STI showcase

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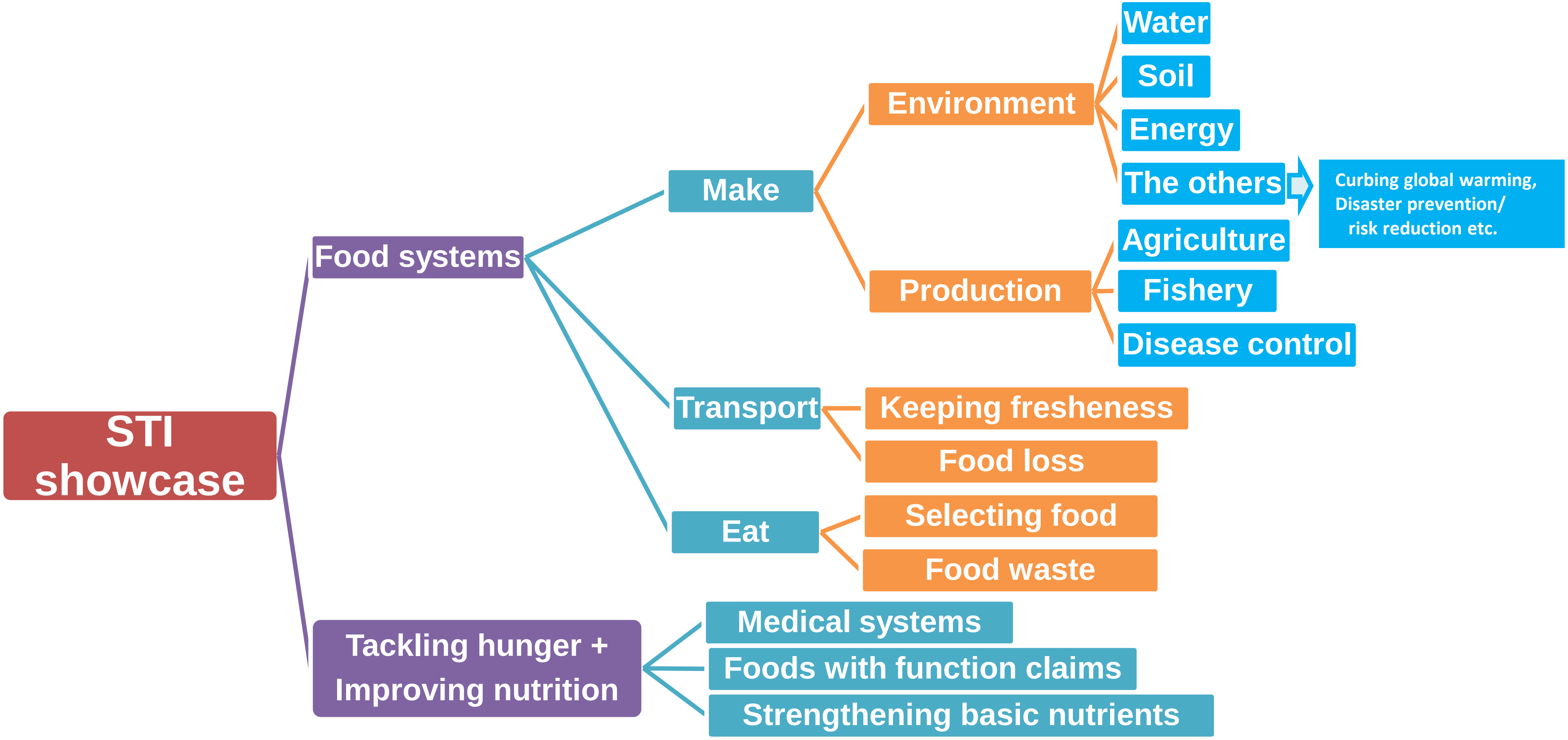
Advisory Board for Promoting Science and Technology Diplomacy

Ministry of Foreign Affairs of Japan

Classification of STI showcase (as of Dec. 2021)



Classification

◎ : Immidiately applicable
○ : Applicable
☆ : Available in the near future

●Science,Technology, and Innovation (STI) Name：

●Issues：

●STI Description：

●Collaborating STI：

●Applicable conditions and the examples of social implementations (SI):

Explanation

Credit

Food Systems | Make | Environment | Water

●STI Name:

Photocatalytic drinking water purification technology

●Issues:

Purification of bacteria-contaminated drinking water in areas with poor infrastructure in developing countries

●STI Description:

- Achieve SDG 6: "Access to Safe Water" by Solar photocatalysis
- Develop photocatalytic materials that can be used semipermanently in water
- Evaluate the effect of groundwater components on photocatalytic performance, and design a photocatalytic water treatment system
- Varify performance of the photocatalytic water purifier in a hill tribe village in Chiang Rai Province, Thailand

●Collaborating STI:

- Technology for access to safe water

●Applicable conditions and SI examples:

- Instillation of the drinking water supply system in areas with poor infrastructure in developing countries

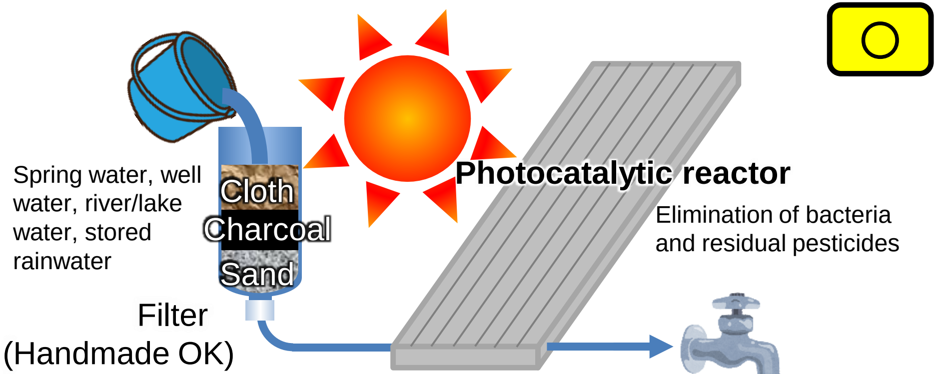


Fig. 1 Water purification by solar irradiation only

Fig. 2 TiO_2 ceramic photocatalyst

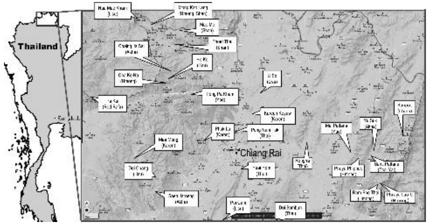


Fig. 3 Field investigation. Extraction of problems associated with drinking water (Chiang Rai province, Thailand).

Fig. 4 Field Test in Thailand

AIST

Food Systems | **Make** | **Environment** | **Water**

●STI Name：
Energy saving desalination system with an integrated water reuse process

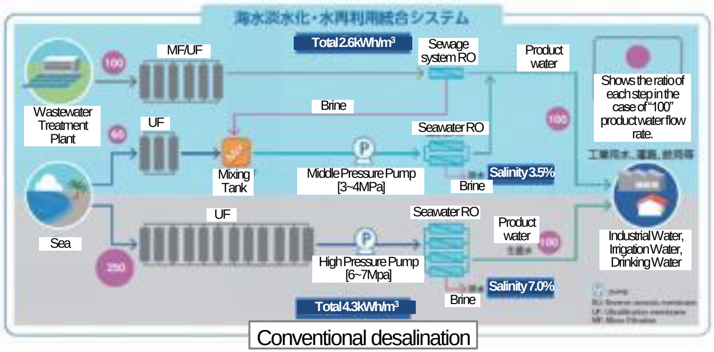
●Issues：
·Reduce desalination cost
·Utilize treated wastewater
· Using “Sea water” and “Treated wastewater” are renewable resources

●STI Description：
·Dilute Brine with treated wastewater to reduce the salinity to the same level as seawater
·Using RO membranes

●Collaborating STI：

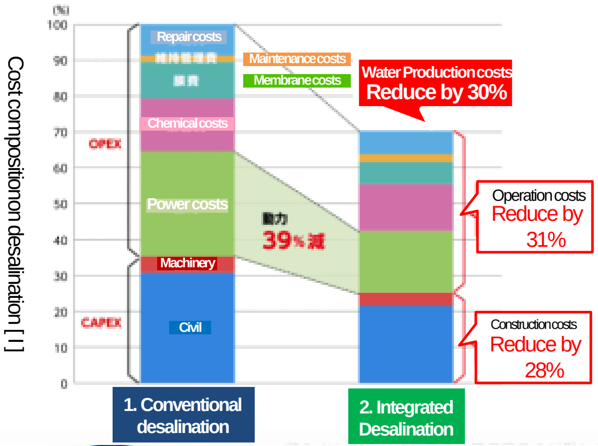
●Applicable conditions and SI examples:
Republic of South Africa (under demonstration)

Energy saving desalination system with an integrated water reuse process



Conventional desalination

Planned Water Production of the Demonstration Project in South Africa : 6,250t/d



NEDO 国立研究開発法人 新エネルギー・産業技術総合開発機構

Food Systems | Make | Environment | Soil | Curbing global warming

●STI Name：
Life cycle GHG emission reduction by alternate wetting and drying (AWD) irrigation technique in rice paddies

●Issues： GHG emission reduction

●STI Description：

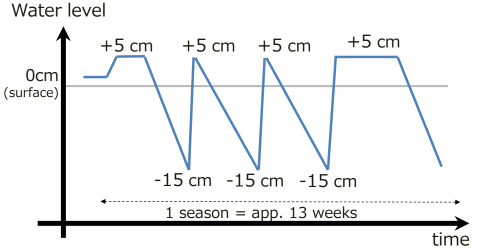
Life cycle GHG emission, including soil CH4, can be reduced by 41% through repeated natural drainage of paddy surface water to -15 cm relative to keeping +5 cm as conventional.

●Collaborating STI：

Management practices for conserving water resources, including ICT utilization.

●Applicable conditions and SI examples:

AWD is feasible in irrigated rice areas in Monsoon Asia. For further disseminating AWD, it is necessary to establish an institution, which is also beneficial to farmers.



Surface water is naturally drained to -15 cm after flooding at +5 cm as conventional. The irrigation-drainage cycle is then repeated.

Fig. 1. Schematic of AWD irrigation technique.

Photo. Measurement of soil GHG emissions by a closed chamber method in a rice paddy with AWD.

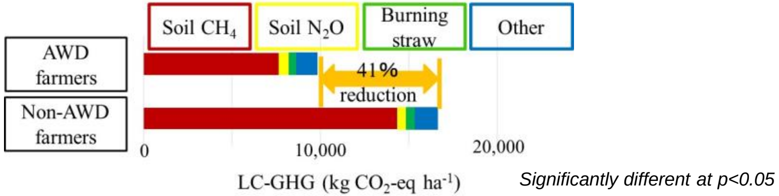


Fig. 2. Comparing GHG emissions between AWD farmers and non-AWD farmers

Leon A et al. (2020) Journal of Cleaner Production, 285:125309

https://doi.org/10.1016/j.jclepro.2020.125309

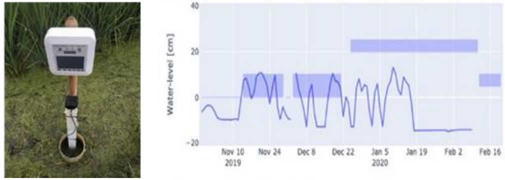


Fig. 3. Automated remote monitoring of paddy surface water level using an ICT device.

Food Systems | Make | Environment | Soil

●STI Name：

An underdrain-drilling machine “Cut Drain”: Easy construction of subsurface drainage with no materials required

●Issues：

Farmland with poor drainage and semi-arid region with salt damage.

●STI Description：

The machine towed by a tractor constructs the underdrainage in the subsurface of farmland. The machine can apply to the flat and argillaceous farmland. Tractor makers in Japan deal in the machine.

●Collaborating STI：

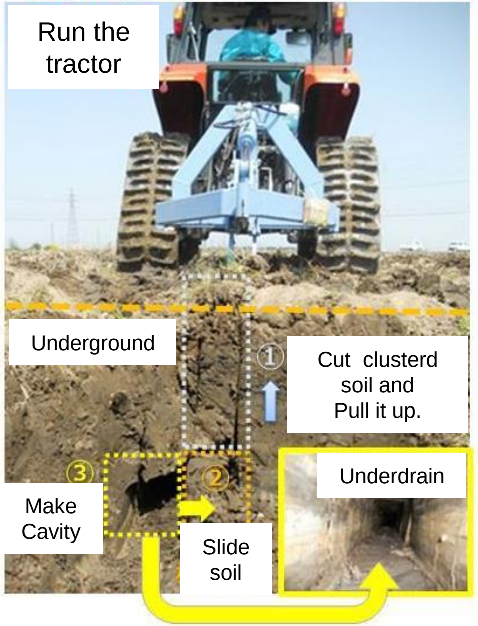
Usage of Automatic steerage and Robot tractor. Field trials demonstrated the effectiveness of the machine at Hokkaido, Japan. GPS and GIS support the construction management in the farmland.

●Applicable conditions and SI examples:

Field trial demonstrated the effectiveness of the machine in Uzbekistan for improving drainage and salt-damaged farmland.This system can be applied to low-level wetland and salt-damage area in Asia and Africa.

The appearance of the Machine

Work scenery



Construction process of underdrainage

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Food Systems | Make | Environment | Soil

●STI Name：
Production technology of phosphorus fertilizer utilizing low grade phosphate rock

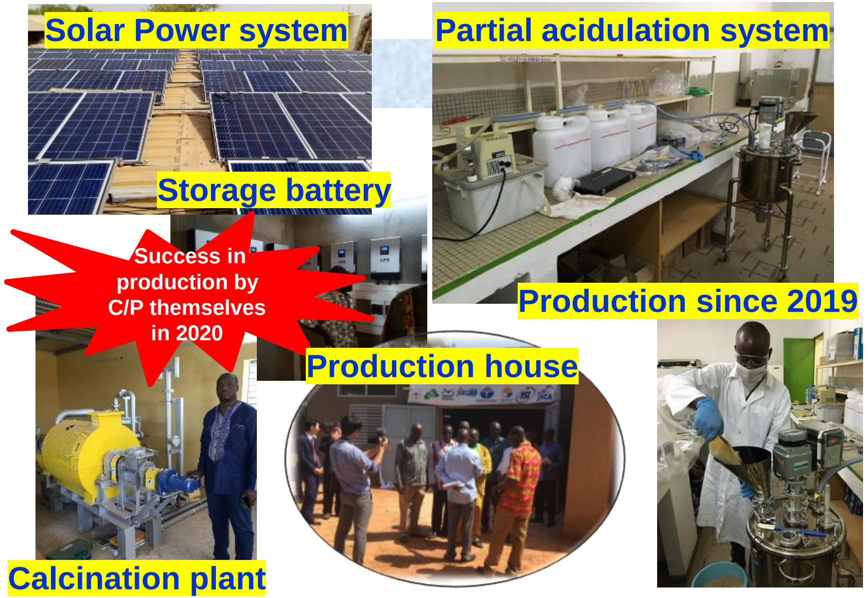
●Issues：
・Increase in agricultural productivity and suppression of cultivated area expansion

●STI Description：
・Local fertilizer production and promotion utilizing low grade phosphate rock (Calcination and Partial acidulation) and improvement of fertilization technics

●Collaborating STI：
・Optimum cultivation management technology
・Economic and clean phosphate rock utilization

●Applicable conditions and SI examples:
African countries where low grade phosphate rock resources are available (Burkina Faso, Zambia, Nigeria, Ethiopia, etc.)

Technical transfer and start of local production



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Food Systems | Make | Environment | Soil

●STI Name: Development of Comprehensive International Geoinformation Sharing Infrastructure

●Issues:

Visualization of Asian "Terroir" based on various geoinformation datasets

●STI Description:

- Develop an International Geoinformation Sharing Infrastructure in collaboration with East and Southeast Asian Countries
- Sharing more than 800 geospatial data such as geological maps and hazard maps
- Geoinformation sharing portal sites are developed based on thematic projects such as mineral resources and geological hazards
- Conduct technology trainings on WebGIS technology for Asian countries

●Collaborating STI:

- Sharing data such as food production condition in some areas in each country

●Applicable conditions and SI examples:

- CCOP Geoinformation Sharing System, OneGeology

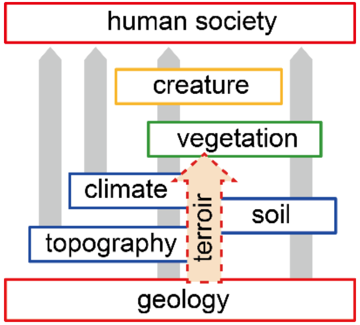

Fig.1 Compilation and management of terroir data

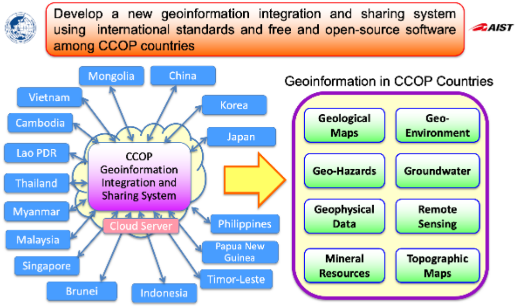

Fig.2 Concept of CCOP Geoinformation Sharing Infrastructure (CCOP GSi)

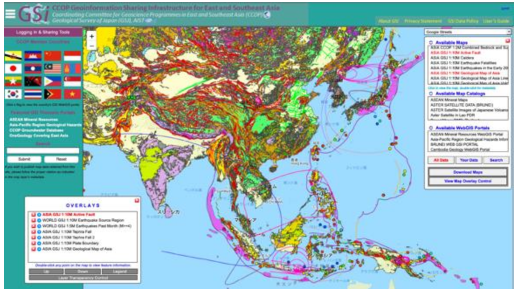

Fig. 3 Browse and search system of the CCOP GSi portal

Fig. 4 Annual international training courses on WebGIS technology for Asian countries

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●STI Name：Synecoculture™

●Issues：

Introduced Synecoculture by planting 150 kinds of useful plants in desertified land (500㎡). Successfully greened the land by restoring ecosystem with augmented biodiversity in a year.

●STI Description：

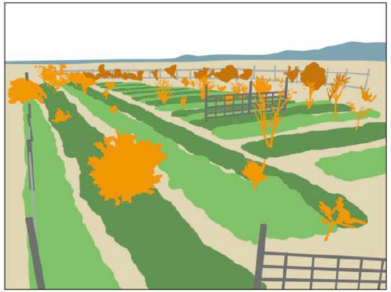
Synecoculture farming is an open-field crop cultivation method, without the use of tillage/fertilizer/pesticide/herbicide. It requires a high variety of seeds and seedlings to produce useful plants in ecological optimum state. This is accomplished through interactive control of the ecosystem that makes intelligent use of the natural characteristics of the plant.

●Collaborating STI：

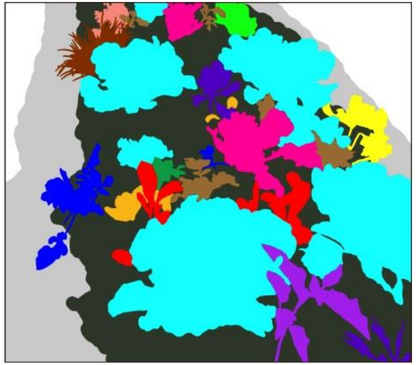
Augmented ecosystems and related supporting technologies

●Applicable conditions and SI examples:

Small-scale agriculture in semi-arid areas
Africa: Burkina Faso (2015-), Mali (2019-)



Productive Surface
Fruit Trees
Fences for Vines



Chou chinois
Aubergine
Komatsuna
Pak-choï
Chou-fleur
Pomme de terre
Radis daikon
Chrysantème
Chou violet
Bardane
Ciboulette
Chou
Carotte
Autres herbes
Passage

Sony CSL

Food Systems | Make | Environment | Energy | Curbing global warming

○

●STI Name: Value added technology of old oil palm trunk (OPT)

●Issues:

Recycling of oil palm trunk (OPT) left in oil palm plantations.
OPT has the problem of the spread of soil pathogens and the outbreak of GHG when OPT are cut down for replantation.

●STI Description:

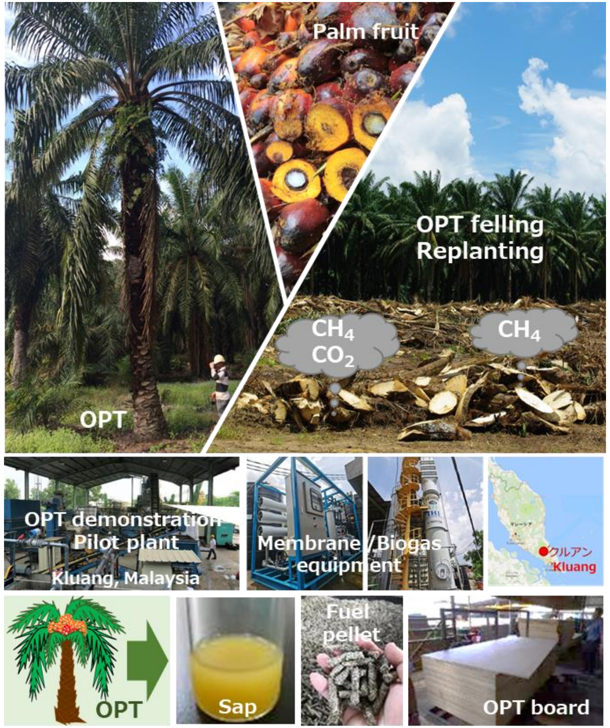
New manufacturing technologies for value-added products such as biogas, biomaterials, and fuel pellets are developed toward the advanced resource recovery of OPT.

● Collaborating STI:

The latest zero-emission technology of Japanese and Malaysian small companies involved in mortar, squeezing, and water treatment is concentrated in the plant equipment at the demonstration test site.

●Applicable conditions and SI examples:

Applicable to palm oil producing countries (Malaysia / Indonesia).Direct contribution to Japan’s GHG reduction.



https://www.jircas.go.jp/ja/satreps/topics/activity/20190718

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Food Systems | Make | Environment | Curbing global warming

●STI Name:

Prolonged midseason drainage in paddy fields for keeping the agricultural production while mitigating the emissions of greenhouse gas (GHG)

●Issues:

mitigating the GHG (CH_4) emission from paddy fields.

*The global warming potential of CH4 (Methane) is 25 times higher than that of CO_2.
The paddy fields emitted ca.480 Million tonnes of CO_2 per year corresponding to the 10% GHG emitted by the global agricultural sector.

●STI Description:

Prolonged midseason drainage** of paddy fields for a week longer than usual reduces CH_4 emission by ca.30% without any negative impact on rice production rate and quality.

**Intermittent drainage for one to two weeks during the cultivation period to improve the production and quality of rice.

●Collaborating STI:

Analytical methods of GHGs emissions from paddy fields.

●Applicable conditions and SI examples:

Filed trials to reduce CH_4 emission were carried out in Vietnam, the Philippines, Thailand, Indonesia, and India. This system can be applied to paddy fields all over the world.

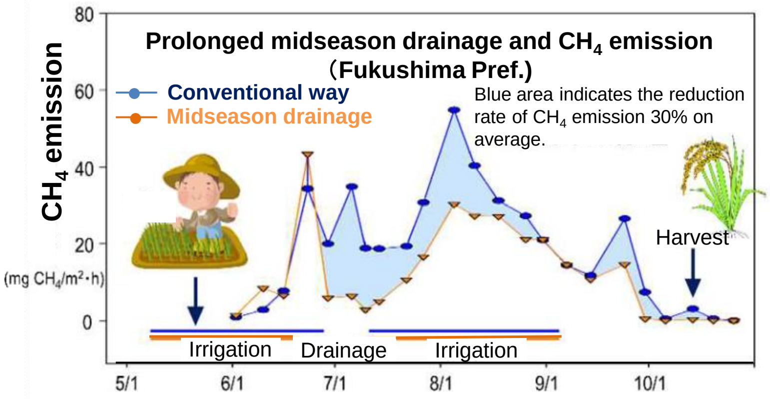

Fig.1. CH_4 emission and the effect of prolonged midseason drainage

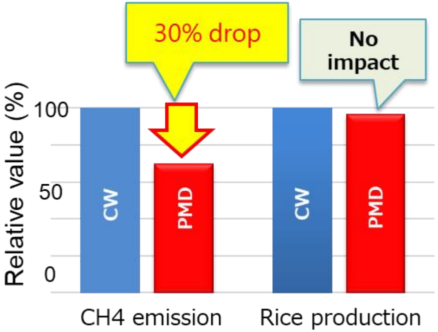

Fig.2. CH4 emission and the impacts on rice

CW, Conventional way;
PMD, Prolonged midseason drainage

Midseason drainage in paddy fields

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Food Systems | Make | Environment | Agri. | Curbing global warming

●STI Name:

Mitigation of methane emission from Vietnamese local cattle (Lai Sind) by cashew nut shell liquid (CNSL) feeding

●Issues:

GHG emission from livestock production sector

●STI Description:

CNSL feeding to Vietnamese local cattle (Lai Sind) can affect the methanogens in the rumen and it can mitigate 20.2%–23.4% of methane emission from enteric fermentation.

●Collaborating STI:

livestock production

●Applicable conditions and SI examples:

This technology can utilize the huge amount of cashew shell which is produced as biproduct from cashew nut production in Vietnam.

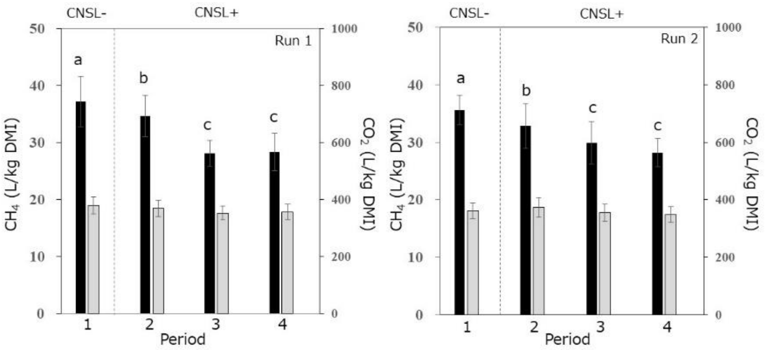

Figure: Enteric CH_4 (black) and CO_2 (grey) emissions per kg dry matter intake (DMI) from Lai Sind cattle with (periods 2–4) and without (period 1) CNSL feeding (n = 4). Different doses of CNSL were set in Run 1 (4 g/100 kg BW: A) and Run 2 (6 g/100 kg BW: B). CNSL feeding can mitigate enteric CH_4 emission by 23.4%. Maeda *et al*. (2020) Microb. Biotechnol. doi:10.1111/1751-7915.13702

Cashew nut (*Anacardium occidentale*)

IDEMITSU

- 30% of shell weight is oil
- 60% of the sell oil is anacardic acids
- Anacardic acid has <u>anticrobial function</u>

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Food Systems | Make | Environment | Agri.

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●STI Name：
Rice breeding by using genomic information

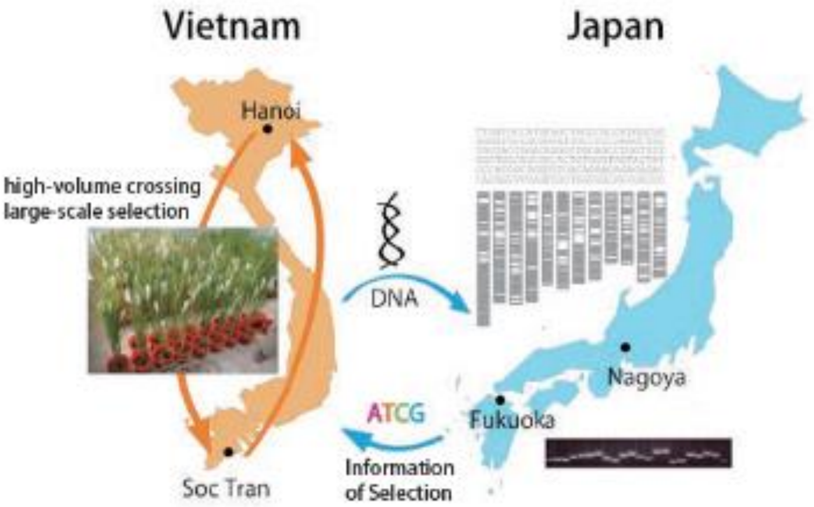
●Issues：
Increase of rice productivity in northern Vietnam under cold climate

●STI Description：
Development of new rice varieties which fit cold climate in efficient way through genotyping by sequencing

●Collaborating STI：
Accumulation of genetic information on potential rice strains

●Applicable conditions and SI examples:
Development of new rice varieties which can be applied for various agricultural environment in the world

https://www.jica.go.jp/project/vietnam/014/outline/index.html



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●STI Name：
App for smart-agriculture

●Issues：

Increase of crop productivity

●STI Description：

Apps for irrigation/water management, and pest control

●Collaborating STI：
Accumulation of genetic information on potential rice strains

●Applicable conditions and SI examples:
Utilization of apps on irrigation/water management, and pest control in Myanmar

Application on irrigation/water management

Best mix

Application on pest control

Typical technical training

Food Systems | Make | Environment | Agri.

●STI Name:

"Paddy Field Dam" for mitigating flood damages without decreasing rice yield

●Issues:

Preventing flood damages by heavy rain events

●STI Description:

To use paddy fields for alleviating flood damages after heavy rainfalls, this project examined the upper thresholds of ponding water depth and the duration in the paddy field that does not have a negative impact on its yield. In addition, the runoff control devices called “Dam keeper” and “Field gate” were developed to control the ponding water level inside the paddy field.

●Collaborating STI:

The collaboration with weather forecasting tech. (e.g., The Agro-Meteorological 1km Grid Square Data) makes the system sophisticated.

●Applicable conditions and SI examples:

This system can be applied to the puddy fields in flood-prone zones in South East Asia and other regions.

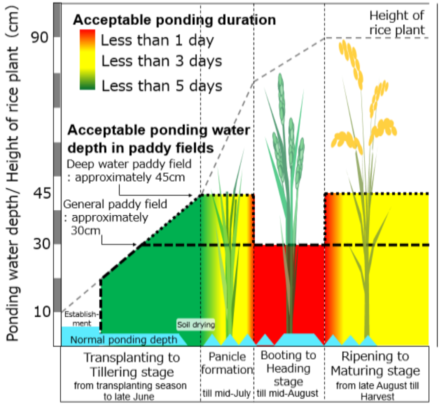

Fig.1 Growth term of rice and the threshold of ponding water depth.

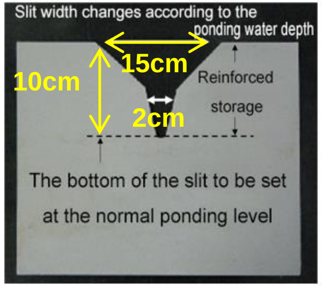

Photo.1 The structure of "Dam keeper"

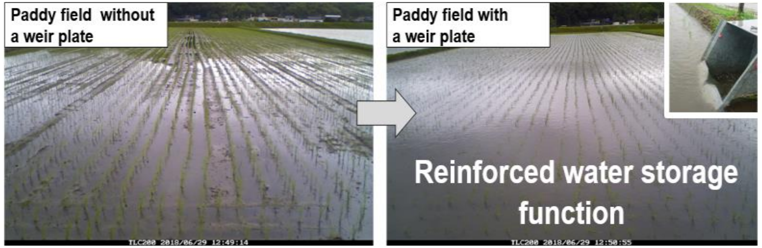

Photo 2. An example of “Paddy Field Dam"

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○

● **STI Name**：
IoT solution for agriculture

● **Issues**：

Increase of rice productivity

● **STI Description**：

Improvement of rice cultivation in efficient way and quality enhancement by utilizing the accumulated scientific data and analysis

● **Collaborating STI**：
Rice cultivation techniques

SoftBank

● **Applicable conditions and SI examples:**

Support for increasing rice productivity in Colombia and Ecuador

https://www.e-kakashi.com/case/details09
https://www.jica.go.jp/tsukuba/enterprise/agricul/news/20210621.html

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●STI Name：

Rice production technologies to improve nutrient use efficiency

●Issues：

Improved and sustainable rice production with little fertilizer use and reduced environmental impact

●STI Description：

A new fertilization technique and variety to increase phosphorus uptakes and productivity of rice under P-deficient lowlands in the tropics

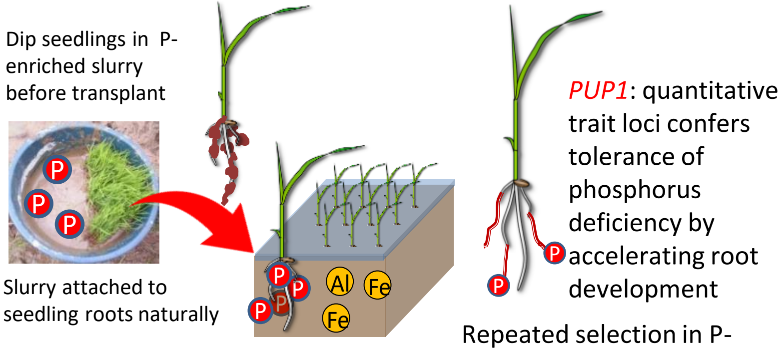
●Collaborating STI：

soil fertility sensing, marker-assisted variety development

●Applicable conditions and SI examples:

Lowland rice production areas with low fertilizer input and phosphorus deficient soils such in Madagascar and sub-Saharan Africa.

Use of genetic resource



Improve fertilizer efficiency by localizing P nearby root system

Repeated selection in P-deficient lowlands in Madagascar

＞Pilot-test with >300 farmers

Variety release

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○

●STI Name：
Genome breeding

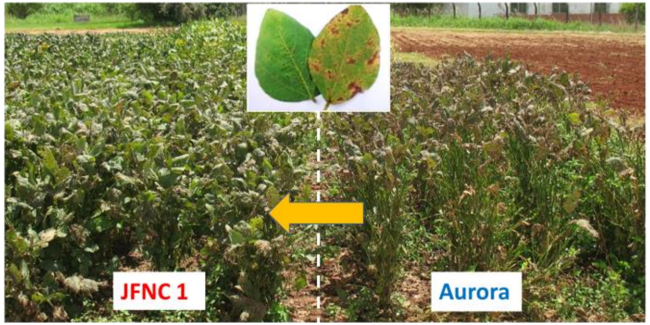
●Issues：
Productivity improvement of soybean, Stabilization of international soybean price, Construction of sustainable food system by reducing use of fungicide

●STI Description：
Development of new soybean varieties highly resistant to soybean rust disease, major problem of soybean production in South America

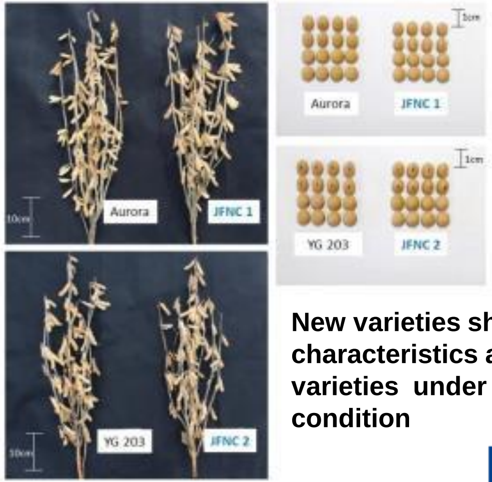
●Collaborating STI：

●Applicable conditions and SI examples:
Registration of new soybean varieties in Paraguay,
Application for registration of new soybean varieties in Argentina
https://www.jircas.go.jp/ja/reports/2019/r20190822

New rust-resistant variety JFNC 1 bred from susceptible Aurora



Resistant: Less defoliation | Susceptible: heavy defoliation



New varieties show the same characteristics as their original varieties under no rust disease condition

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●STI Name：
Development of sustainable agricultural technologies for climate change adaptation using molecular breeding techniques

●Issues：
Improving productivity of wheat in dry and heat-prone areas.

●STI Description：
Development of climate-change tolerant lines based on heat-tolerant lines derived from wild relatives of Sudanese species.

●Collaborating STI：
Genetic breeding techniques based on the identification of useful loci and selection markers.

●Applicable conditions and SI examples:
Building a network with molecular breeding facilities in Sudan as a hub and spread to sub-Saharan Africa.

Experiment in selecting heat-tolerant wheat using high-temperature-stress fields in Sudan.

Diversity shown by Aegilops tauschii, a wild species that serves as donor for heat-tolerant genes.

Beginning to develop commercial varieties by crossbreeding heat-tolerant wheat with Sudan’s commercial varieties.

○

Food Systems | **Make** | **Production** | **Agri.**

●STI Name：
Smart Urban Agriculture

●Issues：

The hydroponic system turns a roof of a building into an oasis, where pesticide-free and eco-friendly cultivation using solar power generation is operated. The new urban agriculture contribute to reduction of heat island phenomena, 6th industry by self production and consumption, dietary education, and regional activation.

●STI Description：

Various vegetables such as tomato, strawberry, and melon have been cultivated by the hydroponic system equipped with sensor control technology at 20 places such as hospitals and schools in Tokyo up to now. Users can cultivate their favorite vegetables in many varieties and small quantities. A smart beekeeping system essential for pollination will also be integrated with the hydroponic system. Product development at restaurants and cake shops for 6th industrialization, harvesting events, and support for children cafeterias are conducted.

●Collaborating STI：

●Applicable conditions and SI examples: Japan

UEC The University of Electro-Communications

☆

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●STI Name:
Development of sustainable production technology for quinoa

●Issues:
Stable production of quinoa, a highly nutritious crop, and improvement of national income

●STI Description:
We will develop and disseminate sustainable production technologies for quinoa through the development of quinoa genetic resources and resilience-enhancing breeding materials, and improvements in fallow management and in integrated crop-livestock systems.

●Collaborating STI:
Technology to produce early ripening lines, construction of genetic resource storage system, and development of cultivation system for sustainable high production

●Applicable conditions and SI examples:
We will apply our production technologies not only to arid regions on the brink of desertification, such as Southern Altiplano, but also to diverse agricultural environments.


Survey of quinoa fallow lands threatened by soil erosion


Quinoa cultivated in a harsh environment overlooking Uyuni Salt Flat


Interview with farmers producing quinoa


Research in quinoa field beside Uyuni Salt Flat

JST Japan Science and Technology Agency JIRCAS jica

Food Systems | Make | Production | Agri. | Water | Soil

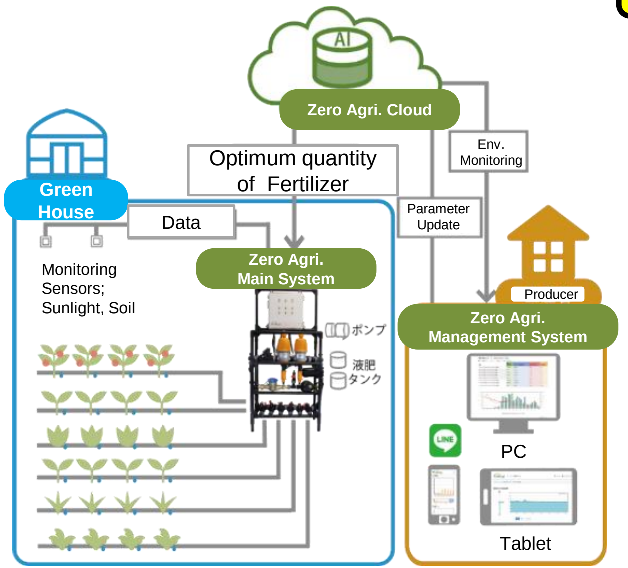
●STI Name：
Automated irrigation and fertilization using IoT and AI technology

●Issues：
By optimizing irrigation and fertilization through IoT and AI technology, this AI-based system achieved "high-yield, high-quality, and labor-saving“ process, while at the same time reducing the use of chemical fertilizers and addressing water depletion.

●STI Description：
The system estimates the evaporation rate based on solar radiation and soil moisture content. It can autonomously supply the minimal amount of water needed for the plant's growth. This smart agricultural technology can be introduced at low cost to soil-tilled pipe houses, which are common in the Asian monsoon region.

●Collaborating STI： ICT Infrastructure

●Applicable condisions and SI examples:
Japan, Asian monsoon region (Vietnam, Thailand, etc.)



ROUTREK NETWORKS

Food Systems | Make | Production | Agri. | Energy

○

●**STI Name**: **Cha-batake Solar**
(Solar power sharing in a tea plantation)

●**Issues**:
By utilizing the FIT (Feed-in Tariff) system in Japan, it effectively use the upper space of the farmland for solar power generation in parallel with tea farming.

●**STI Description**:
"Cha-batake Solar" sets up solar panels at a regular interval in the upper space of the tea farm to enable solar power generation while producing tea leaves. The framework for solar panels creates some shade to control photosynthesis to produce high-quality "Matcha" green tea leaves, utilizing Japan's unique way of undercover farming. It reduces the initial investment of setting up the framework by using the nets and increases the unit price.
The investors in the tea plantation solar system receive revenue from the sales of the electricity, the tea farmers can produce tea leaves of better quality, and the landowners receive fees for renting out the upper space of the farmland. Thus, this system creates a win-win situation for all.

●**Collaborating STI**: Solar Panels

●**Applicable condisions and SI examples**: Japan

LEAF
Leading Energy Agriculture Farm | LEAF.Inc

Food Systems | Make | Production | Fishery

●STI Name: HYPERPOST/Fish Farming Management System

●Issues:

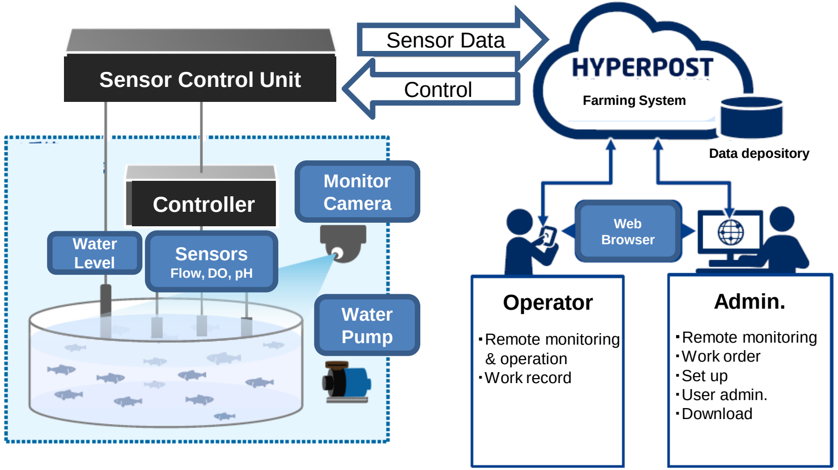
A cloud service that monitors the status of remotely installed sensors and operations to provide accurate work orders and automated equipment control.

●STI Description:

This service visualizes and shares the fariming information using cloud technologies, which enhances the effeciency of the farming management. In particular, the system contributes to improve the efficiency for key operations, such as collecting and visualizing of water quality data from sensors, alert notifications, accumulating and visualizing the data on feeding and growth information, and preventing the omissions of the work by using checklists.

●Collaborating STI: ICT Infrastructure

●Applicable condisions and SI examples: Japan



※ Window images will be updated.

Food Systems | Make | Production | Fishery

●STI Name:
Development of sustainable agricultural technologies for climate change adaptation using molecular breeding techniques

●Issues:
Improving productivity of wheat in dry and heat-prone areas.

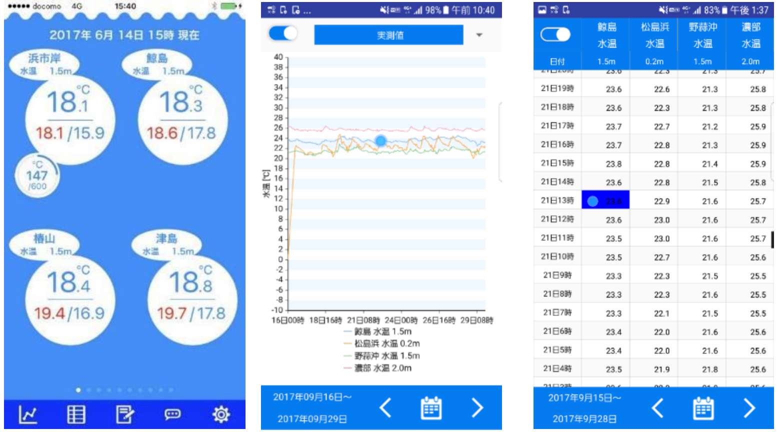
●STI Description:
Development of climate-change tolerant lines based on heat-tolerant lines derived from wild relatives of Sudanese species.

●Collaborating STI:
Genetic breeding techniques based on the identification of useful loci and selection markers.

●Applicable conditions and SI examples:
Building a network with molecular breeding facilities in Sudan as a hub and spread to sub-Saharan Africa.

・ICT buoy

・The screen image of the application "Umimiru"



Servise provider:NTT DOCOMO,inc.

Food Systems | Make | Production | Fishery | Transport | Food loss

☆

●STI Name：
Closed recirculating aquaculture system (Closed RAS)

●Issues：
- Development of aquaculture business in water shortage areas such as deserts
- Reduction of marine pollution by fish food, droppings and antibiotics
- Reduction of food loss with local production for local consumption of fish species that depend on imports

●STI Description：

FRD Japan's closed RAS system uses a unique filtration technology that utilizes bacteria, making it possible to conduct aquaculture while circulating artificial seawater made from tap water instead of using seawater or groundwater.

●Collaborating STI：
- Seedling production utilizing genome editing
- Development of alternative protein for fish meal such as insects / microalgae
- IT conversion of aquaculture industry utilizing IoT / AI

●Applicable conditions and SI examples:

Applicable anywhere as long as there is tap water

OKA SODACHI
おかそだち

FRD Japan

Food Systems | Make | Production | Fishery | Transport | Food loss

☆

●**STI Name**:
Seawater-free marine fish aquaculture technology

●**Issues**:
Minimal transportation costs from the consumption area
Serving fresh seafood in a country without sea
(prawn, salmon, hybrid grouper (*) etc)

●**STI Description**:
Recirculation aquaculture system (RAS) using groundwater, rainwater, and city water
Growth promotion, Control of fish disease
Use of abandoned mines and tunnels, underground spaces, etc. (Place with constant temperature)
Combination with renewable energy

●**Collaborating STI**: The Third Water

●**Applicable conditions and SI examples:**
Japan, Thailand, Cambodia, Mongolia (※)

(*) Joint Research with KITAGAWA Co., Ltd.


RAS with a total water volume of 400 tons


Tiger GG shipping work


Black Tiger prawn


Giant freshwater prawn


Sockeye salmon


Tiger Giant Grouper

Okayama University of Science

Food Systems | Make | Production | Fishery

○

●STI Name:

Farming methods exploiting genomic information

●Issues:

A stable supply of highly nutritious fish and shellfish farmed in a way that has a low impact on the natural ecosystem.

●STI Description:

Development of DNA markers.
Development of prevention methods against microbial pathogens.
Establishment of highly efficient farming methods.
Development of a seed bank for the preservation of genetic diversity.

●Collaborating STI:

It will be possible to preserve gene resources in perpetuity on the cellular and tissue level.

●Applicable conditions and SI examples:

To make Asian sea bass and banana prawns, which are indigenous to Thailand, into major farmed marine products that can hold a top position in the international market.

A culture pond for prawns in Thailand.

Banana Prawns

Breeding facilities at a Department of Fisheries research and development center.

Asian sea bass reared at a Department of Fisheries research and development center.

Japan Science and Technology Agency

Food Systems | Make | Production | Disease control

●STI Name：

Easy-handling and highly-sensitive detection kits for Foot-and-mouth disease virus (FMDV)

●Issues:

Preventing the spread of FMD which causes serious damage to livestock industry in Asia and Africa

●STI Description：

This detection kit does not need any additional equipment. It can detect all types of FMDV with high sensitivity in a short time from the lesions in the tongue and oral cavity.

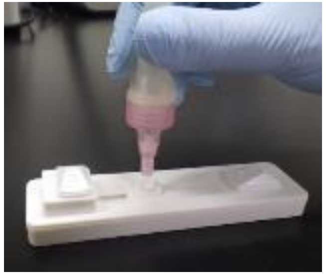
●Collaborating STIs：

A new kit for identifying the serotypes of FMDV is under development.

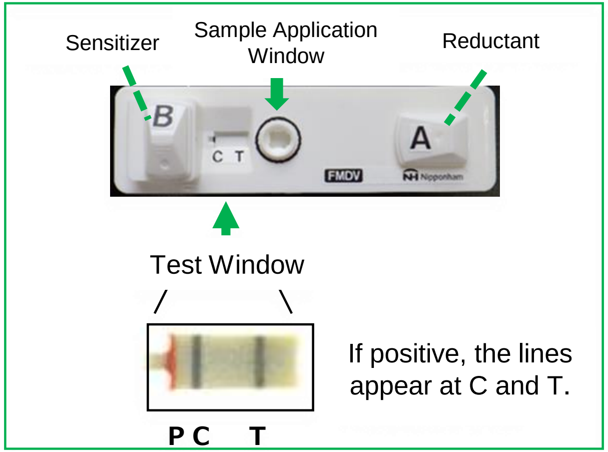
●Applicable conditions and SI examples:

In Japan, the detection kits are commercially available and stocked for primary inspection at livestock hygiene service centers in each prefecture. The kits can be used as a diagnostic method in developing countries where inspection facilities are not enough.

Cattle Infected by FMDV



Sample drop



Test results by the kit

農研機構 NARO

Food Systems | Make | Production | Animal husbandry

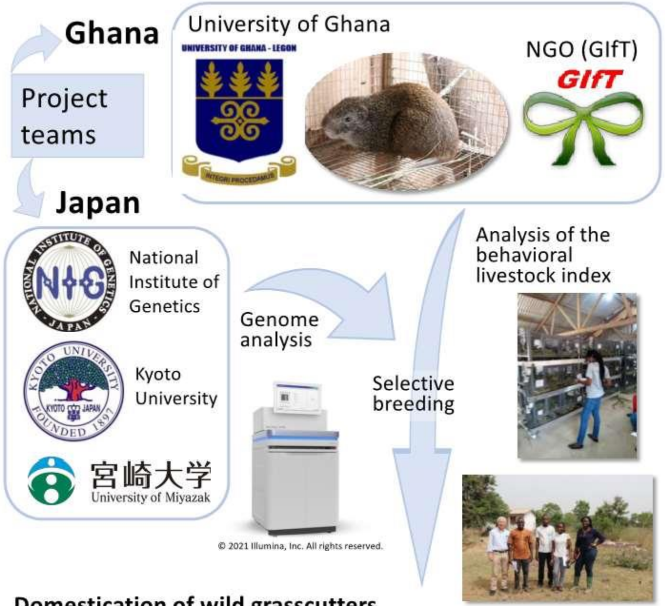
●STI Name：
Behavioural/Genetic analysis of wildlife

●Issues：
Creation of a new livestock industry. Protecting the environment and ensuring a safe diet.

●STI Description：
Analysis of the livestock index of wild grasscutters. Discovery of the genetic and behavioral diversity required for domestication.

●Collaborating STI：
Genome editing

●Applicable conditions and SI examples：
West African countries.



Domestication of wild grasscutters
- Analysis of behavioral livestock index
- Characterization of genomic polymorphism
- Genetic analysis of domestication
- Establishing domesticated grasscutters

Future goal:
- Establishing domesticated grasscutters
- Create a new livestock industry

Japan Science and Technology Agency

Food Systems | Make | Production | Animal husbandry

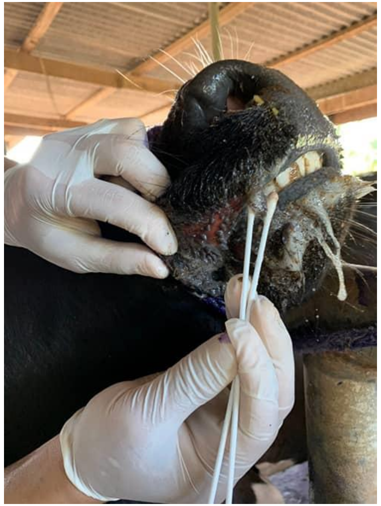
●**STI Name**：
Establishing a new system for infectious disease control in livestock

●**Issues**：
Promoting a stable and sustainable livestock production and a safe meat supply.

●**STI Description**：
Development of a multi-diagnostic system for major infectious livestock diseases, a food poisoning bacteria elimination technology for poultry, and an epidemic prevention system based on a disease dissemination mathematical model.

●**Collaborating STI**：
Development of mathematical models and simulators based on big data on livestock infectious diseases.

●**Applicable conditions and SI examples**：
Establishing a new system for infectious disease control in livestock and developing a safe meat production technology in Thailand.
Spreading a stable and secure supply system for livestock resources in the ASEAN area.



Diagnosing livestock diseases.

R&D of food poisoning elimination technology for poultry.

Consensus meeting on the launch of the Japan-Thailand research partnership.

Japan Science and Technology Agency

Food Systems | Transport | Keeping freshness | Food loss

●STI Name：CAS (Cell Alive System)

●Issues：

CAS adds value to products, and reduce food loss by maintaining freshness

●STI Description：

CAS can be installed in existing freezer. By combining quick freezing device with CAS (Cell Alive System) engine ,CAS enables to retain and reproduce the freshness, texture, umami, and color of foodstuffs that were diminished by conventional freezing technology.

●Collaborating STI：

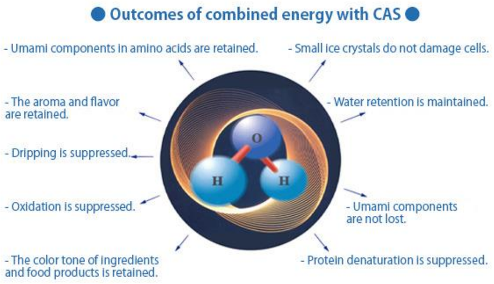
Medicine (iPS cell, tissue, organ preservation), physics

●Applicable conditions and SI examples：

Japan, France, USA, China, Vietnam, Spain, Peru etc.

Even if it is thawed, freshness is revived. Traditional Japanese food can be exported to the world market.

The thawed dishes return to the freshly prepared dish.



The CAS enables the long-term maintenance of the freshly caught, freshly prepared taste.

<Perspective from ABI Research Institute>

ABI Co., Ltd.

Tackling hunger + Improving nutrition

Foods with function claims

●STI Name:

Functional ingredient for better health in Japanese agricultural products

●Issues:

Addressing the increasing health problems induced by lifestyle-related diseases

●STI Description:

The study demonstrated the scientific evidence on the functions of Japanese foods and agricultural products. High-quality agricultural products with various functional ingredients have been developed.

●Collaborating STI:

CODEX Guidelines for the Use of Nutrition and Health Claims (CXG 23-1997)

●Applicable conditions and SI examples:

The national labeling system of "Foods with Function Claims" has been launched in Japan.(Food Science and Technology Research, 2021) Several countries developed a similar labeling system of "Foods with Function Claims".

Food with functional Ingredients (Examples)

Barley("Waxyfiber")
β-glucan controls the rise in postprandial blood glucose levels.

Greentea("Benifuki")
Methylated catechin alleviates allergic symptoms. Improving lipid metabolizm.

Onion(“Quel Gold")
Improving cognitive function

Citrus ("Seinannohikari")
β-cryptoxanthin contributes to maintaining bone health

Apple
Procyanidin decreases the level of visceral fat.

Natto (fermented soybeans)
γ-polyglutamic controls the rise in postprandial blood glucose levels.

農研機構 NARO

Tackling hunger + Improving nutrition

Strengthening basic nutrients

●STI Name: Nutritional Food for Infants – "KOKO Plus"

●Issues: The social problem of stunted growth of children under five years old caused by lack of protein and nutrients necessary for growth.

●STI Description: "KOKO Plus" is a nutritional supplement that uses local soybeans as the main ingredient and adds the amino acids, vitamins and minerals that are lacking in koko (a porridge fed as a complementary food in Ghana made from fermented corn). Through efficacy study on the effects of nutrients, we have evidence that shows that by sprinkling one sachet of "KOKO Plus" on porridge each day and feeding it to a child, they gain the daily requirement of protein, which promotes growth.

●Collaborating STI: The most appropriate nutritional education for mothers and children (educational movies, etc.) depending on their status, creation of behavior change through feedback on growth records

●Applicable conditions and SI examples:
Creating behavior changes and social impact by "Nutritional Education + 'KOKO Plus' introduction" for mothers, through Public-Private-Partnership with the Ghana Health Service. We are currently building a sustainable business model in Ghana that creates a state where "KOKO Plus" is manufactured/sold by private partners, and beneficiaries can easily obtain the product, which is affordable and easy to use. We are currently constructing several types of models to penetrate to the beneficiaries in different environments, and researching expanding to other African countries with appropriate models for their situations.

"KOKO Plus"


Nurses giving nutritional instructions and introducing "KOKO Plus" to mothers.

Nutritional education materials for mothers, developed in cooperation with the Ghana Health Service.
It mainly uses picture-based information.


A mother feeding a child koko with "KOKO Plus"

TAF THE AJINOMOTO FOUNDATION