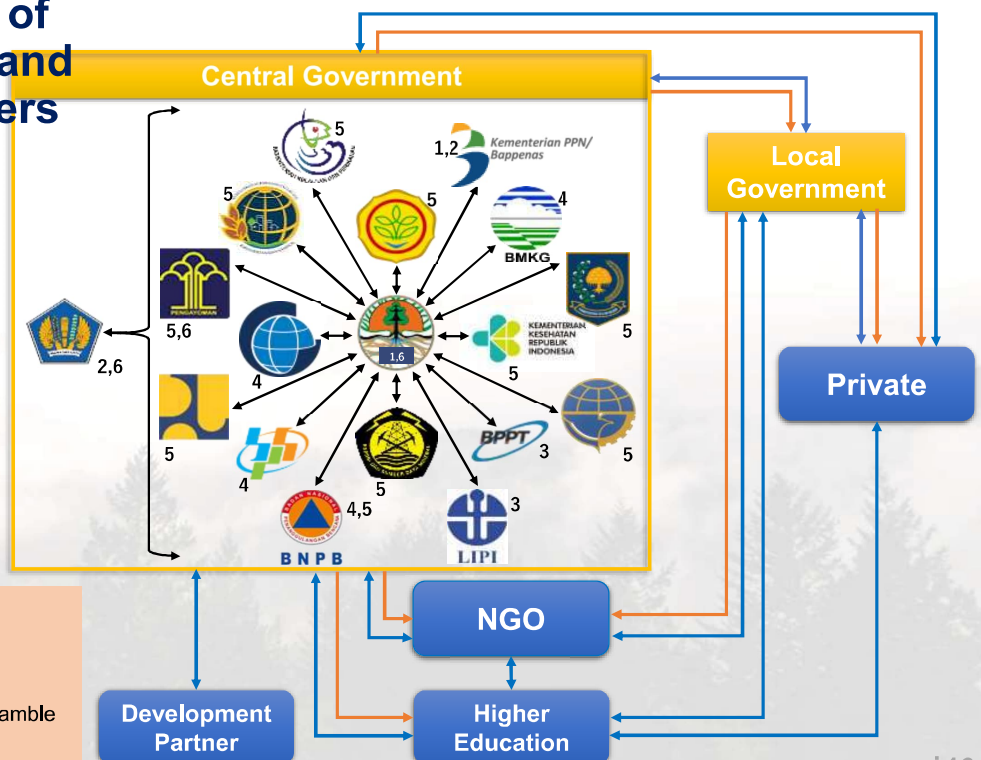
Catatan: Angka dalam Triliun mengacu pada kebutuhan pendanaan setiap strategi dari pengembangan roadmap NDC adaptasi 2020-2030

Description:

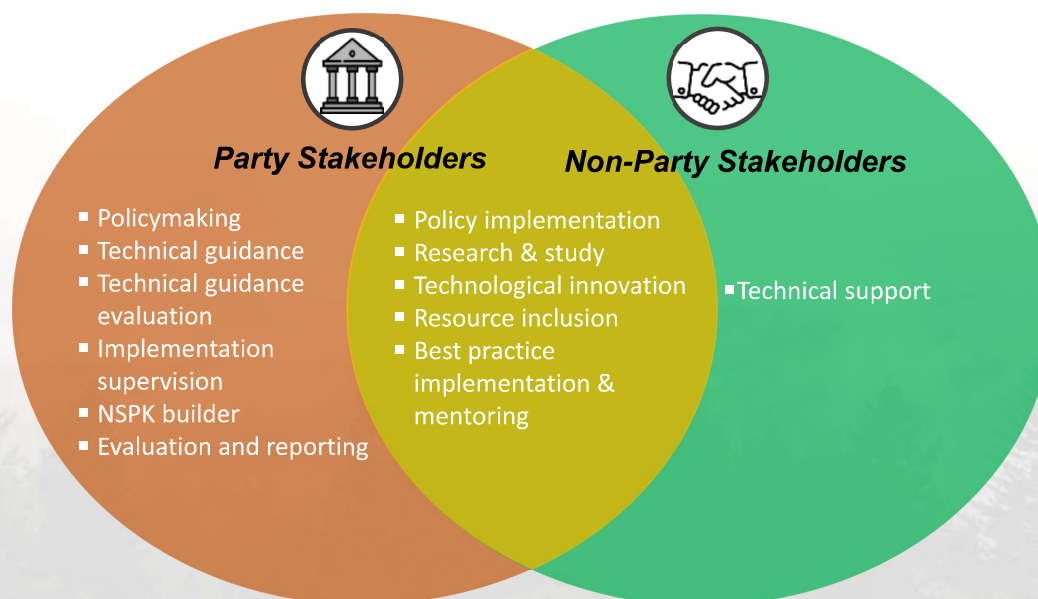
-  Instructions
 Coordination
1. Planning
 2. Budget
 3. Study
 4. Data Provision
 5. Execution
 6. Supervision

Notes:

1. List of K/L listed in climate change adaptation mandate (BKF 2015).
2.  *Non-Party Stakeholders**
*Definition of NPS refers to the Preamble Paris Agreement CP-21 (Page 19 paragraph 133)

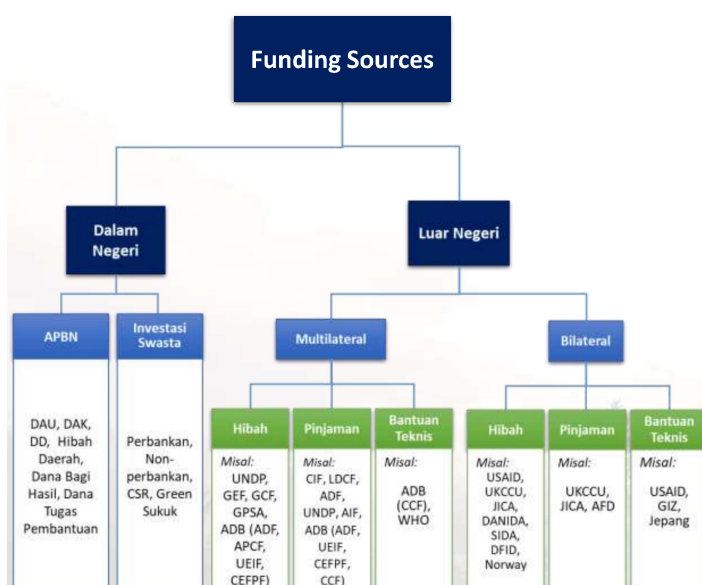


Stakeholder Contribution



17

Potential Sources of Indonesia's Climate Change Funding



The mechanism of foreign funding depends on each donor under the UNFCCC as the operating entity

Funding proposals to donors must take into account the following criteria:

1. Assessment of impacts and risks through the availability of maps of climate hotspots
2. Assessment of the impact of climate change as an incremental cost (contribution of climate change to the impact of losses)
3. Impact validation by KLHK
4. Proposed adaptations to respond to measurable impacts
5. Submission of adaptation options to various working groups (pokja) on climate change adaptation in the regions, which are then proposed to governors and ministries.

AF potential for Indonesia in 2019 reached USD 10 million, but only used about ± USD 690 thousand

18

An aerial photograph of a two-lane asphalt road that curves through a dense, green forest. Several cars are visible on the road: a white car in the upper left, a blue car in the lower right, and a white car further down the road. The road has white dashed lines for lane markings. A dark blue horizontal band is superimposed over the center of the image, containing the text 'Terima Kasih' in white.

Terima Kasih

ADAPTATION PRACTICES OF CONSERVING WATER RESOURCES IN UPSTREAM AREAS



Product Innovation Milestones





A strategy that fits on a coaster

In close alignment with our external and internal stakeholders, we have developed a strategy that fits on the back of a coaster.

Three pillars, nine ambition areas.
Each commitment area containing one or more concrete and measurable commitments.

'Brew a Better World' remains our foundation and the task we set for ourselves and in working with others.

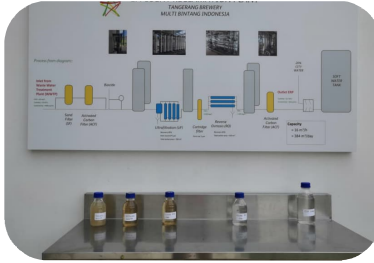
'Raise the Bar 2030' reflects the increased ambition of our new action plan.

The iconic circle is the footprint of our Heineken® bottle. It reminds us every day to leave our mark by limiting our potential negative impacts and maximising our positive contribution. It also reminds us – in a playful way – of the planet we depend on, the path to circular business and our (imperfect) journey to create a better world.

TOWARDS HEALTHY WATERSHEDS



Water Efficiency
to reduce average water intake to 2.6 liters in water-stressed areas



Water Circularity
100% of our wastewater is being treated worldwide.



Water stewardship
100% balance the water we use in water-stressed areas

5

BRANTAS WATERSHED



Land Degradation

< 20% land with natural vegetation



Run-off, erosion and Landslides

423 mm/year is lost to runoff and 5515 million M3 is lost to erosion



River Pollution

60 % of families who live near the Brantas throw their used diapers into the river.



Water Crisis

> 100 villages in the upstream Brantas suffer lack of access to clean water



Floods

2-4 floods per year including mud floods with high fatality rates

6



BAMBOO SOLUTION FOR BRANTAS RIVER RESTORATION



By 2024, 5000 small-scale farmers will focus on bamboo cultivation in 220 ha of degraded lands, rather than doing illegal logging in protected forests. Estimated 2.40 tons/year of erosion will be decreased and 160.190 m³/year of water will be infiltrated and recharged to targeted springs.

In addition to that, we will use simple technology using bamboo as a readily-available material to create bamboo waste traps. With the involvement of more than 20.000 waste bank community members, we will collect 70% of solid waste in the river's upstream.

77

OUR APPROACHES



Community based bamboo seedling & Planting

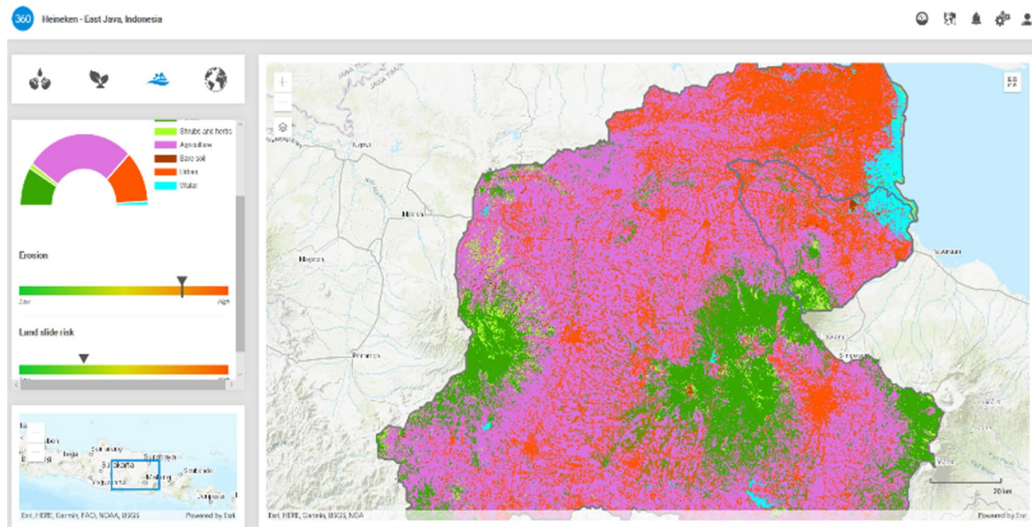


Bamboo farmers cooperatives & bamboo workshop



Bamboo Waste Traps

DIGITAL WATESHED MONITORING



52impact



9



Change is the end result
of all true learning

Leo Buscaglia



Climate-based insurance in climate smart agricultural practices

A Sample of Ecosystem-based Disaster Risk Reduction (Eco-DRR) in Agriculture



Tuesday, January 11th 2022

Jakub Nugraha

Department Head of Microinsurance and Agriculture Insurance
Asuransi Central Asia (ACA) - Indonesia

ACA IN BRIEF - Agriculture Insurance in Indonesia – Finance Industry in Agriculture - EcoDRR -

- ❖ Established 29 August 1956 by Salim Group, Gross Premium Written = USD 214 million (31 Dec' 2021)
- ❖ A local general insurance company with various products = property, marine cargo, motor vehicle, health, engineering, casualty, liability, etc.
- ❖ Actively participate in the organization of General Insurance Association of Indonesia and ASEAN Insurance Council (Agriculture Insurance Working Group)
- ❖ Agriculture insurance development =
 - ✓ 1990 = palm oil insurance → for corporation
- ❖ Agriculture insurance development for small holder farmers
 - ✓ 2015 = corn insurance → indemnity insurance (climate risk insurance)
 - ✓ 2018 = shrimp insurance → indemnity insurance
 - ✓ 2021 = horticulture insurance → revenue insurance (climate risk insurance)



- Mostly managed by low income society (poor farmers)
- Not a profitable business, therefore less attracted for young generations
- Highly frequent in harvest failure every year due to =
 - * lack of Good Agriculture Practices
 - * farmers un-preparedness to cope with climate risks
- Government has put many efforts to subsidize farmers with fertilizer, seeds, hand tractors, KUR (subsidize loan/bank interest rate for small enterprise), insurance premium, field officers, etc. → most poor farmers are still *un-bankable* (not eligible to get the loan from the bank)
- Farmers are trapped with money lender



- Banking sectors =
 - ✓ Key Performance Indicator = Non Performing Loan < 3%
 - ✓ most farmers pay the loan after harvest
 - ✓ If harvest failure occurred → NPL > 10%
- Insurance sector =
 - ✓ Key Performance Indicator = claim ratio < 50%,
 - ✓ Most farmers do not apply Good Agriculture Practices and Good Harvest Practices
 - ✓ If harvest failure occurred → loss ratio up to 900%
- Therefore, agriculture is not the appetite business for financial industry → *high risk business*.



Integrated Risk Management in Agriculture Closed-loop Ecosystem in 2015

- ACA developed agriculture insurance concept based on Integrated Risk Management in a closed-loop ecosystem to cope with climate change for corn farmers.
- Dedicated field officers (agronomists) were appointed to ensure all farmers applied Good Agriculture Practices. If farmers were not obey agronomists' advice, then those farmers were not eligible to proposed or submitted any claim. This statement was clearly stated in the policy wording.
- Year 1 – claim ratio = 200% due to drought (El-Nino) → farmers planted the first seed based on tradition instead of considering weather prediction
- Year 4 – claim ratio < 50% , with 4.000 hectares (2015-2019)
- The risks covered were drought (El-Nino) and tropical typhoon / strong wind



Day 1 after the strong wind (2018) → field officers advise farmer to apply Good Agriculture Practices → 2 weeks later the crops were going back to normal → no harvest failure



In 2021 ACA developed her **sustainable agriculture insurance** with the following characteristics:

1. Agriculture insurance is implemented under closed loop ecosystem
2. Each of the stakeholders commit to apply Integrated Risk Management, i.e. do his/her own risk mitigation and focus on reducing the possibility of harvest failure
3. Farmers are obliged to:
 - a) obey agronomists in applying **Good Agriculture Practices based on smart farming or Agriculture 4.0** to *reduce the possibility of harvest failure*, and
 - b) apply **Good Harvest Practices supported by digital finance** to *increase farmers net profit and enable farmers to pay insurance premium without government subsidy*



4. Risks covered:
 - a) natural disaster,
 - b) pest and disease,
 - c) climate risk (drought, heavy rainfall with strong wind, flood, extreme temperature, landslide)
5. Insurance scheme with the least admin cost, transparent, fast claim process and claim settlement, match with Indonesian poor farmers' characters and Indonesia's widespread geography → *agriculture micro insurance policy wording*



Integrated Risk Mitigation by each of the stakeholders → reduce the possibility of harvest failure for Sustainable Farming

Stakeholder	Target(s) to Achieve / Expected results	Risk Mitigation
Farmers	• Increase in profit , sustainable business	Follow SOP supported by IoT thru access to: technology, market and finance
Seeds and agro chemicals	• Productivity , traceability, • Continuous sales for the next cycles	• Providing frequent agronomists with customer friendly mobile apps. • The Value Proposition is to help the farmers achieve their targets: secure repeat order more efficiently and expanding the market
Off-taker	• Better harvest , reasonable commodity price from the grower	• Frequent field supervision, reward for premium quality product • After harvest technology → traceability, environmental safe, cost efficiency for the farmers to understand the off-taker's standard
Insurance	• Manageable loss ratio , the least fraudulent claim through social control amongst all stakeholders thru ecosystem • Real time crops monitoring , • Qualified data for underwriting guidelines	• Policy wording that ensure farmers obey the procedures , otherwise the claim will be rejected • Ensure each of the stakeholders apply her own risk mitigation to reduce harvest failure for continuous repeat order from the new farmers
Lender	• Comply in disbursing the loan, • Non Performing Loan under 3 %	• Credit insurance (repayment capacity), agriculture insurance (harvest failure) • IoT that provides the real time grower's production cost, yield, payment from the off-taker, incentive for loan repayment before its due date
Local government	• Real time yield data , • Number of young farmers , • Local economic development , employment, etc.	• Local regulation on the implementation of Value Chain based on risk mitigation which adopt the climate risk issues • IoT (Farming 4.0) will enable any government agency to monitor all stakeholders role, and ensure the fulfillment of financial inclusive

Role of Sustainable Agriculture Insurance in Disaster Preparedness and Disaster Risk Reduction

- Pre-disaster = applying GAP to increase crops immune
- Disaster = emergency response action to:
 - ❖ identify any damage crops
 - ❖ risk mitigation for recovery action to prevent harvest failure
- Post disaster = implementing:
 - ❖ Good Agriculture Practices to reduce harvest failure
 - ❖ Good Harvest Practices to optimize farmers net profit
 - ❖ Family financial planning for farmer's emergency fund, livelihood, savings / investment for the next planting season

Closing:

Climate-based agriculture insurance supported by Integrated Risk Management in an Ecosystem-based Disaster Risk Reduction will become the basis for sustainable farming protected by sustainable insurance.

Contribution to Climate Change Adaptation in Indonesia with Yamaha Clean Water Supply System

Masashi Kanemaru
Yamaha Motor Co., Ltd.
11 January 2022



Yamaha Motor business in Indonesia



- 9 group companies in Indonesia
- Expanding business in all regions based on the motorcycle



PT. Yamaha Indonesia Motor Manufacturing



PT. Yamaha Motor Nuansa Indonesia
Started household water purifier business in the 1990s



Solving Societal Issues through Our Business



Addressing regional transit issues via low-speed mobility



Contributing toward labor savings and automation of agriculture through robotics



Development of next-gen boat steering systems using an electric propulsion unit



Installing more small-scale water purification systems to contribute to better hygiene and quality of life



Running programs for traffic safety and education across various markets and businesses



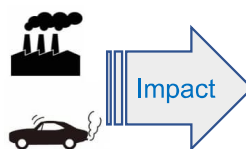
Water purification business for rural areas

■ Main Issue

Increased water pollution due to climate change will lead to increased pollution of water sources, which in turn will lead to increased number of sick people and reduced socioeconomic development due to deteriorating health.



Urban



Rural



Big

Economic activities

Small

Impact of the natural environment

Small

Impact of climate change on daily life

Big



Filtration



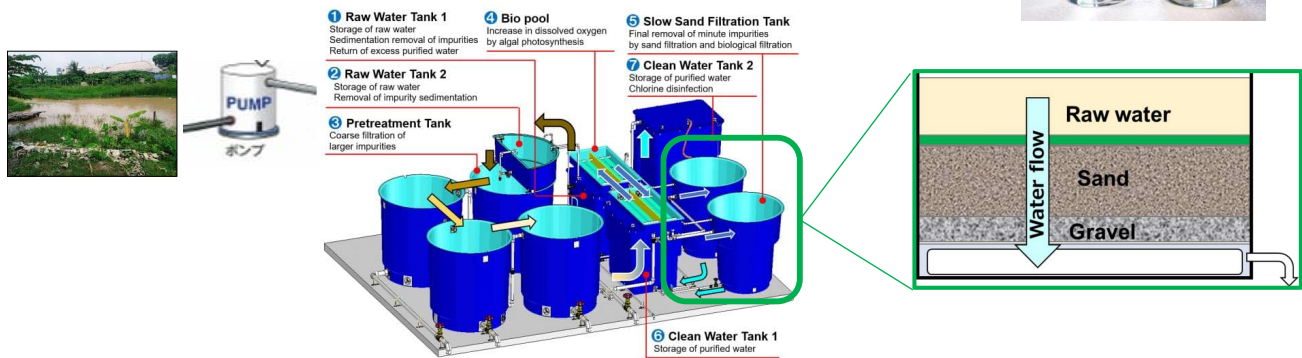
Safe Water



Environmentally-friendly with Slow Sand Filtration (Biological purification)

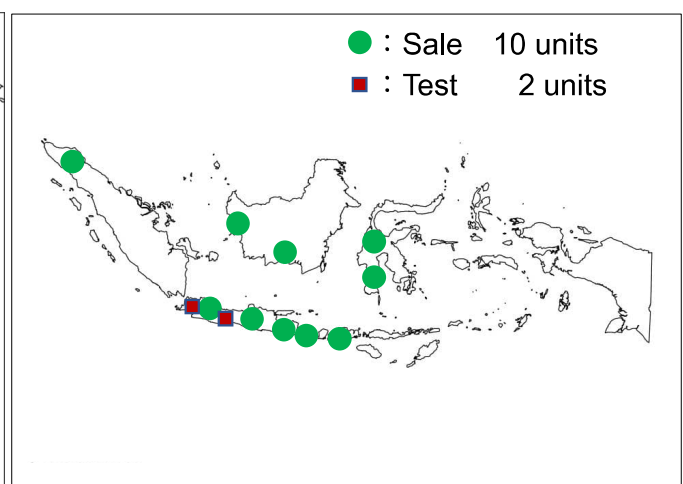
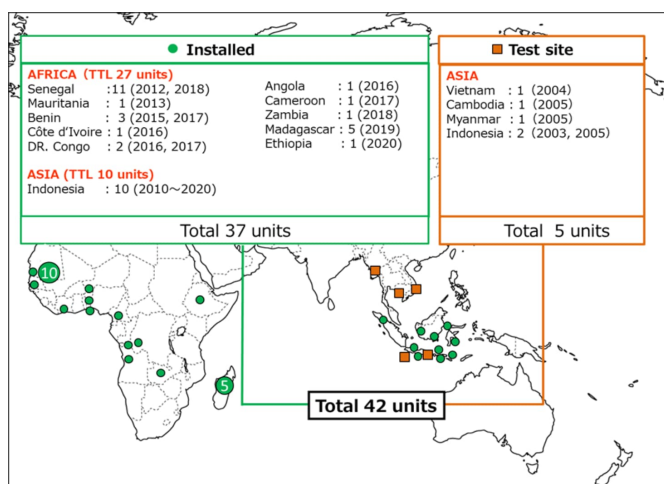
■ Features

- Low running cost (no consumables or parts to be replaced)
- Maintenance is easy (there is no need for engineers with special abilities)
- Environmentally Friendly to use natural water purification mechanism



Installation map (Dec 2021)

Total 42 units installed, mainly in Asia and Africa



Senegal _ West Africa



Ache _ Indonesia



Bali _ Indonesia



Malang _ Indonesia

Water delivery business by villagers



The system has also led job creation, such as water delivery in some cases.



As adaptive technology



Introduced in CTCN as a climate technology solution



CONNECTING COUNTRIES TO CLIMATE TECHNOLOGY SOLUTIONS



TECHNICAL ASSISTANCE NETWORK CAPACITY BUILDING COUNTRIES TECHNOLOGY SECTORS NEWS & MULTIMEDIA CALENDAR

Search ABOUT US CONTACT NEWSLETTER LOGIN

Home > Water treatment: YAMAHA Clean Water Supply System

Water treatment: YAMAHA Clean Water Supply System

Sectors:
Renewable energy

Objective:
Mitigation

Country:
Japan

YAMAHA Clean Water Supply System Improves People's Lives in Rural Areas



Yamaha Motor Co., Ltd. is offering a Clean Water Supply System designed to supply clean drinking water in rural areas using sand filtration. With a solar PV system, the system can be installed and run without being constrained by accessibility to electrical grid. The system does not require high running costs, neither complicated installation nor maintenance. As a result, the system has already been implemented many places in Asia and Africa (16 units in Asia; 27 units in Africa) since 2003, showing significant improvements in sanitation and health conditions in installed places.

CTCN Web site : <https://www.ctc-n.org/products/water-treatment-yamaha-clean-water-supply-system>

UNIDO Web site : https://www.unido.or.jp/en/technology_db/1674/

Yamaha Motor Web site : <https://global.yamaha-motor.com/business/cw/>

Changing water changes life

Terima Kasih Banyak



CTCN

CTCN's support mechanism

Clara Landeiro

CTCN Regional Manager, Asia-Pacific

Workshop "Private Sector Contribution to Climate Change Adaptation in Indonesia", 11 January 2022

CTCN

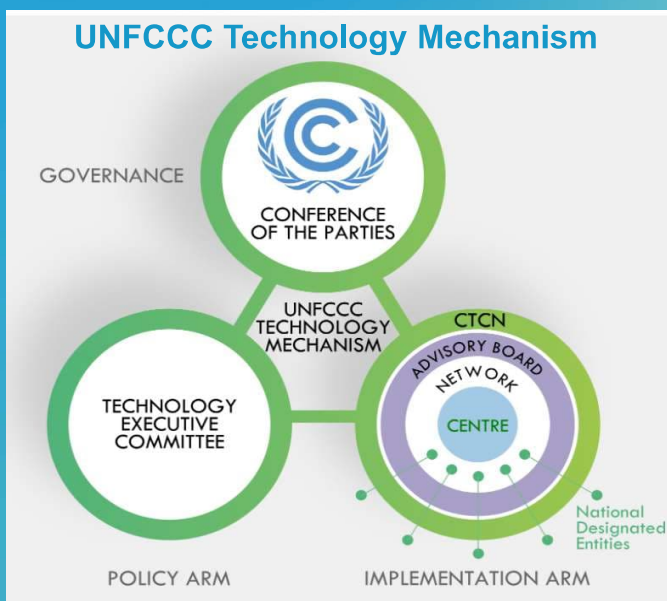
UNFCCC Climate Technology Centre & Network

UN environment
programme

UNFCCC

UNIDO

UNFCCC Technology Mechanism



mission..

to promote the accelerated development and transfer of climate technologies for energy-efficient, low-carbon and climate-resilient development, at the request of developing countries



Innovation, Collaboration, Networking, Capacity Building & Knowledge Sharing



CTCN Regional Forum for NDEs



Webinars



Capacity building initiatives

Innovation Hubs
SME Clinics

South-South
learning on
low-emission
transportation

Matchmaking events



Newsletter / Bulletin / Website



Publications

CTCN website (www.ctc-n.org)



Countries Receiving Technical Assistance



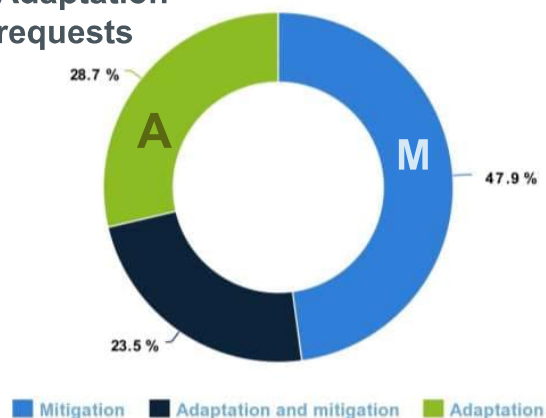
100+ countries
through their NDEs
and a network of
650+ members

- **300+ technology transfer initiatives**
- **30% TA requests from Asia-Pacific**

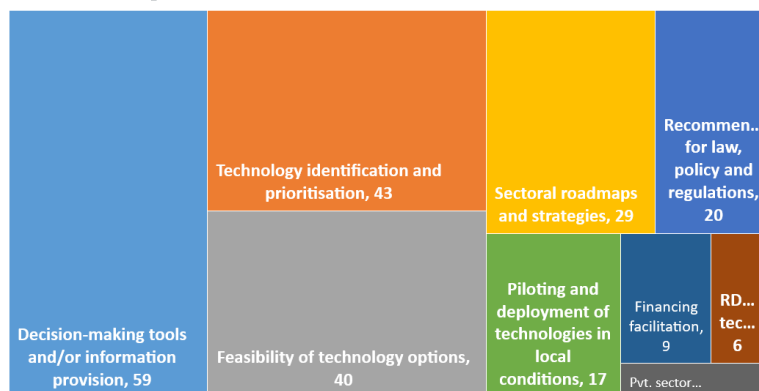
CTCN Technical assistance portfolio

Demand from developing countries..

Mitigation/ Adaptation requests



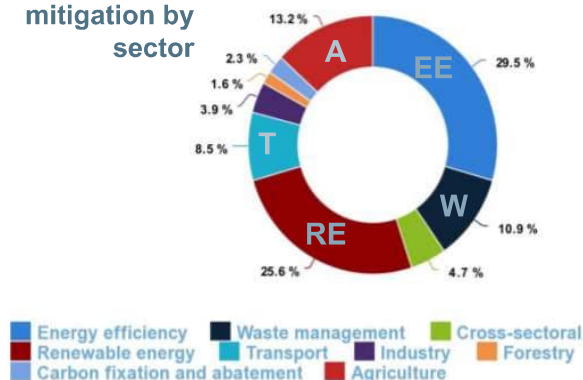
Type of TA requests



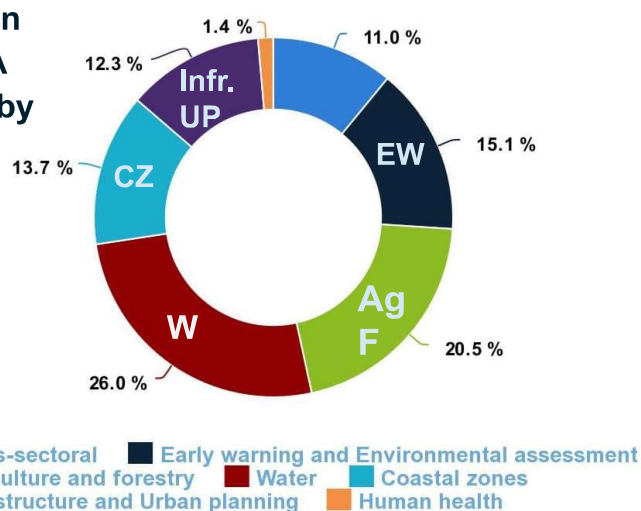
CTCN Technical assistance portfolio

Demand from developing countries..

TA requests related to mitigation by sector



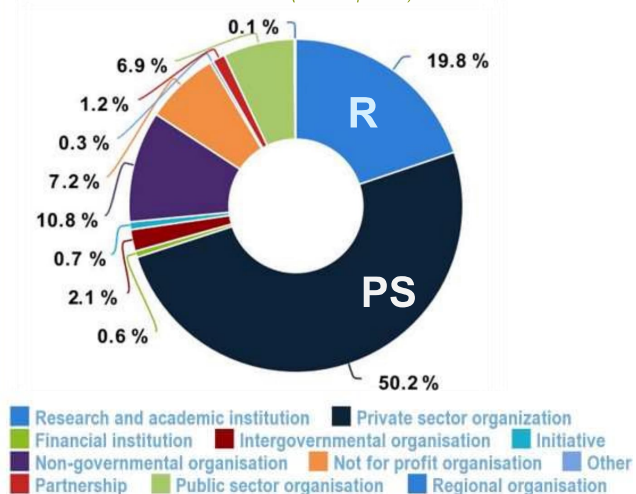
Adaptation related TA requests by Sector



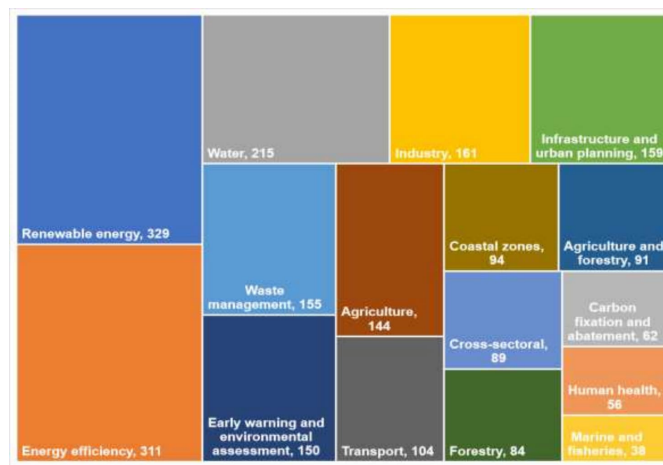
CTCN Network Members

650

Technology companies and organisations work with the CTCN (as of Sep 2021)



a wide range of expertise



Accessing CTCN Technical Assistance (TA)



Interested parties in developing countries contact their national focal point (National Designated Entity, NDE) to **request TA**.

The **NDE confirms the alignment** of the request with its national climate priorities and passes it along to the CTCN.

The CTCN collaborates with the NDE and applicants to develop a **tailored technology transfer plan**.

The Climate Technology Centre **selects a Network Member** to implement the technology solution.

Submission of
TA request



Appraisal of TA
request



Development of
TA response plan



Implementation of
TA response plan

CTCN technical assistance (TA)



Operation of the CTCN TA

- **Maximum duration of the CTCN TA:** 12 months
- **Maximum budget:** USD 250,000
- **No transfer of financial resources** to the TA proponent or the host country NDE
- **Hardware component** should **not be more than 10 - 15% of the total cost** of the CTCN TA
- **Intellectual property (IP) of products** generated through the CTCN TA **belongs to UNEP** (*open to the public*)

Role of the NDE and the TA proponent

- **(NDE)** Monitoring of the technical support provided, together with the CTCN
- **(TA proponent)** Main beneficiary of the CTCN TA (**NOT** the implementer of the CTCN TA)
- Support for coordination of the CTCN TA and facilitation of stakeholder engagement
- Provision of feedbacks to the CTCN and the TA implementer during the im

Accessing CTCN TA: *other opportunities*



CTCN/UNEP **AFCIA** - Adaptation Fund Climate Innovation Accelerator



ADAPTATION FUND

- **Objective:** Support developing countries to test, evaluate, rollout and scale up innovative adaptation practices, products and technologies
- **5-yr Budget:** USD 5 million (AF) + USD 1 million (CTCN)
- **Knowledge sharing**
- **Implementation:** **25 TA projects**
(*up to USD 250,000 each; up to 18 months*)
- **Who can apply?** Governments, NGOs, Private Sector, and other groups from developing countries without direct access to AF funds (like Thailand)
- **Need endorsement:** NDE and AF Designated Authority
- **PP cannot be the implementer** (IP: CTCN Network Member)

What is UNEP-CTCN AFCIA looking for in applications?

- Propose to test or scale up innovative climate technologies in their specific contexts
- Contribute to national adaptation priorities (NDC/NAP)
- Well-defined problem, clearly linked to CC
- Potential for replication/ scale-up
- Potential to leverage additional support



Access directly AFCIA via the link:
<https://www.ctc-n.org/afcia>

3rd Call for applications : **Q1 2022**

Accessing CTCN TA: *other opportunities*



PRO BONO CTCN TA



CTCN TA Pro bono portfolios from Japan and Korea

Engagement of Japan with CTCN

- **Support of CTCN operations**, including TA (Japan is the 2nd largest donor country of CTCN)
- **Pro bono support** (Ministry of Economy, Trade and Industry, METI)
 - Benchmarking Energy & GHGs Intensity in Metal Industry of Thailand (Feb 2017 - Jun 2018)
 - Technical Capability Enhancement to Promote Waste-to-Energy Technology in Vietnam (Aug 2021-..)
- **Japanese Network Members participate as implementers** of CTCN TA
 - E.g. Ocean energy technical pre-feasibility study (Nauru) - OECC
- **Japanese Network Members contribute to information sharing** on climate technologies via the CTCN knowledge platform



An example from Laos.. leveraging CTCN Technical Assistance



- **City Climate Vulnerability Assessment and Identification of Ecosystem-based Adaptation Intervention in Laos** (2017-2018)

Identified the vulnerability of people and ecosystems in each of the six cities and identified the overall costing of EbA interventions that would be required to respond for reducing climate risks.

Leveraged USD 11.5 million (GCF grant + Gov Laos in-kind)



- TA/FTA were the 1st step for a national scale assessment and mapping of climate change vulnerability
6 VAs (2017) → 145 VAs (2021) *The National Vulnerability Assessment Report was endorsed by MONRE in 2021 and is being distributed to all relevant sectors*
- They built the foundation for work in other sectors (e.g. GEF proposals IWRM, C. Finance)
GEF proposals being finalized on Integrated Water Resource Management and Ecosystem-based Adaptation in the Xe Bang Hieng river basin and Luang Prabang city, and on Piloting innovative financing for medium-sized cities (the CTCN GEF challenge program)
- They were instrumental in leveraging financing to implement adaptation measures
\$ 270 K → \$11.5 Million *GCF project to build resilience in 4 city populations with ecosystem-based solutions.*

>> **CTCN support has been catalytic, transformational, and has helped leverage larger financing**

Explore opportunities..

Contact us..



► Contact Indonesia's NDE with your ideas for potential TA requests/support..

Consider leveraging CTCN support (regular TA, FTA, Pro bono TA, GCF Readiness, special programs) to support technology needs for NAP / NDC implementation

► Do not miss the opportunity to tap into AFCIA support to innovative adaptation technologies.. 3rd call in Q1 2022 <https://www.ctc-n.org/afcia>

► To our private sector colleagues from Japan: Join the CTC-Network

► Find out more: Climate technology knowledge portal <https://www.ctc-n.org>

The website hosts nearly 17,000 publications, case studies, tools and webinars on climate change adaptation and mitigation, women and gender, etc.

Technology Sectors

Sectors

Adaptation



Recorded webinars



CTCN Virtual Regional Meetings: Forum for Annex I NDEs (video)



Highlights from the UNFCCC Technology Mechanism event: Together we can recover better (video)



CTCN Virtual Regional Meetings: Forum for the NDEs in Pacific (video)



Thank you

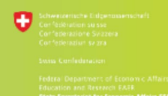
Email: h.chon@unido.org

CTCN Secretariat
UN City, Marmtorvej 51
DK-2100 Copenhagen, Denmark
www.ctc-n.org
ctcn@un.org

UNFCCC_CTCN

UNFCCC.CTCN

Supported by



Examples

CTCN technical assistance for adaptation in Asia-Pacific



■ Infrastructure and urban planning sector

- (Sri Lanka) **Development of Kurunegala as a climate smart city**

Development of *the adaptation action plan (water scarcity and heat stress)* and *the manual for local adaptation planning* would help local government officials in Sri Lanka take action to reduce climate risk at city/local levels.

- (Indonesia) **Hydrodynamic modelling for flood reduction and climate resilient infrastructure development pathways in Jakarta**

Development of *the high-resolution hydrodynamic model* and socio-cultural survey would improve capacity of relevant government agencies to formulate policy and action plans to reduce flooding and support sustainable city planning in Jakarta.



Examples

CTCN technical assistance for adaptation in Asia-Pacific



■ Coastal zones sector

- (Kiribati, Marshall Islands, Palau & Solomon Islands) **Capacity development to address risks in coastal**

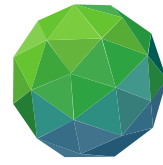
Development of *the bathymetric (standardised bathymetric grids and digital elevation grids)* and *the wave models* for four Pacific island states would provide a coastal modeling tool that outlines 'high hazard' areas and could be used in coastal zone risk management and planning.

- (Bangladesh) **Technology for monitoring & assessment of climate change impact on geomorphology in the coastal areas of Bangladesh**

Development of *the methodology for use of earth observation (EO) tool* would enhance capacity of technical staff and decision makers to utilise modern EO techniques to monitor climate change challenges and provide early warning of bank erosion in the coastal zone of Bangladesh.



INTRODUCTION TO THE GCF



GREEN
CLIMATE
FUND

Vladislav Arnaoudov | Senior Quality Assurance and M&E Specialist

11 January 2021



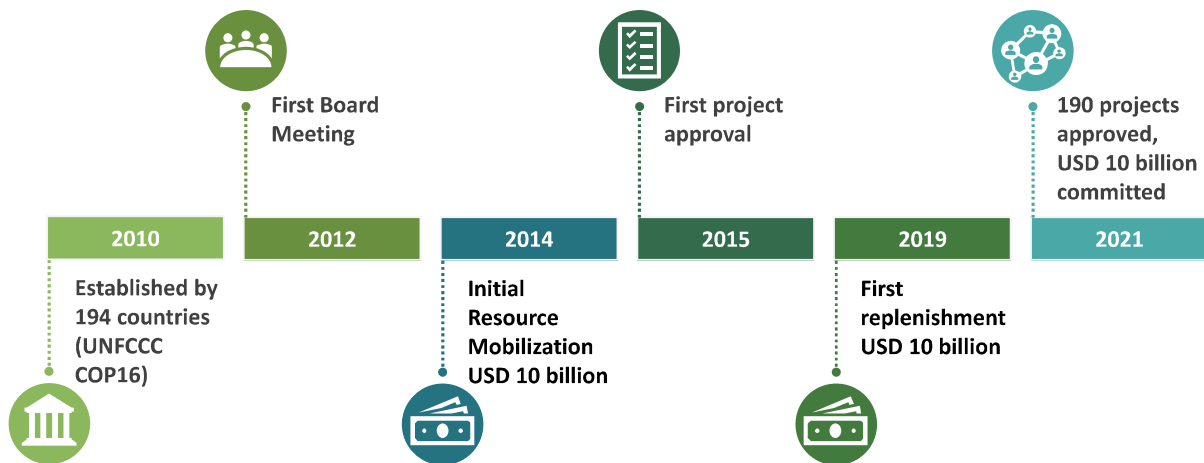
GREEN
CLIMATE
FUND

1 | GREEN CLIMATE FUND





HISTORY OF THE GCF

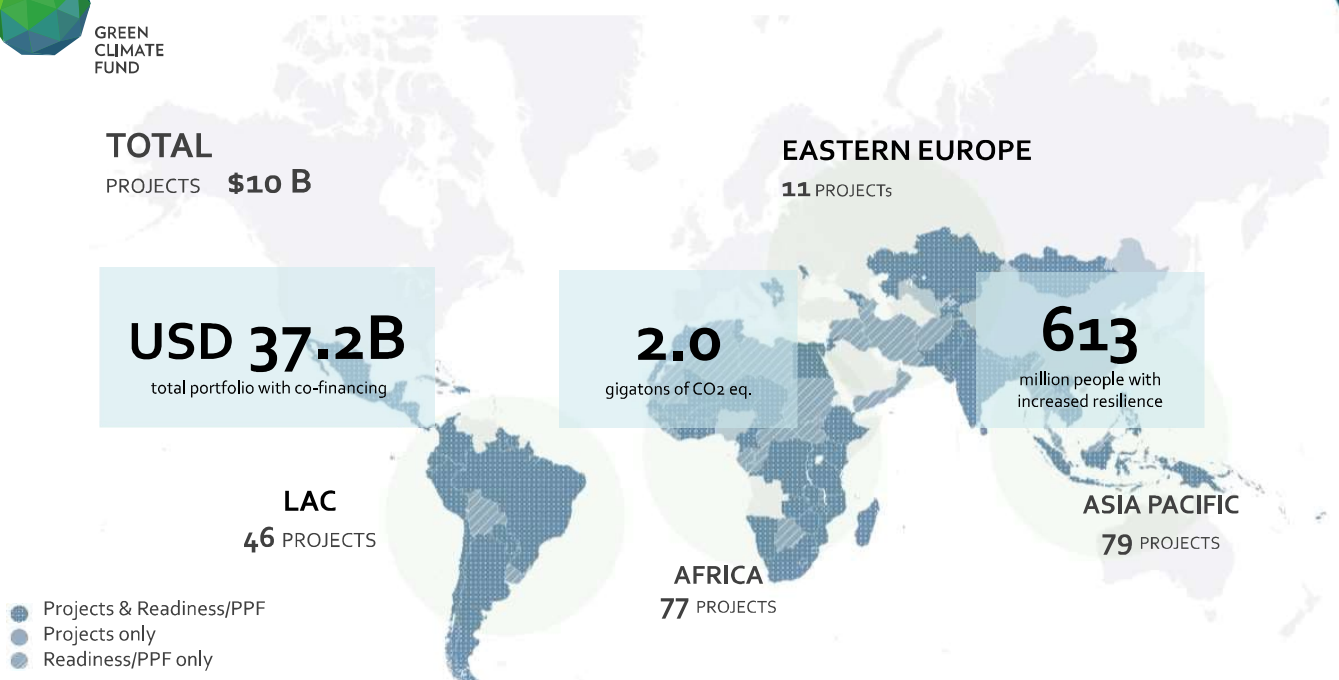


The largest specialized climate fund. Part of the UNFCCC financial mechanism. Supports countries to achieve paradigm shift toward low emission and resilient development

3



OUR PORTFOLIO

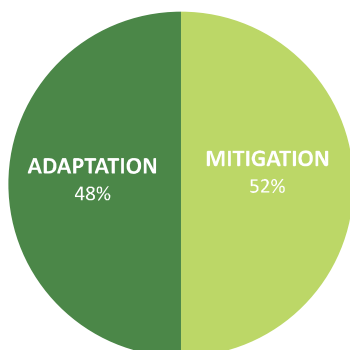


Source: Green Climate Fund (September 2020)

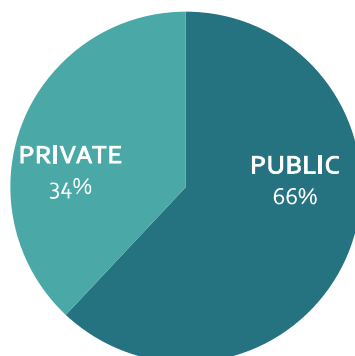
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OUR PORTFOLIO

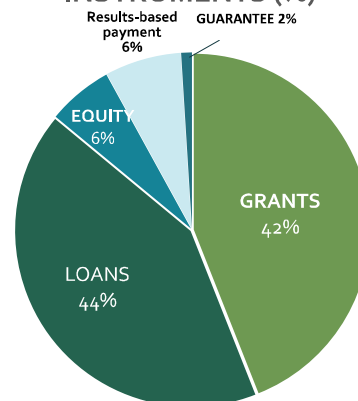
AREAS
(Grant equivalent terms)



**PUBLIC AND PRIVATE
SECTOR**



**FINANCIAL
INSTRUMENTS (%)**



5

WHAT WE LOOK FOR

Additionality of GCF Funding - Why GCF? - Projects must crowd-in additional financing on top of GCF	Strong Climate Rationale - Climate Impact of investment is key - Scientific evidence to provided	8 Results Areas  Energy  Transport  Buildings, Cities, Industries  Ecosystems  Livelihoods of people & comm.  Health, food and water security  Forests and land use  Infrastructure	Compliance with GCF Policies - Fiduciary standards - Risk Management - ESS - M&E Criteria - Gender Policy - Legal Standards
Country Driven Approach - Alignment with NDCs - Early country (NDA) engagement - No-objection letter	Six Investment Criteria - Impact Potential - Paradigm Shift Potential - Sustainable development potential - Recipient needs - Country ownership - Efficiency & effectiveness		Completeness of documentation - Feasibility study - Financial Model - Project Timetable - Gender Analysis - Environmental studies - No-objection letter



2 PROJECT EXAMPLES

Adaptation Project

Global Fund for Coral Reefs

Country	GCF financing	Accredited entity	Financial instrument
Indonesia + 16 other countries	USD 125 million	Pegasus CA	Equity

- The project creates a private equity fund to encourage investments in the blue economy and protection of coral reefs
- Anchor investment to encouraging further public and private sector investment in sustainable ocean production, ecotourism, and sustainable infrastructure and waste management.
- Synergies with the grant window to foster enabling environment for seeding a pipeline of investment-ready projects



Co-Financing
Equity **USD 375 M**

PEGASUS
CAPITAL ADVISORS

9

Attachment 4: Presentation Material of Japan Pavilion

- (1) EY / Contribution by application of NbS in business activity: Climate Change Adaptation Good Practices by Japanese Private Sector

Contribution by application of NbS in business activity

~Climate Change Adaptation Good Practices by Japanese Private Sector~

Ernst & Young ShinNihon LLC

3 Nov 2021



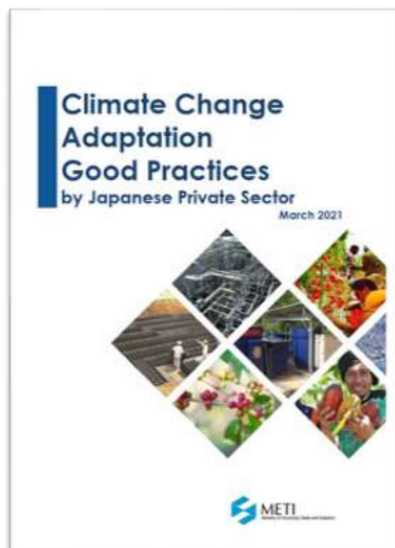
Contents of today's presentation

1. METI's effort on engagement of private sector in climate change adaptation
2. Example of good practices on application of Nbs by private sector
 - 2.1 Prevention of soil surface erosion with soil algae (BSC methodology) /Nikken Sohonsa Corporation and Nippon Koei Co., Ltd.
 - 2.2 Organic soil afforestation to prevent flood and protect eco system
 - 1) Production of cosmetic raw materials/from far east inc.
 - 2) Production of organic cotton/Sunford Co., Ltd.



1. METI's effort on engagement of private sector in climate change adaptation

- ▶ Ministry of Economy Trade and Industry (METI) Japan has been paying particular attention to contribution of the private sector to climate change adaptation measures in countries those highly vulnerable to climate impacts.
- ▶ Examples of business contributions to climate change adaptation are summarized in the collection of good practices.
- ▶ Some good practices are adopting NbS to contribute to climate change adaptation.



https://www.meti.go.jp/policy/energy_environment/global_warming/adaptation_goodpractice_FY2020ENG.pdf

Page 3

EY

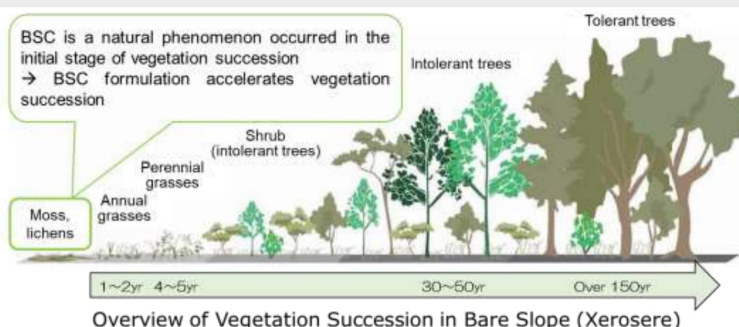
2. Good practices of NbS by private sector

2.1.Prevention of soil surface erosion with soil algae (BSC methodology)

Company	Nikken Sohonsa Corporation [http://chlostanin.co.jp/] Nippon Koei Co., Ltd. [https://www.n-koei.co.jp/]
Country of NbS implemented	Nepal (JICA Collaboration Program with the Private Sector*)
Technology/Product	Biological Soil Crust (BSC) is a colony of algae, moss and lichens which covers soil surface in the initial stage of vegetation succession. After spraying BSC-1 mixed with water onto slope, it formulates networks among soil particles. It covers soil surface and prevents erosion, then accelerates recovery of grasses and trees. Since soil algae applied in BSC method is cosmopolitan species, there is no risk of hybridization and genetic disturbance. BSC method needs only to spray liquid of soil algae on the slope surface, which is more reasonable than other methods.
Business Model	Planning and implementation service including production and sales of algae material, site evaluation etc.



▲BSC material



*Collaboration Program with the Private Sector for Disseminating Japanese Technology for Environment-Friendly Slope Restoration with Soil Algae in Nepal, implemented by the Joint Venture (JV) between Nikken Sohonsa Corporation and Nippon Koei Co., Ltd. based on the contract with JICA (from February 2019 to March 2021)

Page 4

EY

2.2 Organic soil afforestation to prevent flood and protect eco system

1) Production of cosmetic raw materials

Company	from far east inc. [http://minnademirao.net]
Country of business implemented	Cambodia
Technology/Product	Afforestation using organic soil improver to increase productivity of plant for medical/pharmaceutical ingredients
Business Model	Cosmetic made from ingredients is marketed as high value-added product. Profit is re-invested into expansion of afforestation areas.



Vegetation plan



Afforestation



Vegetation in the project



Cultivation



Cultivated plants



Oil extraction



◀ Products for Japan Market:
(Top Left) Moringa Tablet
(Bottom Left) Moringa Oil
(Right) Organic Shampoo

2.2 Organic soil afforestation to prevent flood and protect eco system

2) Production of organic cotton

Company	Sunford Co., Ltd. [http://www.sunrallygroup.co.jp/group/sunford/]
Country of business implemented	Cambodia
Technology/Product	Afforestation and organic cotton farming through agroforestry
Business Model	Clothing made from the cotton will be marketed in Japan with added social and environmental values. Profits will be re-invested into afforestation and establishes circular business model.



Cotton before Harvest



Seeds Removal from Cotton Harvest



"T-shirts for Pilot Marketing



Growth of Cotton in the Fields



Twisted yarn



Non-woven fabric by pearl stick

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Attachment 5: Presentation Material of Indonesia Pavilion

- (1) EY / Engaging Private Sector to Support Climate Change Action in the Local Level: Climate Change Adaptation Good Practices by Japanese Private Sector

Engaging Private Sector to Support Climate Change Action in the Local Level

~Climate Change Adaptation Good Practices by Japanese Private Sector~

Ernst & Young ShinNihon LLC

9 Nov 2021



Contents of today's presentation

1. Needs for technology and solution to support local communities to adapt to climate change
2. METI's effort on private sector's engagement in climate change adaptation
3. Good practices of Japanese companies to support climate change actions in the local level in Indonesia
 - 3.1 Improving village people's lives through introduction of power supply container
/Panasonic Corporation
 - 3.2 Adapting to changing cultivation environment for traditional crops
/Dari K Co., Ltd.
 - 3.3 Clean water supply in villages
/Yamaha Motor Co., Ltd.



1. Needs for technology and solution to support local communities to adapt to climate change

- ▶ The effects of climate change have become serious in recent years.
- ▶ People in villages, whose livelihoods depend on natural resources, are vulnerable to these impacts.
- ▶ There are technologies and solution of private sector which can contribute to climate change adaptation and resilience of local communities.



Technologies and solutions which can contribute to climate change adaptation



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Source: https://www.meti.go.jp/policy/energy_environment/global_warming/adaptation_goodpractice_FY2020ENG.pdf

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2. METI's effort on promoting private sector engagement in climate change adaptation



- ▶ Ministry of Economy Trade and Industry (METI) Japan has been paying particular attention to possible contribution of the private sector to climate change adaptation measures in countries those highly vulnerable to climate impacts.
- ▶ Examples of business contributions to climate change adaptation are summarized in the collection of good practices.
- ▶ There are good practices of adaptation activities involving local communities as well.



https://www.meti.go.jp/policy/energy_environment/global_warming/adaptation_goodpractice_FY2020ENG.pdf

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3.1. Improving village people's lives through clean energy supply /Panasonic Corporation

- ▶ *Panasonic* offers “Power Supply Container”, a stand-alone photovoltaic power package to villages in West Kalimantan.
- ▶ *Panasonic* also supported the creation of local industries/means of livelihood by utilizing electricity:
 - ▶ Improving the efficiency of fish processing
 - ▶ Processing and marketing of agricultural products
 - ▶ Quality improvement of natural honey processing methods
- ▶ Improving the lives of communities and strengthening their resilience by creating value-added, marketable products.

West Kalimantan and others



Manufacture marketable products and improve livelihoods of villagers



Clean Electricity Supply



Source: Panasonic website



Moringa products



Honey



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3.2 Adapting to changing cultivation environment for traditional crops /Dari K Co., Ltd.

- ▶ *Dari K* promotes conversion from traditional agricultural products to high-quality cacao which requires less water and fertilizer.
- ▶ Weather-consistent agriculture of value added crops contributes to sustainable food supply and greater income of farmers.
- ▶ Provides hands-on guidance on fermentation technology which is necessary for producing tasty chocolate and improving quality of cacao beans.
- ▶ Purchase fermented high-quality cacao beans directly from local farmers and improve farmers revenue.

Sulawesi



High quality cacao through agroforestry



Fermentation Process



Quality Check & Direct Purchase



High quality cacao product

Source: Dari K website

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3.3 Clean water supply in villages /Yamaha Motor Co., Ltd.

- ▶ Yamaha Motor introduced “Yamaha Clean Water Supply System”, a small-sized water purifier, in villages in Sumbawa and other islands.
- ▶ The system contributed to reduce the outbreak of diarrhea, fever and other illnesses caused by polluted water.
- ▶ The system has also led job creation, such as water delivery and ice making in some cases.



Sumbawa and others

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Source: Yamaha Motor website **EY**

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