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**Report Highlights:**

This report summarizes the Government of Japan's (GOJ) climate change targets, policy, research, and international engagement for the agricultural, forestry, and fisheries sectors. The Ministry of Agriculture, Forestry, and Fisheries is the lead GOJ ministry for addressing climate change in these industries. In 2018, agriculture contributed to 4 percent of Japan's total greenhouse gas emissions. The GOJ currently operates two carbon credit markets, one for domestically produced credits and another for credits produced bilaterally with international partners. Japan is not a significant producer or user of renewable biofuels, but the GOJ aims for biomass to account for 3.7 - 4.6 percent of electricity generation by 2030.

## Executive Summary

The Ministry of Agriculture, Forestry, and Fisheries (MAFF) is the primary Government of Japan (GOJ) ministry responsible for addressing climate change in Japan's agriculture, forestry, and fishery sectors. MAFF sets and implements policy, funds and directs research, facilitates markets, and engages internationally in its efforts to mitigate and adapt to climate change. MAFF is already addressing the effects of climate change to agriculture and is preparing to address the predicted effects in the coming decades. MAFF also implements policies, incentivizes production practices, and develops and makes available technology to avoid and reduce greenhouse gas (GHG) emissions and increase carbon sequestration. In 2018, Japan's agriculture, forestry, and fishery industries accounted for 4 percent of Japan's GHG emissions.

MAFF is the primary driver and funder of agricultural and climate change research in Japan. MAFF, affiliated research institutions, and public universities are responsible for carrying out much of the research. Rice and horticultural products are important subjects of climate change adaptation research, while forestry, rice, livestock, and greenhouse horticulture are critical areas of mitigation study. Soil carbon sequestration, energy efficient agricultural machinery, and genome editing are other common areas of interest for climate related research in Japan.

Japan is not a significant producer or user of renewable biofuels, but biomass electricity generation is growing due to a feed in tariff designed to promote the use of renewable energy in electricity production. The GOJ aims for biomass to account for 3.7-4.6 percent of electricity generation by 2030. Japan's bioethanol use in transportation matches its 2017 biofuel target, which will expire in 2022.

The GOJ is actively engaged in international climate change mitigation, adaptation, and finance cooperation. Japan is a party to the Paris Agreement and pledged to reduce GHG emissions by 26 percent compared to 2013 levels and expects agriculture and forestry to contribute to this reduction. The GOJ also funds and implements international projects to address climate change, develop GHG emission offset credits, and facilitate the transfer of low carbon technology to developing countries. MAFF supports engagement on REDD+ and the Global Research Alliance (GRA), as well as other research and project implementation through a range of international forums. The GOJ is a party to three trade agreements that include chapters dedicated to environmental outcomes, including low emission economies and climate change.

On April 16, 2021, President Biden and Prime Minister Suga announced the [U.S.-Japan Climate Partnership on Ambition, Decarbonization, and Clean Energy](#) to reinforce bilateral cooperation to achieve 2050 net zero goals and the aligned 2030 Paris Agreement targets. The three priority areas of the agreement are, 1) Cooperation and dialogue on climate ambition and implementation of the Paris Agreement, 2) Climate and clean energy technology and innovation, and 3) Cooperation on accelerating the transition to a decarbonized society in third countries, particularly in the Indo-Pacific.

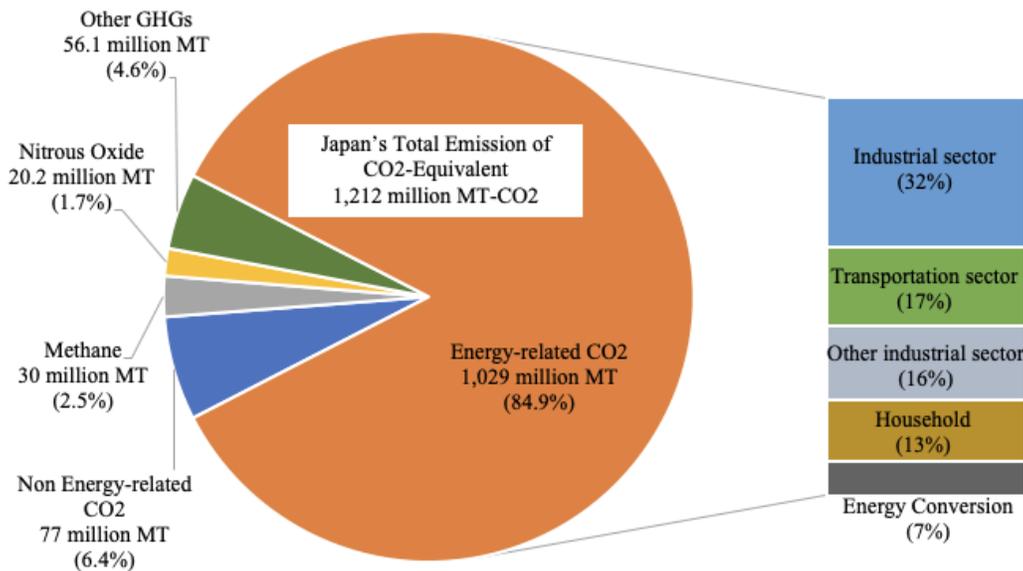
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## Section 1: Government of Japan Climate Change Emissions and Targets

As of 20 April 2021, the Government of Japan’s Nationally Determined Contribution (NDC) to the Paris Agreement is to reduce greenhouse gas emissions (GHG) by 26 percent by 2030 compared to 2013 levels. In October 2020, Prime Minister Yoshihide Suga announced a more ambitious, long-term target for Japan to become a carbon neutral society by 2050. During the 2019 Japanese Fiscal Year (JFY, April 2019-March 2020), Japan’s GHG emissions totaled 1,212 million metric tons (MT) of carbon dioxide (CO<sub>2</sub>) equivalent, down 2.7% compared to JFY2018 and down 14% compared to JFY2013 levels. The GOJ is considering an update to its Paris Agreement NDC to include a more aggressive 2030 target.

**Chart 1: Japan GHG Emissions by Source (JFY2019)**



Source: Ministry of Environment (MOE)

To meet these targets, Prime Minister Suga instructed cabinet members to develop plans to reduce GHG emission reductions from their relevant sectors and tasked the Ministry of Environment (MOE) and the Ministry of Economy, Trade, and Industry (METI) as co-leads of the government’s efforts to achieve net

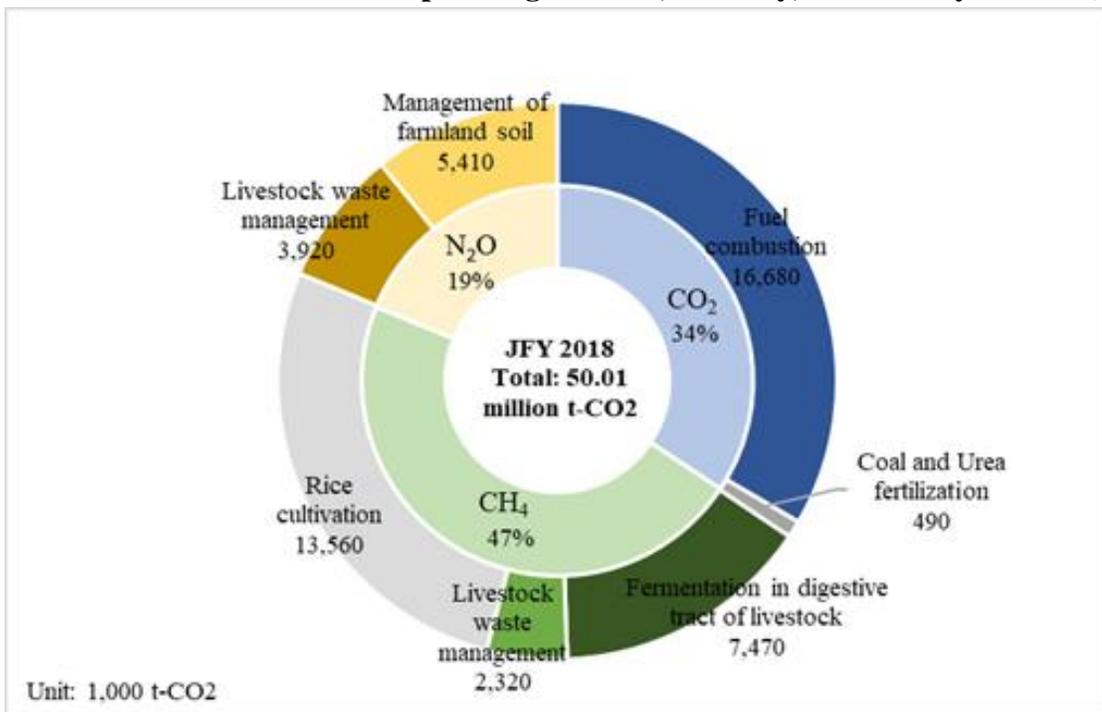
zero emissions by 2050. The agricultural, forestry, and fisheries sectors accounted for approximately 4 percent of Japan’s total JFY2018 GHG emissions, the most recent year with sector specific data available. Methane (CH<sub>4</sub>) emissions from rice paddy and livestock production account for roughly half of the GHG emissions from the agricultural, forestry, and fishery sectors.

**Section 2: Agricultural Policy and Climate Change**

**A) GHG Emissions and Carbon Sinks**

GHG emissions from Japan’s agricultural sector totaled 50.01 million MT in JFY2018, accounting for approximately 4 percent of Japan’s total emissions. Methane, from rice cultivation and livestock production, accounts for the most emissions by GHG type, totaling 47 percent of the sector’s emissions. The largest single source of GHG emissions from Japan’s agricultural sector is carbon dioxide from fuel combustion, accounting for 34 percent of total emissions. Nitrous oxide (N<sub>2</sub>O) emissions from farmland soil and livestock waste management account for the remaining 19 percent of emissions from the sector in Japan (Chart 2). Conversely, forest, pasture, and farmland sequestered 54.5 million MT of carbon in 2018, over 97 percent of Japan’s total removal of atmospheric carbon in JFY2018.

**Chart 2 - GHG Emissions in Japan's Agriculture, Forestry, and Fishery Sectors (JFY2018)**



Source: MAFF

**B) Agriculture and Climate Change Policy**

The Ministry of Agriculture, Forestry and Fisheries (MAFF) currently operates two major initiatives to address climate change in the agricultural, forestry, and fishery sectors. One is to mitigate the effects of climate change to agriculture and the other is to prepare the industry to adapt to climate change.

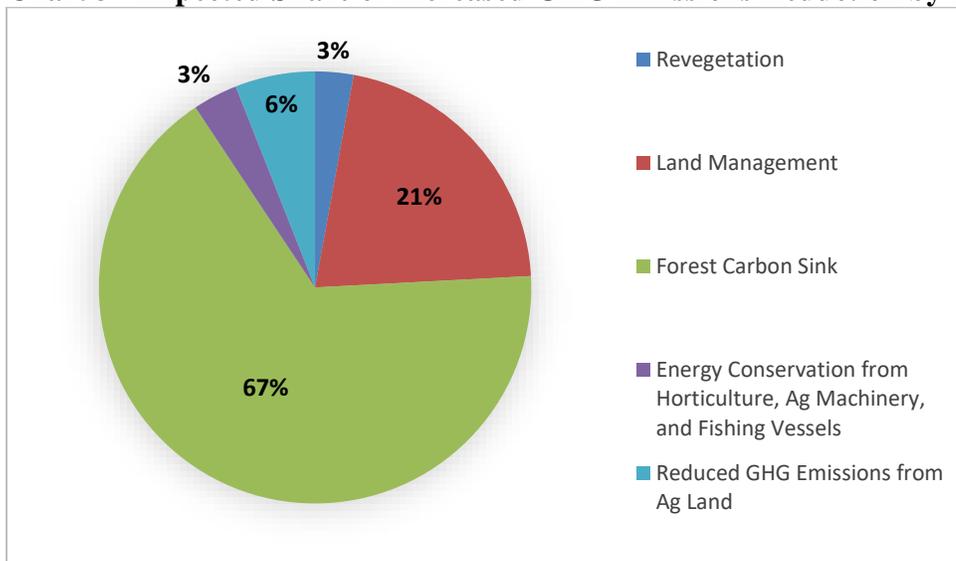
### Mitigation

The “Plan for Global Warming Countermeasures of the Ministry of Agriculture, Forestry and Fisheries (2017),” mitigates climate change through reduced emissions and the removal of carbon from the atmosphere. Land use, land use change, and forestry (LULUCF) play a significant role in MAFF’s strategy to meet GHG reduction targets and account for 91 percent of 2030 GHG reduction targets. MAFF is taking action to sequester an additional 27.8 million MT of CO<sub>2</sub>-equivalent above 2013 levels in forest sinks by 2030; an additional 7.9 million MT of CO<sub>2</sub>-equivalent through cropland and grazing land management; and an additional 1.2 million MT of CO<sub>2</sub>-equivalent through revegetation of urban green spaces.

MAFF projects efforts to reduce emissions from agricultural and fishery production to total up to an additional 3.9 million MT of CO<sub>2</sub>-equivalent above 2013 levels by 2030. These gains are set to come from improved energy efficiency in horticultural greenhouses, reduced emissions from agricultural machinery, and reduced methane and nitrous oxide emissions from the livestock and rice sectors.

Through these efforts, MAFF anticipates the agricultural, forestry, and fishery sectors to avoid or sequester an additional 41.8 million MT of CO<sub>2</sub>-equivalent above 2013 levels by 2030. The GOJ anticipates these sectors to account for 2.8 percent of Japan’s Paris Agreement NDC.

**Chart 3 - Expected Share of Increased GHG Emissions Reduction by Practice**



Source: MAFF

There are 23.6 million hectares of forest in Japan, nearly two-thirds of Japan’s total land area. National and local governments own over 40 percent of forested areas, and the remaining 60 percent is privately owned. The United Nations Framework Convention on Climate Change (UNFCCC) requires active management of forests for carbon removal to count towards meeting climate targets. MAFF allocates approximately 120 billion yen (USD \$1.1 billion<sup>1</sup>) to implement management practices that result in increased atmospheric carbon removal. These practices include annual thinning and selective logging operations on about 450,000 hectares of private and public forest land, for more see [JA9098](#).

<sup>1</sup> This report uses an exchange of USD \$1 = 110 Japanese Yen.

To determine GHG emission reduction gains, MAFF conducts annual surveys of carbon storage in farmland and grassland using a model developed by the National Institute for Agro-Environmental Sciences (NIAES). MAFF reports the results internationally according to UNFCCC guidelines. NIAES uses the Rothamsted carbon (RothC) model for upland andosol soils and uses a modified version of the RothC model for other upland soils and paddy fields to calculate carbon storage. See [here](#) for more information on NIAES use of the RothC.

**Table 1 – MAFF Climate Change Mitigation Targets (compared to the 2013 Levels)**

<b>Mitigation Measure #1: GHG Emission Reduction Measures</b>	<b>JFY 2030 Target Contribution</b>	
○ GHG Emission Reduction from Horticultural Facilities and Agricultural Machinery	Horticulture:	1.24 million MT CO <sub>2</sub>
	Agricultural Machinery:	1,300 MT-CO <sub>2</sub>
○ Energy conservation measures for fishing vessels	0.162 million MT-CO <sub>2</sub>	
○ Measures to reduce GHG emissions from agricultural land	Methane:	0.64-2.43 million MT-CO <sub>2</sub>
	Nitrous oxide:	0.102 million MT-CO <sub>2</sub>
<b>Mitigation Measure #2: GHG Sequestration Measures</b>	<b>JFY 2030 Target Contribution</b>	
○ Forest Carbon Sink	27.8 million MT-CO <sub>2</sub>	
○ Cropland and grazing land management	6.96-8.9 million MT-CO <sub>2</sub>	
○ Revegetation through creation of urban green spaces	1.2 million MT-CO <sub>2</sub>	

Source: MAFF

### *Adaptation*

The “Climate Change Adaptation Plan (2015, revised in 2017 and 2018),” guides MAFF’s work to adapt to the effects of climate change. Through the plan, MAFF is already addressing the effects of climate change to agriculture and is preparing to address the predicted effects in the coming decades. Observed effects include a nationwide decline in the ratio of high-quality rice; the northward shift in favorable temperature zones for some horticultural products; an increase in the occurrence of pests and weeds; and increased frequency of heavy rains and natural disasters.

**Table 2 – MAFF’s Climate Change Adaptation Measures**

<b>Adaptation Measures</b>
○ Current Activities
- Rice: development of heat tolerant varieties and breeding materials with heat tolerant sterility
- Fruit trees: conversion to improved coloring of fruit varieties
- Pests and weeds: promotion of timely pest control based on the forecast of pest outbreaks, etc.
- Natural disasters, etc.: Development of mountain control facilities and forests, development of coastal disaster prevention forests, and conservation facilities, etc.
○ Promote local efforts to address impacts that are not currently apparent: Provide scientific impact assessment and adaptation technologies.
○ Promote impact assessment research and technology development: Promote research and technological development in areas where there is little knowledge about future impacts.
○ Utilization of opportunities: Promote conversion to subtropical and tropical fruit trees.

Source: MAFF

### C) MAFF Green Food System Strategy

In December 2020, MAFF established the Green Food System Strategy Headquarters to develop strategies for MAFF to meet Prime Minister Suga’s new 2050 carbon neutrality target, to align with the

GOJ’s new Green Growth Strategy, and to better adapt to supply-chain disruptions caused by increasing natural disasters and the COVID-19 pandemic. The strategy, “Measures for Achievement of Decarbonization and Resilience with Innovation (MeaDRI),” outlines MAFF’s 2050 strategic sustainability targets. The plan includes a 2050 zero carbon emission target for the agricultural, forestry, and fishery industries. Table 3 below summarizes other MeaDRI targets. MAFF will publish a final MeaDRI strategy by the end of May 2021, for more see [JA2021-0048](#).

**Table 3 – MeaDRI Strategic Targets**

Subject	2050 Target
○ GHG Emissions	Zero carbon emission from agricultural, forestry, and fishery sectors
○ Chemical Pesticides	50% reduction in application (on a risk basis)
○ Chemical Fertilizers	30% reduction in application
○ Organic Agriculture	25% of total arable land converted into organic farming (1 million hectare)
○ Horticultural Facilities	Eliminate the use of fossil fuels for greenhouses
○ Ag Machinery	Develop electric/hydrogen power for agricultural machinery (2040 Target)
○ Food Loss	50% reduction in food loss from food industry (2030 Target)

Source: MAFF

D) MAFF’s Climate Change Budget for JFY 2021

MAFF’s JFY 2021 budget includes 137.8 billion yen (USD \$1.25 billion) to address climate change. MAFF will allocate 98 percent of the funding, or 135.4 billion yen (\$1.23 billion), to mitigation measures and most of that is earmarked for promoting carbon sequestration in forests (124.8 billion yen or \$1.13 billion). The budget also includes 2.48 billion yen (\$22.6 million) for adaptation projects and 36 million yen (\$0.3 million) for international cooperation on climate change. See Appendix Table 1 for more detail on MAFF’s JFY 2021 climate change budget.

**Section 3: Carbon Markets**

The GOJ operates two carbon credit certification schemes, the J-Credit System for domestic activities and the Joint Crediting Mechanism (JCM) for international activities. Both programs were launched in 2013.

A) Domestic Program – J-Credit System

In April 2013, METI and MOE combined their independent carbon markets to form the J-Credit system. MAFF, METI, and MOE jointly manage the J-Credit carbon market. The objective of the J-Credit system is to support regional efforts toward GHG emission reduction. Details of the projects and methodologies used in the J-Credit System are available [here](#).

There are four methodologies for developing credits through agricultural practices, two methodologies for forest sinks, and several methodologies for energy efficiency and renewable energy use that agricultural facilities can be implement.

**Table 4- J-Credit Agriculture and Forestry Methodologies**

Agriculture
<ul style="list-style-type: none"> <li>• Abatement of N<sub>2</sub>O emissions from pig and broiler excreta by utilizing low-protein feed</li> <li>• Conversion of disposal management system for livestock excreta</li> <li>• Mitigation of N<sub>2</sub>O emissions from tea land soil by applying chemical fertilizers containing nitrification inhibitor</li> <li>• Biochar addition to mineral soil in cropland/grassland</li> </ul>
Forestry Sinks
<ul style="list-style-type: none"> <li>• Forest management activity (thinning)</li> <li>• Afforestation activity</li> </ul>

As of March, J-Credit project developers have registered 317 projects (excluding those transferred from the previous systems) and 81 of those projects are in the field of agriculture, forestry, and fisheries. J-Credit projects are expected to account for 10.54 million MT of carbon dioxide equivalent emission avoidance and reductions, of which 620,000 MT, approximately 6 percent, come from registered projects in the agriculture, forestry, and fisheries sectors. Of the agriculture, forestry, and fishery projects, 30 are related to energy conservation, such as the installation of equipment and devices with higher energy efficiency, and 23 projects are in the field of renewable energy use, such as the installation of equipment that uses renewable energy such as wood biomass.

J-Credit carbon credits must undergo third-party evaluation to receive certification. See Table 5 for a list of approved third-party inspectors with their areas of expertise.

**Table 5 –Approved J-Credit Third-party Inspectors**

Company Name of Third-party Inspectors	Methodology				
	Energy	Industrial Process	Agriculture	Waste	Forestry
Deloitte Tohmatsu Sustainability Co., Ltd.		○	○	○	
Perry Johnson Registrars Clean Development Mechanism, Inc. (PJRCMD)	○				
Japan Management Association for Climate Change	○				○
Japan Quality Assurance Organization	○			○	○
Nippon Kaiji Kyokai	○				
SOCOTEC Certification Japan	○			○	○

Source: [J-Credit Scheme \(METI\)](#)

#### B) International Program - Joint Crediting Mechanism

The GOJ developed the Joint Crediting Mechanism (JCM) to facilitate and track GHG emission avoidance and reduction projects in partner countries to achieve GHG reduction targets and disseminate low carbon technology to developing countries. Through the JCM, both Japan and bilateral partners are eligible to receive JCM credits. Japanese businesses may buy credits through the JCM registry and use them as offsets to meet carbon reduction targets. Like the J-Credit system, all JCM projects must

undergo third-party evaluation to receive certification as a JCM credit. Japan has signed bilateral agreements with 17 countries.<sup>2</sup> For more on JCM, see the [Overview of the Joint Crediting Mechanism](#).

#### **Section 4: Agriculture and Climate Change Research**

The GOJ, led by MAFF, funds a range of agricultural and forestry climate change research initiatives to meet targets and adapt to the effects of climate change. Within MAFF, the “Agriculture, Forestry and Fisheries Research Council,” determines the basic plan for agricultural research and publishes an annual “Innovation Strategy on Agriculture, Forestry, and Fisheries Research” (ISAFFR). In 2020, the ISAFFR had three core themes for agricultural research: smart agriculture, the environment, and biotechnology. ISAFFR’s climate change research strategy focuses on carbon storage and sequestration as well as the reduction of methane production from paddy fields and livestock.

Research institutions formerly housed within MAFF but that now function more autonomously and are referred to as “Incorporated Administrative Agencies” are the primary implementing institutions of MAFF-funded research projects. MAFF leads and conducts research both domestically and internationally. The major agencies are, the National Agriculture and Food Research Organization (NARO), the Japan International Research Center for Agricultural Sciences (JIRCAS), the Forest Research and Management Organization (FRMO), and the Japan Fisheries Research and Education Agency (FRA). In addition, national universities such as the University of Tokyo and Tohoku University conduct MAFF-funded research projects.

The GOJ also regularly incorporates agricultural and climate change research into government-wide efforts, including the new Moonshot Program and the Environment Innovation Strategy.

##### **A) Observed and Predicted Effects of Climate Change on Japanese Agriculture**

MAFF’s primary concerns for the effects of climate change on agriculture are for [rice](#) and [fruit](#) production, pests, diseases, and weeds. For rice, Japan’s staple crop, MAFF has already observed declining quality throughout key production regions and has invested resources to develop heat tolerant rice varieties. High temperatures have led to immature and cracked grains reducing the ratio of highly graded rice in Japan’s rice harvest. Heat stress has also put downward pressure on yields in some regions and at least one MAFF estimate show rice yields declining by 30 percent by 2050 if producers do not more widely adopt heat tolerant rice varieties.

MAFF also tracks and promotes [opportunities](#) created by climate change for agriculture, notably the expansion of suitable climates for fruit production. Peaches, blood oranges, and tropical fruit are some of the high-value crops that are now more feasible for production in new parts of Japan.

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<sup>2</sup> Japan has established the JCM with Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Viet Nam, Lao PDR, Indonesia, Costa Rica, Palau, Cambodia, Mexico, Saudi Arabia, Chile, Myanmar, Thailand, and the Philippines.

## B) Sustainable Food System Research (MeaDRI)

As described in section 2, MeaDRI is MAFF’s long-term sustainable food system strategy. To achieve the targets set in MeaDRI, MAFF aims to develop innovative technologies and sustainable agricultural production systems for use by Japanese industry. Table 9 summarizes the research included in the MeaDRI initiative.

**Table 6 – Agricultural Technologies anticipated by MeaDRI**

2050 Target	Examples of Implementing Technologies Undergoing Research
Zero carbon emission from agricultural, forestry and fishery sectors	<ul style="list-style-type: none"> <li>Solar power generators</li> <li>Energy-efficient horticultural facilities (e.g. use of energy-efficient heat-pumps for greenhouse heating and cooling)</li> </ul>
50% reduction of chemical pesticide application	<ul style="list-style-type: none"> <li>Precision pesticide application (e.g. by drones)</li> <li>RNA-interference pesticides</li> </ul>
30% reduction of chemical fertilizer application	<ul style="list-style-type: none"> <li>Soil analysis and precision fertilizer application using Artificial Intelligence</li> <li>Improving crop varieties with higher fertilizer-use efficiency</li> </ul>
Expand organic farming to 1 million hectares (25% of total arable land)	<ul style="list-style-type: none"> <li>Pest control system using lights and sounds</li> <li>Variety development with improved disease resistance</li> </ul>

Source: MAFF

## C) GOJ Environment Innovation Strategy

The GOJ’s “[Environment Innovation Strategy](#),” developed under the auspices of the Prime Minister’s office, promotes technological innovations in the energy and environmental fields of study. A primary goal is to develop climate-smart technologies that are economically feasible and applicable, for domestic and international adoption. The “Zero-Emission Agriculture, Forestry and Fisheries” component aims to avoid and/or sequester more than 15 billion MT of CO<sub>2</sub> equivalent through four areas of research, consisting of 10 specific programs, see Table 7.

**Table 7 – Areas of Research for Zero-Emission Agriculture, Forestry and Fisheries**

Focal Areas	Programs
CO <sub>2</sub> absorption and fixation in the ocean, farmland, forest with advanced biotechnology	<ul style="list-style-type: none"> <li>Genome editing technology and other applied biotechnology</li> <li>Development of alternative raw material using biomass</li> <li>Carbon sequestration in farmland using biochar</li> <li>Wooden high-rise buildings and wood-based bioplastics</li> <li>Smart forestry and fast-growing trees</li> <li>Blue carbon (carbon sequestration in the marine ecosystems)</li> </ul>
Reduction of CH <sub>4</sub> and N <sub>2</sub> O from agriculture and livestock industry	<ul style="list-style-type: none"> <li>Breeding new varieties of crops and livestock as well as development of new farm and livestock management to acclimate to climate change</li> </ul>
Smart agriculture, forestry, and fisheries	<ul style="list-style-type: none"> <li>Building a new energy system based on local production and consumption (best suited for rural areas)</li> <li>Reduction of fossil fuel usage in agricultural sectors by introducing more energy efficient machinery and/or optimizing practices</li> </ul>
Capturing CO <sub>2</sub> in the air	<ul style="list-style-type: none"> <li>Development of Direct Air Capture technology</li> </ul>

Source: Prime Minister of Japan Cabinet Office

#### D) Moonshot Research and Development Program

The Prime Minister Cabinet Office launched the “[Moonshot Research and Development Program](#)” in 2018 with a five-year budget of 100 billion Japanese Yen (\$910 million) to develop radical solutions for difficult societal challenges by 2030. Of the program’s seven major goals two are related to the environment, see Table 8 for more detail.

The GOJ encourages researchers that use Moonshot funding to collaborate with the international research community. For example, in March, NARO hosted [an online symposium](#) as a part of Moonshot Program #4 and invited researchers from Tohoku University, the New Energy and Industrial Technology Development Organization (NEDO), and the French National Research Institute for Agriculture, Food and Environment (INRAE). The speakers shared their individual research and discussed “GHG mitigation by optimizing nitrogen and carbon cycles.”

**Table 8 – Moonshot Research and Development Programs**

<b>Program</b>	<b>Objectives</b>
<b>Program #4: Cool Earth &amp; Clean Earth</b>	By 2030, develop GHG circulation technologies to reduce GHGs in the atmosphere (Cool Earth), and to develop technologies to convert harmful substances into valuable or harmless forms (Clean Earth).
<b>Program #5: Sustainable food supply without food-loss and environment loading</b>	By 2050, exploit unused biological resources (e.g. microbes and insects) to achieve a sustainable, global food supply. One project, “Achieving zero food risk by improving crop resilience using cyber-physical system,” includes the use of genome editing to breed new crop varieties. This program also aims to develop technical solutions for eliminating food loss.

Source: Cabinet Office

#### E) Global Research Alliance

The [Global Research Alliance](#) (GRA) on Agricultural Greenhouse Gases is an international consortium designed to tackle agricultural GHG emission research, including mitigation technologies and practices. Founding member countries launched the GRA in 2009 and now has 64 members, including the United States and Japan. The GRA has four core research groups: 1) Livestock, 2) Paddy Rice, 3) Croplands, and the 4) Integrative Research Group.

MAFF is a leader of the GRA Paddy Rice Research Group’s Mitigation in Irrigated Rice Systems Project ([MIRSA](#)). MIRSA studies GHG mitigation from rice paddy fields in Southeast Asia. MAFF is also actively engaged in other areas of collaboration within [GRA](#).

#### F) Public Perception

According to a December 2020 opinion poll on climate change conducted by the GOJ Cabinet Office, 93.6 percent of respondents knew about the effects of climate change and over 90 percent of people responded that they want to take actions to reduce carbon emissions. Conversely, only 19.1 percent of respondents knew the contents of the Paris Agreement, while 64.9 percent recognized the name of the Paris Agreement. When asked about the concept of Zero Carbon Society, 33.2 percent understood the concept, 35.1 percent knew the words, and 31.1 percent said they did not know about the concept. Asked about problematic effects of climate change, “quality deterioration of agricultural products and reduction

in fish catch” was the top ranked effect of climate change, chosen by 83.8 percent respondents (multiple answers allowed), followed by “increase in natural disasters” chosen by 79.5 percent respondents.

According to a 2019 climate change opinion poll conducted by the Ibaraki Local Climate Change Adaptation Center on farmers in Joso City, Ibaraki Prefecture, over 90 percent reported feeling the effects of climate change and over 80 percent of farmers experienced production damage caused by climate change. Recognition of adaptation measures was less than 30 percent. More than half of the respondents that replied said there were no positive effects of climate change on production, while 16.3 percent had felt positive effects on production from climate change. Asked about the government’s measures, early weather and climate forecasts are the top priority for farmers, followed by implementation of new technologies and financial support.

## **Section 5: International Engagement**

### **A) Engagement with International Organizations**

The GOJ is a signatory to the [UNFCCC](#), the [Kyoto Protocol to the United Nations Framework Convention on Climate Change](#), and [The Paris Agreement](#). The GOJ actively participates in and funds international organizations that support agricultural GHG emission reduction efforts in developing countries. MAFF is currently or has engaged in projects through the UN Food and Agriculture Organization (FAO), International Renewable Energy Agency (IRENA), International Rice Research Institute (IRRI), International Center for Tropical Agriculture (CIAT), the International Maize and Wheat Improvement Center (CIMMYT), the Center for International Forestry Research (CIFOR), and the International Tropical Timber Organization (ITTO). For details on MAFF’s engagement with these organizations, see Appendix Table 3.

### **B) Bilateral Engagement**

MAFF’s agricultural and forestry bilateral climate change engagement, often in cooperation with the Japan International Cooperation Agency (JICA), is primarily to support REDD+ (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) activities through financing, the JCM, and the "[Japan Public-Private Platform for REDD+ \(JP3-REDD+\)](#).”

The GOJ provides climate finance based on the "Actions for Cool Earth 2.0," (ACE 2.0), a plan announced by Japan’s Prime Minister at the 2015 UNFCCC Conference of the Parties. The plan committed Japan to 1.3 trillion yen (\$11.8 billion), 7 percent of which went towards the agriculture and forestry sectors, in annual climate financing for developing countries through 2020. Three GOJ ministries are responsible determining climate finance priorities, the Ministry of Foreign Affairs (MOFA), the MOE, and Ministry of Finance. JICA is largely responsible for implementing projects with partners, but METI and the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT) are also engaged in climate finance project implementation. Climate finance programs implemented by the GOJ include grant assistance, loans, technical cooperation, and contributions to international organizations.

The Japan Bank for International Cooperation (JBIC) and Nippon Export and Investment Insurance (NEXI) mobilize private finance by co-financing and providing trade insurance.

The Forest Carbon Partnership Facility (FCPF), UN-REDD, and the Green Climate Fund (GCF) serve as the international cooperation framework to fund REDD+ activities. The GOJ has contributed \$14 million to the FCPF, \$1.5 billion to GCF, and \$3 million to UN-REDD to support REDD+ activities in developing countries. The funding priority is to boost crop production while protecting tropical forests.

### C) Climate Change and Trade Agreements

Japan has entered into three trade agreements over the last three years that include environment chapters that address climate change or low carbon economies, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), the Japan-EU Economic Partnership Agreement (EPA), and the Japan-UK EPA.

#### *CPTPP*

The CPTPP agreement’s Environment Chapter (Chapter 20) promotes mutually supportive trade and environmental policies; promotes environmental protection and enforcement of environmental laws; and enhances the capacities of the Parties to address trade-related environmental issues, including through cooperation. The chapter is subject to a CPTPP dispute resolution process, the first time Japan agreed to dispute resolution for an environment chapter in a trade agreement. Paragraph 20.15 addresses the transition to a low emissions and resilient economy and recognizes the transition should reflect domestic circumstances and capabilities while encouraging Parties to collaborate on common interests.

CPTPP permits Parties to promote environmental standards and objectives in tender specifications but there is no “offset” provision relating the use of domestic contents with environmental standards [Article 15.12 Technical Specifications].

**Table 10 – Environmental Provisions in Japan’s Trade Agreements**

	<b>CPTPP</b>	<b>Japan-EU EPA/Japan-UK EPA</b>	<b>RCEP/USJTA</b>
Environment Chapter	Chapter 20 Environment	Chapter 16 Trade and Sustainable Development	None
Climate Change Provisions	Article 20.4 Multilateral Environmental Agreements	Article 16.4 Multilateral Environmental Agreements	None
	Article 20.15 Transition to a Low Emission and Resilient Economy	Article 16.12 Cooperation	
Removal of tariff and non-tariff barriers on environmental goods and services	Article 20.18 Environmental Goods and Service	Article 16.5 Trade and Investment Favoring Sustainable Development	None
Government Procurement	Article 15.12 Technical Specifications	Article 10.8 Technical Specifications	None

Sources: [CPTPP](#), [Japan-EU EPA](#), [Japan-UK EPA](#), [RCEP](#)

### *Japan-EU EPA and Japan-UK EPA*

Multilateral Environmental Agreements, Article 16.4 of both the Japan-EU EPA and Japan-UK EPA urge parties to enforce their commitments to the UNFCCC and the Paris Agreement. The article stresses the need for parties to cooperate to promote positive contributions of trade to the transition to low GHG emissions and climate-resilient development. Articles 16.5 and 16.12 strive to promote trade and investment of goods and services of relevance to climate change mitigation and trade related aspects of the international climate regime. These articles do not obligate member states to take specific actions.

Article 10.8, Technical Specifications, of each agreement requires objectively verifiable and non-discriminatory criteria for environment-friendly technical specifications, such as environmental labels.

Chapter 19, Cooperation in The Field of Agriculture, of the Japan-EU EPA and Japan-UK EPA promotes trade in agricultural products and foods with cooperation on sustainable agriculture and facilitates, dialogues, and information exchanges on sustainable agriculture.

### **Section 6: Renewable Biofuels**

Approximately 90 percent of Japan's GHG emissions is in the form of carbon dioxide from energy production and use. Based on the METI's 2015 [Long-Term Energy Supply and Demand Outlook](#), the GOJ plans to reduce GHG emissions from the energy sector by 25 percent, approximately 308 million MT carbon dioxide equivalent, compared to 2013 levels. Renewable biofuels (e.g., bioethanol, biodiesel, woody biomass) derived from agriculture and forestry can reduce the consumption of fossil fuels and reduce GHG emissions. In its energy policy documents, GOJ refers to biofuels as a transitional energy feedstock, rather than a long-term solution. For more on Japan's biofuels policy, consumption, and trade, see [JA2020-0180](#).

#### A) Biofuels in the Transportation Sector

The 2010 [Sophisticated Methods of Energy Supply Structure Act directed METI to implement the](#) annual target volume, a *de facto* mandate, of 500 million liters of crude oil equivalent in the transportation sector by JFY 2017. The target is fulfilled through the use of 824 million liters of bioethanol to produce bio-Ethyl Tert-Butyl Ether (ETBE), which is mostly imported and used as an additive in gasoline by Japan's oil refineries. Japan does not offer financial incentives for biodiesel use. The biofuel target may be revised in 2022, when the next Sophisticated Methods of Energy Supply Structure Act is expected to be introduced.

#### B) Biomass in Energy Generation

METI's feed-in tariff (FIT) program for renewable energy drives biomass consumption in the power sector. Under the program, power companies charge customers a premium for electricity derived from eligible biomass sources for up to 20 years. By JFY 2030, Japan is planning to generate approximately 3.7-4.6 percent or 40-49 billion kilowatt hour (kWh) of electricity from biomass. FIT-eligible biomass power plants currently under operations in Japan charge consumers 32-40 yen per kWh for woody

biomass derived from thinning of domestic forests, and 21-24 yen/kWh for other biomass, including imported wood pellets, palm kernel shells ([JA2020-0110](#)) and palm stearin oil ([JA2021-0043](#)), for the first 20 years of plants' operations. METI has initiated a sustainability review for FIT-eligible biomass.

## Appendix

**Appendix Table 1 – MAFF’s JFY 2021 Budget to Address Climate Change**

Measures	JFY 2021 Budget Allocation
<b>Mitigation Measure #1: Measures to Reduce GHG Emissions</b>	
Promotion of "visualization" of the decarbonized food supply chain - Research on case studies of TCFD (Task Force on Climate-related Financial Disclosure) recommendations, development of quantification methods for decarbonization technologies, creation of product category rules for carbon footprints, and development of communication methods to increase consumer willingness to purchase environmentally friendly products.	43 million yen (\$0.4 million)
Measures to reduce GHG emissions in the food and agricultural/livestock industries - Provides comprehensive support for efforts to mix food waste in facilities converting sewage sludge to biogas and for efforts by food-related businesses and food banks to reduce industrial food loss. - Supports measures to recycle plastic resources in the food industry and measures to deal with plastic waste in the agricultural and livestock industries.	79 million yen (\$0.7 million)
Measures to reduce GHG emissions in the agricultural sector - Support for agricultural activities that are highly effective in preventing global warming and are conducted in conjunction with efforts to reduce the use of chemical fertilizers and synthetic agricultural chemicals by at least 50% in principle.	2,450 million yen (\$22.3 million)
Measures to reduce GHG emissions in the dairy sector - Support dairy farmers to reduce environmental impact through securing the feed production areas that are necessary for measures such as the returning of manure.	6,048 million yen (\$55 million)
<b>Mitigation Measure #2: Measures to Sequester GHGs</b>	
Steady promotion of measures for forest absorption	124,803 million yen (\$1,135 million)
Promotion of GHG sink measures in the agricultural sector	48 million yen (\$0.4 million)
<b>Additional Mitigation Measure</b>	
Renewable energy measures	1,894 million yen (\$17.2 million)
<b>Adaptation Measures</b>	
Promotion of regional climate change adaptation in agriculture, forestry, and fisheries - To support local governments in developing local climate change adaptation plans for agriculture, forestry, and fisheries, provides assistance in operating a web search tool for future impact assessment and adaptation measures, developing climate data and impact assessment using impact prediction models, and communicating with stakeholders in agriculture, forestry, and fisheries.	17 million yen (\$0.2 million)
Development of seaweed cultivation technology adapted to environmental changes	317 million yen (\$2.9 million)
Research and development on climate change countermeasures - Promote research and development on carbon sink technologies and greenhouse gas emission reduction technologies in the agriculture, forestry and fisheries sectors to realize a decarbonized society.	2,150 million yen (\$19.5 million)
<b>International Cooperation on Global Warming Countermeasures</b>	
- Capacity building and awareness raising in developing countries on technologies to promote carbon sequestration and reduce GHG emissions from agricultural soils	22 million yen (\$0.2 million)
- Contribute to the establishment of a recycling system for the use of bioenergy in Asian by investigating the needs for power generation, heat utilization, automobile fuel, jet fuel, etc. using biomass as raw materials, and the potential for using by-products	14 million yen (\$0.1 million)

Source: MAFF

**Appendix Table 2 – MAFF’s Engagement with International Organizations**

Partner	Activities
Food and Agriculture Organization of the United Nations (FAO)	<ul style="list-style-type: none"> <li>• Develop effective Measurement, Reporting and Verification (MRV) methods for forest carbon sinks</li> <li>• Train people to scientifically measure and evaluate GHG emission and absorption from farmland soils in Asia</li> <li>• Develop GHG emission reduction technologies</li> </ul>
FAO Global Soil Partnership (GSP) Intergovernmental Technical Panel on Soils (ITPS)	<ul style="list-style-type: none"> <li>• Improve governance to promote sustainable management of soils through a strong interactive partnership and enhanced collaboration among all stakeholders.</li> <li>• Japan is a member of the which develops a protocol for MRV for soil organic carbon in agricultural landscapes.</li> </ul>
International Renewable Energy Agency (IRENA)	<ul style="list-style-type: none"> <li>• Promote biomass energy use in developing countries</li> </ul>
International Rice Research Institute (IRRI); International Center for Tropical Agriculture (CIAT); International Maize and Wheat Improvement Center (CIMMYT)	<ul style="list-style-type: none"> <li>• Collaborate in research and development of reduction methods of GHG emission derived from agriculture</li> <li>• Promotes implementation of planting systems that help to mitigate climate change</li> <li>• Breed crop varieties that contribute to the reduction of GHG emissions in least developed countries</li> </ul>
Center for International Forestry Research (CIFOR)	<ul style="list-style-type: none"> <li>• Collaboration in studies on the causes and mechanisms of land and resources use and anthropogenic forest fires in tropical forests and cold temperate forests in subarctic zones</li> <li>• Promotes adoption of fire prevention practices and regulations</li> </ul>
International Tropical Timber Organization (ITTO)	<ul style="list-style-type: none"> <li>• Promote forest conservation linked to REDD+ with Japan International Cooperation Agency (JICA)</li> <li>• Collaborate on public-affair activities including the joint organization of UNFCCC side events, convening seminars in Japan, and the issue of brochures to promote REDD+</li> </ul>

Source: MAFF

**Appendix Table 3 – Examples of REDD+ Projects funded by the GOJ**

<b>Partner</b>	<b>Projects</b>
Gabon	Enhancing national forest resources inventory system for sustainable forest management (2012 – 2015)
Commission des Forests d’Afrique Centrale <sup>3</sup>	Dispatched experts to COMIFAC on sustainable forest management and climate change and forest ecosystem conservation (2011 – 2015)
Papua New Guinea	Capacity Development Project for Operationalization of PNG Forest Resource Information Management System for Addressing Climate Change (2014 – 2019)
Laos	Forestry Sector Capacity Development Project, Participatory Land and Forestry Management Project for Reducing Deforestation, Capacity Development Project for Establishing National Forest Information System for Sustainable Forest Management and REDD+ (on going)
Vietnam	Project for Sustainable Forest Management in the Northwest Watershed Area (2010 – 2015)
Indonesia	Indonesia-Japan Project for Development of REDD+ Implementation Mechanism (2013 – 2016)
Cambodia	Project for Facilitating the Implementation of REDD+ Strategy and Policy (2011 – 2016)
Mozambique	Project for Establishment of sustainable Forest Resources Information Platform for Monitoring REDD+ (2013 – 2018)
The Democratic Republic of the Congo	Project for Strengthening National Forest Resources Monitoring System for Promoting Sustainable Forest Management and REDD+ (2012 – 2015)

Source: JICA

**Attachments:**

No Attachments.

<sup>3</sup> COMIFAC consists of Burundi, Cameroon, Central Africa, Chad, the Republic of the Congo, the Democratic Republic of the Congo, Equatorial, Guinea, Gabon, Rwanda, and Sao Tome Principe.