(Provisional Translation)

Overview of the Plan for Global Warming Countermeasures of the Ministry of Agriculture, Forestry and Fisheries

October 2021

Global Environment Office
Environment and Biomass Policy Division
Minister's Secretariat
Ministry of Agriculture, Forestry and Fisheries

Plan for Global Warming Countermeasures in the Agriculture, Forestry and Fisheries Sector

- The Ministry of Agriculture, Forestry and Fisheries (MAFF) formulated "the Plan for Global Warming Countermeasures of the Ministry of Agriculture, Forestry and Fisheries" (formulated in March 2017), with the aim of promoting measures to mitigate global warming in the agriculture, forestry and fisheries (AFF) sector comprehensively and strategically, based on the government's "Plan for Global Warming Countermeasures".
- MAFF revised the Plan for Global Warming Countermeasures of the Ministry of Agriculture, Forestry and Fisheries in October 2021, based on Strategy for Sustainable Food Systems and other measures, to maximize the promotion of global warming prevention measures in the agriculture, forestry and fisheries sectors, with the aim of realizing new greenhouse gas reduction for FY2030 targets (46% reduction from FY2013 levels, with a further challenge of 50%) and carbon neutrality by 2050.

Current status of GHG emissions and removals

- The AFF sector accounts for a small proportion of CO_2 emissions, the major source of GHG in Japan, but a large share of CH_4 and N_2O. Most removals occur on forests and farmlands.
- On the other hand, emissions in the AFF sector account for a large share in developing countries.

Domestic and International Trends

- Operationalization of the Paris Agreement (2° C target, 1.5° C effort target, balance between anthropogenic GHG emissions and sinks in the second half of this century, etc.)
- IPCC Sixth Assessment Report of Working Group I, Summary for Policymakers (released Aug. 2021) (noting that "there is no doubt that human impacts have caused warming of the atmosphere, oceans and land").
- Declaration of carbon neutrality for 2050 and 46% greenhouse gas reduction target for FY2030 (compared to FY2013)
- Formulation of Strategy for Sustainable Food Systems (May 2021)

Plan for Global Warming Countermeasures (approved by the Cabinet in October 2021)

- Medium- to long-term strategic initiatives to achieve carbon neutrality by 2050
- Efforts to Reduce Global Greenhouse Gas Emissions
- Synergistic improvement of environment, economy and society, etc.

Overall composition of the MAFF Plan for Global Warming Countermeasures

Introduction

Part I Basic Concept of the Global Warming Countermeasures in the AFF Sector

Part II Measures to Achieve Targets

1. Global Warming Countermeasures
(1) Global warming countermeasures in the agriculture sector
(2) Global warming countermeasures in the food sector
(3) Measures for forest carbon sinks
(4) Global warming countermeasures in the fisheries sector
(5) Cross-sectoral measures
(6) Measures under the MAFF's initiative

2. Creation of innovations relating to global warming countermeasures in the AFF sector
(1) Promotion of development of GHG emission reduction technologies
(2) Promotion of application of research achievements

3. International cooperation in global warming countermeasures in the AFF sector
(1) Response to reduction of emissions from deforestation and forest degradation
(2) Promotion of international collaborative research on GHG emission reduction
(3) Cooperation with international organizations

Part III Matters necessary for comprehensively and systematically implementing global warming countermeasures in the AFF Sectors

Part IV Progress Management

Appendix Timeline

Relationship between the Government's Targets under the Plan for Global Warming Countermeasures (approved by the Cabinet in October 2021) and the Targets in the AFF sectors

Government's mid-term targets under the Plan for Global Warming Countermeasures

Emission reduction target for FY2030
▲46.0% (▲26.0%)
(Compared to FY2013) ※

3.5% reduction (2.8%) through measures in the AFF sector

=

Emission reduction measures:
▲42.2% (▲23.4%)

(Including ▲0.2 % (▲0.2%) in the AFF sector)

+

Carbon sinks measures
▲3.4% (▲2.6%)
AFF sector ▲3.3%
Forest carbon sinks ▲2.7% (▲2.0%)
Agricultural soil carbon sinks ▲0.6% (▲0.6%)

1,408 million t-CO_2

760 million t-CO_2
(1,042 million) (t-CO_2)

Fiscal Year 2013 Total emissions

FY2030 target

※ In addition to emission reduction and sink measures, we aim to achieve international emission reductions and sinks of around 100 million t-CO2 on a cumulative basis by FY2030 through public-private partnerships under the Joint Crediting Mechanism (JCM).

[Emission reduction measures]

GHG emissions reduction measures from greenhouse horticulture and agricultural machinery

Reduction target for FY2030:
Greenhouse horticulture: 1.55 million t-CO_2 (1.24 million t-CO_2)
Agricultural Machinery: 7,900 t-CO_2 (1,300 t-CO_2)
- Introduction of energy-efficient greenhouse horticulture facilities
- Dissemination of energy-efficient agricultural machinery

<Dissemination of heat pumps and other energy-efficient equipment, and automatic steering systems>

Energy conservation measures for fishing vessels

FY2030 reduction target:
194,000t-CO_2 (162,000 t-CO_2)

Replace conventional fishing vessels with energy-efficient ones

<Introduction of energy-efficient outboard engines, LED fishing lights, etc.>

GHG emission reduction measures for agricultural soil

Reduction target for FY2030:
CH_4: 1.04 million t-CO_2 (0.64-2.43 million t-CO_2)
N_2O: 240,000 t-CO_2 (102,000 t-CO_2)
- Reduction of CH_4 emissions from rice paddies by extending the period for midseason drainage
- Reduction of N_2O through optimization of fertilization

<Fertilization guidance based on soil diagnosis>

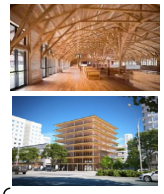
[Carbon sinks measures]

Forest carbon sinks measures

Reduction target for FY2030 target:
38 million t-CO_2 (27.8 million t-CO_2)

- Promotion of sound forest management through proper thinning, replanting by using “elite tree” seedlings
-Expansion of wood use, including in buildings

Planting of “elite tree” seedlings

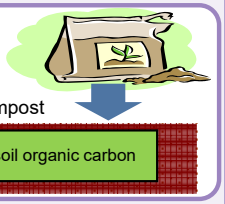


Wood use in buildings

Agricultural soil carbon sinks measures

FY2030 target: 8.5 million t-CO_2 (6.96-8.9 million t-CO_2)

Promotion of carbon storage in farmland and grassland by encouraging farmers to apply organic matter such as compost and green manure, and biochar



The figures in parentheses are the figures in the former Plan for Global Warming Countermeasures.
Source: The Ministry of Agriculture, Forestry and Fisheries based on the "Plan for Global Warming Countermeasures" (approved by the Cabinet on October 22, 2021).

Outline of the Planned Global Warming Countermeasures <Agriculture Sector (1)>

Energy conservation measures for greenhouse horticulture

- Promoting initiatives toward creating production areas using energy-saving technology
- Promoting the introduction of heating systems using renewable energy sources such as sunlight and geo-heat that are not dependent on fuel oil

Energy conservation measures for agricultural machinery

- Dissemination of automatic steering systems
- Promotion of electrification and hydrogenation of agricultural machinery

GHG emission reduction measures for agricultural soil

- Disseminate the effectiveness of fall plowing and extending the period for midseason drainage in rice paddies.
- Review the optimal implementation method of extending the period for midseason drainage in accordance with the planting season in each region.
- Optimize fertilization amount based on soil diagnosis, and through split fertilization use of slow-release fertilizers, etc.
- Promote local fertilization to the rhizosphere, etc.

Energy conservation measures for greenhouse horticulture

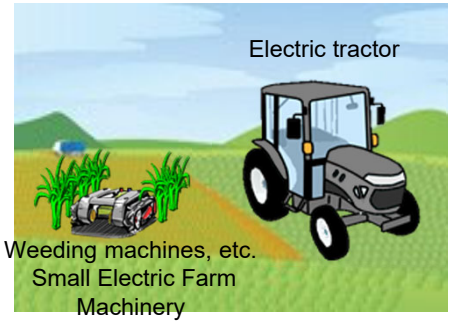
Heat pump, woody biomass heater, etc.

Use geothermal heat, waste heat from factories, etc.
Heating that does not depend on the fuel oil used

Reduction of waste by appropriate temperature control using environmental sensor acquisition data

Energy conservation measures for agricultural machinery

Promoting the spread of "automatic steering systems" that enable highly accurate work and contribute to energy conservation by reducing duplication of work



Promotion of electrification of agricultural machinery and conversion to hydrogen, etc., toward the realization of carbon neutrality in 2050

GHG emission reduction measures for agricultural soil

Reduction of CH4 emissions from rice paddies


Ditch cutting for midseason drainage


Implementation of midseason drainage


Implementation of fall plowing

Extending the period for midseason drainage (by about one week) and Promotion of fall plowing (plowing in rice straw in fall)

Reduction of N2O emissions from fertilization

Optimizing fertilization based on soil diagnosis

Outline of the Planned Global Warming Countermeasures <Agriculture Sector (2)>

Recycling of waste plastics for agriculture

- Grasping and analyzing information on the amount of agricultural waste plastic discharged, etc.
- Instructed regional block councils, etc., to further promote collection and appropriate treatment based on emission control and recycling treatment.
- Dissemination of policies related to industrial waste and demonstration and diffusion of new technologies

Agricultural soil carbon sink measures

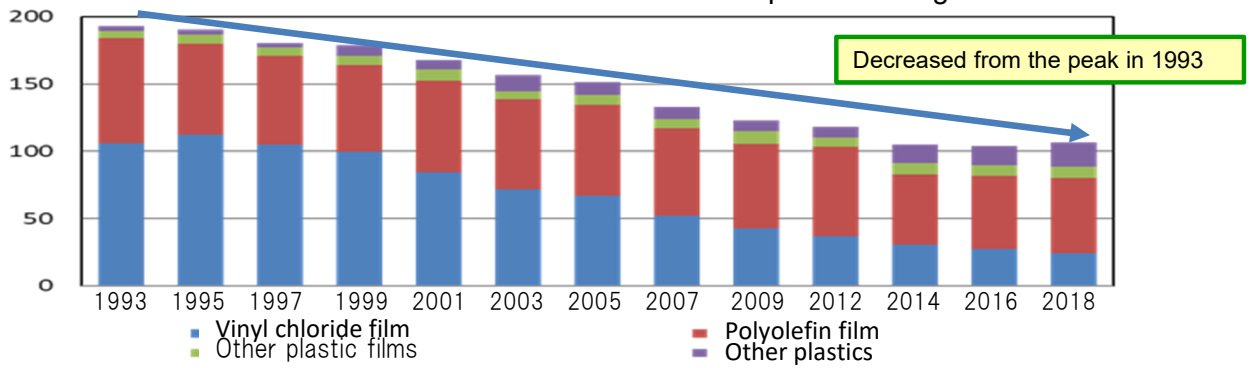
- Continue to promote the application of organic matter to the soil through the promotion of agriculture-livestock cooperation and environment-friendly agriculture such as organic farming.
- Promote soil development by improving the environment necessary for the supply of compost and disseminating the effectiveness of compost.
- Promote the application of biochar on agricultural soil through the J-credit scheme.
- Improve the quality of compost through ripening, pelletizing, mixing with chemical fertilizer, etc., and distribute widely.

Measures to reduce greenhouse gas emissions in the livestock sector

- Alternation of the manure management systems and encouragement of low-protein diet supplemented with amino acid.
- Reduction of greenhouse gas emissions per product, through improvement of genetic abilities of livestock and promotions of labor-saving and precise animal system with ICT.

Recycling of waste plastics for agriculture

Amount of waste plastics for agriculture



Agricultural soil carbon sink measures

Improve the environment necessary for the supply of compost

Pelletizing facilities
Pellet compost (upper right)

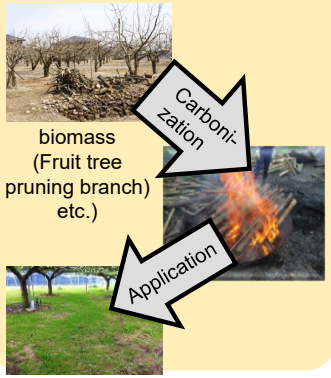
Compost production facilities

Promote the use of organic materials such as compost

Sprinkling Pellet compost

Spreading compost

Application of biochar to agricultural land



biomass (Fruit tree pruning branch) etc.)

Measures to reduce greenhouse gas emissions in the livestock sector

Alternation in the manure management system

Alternation from piling fermentation to forced aerated fermentation

For example, in the case of dairy farming, by changing the method of treating manure from piling fermentation, which is common practice in Japan, to forced aerated fermentation, the methane generated during composting can be reduced by 99%.

piling fermentation

change

forced aerated fermentation

Reduce GHG emissions per unit of output

Improvement of productivity through improvement of molarity, etc.

In order to produce 140,000 tons of beef (partial meat), 400,000 fattening cattle weighing 830 kg are required. If the weight of the cattle can be increased to 880 kg during the same fattening period, the same amount of beef can be produced with 380,000 cattle, and GHG emissions can be reduced by 20,000 cattle.

Estimate based on 60% carcass yield and 70% partial meat yield

Outline of the Planned Global Warming Countermeasures <Food Sector (1)>

Formulation of low-carbon society action plans in the food industry

- Strengthening encouragement of industry associations to formulate low-carbon society action plans with targets for 2030
- Encouraging industry associations that have achieved the target levels set in their action plans to consider setting higher target levels
- Encouraging other industries and associations that have not yet participated in the Commitment to a Low-Carbon Society to formulate their action plans

Measures for energy conservation and GHG emission reduction in the food industry

- Thoroughly promoting energy conservation through the assessment and classification of business entities and the intensive investigation of business entities making less progress in energy conservation, based on periodic reports under the Energy Conservation Act
- Reviewing successful cases of introducing equipment and machinery with high energy efficiency that can be used widely among SMEs
- Promoting reporting of emission data from business entities that emit a certain amount of GHG
- Stimulate business operators' awareness of energy conservation and global warming countermeasures by publicizing good practices through commendation programs, etc.

Low-Carbon Society Action Plans in Food Industry (Target for FY2030)

As of March 2021

Association name	Target index	Benchmark fiscal year	Target level for FY2030	FY2019 Results
Japan Starch and Sugar Producers Association	CO_2 emission intensity	FY2005	-5%	-1%
Japan Dairy Industry Association	CO_2 emissions	FY2013	-15%	-20%
Japan Soft Drink Association	CO_2 emission intensity	FY2012	-18%	-19%
Japan Baking Industry Association	CO_2 emission intensity	FY2013	-13%	-18%
Japan Canners Association	Energy consumption intensity	FY2009	-19%	-26%
Japan Beet Sugar Association	Energy consumption intensity	FY2010	-15%	-17%
Japan Oilseed Processors Association	CO_2 emissions	FY2013	-6.5%	+0%
	CO_2 emission intensity	FY2013	-6.5%	-5%
All Nippon Kashi Association	CO_2 emissions	FY2013	-17%	-15%
	CO_2 emission intensity	FY2013	-17%	-35%
Japan Sugar Refiners' Association	CO_2 emissions	FY1990	-33%	-48%
Japan Frozen Food Association	Energy consumption intensity	FY2013	-15.7%	-4%
Japan Ham & Sausage Processors Cooperative Association	Energy consumption intensity	FY2011	-17%	-3%
JAPAN Flour Millers Association	CO_2 emission intensity	FY2013	-32.1%	-24%
All Japan Coffee Association	CO_2 emission intensity	FY2005	-25%	-50%
Japan Soy Sauce Association	CO_2 emissions	FY1990	-23%	-25%
Japan Convenience Foods Industry Association	CO_2 emission intensity	FY1990	-21%	-23%
Nihon Hamburg & Hamburger Association　Japan Association	Energy consumption intensity	FY2013	-16%	+9%
Japan Association of Mayonnaise and Dressings	CO_2 emissions	FY2012	-21.7%	-19%
	CO_2 emission intensity	FY2012	-17.9%	-24%
Japan Rice Millers Association	Energy consumption intensity	FY2005	-12%	-12%
Japan Processed Foods wholesalers Association	Energy consumption intensity	FY2011	-5%	-16%
Japan Foodservice Association	Energy consumption intensity	FY2013	-15.7%	-15%

Classified evaluation results based on the Energy Conservation Act (FY2019 results)

All businesses	S class Businesses with excellent energy efficiency	A Class Further efforts to save energy are expected businesses	Class B *1 Businesses that are stagnant in energy conservation
12,005 (12,206)*2	53.9% (56.5%)	(34.7%) (32.7%)	11.5% (10.8%)

1: Among B-class businesses, those with insufficient compliance with the criteria are classified as C-class businesses.
2: Figures in parentheses are FY2018 results.
Announced by the Agency for Natural Resources and Energy in April 2021

Outline of the Planned Global Warming Countermeasures <Food Sector (2)>

Food Loss Reduction

- Reducing food waste by relaxing delivery deadlines and reviewing business practices such as labeling of best-before dates only by the year and month.
- Support for efforts to develop food bank activities
- Building the online matching system to manage the information on food donors and recipients in food bank activities
- The spread of take-out of leftovers in the food service industry
- Promoting initiatives such as supply-demand forecasting and precision shipment forecasting using AI, etc.

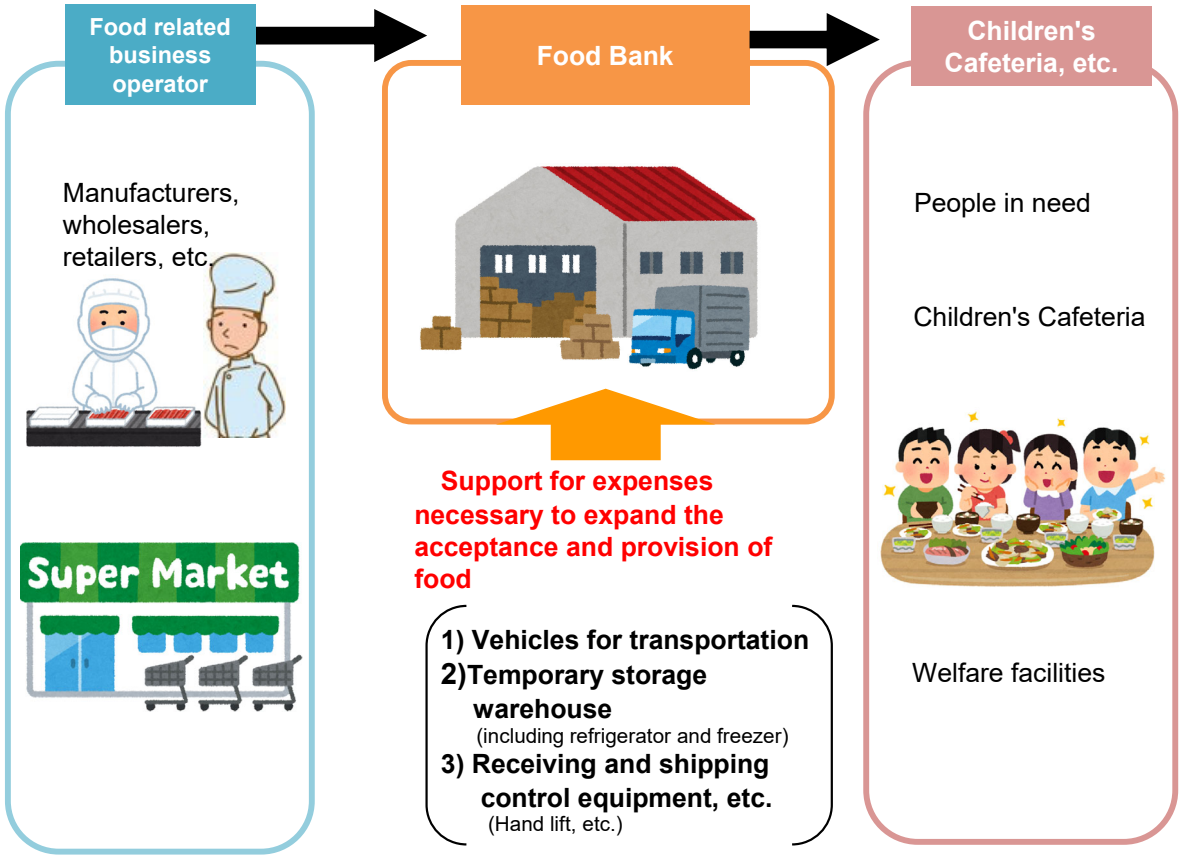
Resource recycling of plastics and other materials in the food industry, etc. and recycling of containers and packaging

- Promoting initiatives such as the reduction of the use of one-way plastics and the voluntary collection and recycling of plastics by retailers and other discharging businesses.
- Guidance to businesses to fulfill obligations under the Containers and Packaging Recycling Law

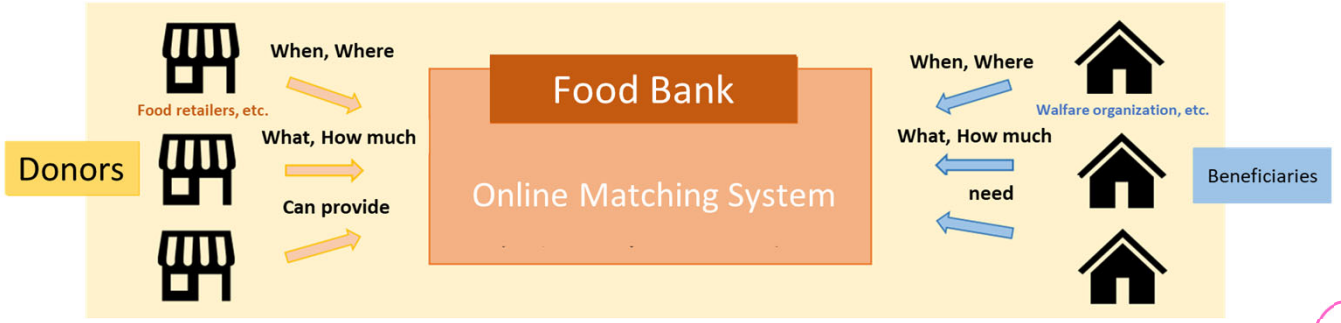
Reduction of the impact on the environment caused by the distribution of food and beverage products

- Construction of a data linkage system for the entire supply chain
- Labor-saving and automation of operations and improved logistics efficiency using ICT and AI
- Promoting initiatives such as the development of wholesale markets and joint distribution bases to secure the cold chain and modal shifts

Support for efforts to develop food bank activities



Support for a matching system to promote food bank activities



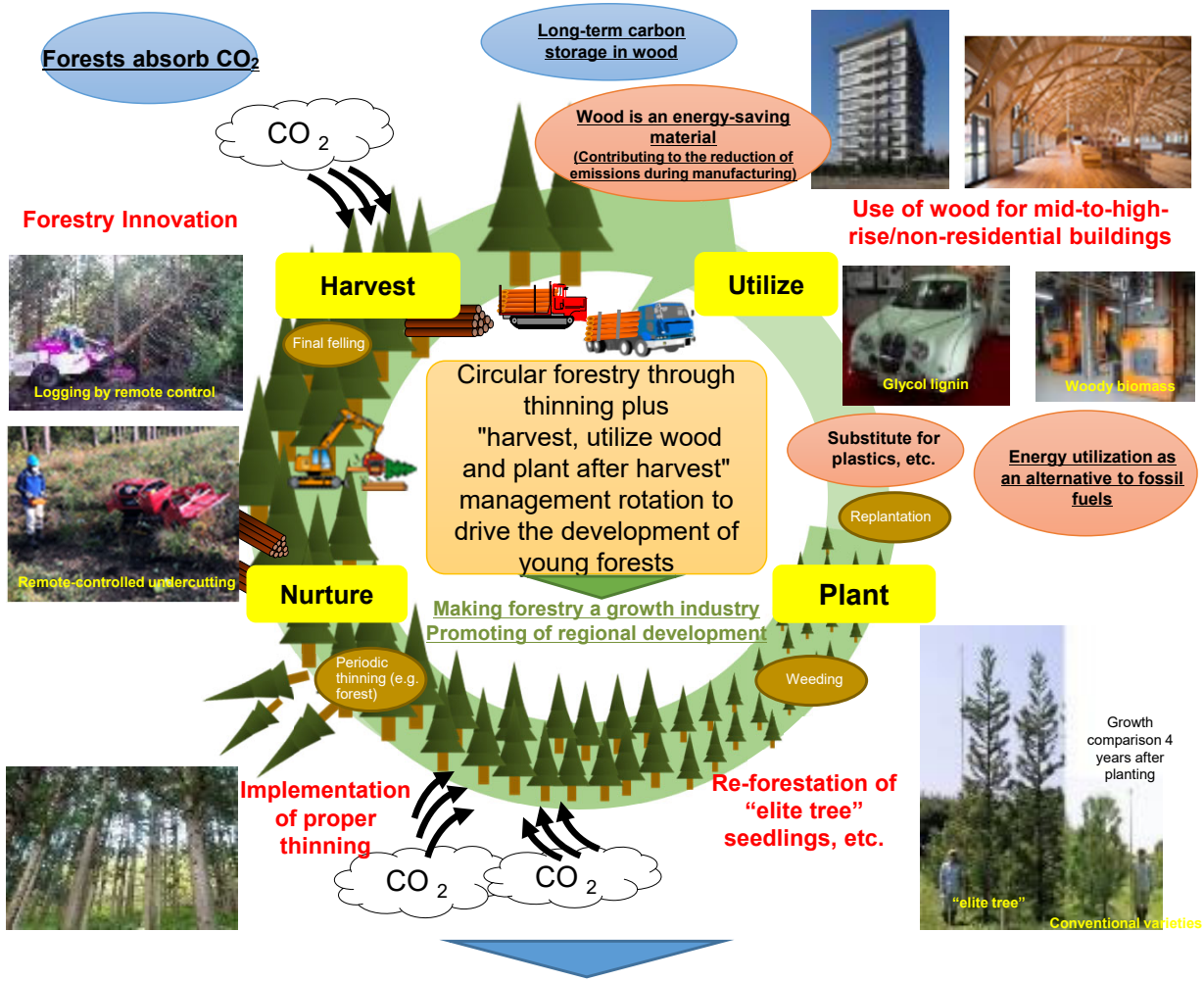
Outline of the Planned Global Warming Countermeasures < Forest carbon sinks measures >

Forest carbon sinks measures

- Forests play a role in land conservation and headwater conservation as well as functioning as carbon sinks.
- Wood products store carbon over a long period of time and contribute to the reduction of CO_2 emissions as they consume relatively less energy for their manufacturing processes and replace fossil fuels for energy production.
- In accordance with the Basic Plan for Forests and Forestry, measures to secure and enhance forest carbon sinks and reservoirs are to be taken over the medium-to-long term to achieve the target of 2.7% removal compared to the 2013 base line emissions by 2030 and contribute to the net-zero by 2050.
- To this end, the cyclic management of planted forests via “harvest, utilize wood and plant after harvest” as well as proper thinning practices coupled with expanded use of timber will be established to ensure the development of young and vigorous forests, including through:
  - Proper forest management and conservation, such as thinning and reforestation after harvest
  - Deployment of seedlings derived from the “elite tree” and other seedlings with excellent growth potential
  - Deployment of innovative forestry technologies to turn the felling to reforestation operations profitable
  - Promotion of wood use for buildings, including mid-to-high-rise/non-residential buildings
  - Nationwide movement to engage people with the care of forests and promote wood utilization

“Green Growth” through forests, forestry and timber industry

Proper management of forests combined with sustainable development and growth of forestry and timber industries underpins prosperous society in line with the 2050 carbon neutrality goals.



- **Achieve the target of 38 million t-CO_2 removals by forest sinks by 2030 and contribute to the realization of net-zero by 2050**

Outline of the Planned Global Warming Countermeasures <Fisheries Sector>

Measures for energy conservation and GHG emission reduction for fishing vessels

- Demonstration of energy-saving technology in fishing vessels and Promotion of the introduction of energy-efficient fishing vessels
- Establishment of technologies on fishing vessels powered by battery or hydrogen fuel cell
- Inspection of Freezing, refrigeration and air conditioning of fishing vessels using chlorofluorocarbons as refrigerants and Guidance on proper management of meters, etc. maintenance of equipment, collection of information on refrigerant charging and recovery

Energy conservation measures for fishing ports and fishing grounds

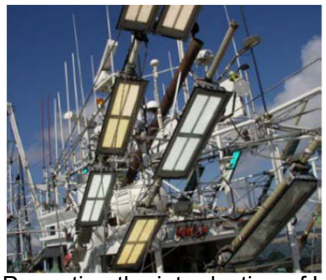
- Establishing an efficient collection and shipping system at fishing ports that serve as distribution bases, etc.
- Promotion of integrated development of power generation facilities using renewable energy such as loading docks
- Development of fish reefs and installation of marine environment observation facilities

Conservation and creation of seaweed beds

- Identification of effective measures to understand the distribution of seaweed beds, etc., and the status of each region
- Development of model for evaluating removal factors of different types of seaweed beds, and development of technology for efficient formation and expansion of seaweed beds.

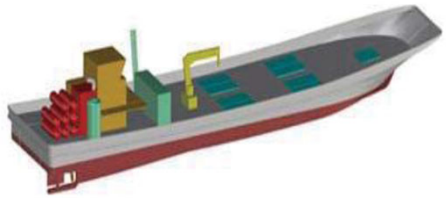
Measures to conserve energy and reduce greenhouse gas emissions from fishing vessels

Introduction of energy-saving fishing vessels



Promoting the introduction of LED fishing lights and energy-saving engines to fishing vessels

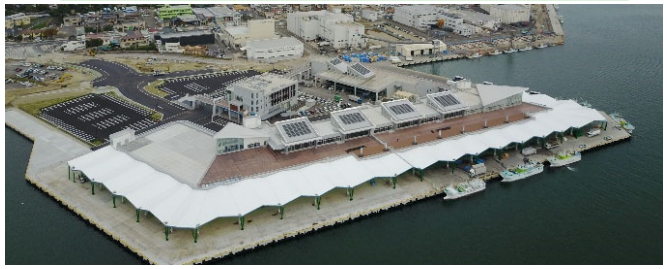
Fishing vessels powered by battery or hydrogen fuel cell



Development of a Fishing Boat Powered by Hydrogen Fuel Cell and Lithium Battery

Energy conservation measures for fishing ports and fishing grounds

Integrated development of solar power generation facilities and fishing port facilities



Utilization of marine environmental information for fishing decisions

Creation of seaweed

Countermeasures against feeding damage, high water temperature, etc.

Extermination of herbivorous species

Creation of seaweed beds in response to changes in vegetation

Outline of the Planned Global Warming Countermeasures <Cross-sectoral countermeasures (1)>

Promotion of the use of biomass

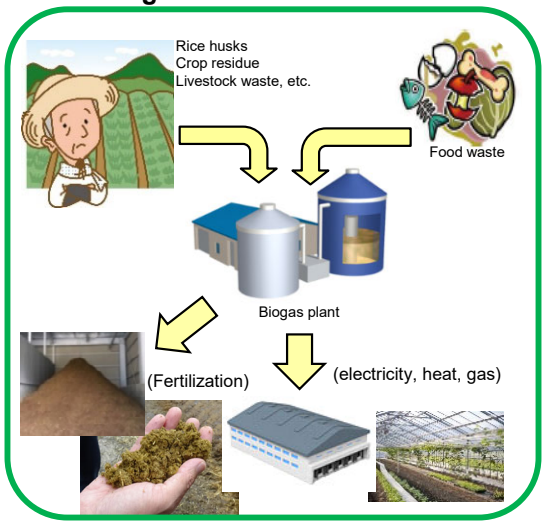
- Support for community-led initiatives
  - Promotion of advanced utilization to create more economical and high-value products according to the characteristics of biomass
  - Multi-level use of sources by reusing resources and utilizing by-products
- Promoting biogas power generation facilities using livestock waste and food waste
- Supporting initiatives for regional resources recycling by promoting the use of bio-liquid fertilizer
- Widely sharing successful initiatives and know-how on the use of biomass

Promotion of the introduction of renewable energy in rural communities

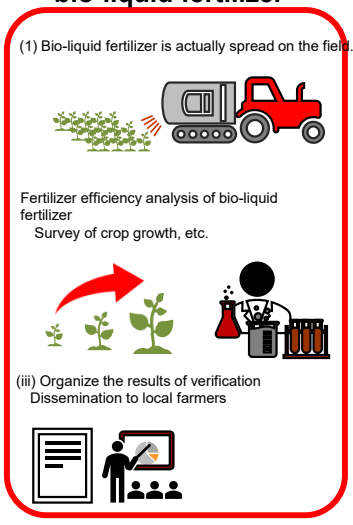
- Promoting the development and introduction of technologies for utilizing renewable energy in farm management
- Constructing a stable energy supply system combining renewable energy in rural areas as well as an efficient and stable energy supply system to other regions
- Promoting the introduction of renewable energy such as small-scale hydroelectric power generation using agricultural water
- Promoting the use of locally available woody biomass for energy purposes

Promotion of the use of biomass

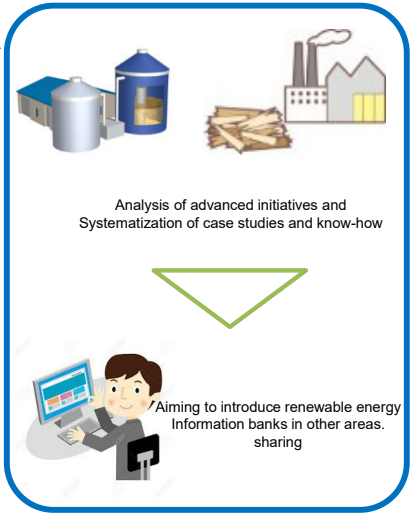
Promotion of biogas power generation facilities



Promoting the use of bio-liquid fertilizer

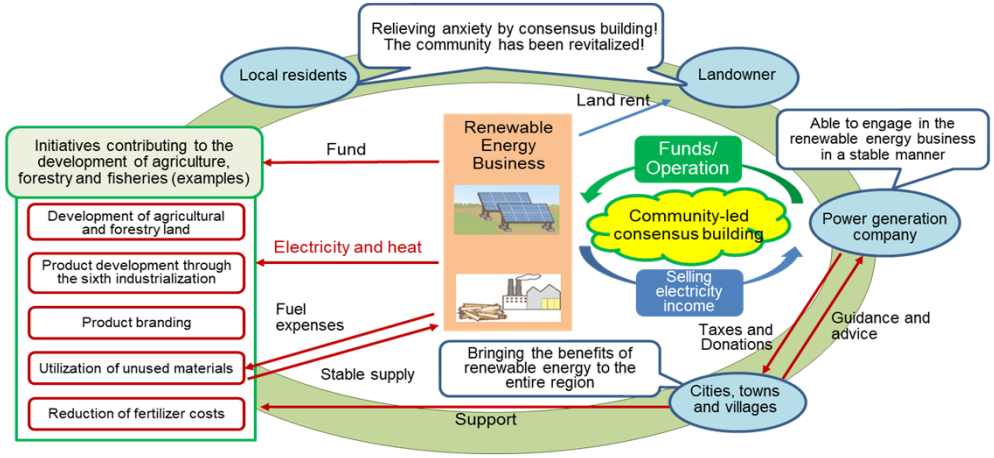


Horizontal development of successful cases



Promoting the introduction of renewable energy in rural areas

Promoting the introduction of renewable energies in rural areas on the premise of securing prime farmland, taking advantage of the Act on the Promotion of Renewable Energy Electric Power Generation Harmonized with Sound Develop, as well as creating a consensus among those concerned



Small hydroelectric power generation facility using a drop

Power generation point (before installation)

Power generation facility (after installation)

Woody biomass power generation

Fuel chip

Farming-photovoltaics

Maintain farming operations in an appropriate manner