

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 CO₂ emissions, the major source of GHG in Japan, but a large share of CH₄ and N₂O. 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

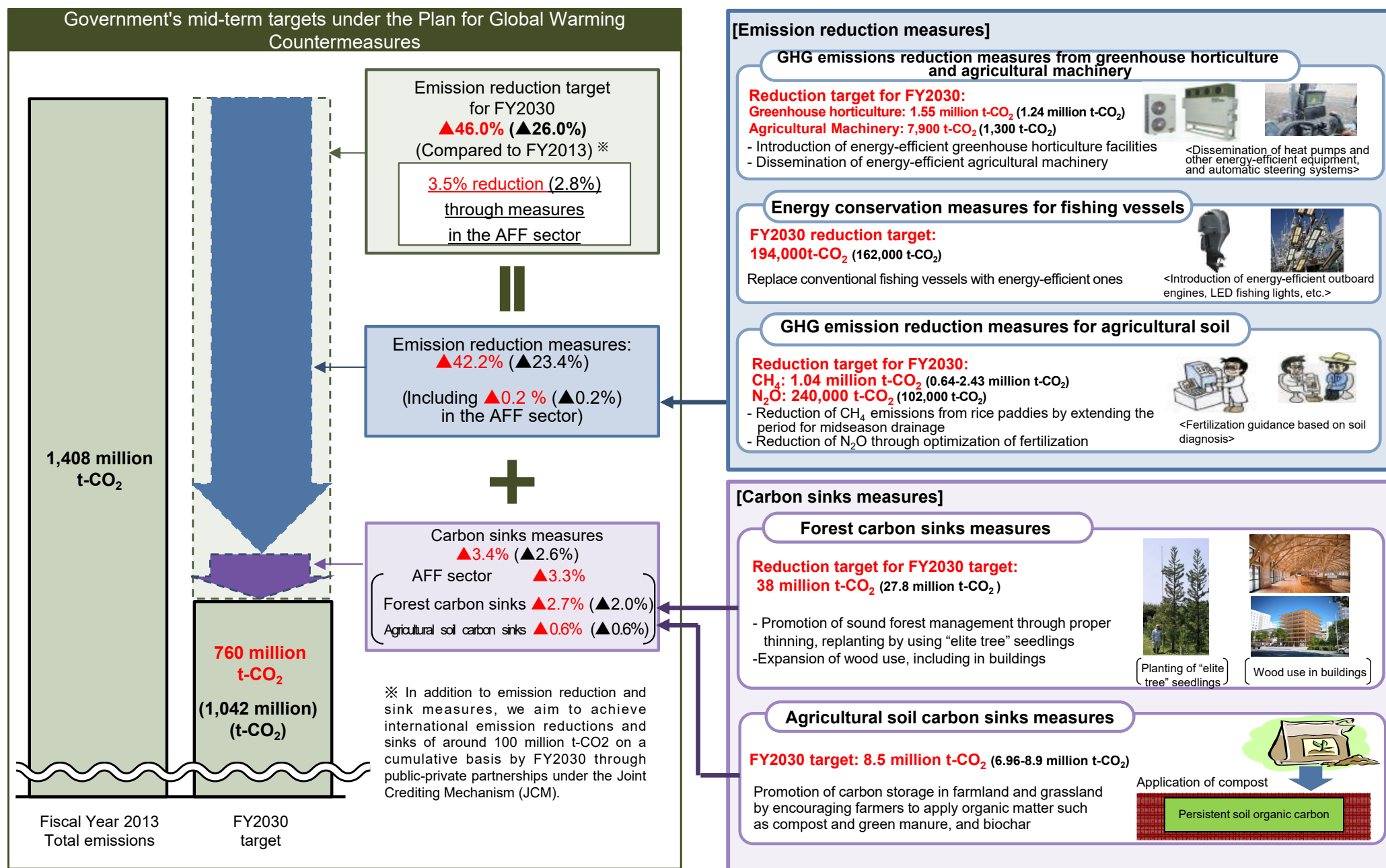
- (1) Response to reduction of emissions from deforestation and forest degradation
- (2) Promotion of international collaborative research on GHG emission reduction
- (3) Cooperation with international organizations

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



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 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

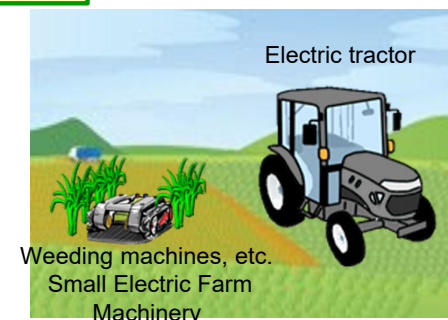
Energy conservation measures for agricultural machinery

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

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

- 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.

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

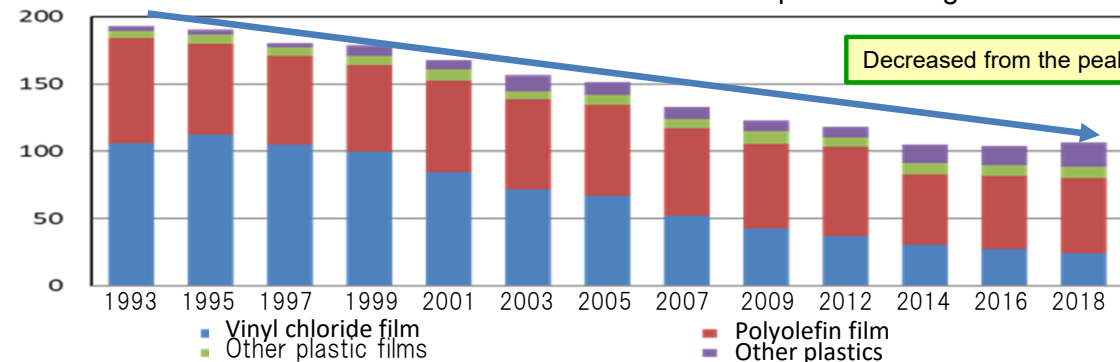
Outline of the Planned Global Warming Countermeasures <Agriculture Sector (2)>

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

Recycling of waste plastics for agriculture

Amount of waste plastics for agriculture



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.

Agricultural soil carbon sink measures

Improve the environment necessary for the supply of compost



Pelletizing facilities
Pellet compost (upper right)

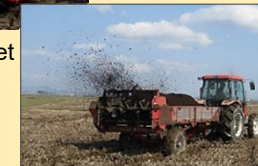


Compost production facilities

Promote the use of organic materials such as compost

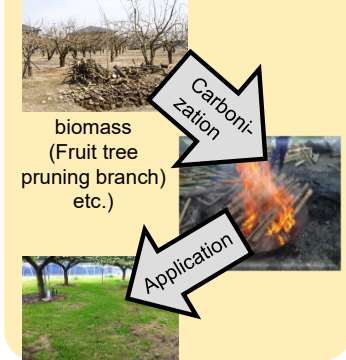


Sprinkling Pellet compost



Spreading compost

Application of biochar to agricultural land



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.

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.



830kg/head



improvement



880kg/head

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%
	CO ₂ emissions	FY2012	-21.7%	-19%
Japan Association of Mayonnaise and Dressings	CO ₂ emission intensity	FY2012	-17.9%	-24%
	Energy consumption intensity	FY2005	-12%	-12%
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.

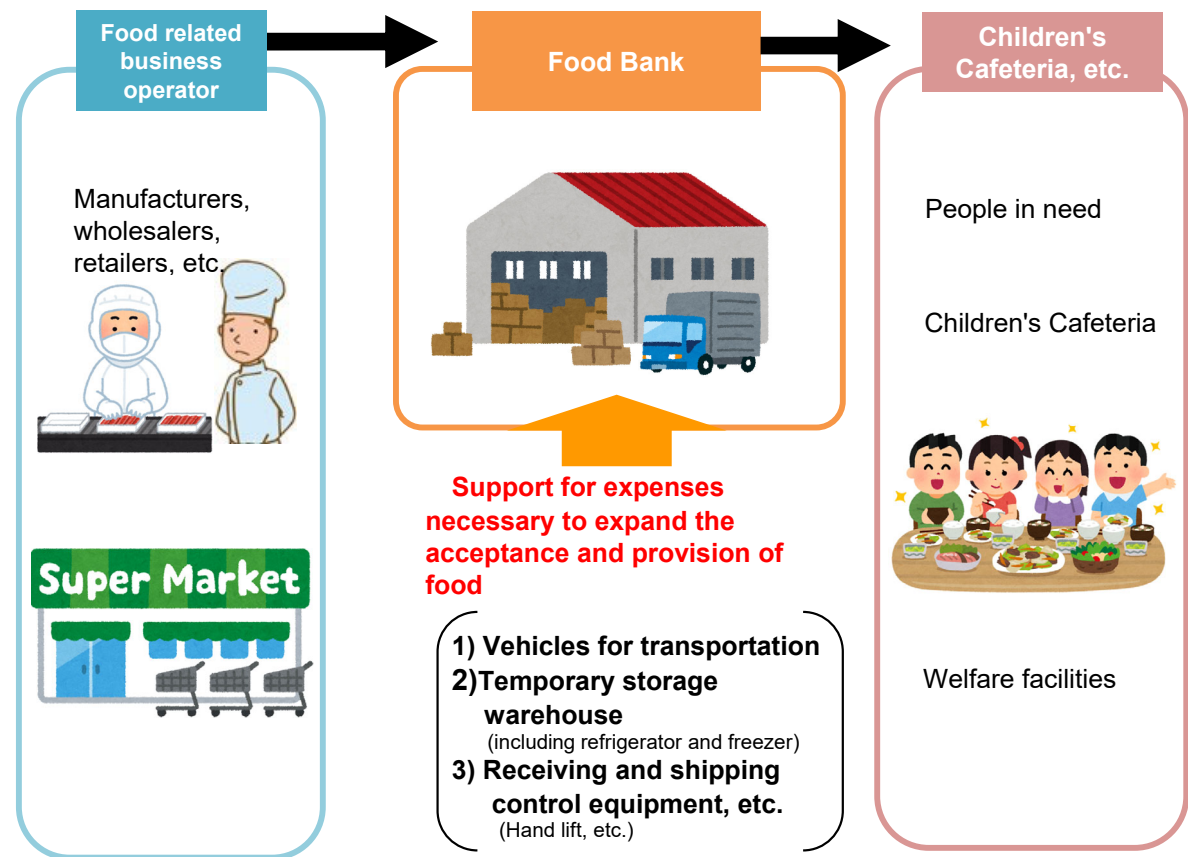
Resource recycling of plastics and other materials in the food industry, etc. and recycling of containers and packaging

- 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

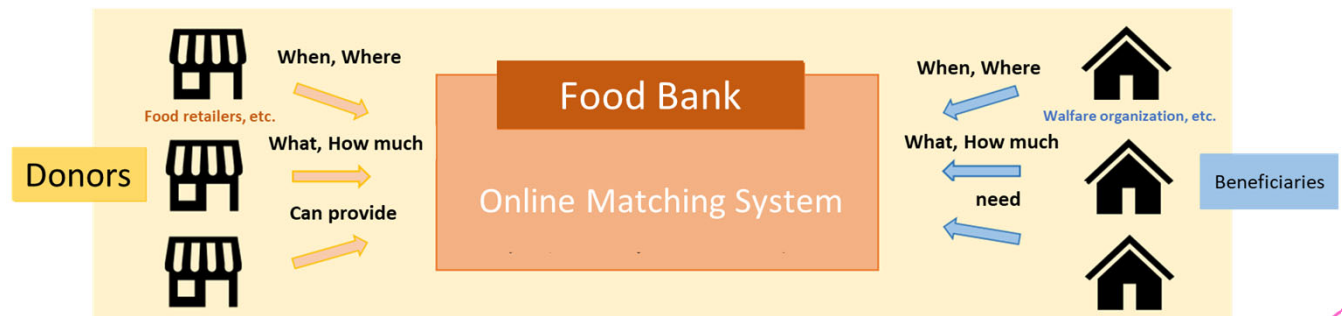
Reduction of the impact on the environment caused by the distribution of food and beverage products

- 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



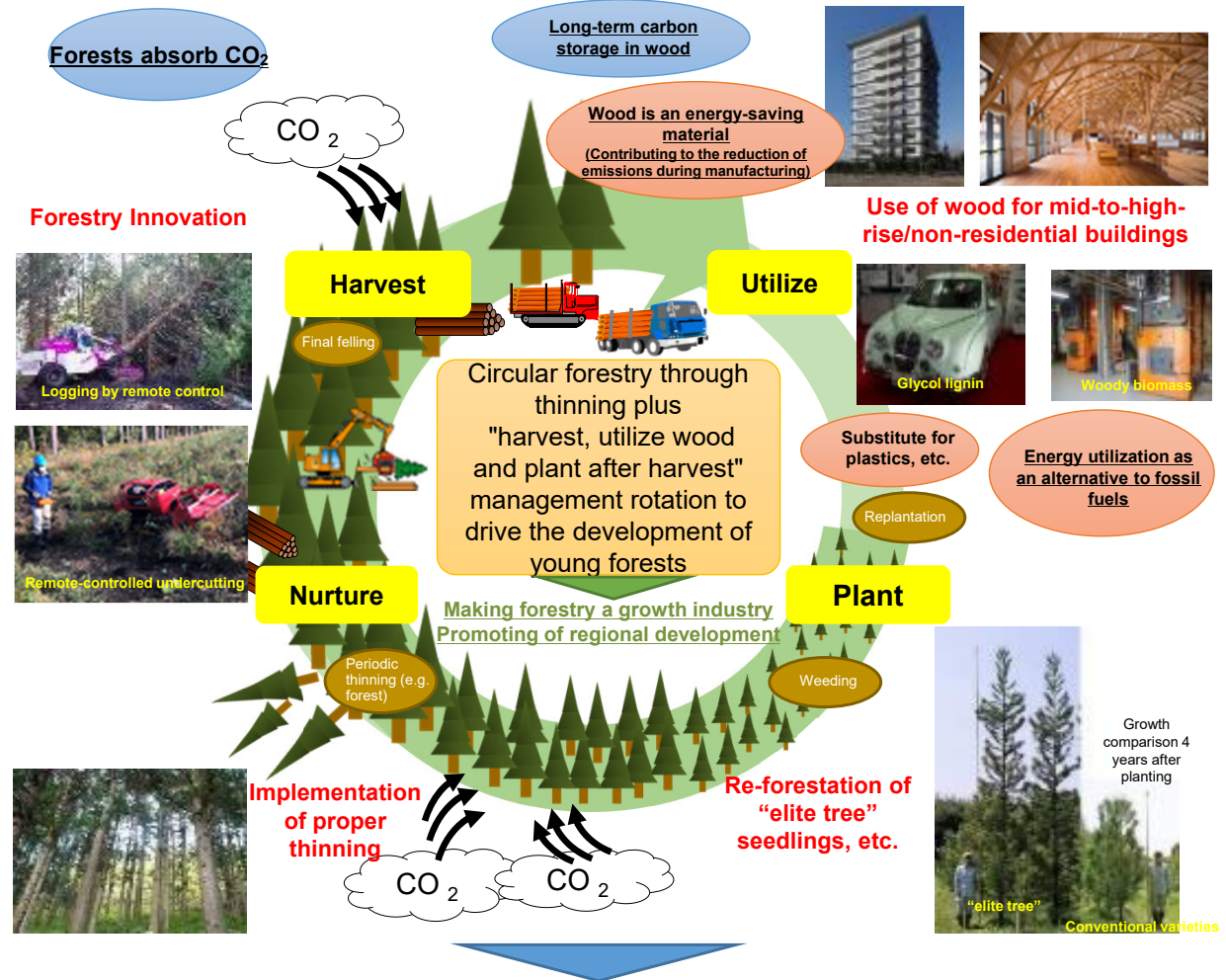
Outline of the Planned Global Warming Countermeasures < Forest carbon sinks measures >

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 CO₂ 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-CO₂ 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

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

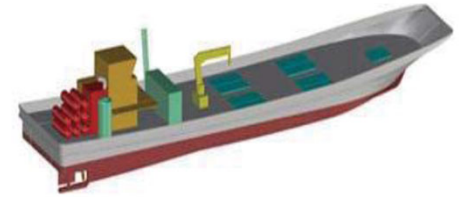
Introduction of energy-saving fishing vessels



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

- 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

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



Conservation and creation of seaweed beds

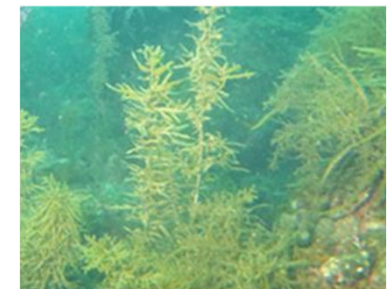
- Identification of effective measures to understand the distribution of seaweed beds, etc., and the status of each region
- Development of model for evaluating removal factors of different types of seaweed beds, and development of technology for efficient formation and expansion of seaweed beds.

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

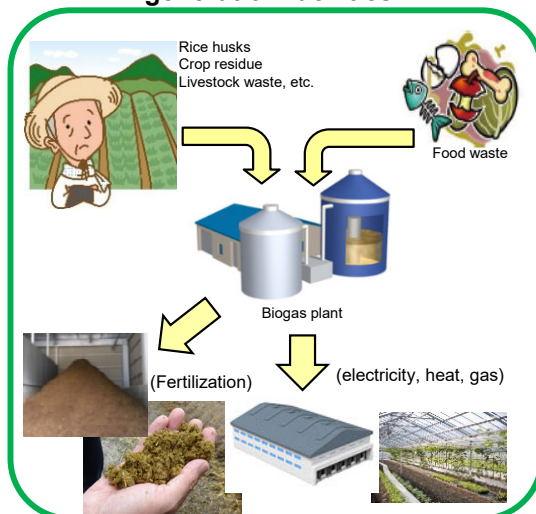
Outline of the Planned Global Warming Countermeasures <Cross-sectoral countermeasures (1)>

Promotion of the use of biomass

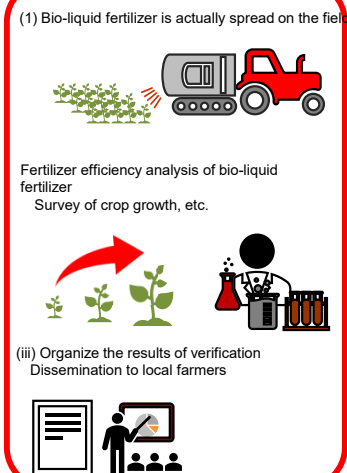
- Support for community-led initiatives
 - Promotion of advanced utilization to create more economical and high-value products according to the characteristics of biomass
 - Multi-level use of sources by reusing resources and utilizing by-products
- Promoting biogas power generation facilities using 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 use of biomass

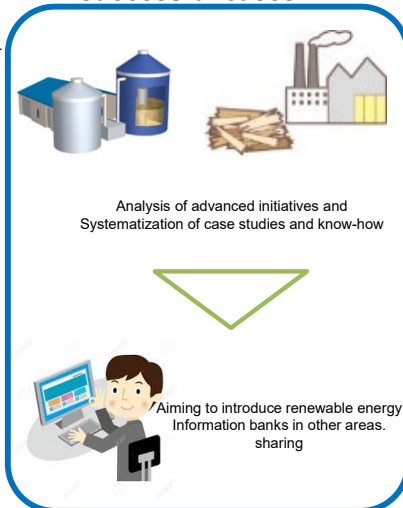
Promotion of biogas power generation facilities



Promoting the use of bio-liquid fertilizer



Horizontal development of successful cases

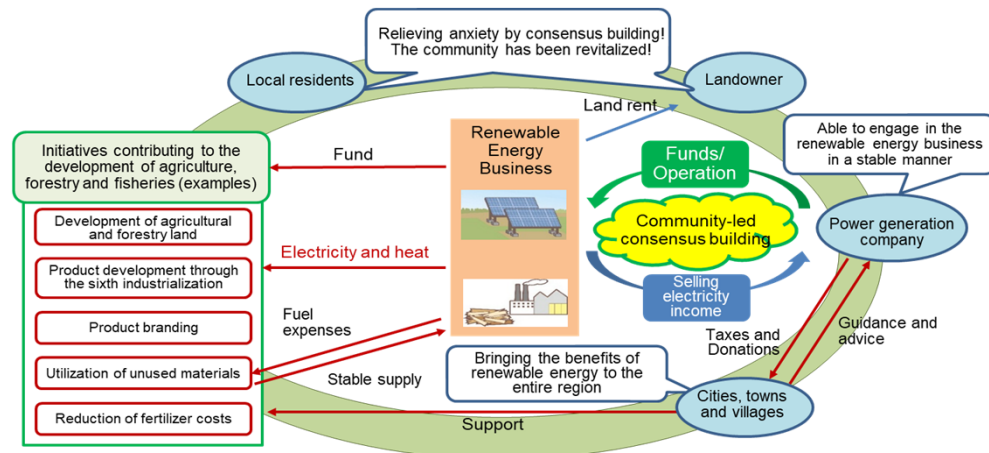


Promoting the introduction of renewable energy in rural areas

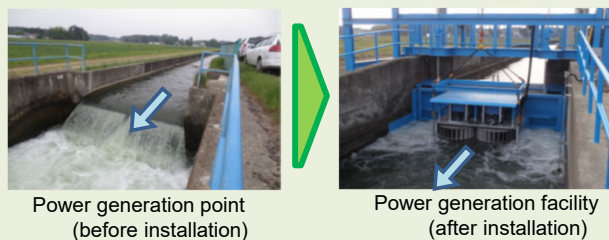
Promotion of the introduction of renewable energy in rural communities

- 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

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



Woody biomass power generation



Farming-photovoltaics

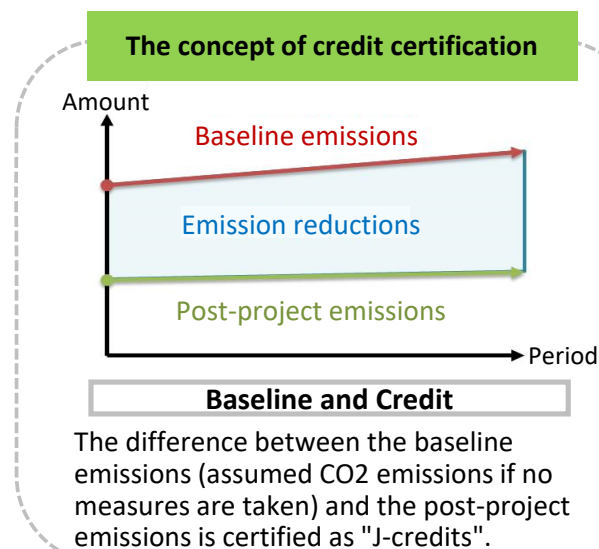


Outline of the Planned Global Warming Countermeasures <Cross-sectoral countermeasures (2)>

Promotion of the J-Credit Scheme

- Informing the J-Credit Scheme by holding environment-related events
- Operating the J-Credit Scheme in a manner that many people and entities can participate in the scheme through hearings with farmers, forestry and fishery workers
- Providing information on best practices of the use of the J-Credit Scheme
- Promotion of formulation of new methodologies and project in the AFF sectors
- Improvement of the carbon crediting methodologies for forest management projects

Promotion of the J-Credit Scheme



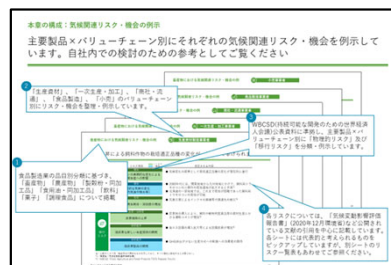
Provision of information on the outline of the Scheme and examples of good practices, etc.

Disclosure of information on climate change-related risks and opportunities, and promotion of visualization of greenhouse gas emissions and reductions

- Promoting disclosure of information about the climate-related risks and opportunities based on TCFD recommendations
- Promotion of decarbonization practices of those involved in agriculture, forestry and fisheries
- Promotion of increased consumer willingness to purchase though carbon footprints
- Generalization of GHG calculation method on agricultural and rural development projects

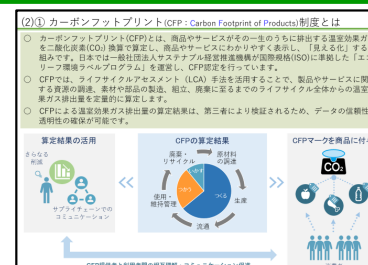
Disclosure of information on climate change-related risks and opportunities, and promotion of visualization of greenhouse gas emissions and reductions

TCFD Guide for Food Business Operators (Announced by the Ministry of Agriculture, Forestry and Fisheries in June 2021)



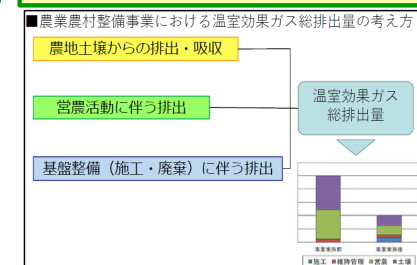
Examples of key issues and business impacts of climate risks and opportunities by the industry sector, including livestock products and agricultural products

Introductory materials on Decarbonization Technology and Visualization (Announced by the Ministry of Agriculture, Forestry and Fisheries in June 2021)



Introduction of decarbonization technologies and a carbon footprint system to visualize decarbonization efforts, etc.

GHG Emissions Calculation Program in agricultural and rural development projects (Announced by the Ministry of Agriculture, Forestry and Fisheries in 2020)



Calculation scheme of GHG emission and reduction over the entire life cycle of agricultural facilities

Outline of the Planned Global Warming Countermeasures <Cross-sectoral countermeasures (2)>

Measures under the MAFF's initiatives

- Formulation of the Action Plan of the Ministry of Agriculture, Forestry and Fisheries, based on the "National Government Action Plan"
- Taking the initiative in introducing solar power generation in buildings, EV, LED lighting, as well as procuring electricity from renewable energy sources

(Reference) Strategy for Sustainable Food Systems

- Realization of Zero CO₂ emission from fossil fuel combustion in the AFF sector by 2050 (KPI)
- Promotion of measures to reduce methane and nitrogen oxide emissions from the agriculture and livestock sectors
- Promotion of carbon sinks measures through long-term, large-scale storage of carbon in crop land, forests, timber, and the ocean.

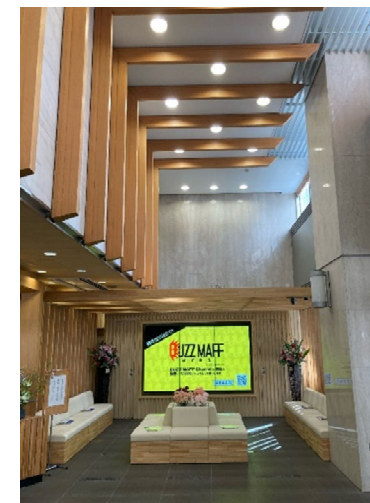
Measures under the MAFF's initiatives



Installation of solar power generation equipment on the roof of government buildings

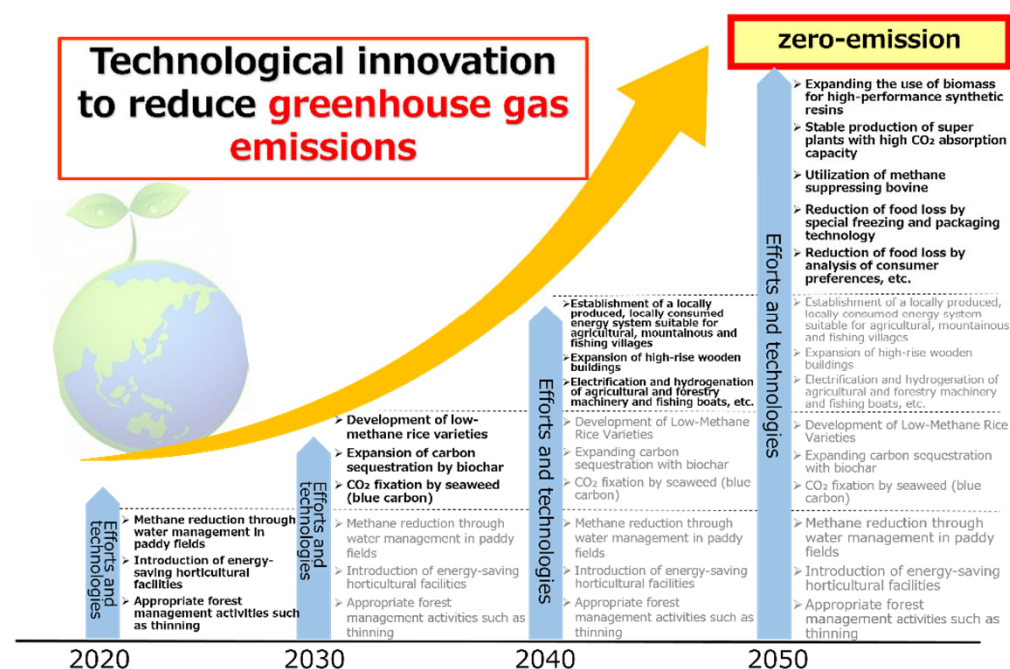


Introduction of LED lighting



Wooden building interiors

Efforts to achieve zero emissions in the agriculture, forestry, and fisheries sectors



Outline of the Planned Global Warming Countermeasures <Creation of Innovation (1)>

Development of GHG emission reduction technology

- Improving the existing emission reduction technology
- Development of technology to achieve significant energy and labor savings in agriculture, forestry and fisheries through the use of ICT, etc.
- Development of technology to reduce greenhouse gas emissions by utilizing the unique agriculture, forestry and fishery resources of the region
- Development of emission reduction technologies in the livestock sector where practical technologies have not yet been established. For example, technologies to reduce GHG emission from fermentation within digestive tracts and from excreta.
- Development of technologies for the electrification and hydrogenation of agricultural and forestry machinery and fishing vessels

Development of GHG emission reduction technology

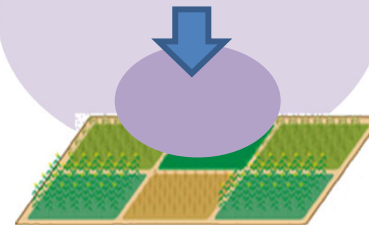
Small-scale hydroelectric power generation



Biogas plant

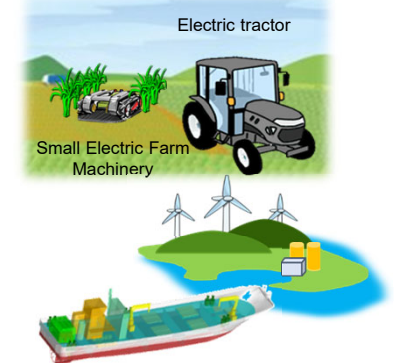


Local agriculture, forestry and fisheries
Utilization of resources
Reduction of Greenhouse Gases



R&D for measuring methane production with milking robots to produce low-methane producing cows

Promote the elimination of fossil fuels by electrifying and increasing the efficiency of various machines

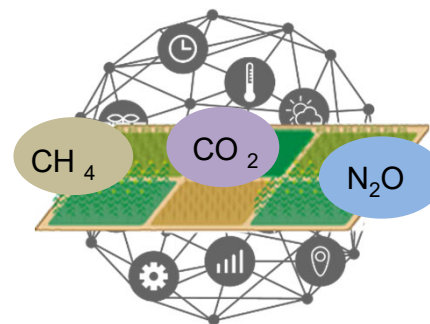


Promotion of fossil fuel-free fishing by developing next-generation electric propulsion fishing boats, etc.

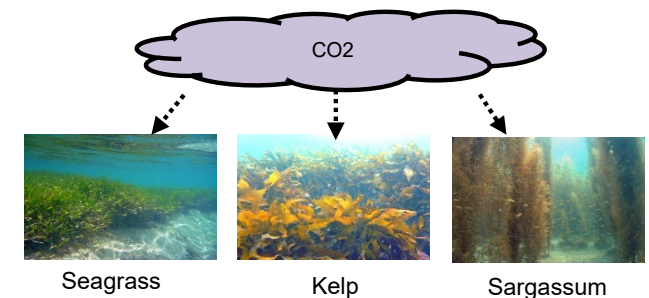
Research and technology development that will contribute to calculating GHG emissions and removals and improving monitoring

- Implementing yearly monitoring on GHG emissions and removals in the AFF sector
- Implementing research and technology development that will contribute to improving monitoring techniques and calculation methods necessary for calculating accurate amounts of emissions and removals
- Development of evaluation methods for blue carbon and technologies for efficient seaweed bed formation and expansion (reprinted)

Research and technology development that will contribute to calculating GHG emissions and removals and improving monitoring



Monitoring and calculation methods.
Research and technological development to improve



Development of evaluation methods for blue carbon, etc.

Outline of the Planned Global Warming Countermeasures <Creation of Innovation (2)>

Basic research and technology development on forest carbon sinks

- Development of forest tree breeding and forestry machinery to enhance and reserve forest sinks in the medium- and long-term
- Development of wooden building materials for long-term and mass storage of carbon with wood
- Utilization of new wood-derived materials to replace plastics and other materials and development of new wood-derived materials
- Development and dissemination of the technologies that contribute to reforestation in degraded areas in developing countries

Promotion of application of research achievements

- Organizing the information according to the development level of the results obtained, and promptly develop them into demonstrations, social implementation, and dissemination through provision and collaboration with administrative departments, experimental research institutions, local governments, and private companies
- Preparing a roadmap for each technology field and managing the progress of its implementation depending on the maturity level
- Enhancing the information dissemination to foreign countries

Basic research and technology development on forest sinks

Breeding of "elite tree" seedlings and fast-growing trees



"elite tree"



Conventional varieties

Growth comparison 4 years after planting

Development of wooden building materials



Long-term and large-scale storage of carbon

Utilization of new wood-derived materials



Substitution of plastics and other materials with new wood-derived materials

Reforestation Efforts in Developing Countries



Development of forestry machinery

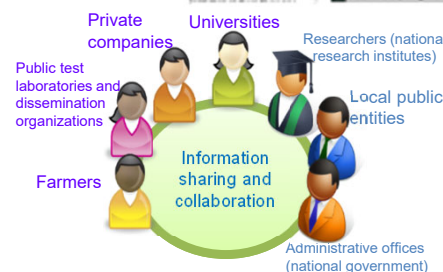


Development of remote and automatic operation machines, etc.

Promotion of application of research achievements

Dissemination of developed research achievements

Publication of the results



Sending information overseas



Distribution of technology dissemination posters (Reforestation of degraded land in developing countries)

Outline of the Planned Global Warming Countermeasures <International Cooperation>

Action to emission reductions from deforestation and forest degradation

- In order to promote REDD+ activities under JCM by the private sector, aim to increase the number of JCM-REDD+ partner countries and formulate projects through developing rules on afforestation and reforestation, and holding public-private workshops. Note: JCM: Joint Crediting Mechanism
- Develop and disseminate methods for visualizing the environmental and social contribution by the private sector through forest projects in developing countries.
- Develop reforestation technologies for degraded forests and lands in developing countries, and disseminate them to governments, private companies, NGOs, etc.
- Utilize and disseminate knowledge and technology of Japan to address issues related to the production and processing of forest resources in developing countries.
- International cooperation on the distribution and utilization of legally-harvested wood, etc., including securing international cooperation for the suppression of illegal logging in foreign countries.

Promotion of international collaborative research on reduction of GHG emissions

- Utilizing various international platforms in the field of agriculture, sharing of Japan's excellent technologies, knowledge and experience, and promotion of joint research
- Promotion of research on cultivation management technologies that can reduce greenhouse gas emissions from paddy fields
- Provision of Japan's scientific knowledge, etc. through dispatch of experts, etc. in preparation of the IPCC assessment report, etc.
- Development of climate change response technologies that contribute to the realization of Measures for achievement of Decarbonization and Resilience with Innovation (MeaDRI)

Cooperation with international organizations

- Promote the spread of efficient biomass utilization methods that are compatible with food supply and forest conservation to developing countries, etc., through collaboration with IRENA (International Renewable Energy Agency).
- Promote the development of cultivation management systems and new varieties that contribute to the reduction of greenhouse gas emissions through collaboration with CIAT (International Center for Tropical Agriculture) and CIMMYT (International Maize and Wheat Improvement Center).
- Preserve and enhance the function of forests as carbon sinks in cooperation with the Food and Agriculture Organization of the United Nations (FAO), and promote initiatives for the calculation and assessment of greenhouse gases absorbed and emitted from agricultural soil in Asia and the development of technologies for their reduction.
- Preparation of a local plan for forest fire reduction and damage mitigation in collaboration with CIFOR (Center for International Forestry Research), etc.

(Example) Recent initiatives

■ Development of reforestation technology for degraded land in developing countries

Demonstration tests were conducted in the drylands of Uzbekistan and on sandy beaches in the Philippines to improve seedling mortality rates and promote growth.



Adapted from Reforestation Technical Note (Technical Data Base)

■ Holding international symposiums

Taking the opportunity of the Intergovernmental Panel on Climate Change (IPCC) General Assembly to be held in Kyoto, an international symposium on climate change and agricultural technology will be held in May 2019 under the theme of "Agriculture is the solution! for climate change," an international symposium on climate change and agricultural technology will be held in Shiga Prefecture in May 2019.



Outline of the Planned Global Warming Countermeasures

< Matters Necessary to Promote Global Warming Countermeasures >

1 Implementation of measures that address the viewpoint of the general public and the actual situation of rural communities

- In Japan, various forms of agriculture, forestry, and fisheries are operated by taking advantage of the characteristics of different rural areas. The management styles of agriculture, forestry, and fisheries are also diverse, ranging from family business to corporate management and from small- and medium-scale to large-scale businesses.
- It is necessary to pay attention to the trade-offs between the reduction of greenhouse gas emissions and the stable supply of food as well as the biodiversity conservation
- Efforts will be made to implement measures that address the actual situation of rural communities while identifying local issues and needs

2 Effective and efficient system for promoting measures

- In implementing measures, efforts will be made to promote understanding among agricultural/forestry/fishery workers and consumers by employing easy-to-understand expressions that demonstrate the benefits of the measures, etc.
- Efforts will be made to accurately communicate information to agricultural/forestry/fishery workers and consumers by collaborating and sharing information with local governments and other relevant organizations in the region.

3 Promotion of measures through participation of various people concerned and cooperation among relevant ministries

- Since global warming countermeasures concerning agriculture, forestry, and fisheries are related to a wide range of fields in the lives of people and the economic society, measures will be comprehensively and systematically implemented based on an appropriate division of roles among the national and local governments, agricultural/forestry/fishery workers, consumers, business operators, and relevant organizations.
- Based on the numerical targets and policy directions set forth in the "Plan for Global Warming Countermeasures" and other documents formulated by the government, as well as the "Strategy for Sustainable Food Systems" and other documents formulated by MAFF, measures will be implemented in cooperation with relevant parties and ministries.

Planned Targets for Global Warming Countermeasures (1)

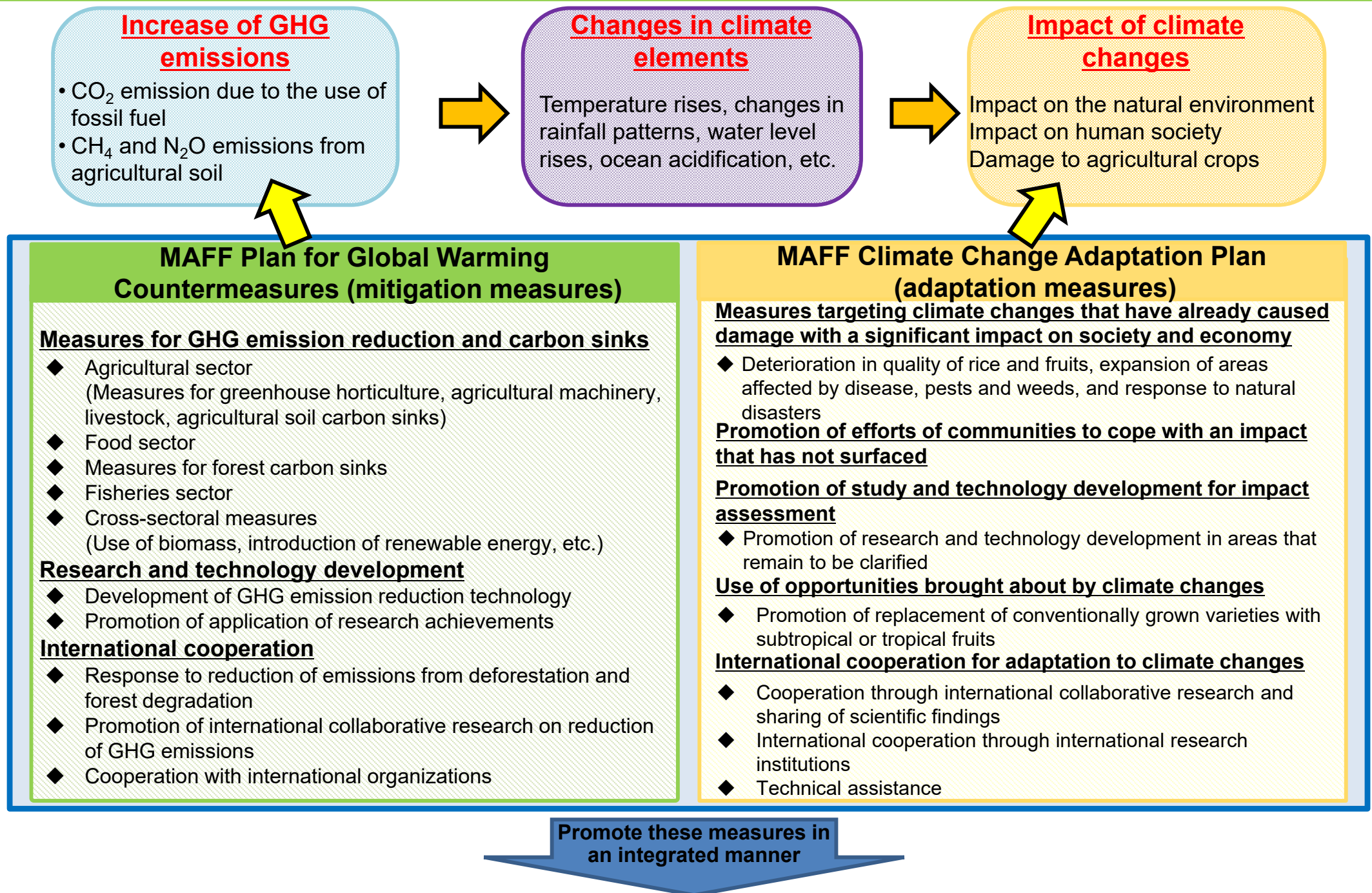
Measures	Targets				
	Index	Target fiscal year	Target level	Note	Related plan
Global warming countermeasures in the agriculture sector					
Energy conservation measures for greenhouse horticulture	Number of energy-efficient machines introduced	2025	143,000 units		Government's Plan for Global Warming Countermeasures
		2030	170,000 units		
	Number of sites where energy-efficient facilities are installed	2025	304,000 sites		
		2030	376,000 sites		
Energy conservation measures for agricultural machinery	Number of energy-efficient agricultural machines introduced	2025	70,000 units		
		2030	190,000 units		
GHG emission reduction measures for agricultural soil	Dissemination rate of the extending the period for midseason drainage	2030	30%		
		2025	380,000 tN		
	Amount of demand for chemical fertilizer	2030	358,000 tN		
Recycling of waste plastics for agriculture	Ratio of recycled amount to total plastic discharge in horticulture	2025	80%		Plastic Resource Recycling Strategy
		2030	90%		
Measures for agricultural soil carbon sinks	Carbon storage in soil (mineral soil)	2030	8,500,000 t-CO ₂		Government's Plan for Global Warming Countermeasures
GHG emission reduction measures in the livestock sector	• Improvement of productivity through improvement of livestock breeding management through livestock improvement and use of ICT, etc. • Promote manure management systems that reduce greenhouse gas emissions. • Spreading the use of feeds with improved amino acid balance				Green growth strategies associated with carbon neutrality in 2050
Global warming countermeasures in the food sector					
Formulation of low-carbon society action plans in food industry	Increase in the number of industry associations that have formulated their low-carbon society action plans for 2030				Government's Plan for Global Warming Countermeasures
Measures for energy conservation and GHG emission reduction in food industry	Decrease in the number of business entities making less progress in energy conservation, and promotion of the introduction of equipment and machinery using natural refrigerants				
Reduction of food loss	Amount of business-related food loss	2025	2,940,000 t		Basic Policy for Promoting Use of Recyclable Food Resources
		2030	2,730,000 t		
Resource recycling of plastics and other materials in the food industry, etc. and recycling of containers and packaging	• Reduce the use of plastics and promote recycling • Promotion of recycling of waste containers and packaging				Plastic Resource Recycling Strategy
Reduction of the impact on the environment caused by the distribution of food and beverage products	Promote initiatives such as the establishment of a data coordination system for the entire supply chain.				

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Planned Targets for Global Warming Countermeasures (2)

Measures	Targets				
	Index	Target fiscal year	Target level	Note	Related plan
Measures for forest carbon sinks					
Sound forest management	Forest management area	2030	700,000 ha	Average between FY2021 and FY2030	- Government's Plan for Global Warming Countermeasures - Forest and Forestry Basic Plan
Proper maintenance and conservation of protection forests					
Development of efficient and stable forestry management					
Promoting citizen involvement in forest development					
Promotion of the use of wood and woody biomass					
Global warming countermeasures in the fisheries sector					
Measures for energy conservation and GHG emission reduction for fishing vessels	Replacement of conventional fishing vessels with energy-efficient models	2025	32.6%		Government's Plan for Global Warming Countermeasures
		2030	41.0%		
Energy conservation measures for fishing ports and fishing grounds	Number of floating fish reefs maintained (units)	2025	Approx. 30 units		- Basic Policy for Promoting Development of Fishing Ports and Fishing Grounds - Long-term Plan for Development of Fishing Ports and Fishing Grounds
		2030	Approx. 30 units		
Conservation and creation of seaweed beds	Promotion of development of seaweed beds				
Cross-sectoral measures					
Promotion of the use of biomass	Amount of biomass used	2025	Approx. 26 million t-C		Basic Plan for the Promotion of Biomass Utilization
	Formulation of plans for promoting the use of biomass	Prefecture	2025	47	
		Municipality	2025	600	
Promotion of the introduction of renewable energy in rural communities	Scale of biomass industry	2023	60 billion yen		(Government's Plan for Global Warming Countermeasures)
	Ratio of electricity generated from renewable energy such as small-scale hydroelectric power generation using agricultural water utilization facilities to the amount of electricity used by land improvement facilities.	2025	Approx. 40% or more		Long-term Plan of Land Improvement (Government's Plan for Global Warming Countermeasures)
	Amount of use of fuel wood (domestic wood)	2025	8 million m³		Forest and Forestry Basic Plan
		2030	9 million m³		
Promotion of the J-Credit Scheme	Increasing the number of projects in the AFF sector that participate in the J-Credit Scheme				Government's Plan for Global Warming Countermeasures
Disclosure of information on climate-related risks and opportunities, and promotion of visualization of greenhouse gas emissions and reductions	• Expansion and enhancement of information disclosure based on TCFD recommendations by food business operators • Increase consumers' willingness to purchase low-carbon products. • Understanding the results and effects of activities such as greenhouse gas reductions in business activities.				
Measures under the MAFF's initiative					
GHG emission reduction in MAFF's work and projects	GHG emissions	2030	50% reduction from the FY2013 level		(National Government Action Plan)

(Reference) Outline of Global Warming Countermeasures (mitigation/adaptation) in the AFF Sector



Promote global warming countermeasures in the AFF sector comprehensively and systematically