Agri transformation (AX) x Green transformation (GX)
Using our proprietary biochar technology

Tromso Co., Ltd.

Company overview

株式会社トロムソ
TROMSO CO., LTD.

Name	Tromso Co., Ltd.
Location	5265 Shigeicho, Innoshima, Onomichi City, Hiroshima Prefecture, 722-2102
TEL	0845-24-3344
FAX	0845-24-3181
Establishment	October 19, 1994
Capital	29.99 million yen
CEO	Masaaki Uesugi
Business Contents	・Manufacture and sale of biochar production machine ・Providing agricultural consulting services to farmers on how to use biochar ・Sale of carbon credits associated with the use of biochar ・Manufacture and sale of rice husk solid fuel production equipment

Tromso Co., Ltd.　　HP : https://tromso.co.jp/

From Innoshima, Hiroshima Prefecture, we are taking on the challenge of solving global problems with new technology!

TROMSO VN COMPAMY LTD

Date of establishment: June 1, 2021

Address ：360C Ben Van Don street, Ward 1, District 4, Ho Chi Minh City Vietnam

C.E.O：Masaaki Uesugi

Employees：6 full-time employees, 4 part-time employees

(Can Tho University, Faculty of Agriculture)

Of the 6 full-time employees, 4 can speak Japanese.

Capital ：663,695,445 VND (~29,400USD)「100% owned subsidiary of Japanese corporation」

Business Contents ：Conducting biochar demonstration-related work and research under contract from Japanese corporations, selling Grind Mills and biochar production machines, providing consulting services regarding biochar application, carbon credit application services, and selling water purifiers.

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Management Philosophy

From a business that "protects greenery" to a business that"nurtures greenery"

Currently, the world population is 8.18 billion, exceeding 8 billion people, and the average concentration of carbon dioxide (CO_2) in the atmosphere is 417.9 ppm, exceeding 400 ppm, and is rising by an average of more than 2 ppm per year. This concentration is 50% higher than the average concentration of about 278 ppm before industrialization (1750), and the average temperature has risen by about 2 ℃ to 3 ℃ along with the increase in CO_2 concentration. In this situation, we are facing two major issues that have a global impact: 1) food security, and 2) the problem of increasing greenhouse gases (GHGs) such as CO_2, CH_4, and N_2O that are involved in climate change. One of the solutions to these agricultural challenges is the application of "biochar" to farmland.

Our management philosophy is to contribute, however small, to solving these social and environmental issues by utilizing our biochar technology and creating a "sustainable society" where future generations can live comfortably and with abundant greenery.

Business Strategy

The company will promote a global strategy centered on its new business pillar, the biochar business, which turns various agricultural residues into biochar and uses it as an agricultural material. Utilizing the know-how and intellectual property related to biochar, which is the company's strength, the company aims to take market leadership and build its own unique business model. In terms of human resources strategy, as the market for the biochar business is expected to expand in the future, the company aims to grow as a global company by recruiting not only Japanese human resources but also excellent human resources, mainly from African countries.

Management Philosophy

From a business that "protects greenery" to a business that "nurtures greenery"

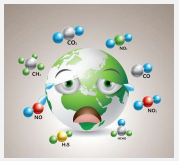
Current world population

8.18 billion people
> 8 billion People

- **Average CO2 concentration →417ppm>400ppm**
  → This is 50% higher than the average concentration of about 278 ppm before industrialization concentration (1750
- **An average of about 2℃ to 3℃ temp. annually rise.**

Problem

① Food insecurity



② GHG emission
CO2, CH4, N2O

Tromso Solution

Application of "biochar" to farmland.
Management philosophy: Solving these social and environmental issues by utilizing our biochar technology and creating a "sustainable society" where future generations can live comfortably and with abundant greenery.

Business Strategy

- Promote a global strategy centered on the biochar business, (converting agricultural residues into biochar, an agricultural material)
- Utilizing the know-how and intellectual property related to biochar, (our strength), take market leadership and build a unique business model.
- As market expands, building excellent global human resource not only in Japan but also from African countries etc.

Introduction of technology and products ①

Rice husk briquetting machine「Grind Mill」

Grind Mill
TRM-120F

Capacity	Approx.120kg/h (Momigalite production)
Size(mm)	2800(W)×1510(D)×2300(H)
Weight	Approx. 1300kg
Power	AC200V 3φ 50/60Hz
Motor	15kW 4P reduction ratio 1/15 0.4KW 4P reduction ratio 1/10 + 0.25KW 4P reduction ratio 1/6
Heater	1.5kW×3 pcs

Grind Mill
TRM-120DD

Capacity	Approx.120kg/h
Size(mm)	2500(W)×990(D)×1500(H)
Weigh	Approx. 850kg
Power	AC200V 3φ 50/60Hz
Motor	18.5kW　4P reduction ratio 1/13
Heater	1.5kW×3 pcs

Introduction of technology and products ②

Rice husk briquettes「Momigalite」

- ✓ **100% briquettes derived from rice husks**
- ✓ **No adhesives are used because it is solidified by heat.**
- ✓ **Calorific value: Momigalite 3970kcal/kg Firewood 4000kcal/kg**
- ✓ **It is also possible to solidify by mixing rice husks with other raw materials (wood scraps, agricultural residue, mushroom waste beds, etc.)**

(Example)

Use of Momigalite as a heat source

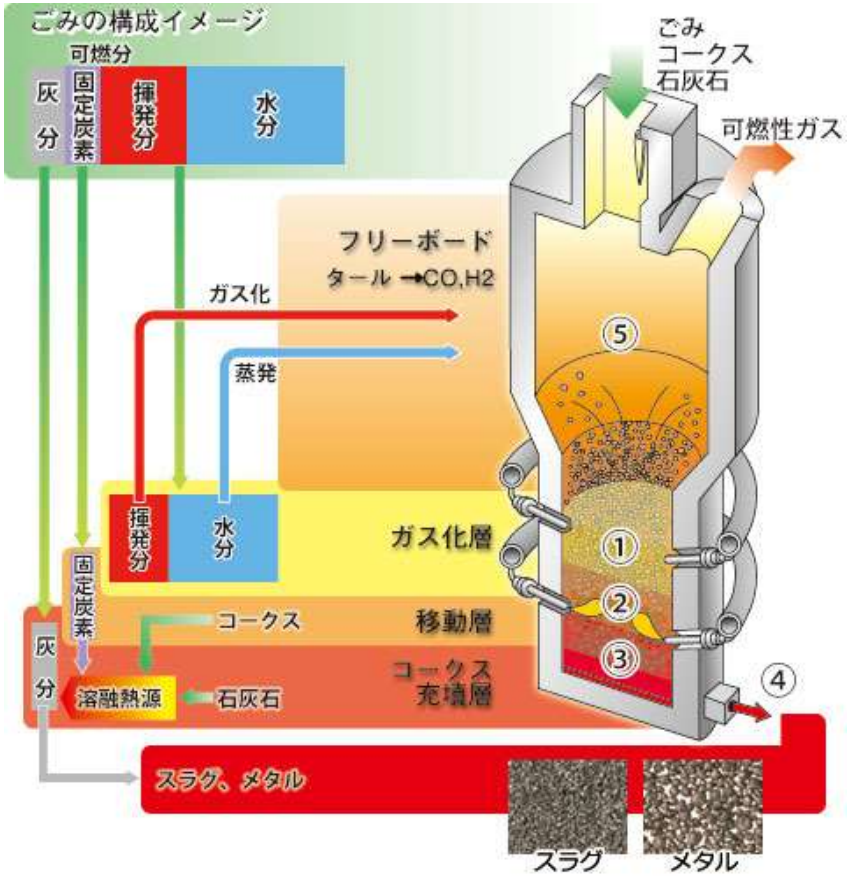
Rocket Stove「Warm rocket」

External dimensions (excluding the spiral part)
Approx. Width 2300 x Height 1850 x Depth 800 (mm)

Momigalite can be used not only for outdoor purposes but also for a variety of other purposes, such as for heating vinyl houses and as a fuel for preventing frost on fruit trees.

Efforts for low-carbon or decarbonization

Utilization as a substitute for coke and coal used in waste incinerators / thermal power plants



※Source: JFE Engineering Corporation homepage
Gasification and melting furnace technology

Environmental problems including climate change due to carbon dioxide (greenhouse gas) emissions from the use of coke and coal

Carbon dioxide emissions from rice husk briquette, which is a carbon-neutral fuel, virtually no emissions
→ Control of climate change

History of overseas business

December 2013	JICA SME project, Tanzania "Investigation of introduction of solid fuel manufacturing equipment using rice husks"
September 2014	JICA SME project, Tanzania "Promotion and demonstration project of solid fuel manufacturing equipment using rice husks"
August 2019	TICAD7 co-sponsored business "Japan / Africa Business Forum & EXPO" opened at Japan Fair
September 2019	Ministry of the Environment's intercity cooperation business consignment business "Biomass project by converting rice husks generated from rice mills into compressed solid fuel"
February 2020	Concluded a contract for 7 grind mills as non-project grant aid for ODA projects at the request of the Nigerian government
June 2020	UNIDO Apply for an overseas Japanese company support project by demonstrating and transferring STePP technology for the prevention of infectious diseases in developing countries.
September 2020	Ministry of the Environment Reiwa 2nd year, adopted for an intercity cooperation project consignment business for the realization of a carbon society.

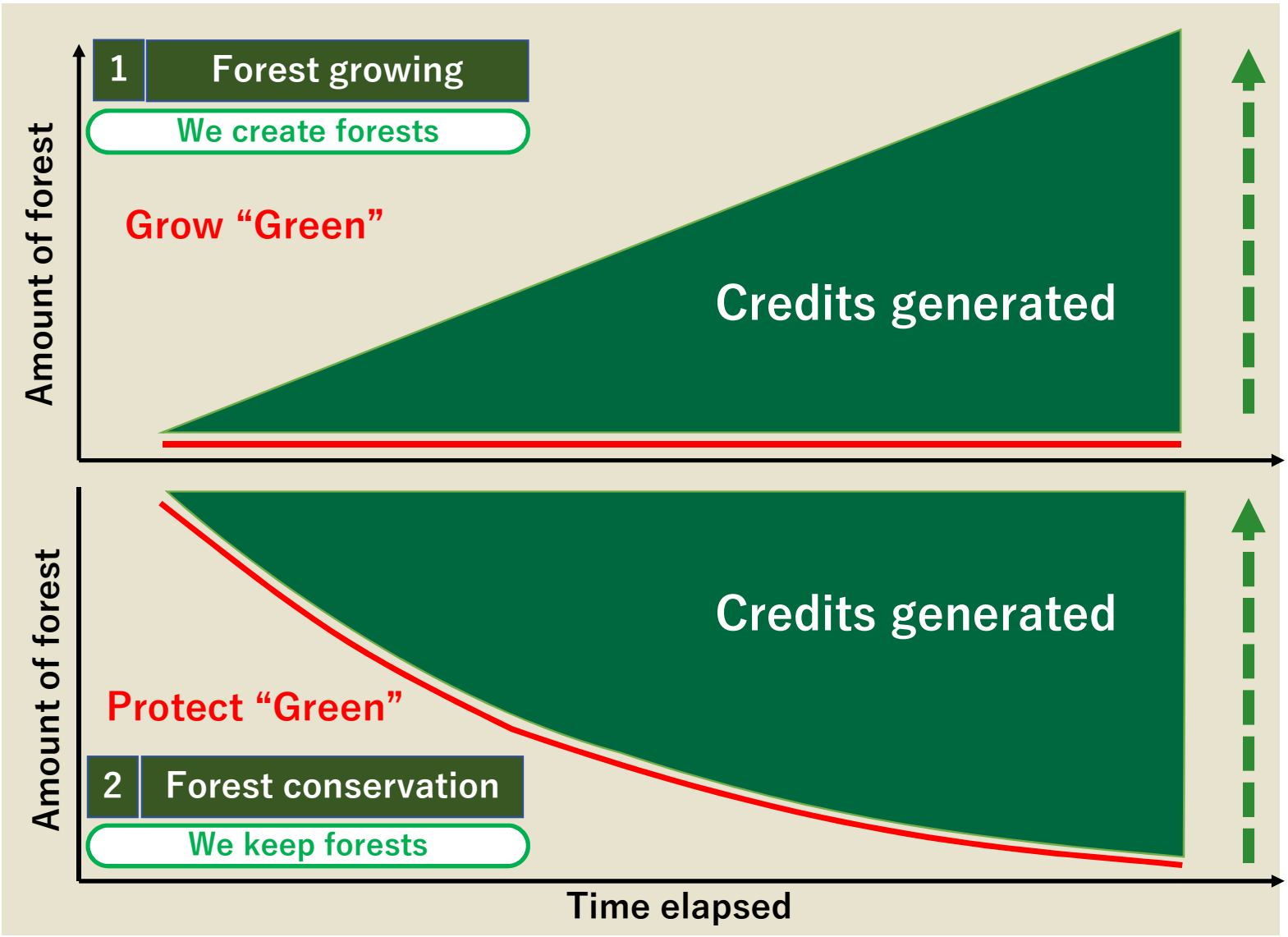
History of overseas business

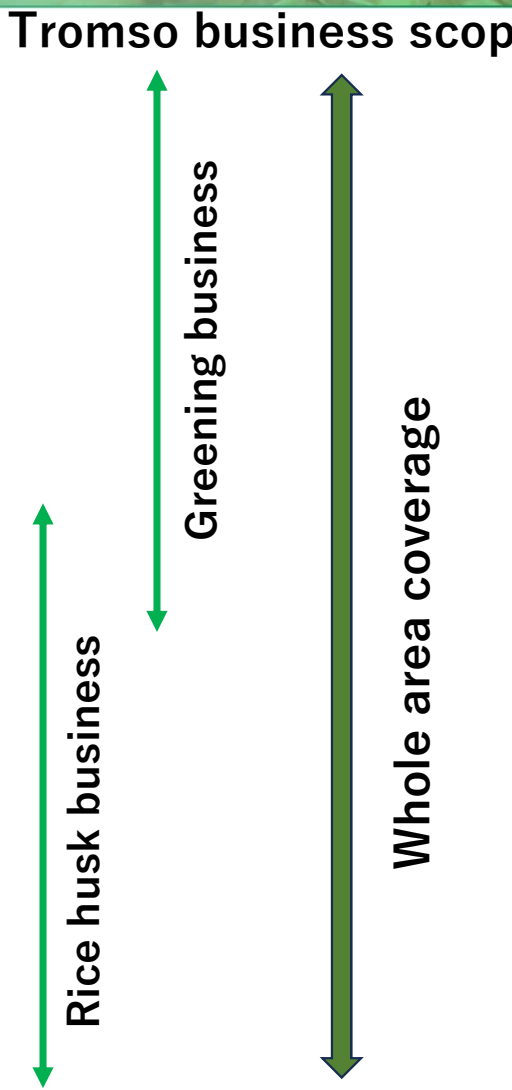
April 2021	Adopted for JICA SME / SDGs Business Support Project.
July 2021	Established a local subsidiary in Vietnam (established Tromso VN)
October 2021	Exhibited at COP26 JAPAN Virtual Pavilion
May 2022	Ministry of the Environment Reiwa 4th year, adopted for an intercity cooperation project consignment business for the realization of a carbon society.
August 2022	Exhibited at TICAD8 (Tunisia) Business Forum Exhibition Booth

Deforestation in Africa

Activities in Africa

Greening business





Source: Nikkei Shimbun

Solutions for adding value to agricultural residues

Farmland use and credit generation for biochar made from agricultural residues

Objective

- **By utilizing agricultural residues and using farmland, the amount of fertilizer used can be reduced, and the income of farmers can be increased by reducing the amount of fertilizer used. By using biochar on farmland (plowing biochar into the soil), carbon is stored in the soil, leading to the creation of carbon credits.**

Biochar

- **It is defined as a carbonized material made by heating biomass at temperatures above 350℃ under controlled oxygen concentrations at levels that do not cause combustion.**
  - **Biochar is made from a variety of organic residues (biomass), including bamboo, rice husks, other agricultural residues (mainly husks), and livestock waste.**
  - **In recent years, biochar has attracted attention not only for its soil improvement effects when applied to agricultural land, but also as a measure to prevent global warming (carbon storage), and it is being used as an agricultural material that can contribute to solving various environmental problems, such as treating organic residues generated by farming and reducing greenhouse gas emissions.**
  - **The use of biochar on agricultural land has attracted attention in recent years, and activities such as applying biochar to agricultural soil to store difficult-to-decompose carbon in the soil have been in the spotlight.**

- **Example: When 1 ton of biochar made from rice husks is applied to agricultural land, it is expected to reduc CO_2 emissions by approximately 1.16 t.**

Social and environmental issues we are addressing

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Based on our management philosophy and strategy, we have set the following three goals to solve these issues:

① Effective use of various unused agricultural waste as biochar (agricultural materials)

②Reducing the amount of chemical fertilizers used by using biochar to build sustainable agriculture

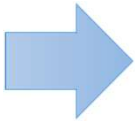
③ Achieving carbon neutrality through biochar application to agricultural land

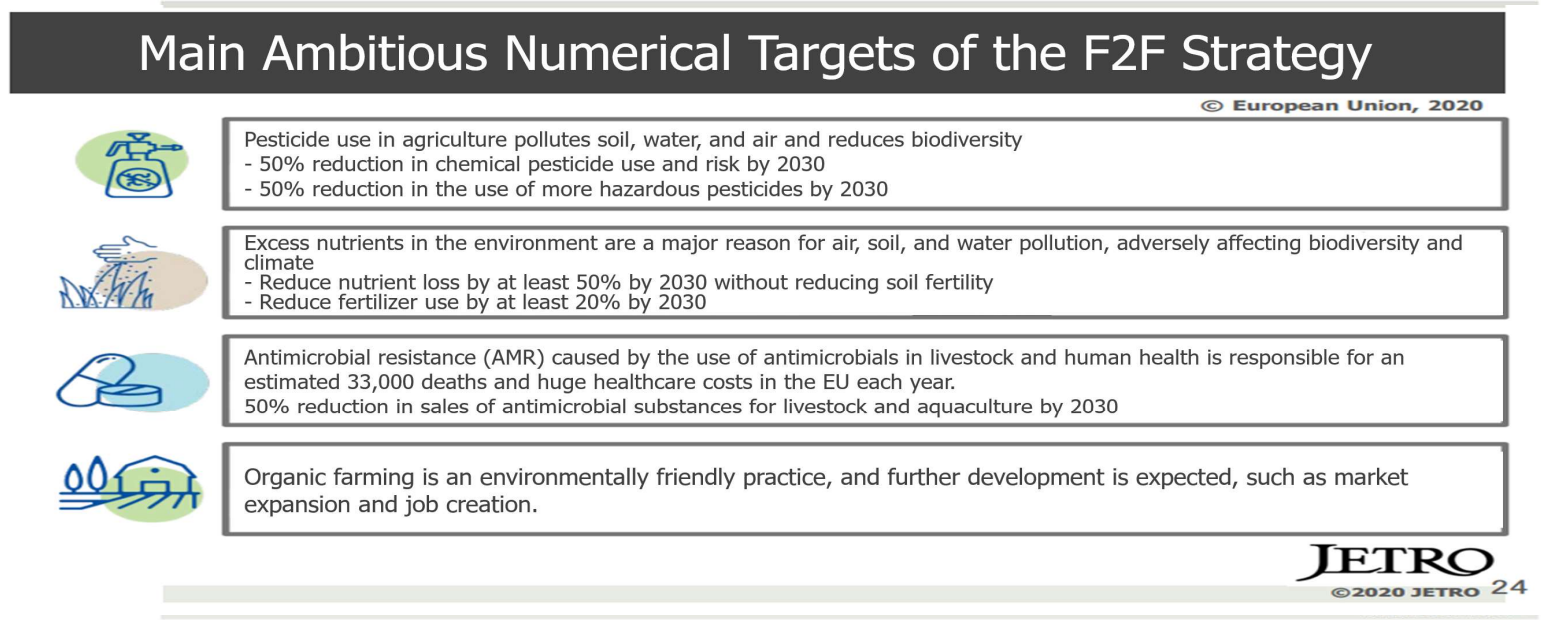
Purpose of solving the problem

By applying biochar to farmland, we aim to reduce the amount of chemical fertilizer used and increase yields, leading to sustainable agriculture and increased income for farmers.

[Farm To Fork Strategy] and Green Food System Strategy (MAFF)

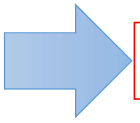
Farm to Fork stands for everything from the farm to the table, and indicates the major direction of the EU's future food administration. It is positioned as the core of the European Green Deal policy announced in December 2019, which will be more specific in the field of the food industry.





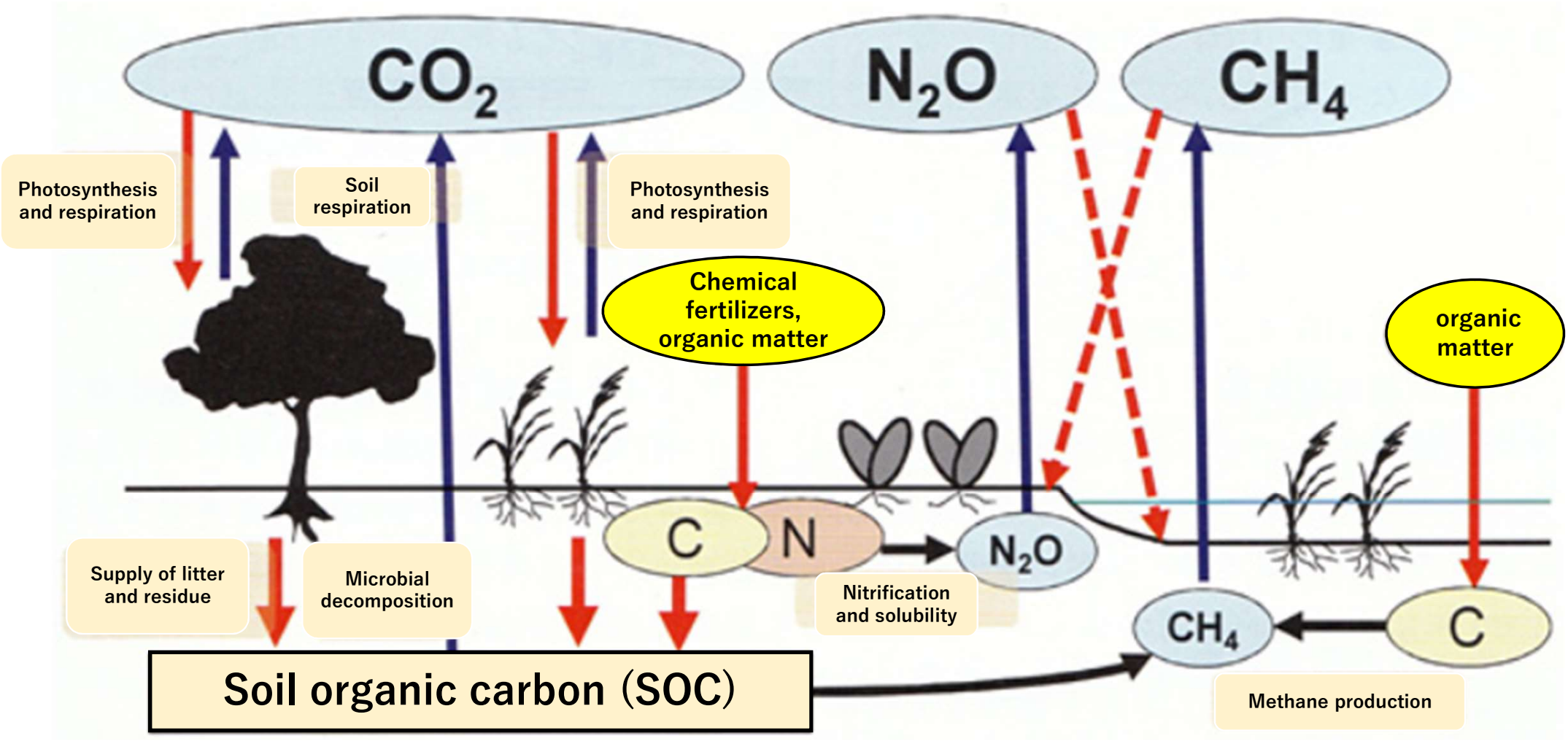
Numerical targets for 2050

(1) Virtually zero carbon dioxide emissions from agriculture, forestry, and fisheries.
2) Expand organic farming to 25% of all farmland
(1 million hectares)
3) Reduce the use of chemical pesticides by half and
4) Reduce chemical fertilizer usage by 30%
5) Complete transition to fossil fuel-free horticulture facilities



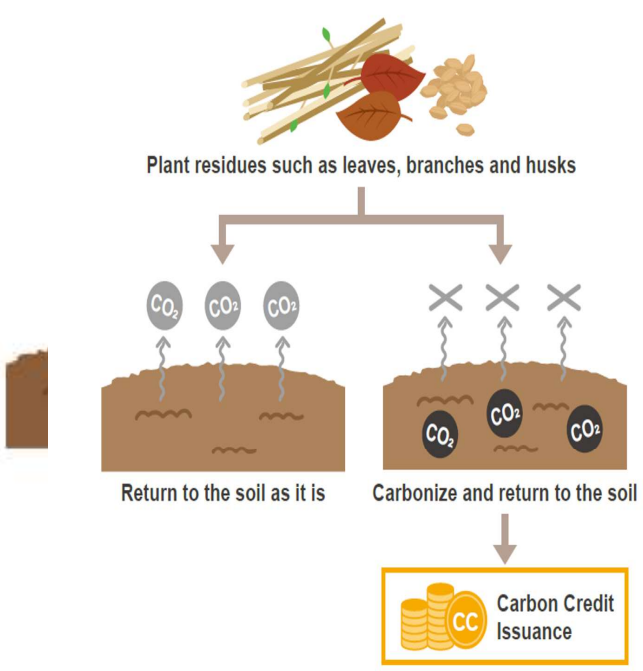
Biochar has great potential as a solution

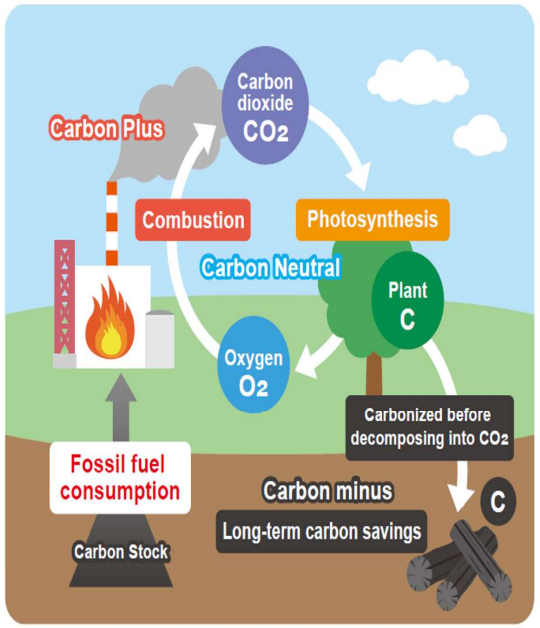
Illustration of greenhouse gas emissions from agricultural land



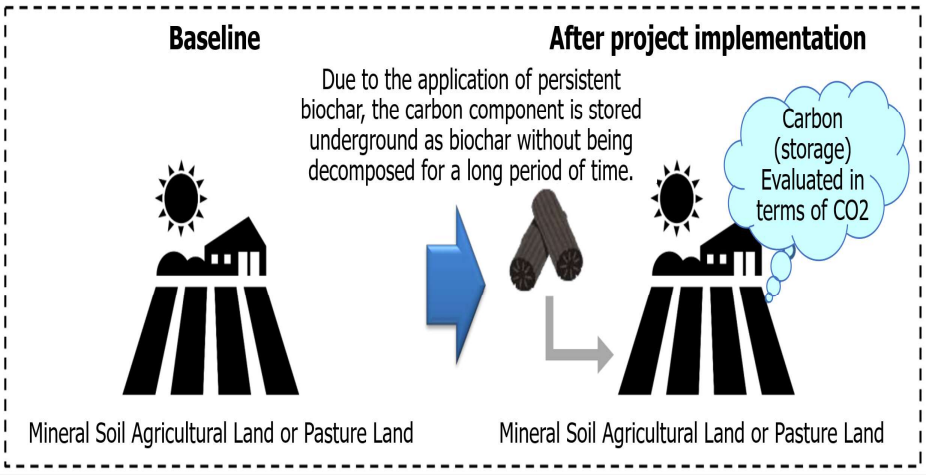
Carbon credits (carbon storage) generated from the application of biochar to agricultural land

Progress is being made in establishing a system that will calculate the amount of carbon dioxide reduction from similar activities around the world based on the amount of carbon stored, and allow governments and private companies to certify and buy and sell credits based on the amount of reduction.





[Image of methodology]



Agricultural demonstration using biochar (Vietnam)

Agricultural demonstration using biochar (Vietnam)

Coffee husk residue is turned into biochar and used for coffee cultivation (Vietnam)

Is it possible to reduce the amount of chemical fertilizer applied to corn cultivation by applying biochar made from rice husks

"Zirobwe Town, Luwero District, Uganda (Right picture), Demonstration Test (2017)"

The corn grain yield in the plot using biochar **increased by about 20%** and the amount of chemical fertilizer application **could be cut in half.**

Conventional chemical fertilizer (Control 1)

250g･m2 biochar application and ½ amount of chemical fertilizer

500g･m2 biochar application only

500g･m2 biochar application and ½ amount of chemical fertilizer

Business Overview

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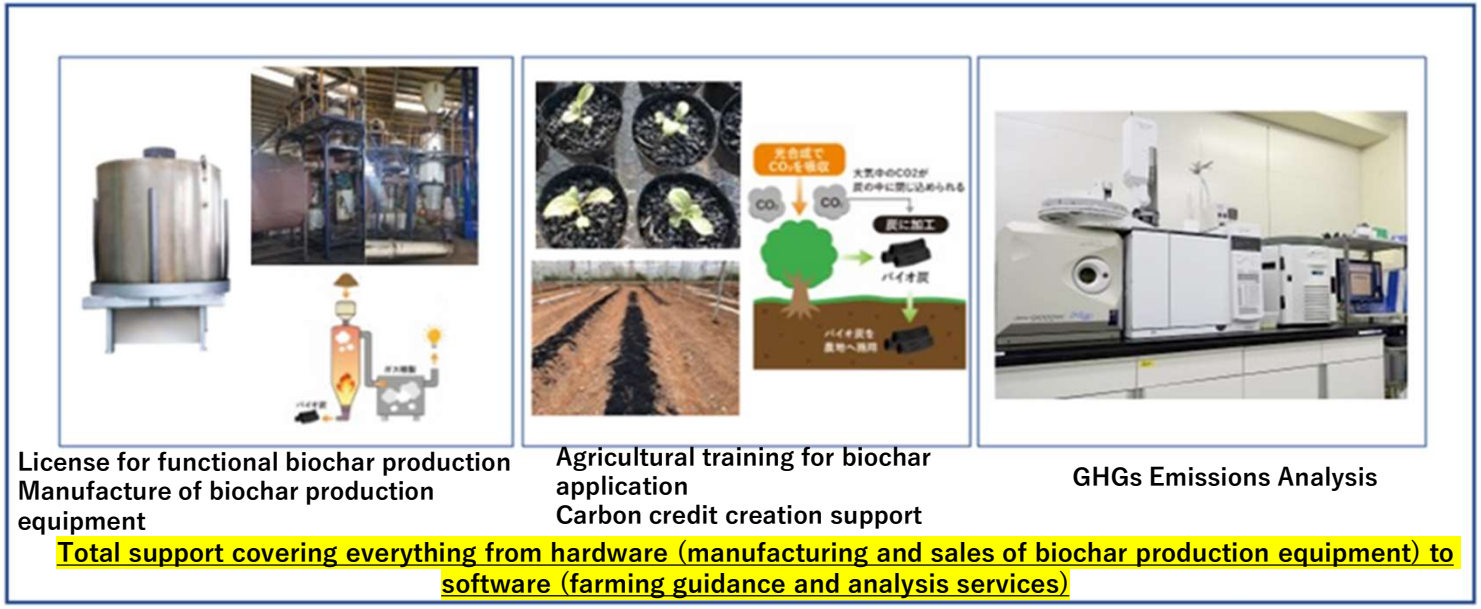
Biochar Comprehensive Service Provider



License for functional biochar production
Manufacture of biochar production equipment

Agricultural training for biochar application
Carbon credit creation support

GHGs Emissions Analysis

Total support covering everything from hardware (manufacturing and sales of biochar production equipment) to software (farming guidance and analysis services)

Although the potential market for biochar is large, the value chain from production to sales in existing businesses is fragmented, resulting in the formation of small markets and not fully realizing the potential.

There are many competitors that manufacture and sell biochar production machines in both domestic and overseas markets, but by being able to provide a one-stop service for the entire upstream to downstream biochar-related business, from the manufacture and sale of biochar production machines to agricultural guidance on the application of biochar and credit creation, we aim to build a unique business model and assume leadership in the biochar market.

Business Description

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In creating new businesses, we will focus on the following three pillars to commercialize them:

① Manufacturing and sales of biochar production equipment

② Biochar-based agricultural guidance and carbon credit creation project

③GHGs analysis business using gas chromatograph

Normally, the above three supply chains are run by separate companies, but by consolidating them into one-stop, we will be able to build a unique business model with our company at the center, and take leadership in the biochar market.

① Manufacturing and sales of biochar production equipment

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The quality of the biochar produced varies depending on the carbonization temperature and time during production, and the characteristics of the biochar used in agriculture also vary. Through three years of demonstrating the use of biochar in agricultural fields, we have accumulated know-how.

→ Based on field demonstration experiments both in Japan and overseas, we manufacture and sell biochar production machines with specifications suitable for agricultural use that can guarantee the quality of biochar.

②Agricultural guidance and carbon credit creation support



・Biochar has a high potassium content, so applying biochar to agricultural land can replace potassium in chemical fertilizers.

・Biochar's high nitrogen adsorption capacity improves nitrogen utilization efficiency and contributes to reducing the amount of nitrogen fertilizer used.

・Provide support for domestic and international agricultural workers in fertilizer design that reduces the amount of chemical fertilizer used by applying biochar and provide agricultural guidance.

→Aiming to improve the income of agricultural workers and build environmentally friendly, sustainable agriculture

②Agricultural guidance and carbon credit creation project

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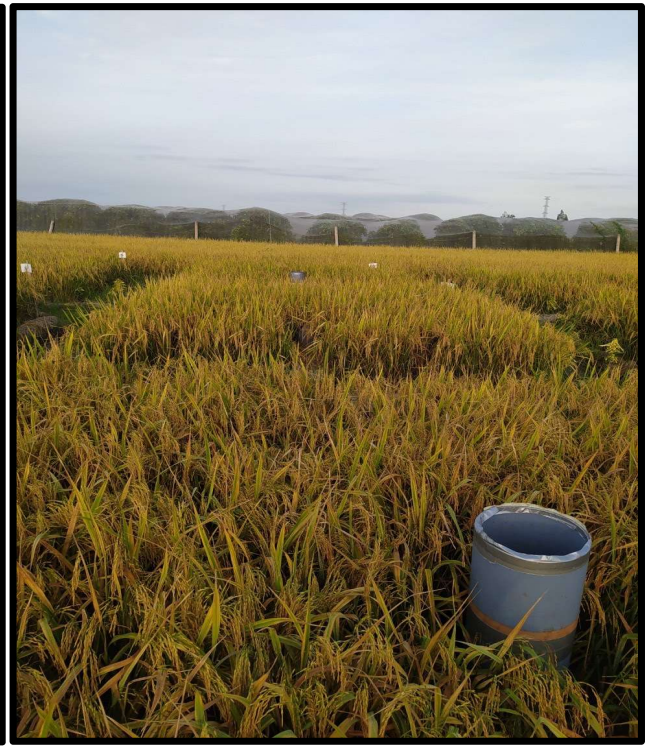

Based on the biochar demonstration experiment, we will calculate the amount of GHG emissions reduction, including CO_2, and create carbon credits.

③GHGs analysis business using gas chromatograph

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Innoshima Flower Center (Image source: Onomichi Machikado Public Relations Office)(https://onomichijp.com/island/innoshima/innoshima_flower_center.html))

The company acquired part of the Onomichi City Innoshima Flower Center in Shigei-cho, Innoshima, and use it as a "biochar promotion center."

The company will use the center's laboratory to quantitatively analyze gas samples collected in demonstration experiments both in Japan and overseas using its own gas analysis equipment. It will also undertake contracted analysis of GHG emissions.

Contribution to the community

GHGs Emissions Analysis

The company will acquire part of the Innoshima Flower Center in Onomichi City, located in Shigei-cho, Innoshima, and use it as a "biochar dissemination center." The center's laboratory will be used to perform contracted analysis of GHG emissions using gas chromatography.

【 Contribution to the community 】

Regional benefits from the expansion of biochar-related service provision

- **Increased employment for local talent**
- **Creation of jobs at business partners**
- **Promotion of local industry, including increased sales for related companies**
- **Contribute to the promotion of environmental and energy industries promoted by Hiroshima Prefecture.**

Innoshima Flower Center (Image source: Onomichi Machikado Public Relations Office)(https://onomichijp.com/island/innoshima/innoshima_flower_center.html))

Team

The Green Innovation Division is working on a biochar project!

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Ugwu Chigozie (Nigeria)

PhD graduate, school of Environmental and Life Science, Okayama University

Responsibilities: Analyzing and quantifying CH_4, CO_2, and N_2O collected during demonstration experiments using a gas chromatograph

Shema Jean de Dieu (Rwanda)

Master's degree from Hiroshima University Graduate School, Chemical Engineering department.

Responsible for: Analyzing and quantifying CH_4, CO_2, and N_2O collected during demonstration experiments using a gas chromatograph

Yikii Walter (Uganda)
Graduated from the Department of Mechanical Engineering, Faculty of Engineering, Tokai University
Responsibilities: Design and Engineering

Yuichi Yanaka
Graduated from the Faculty of International Studies, Bunkyo University
Responsibilities: Overseeing entire business from biochar project demonstration experiments to credit creation

Akari Kuroda
Graduated from the Faculty of Agriculture, Tottori University
Responsibilities: Conducting demonstration experiments using biochar in Japan and Vietnam

— From the business of protecting greenery to the business of growing greenery —