USDA United States Department of Agriculture
Foreign Agricultural Service

GAIN Global Agricultural Information Network

Voluntary Report – Voluntary - Public Distribution **Date:** August 09, 2024

Report Number: JA2024-0038

Report Name: Japan Launches Greenhouse Gas Reduction Labeling System for Agricultural Products

Country: Japan

Post: Tokyo

Report Category: Climate Change/Global Warming/Food Security, Agricultural Situation

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Report Highlights:

On March 1, 2024, the Japan Ministry of Agriculture, Forestry and Fisheries (MAFF) launched a greenhouse gas (GHG) reduction labeling system for 23 domestically-produced agricultural products. Use of the label is voluntary, and producers may use the label to self-declare products that are produced with sustainable practices associated with lower GHG emissions than from conventional cultivation. The labeling system was developed in line with MAFF's Green Food System (MIDORI) Strategy, and its efforts to foster consumer understanding of environmentally-friendly agricultural production efforts that reduce GHG emissions.

General Information:

Following a two-year pilot project, the Japan Ministry of Agriculture, Forestry and Fisheries (MAFF) officially launched its greenhouse gas (GHG) reduction labeling system on March 1, 2024. In line with the Green Food System (MIDORI) Strategy, MAFF promotes decarbonization throughout the food supply chain with an aim to build a sustainable food system. For that purpose, MAFF promotes the "visualization" of environmental impact reduction efforts with food labels to foster public understanding of such efforts, allow consumers to make sustainable purchasing decisions, and to facilitate investment in environmentally-friendly agricultural supply chains.

The labeling system allows producers to calculate their GHG emissions and the reduction contribution rate in accordance with the MAFF Assessment and Labeling Guidelines for Environmental Impact Reduction on Agricultural Products (Japanese only) (hereinafter referred to as "the Guidelines"). The label indicates the reduction contribution rate of GHG emissions compared to the GHG emissions from conventional cultivation for a specific region. The emissions rate is indicated by the number of stars: one star indicates a reduction by 5 percent, two stars indicate a reduction by 10 percent, and three stars indicate a reduction by 20 percent or more (Image 1). The label is voluntary and producers self-declare their environmental practices. Use of the label does not require third-party verification,[1] however MAFF can request raw data from producers if there is doubt about the reported information. In addition, the Guidelines also stipulate that the labeling system is subject to the *Act against Unjustifiable Premiums and Misleading Representations.*[2]

As businesses increasingly seek to adopt GHG emission reduction efforts, MAFF expects that food processors and distributors may use the GHG emissions label as a guide for purchasing products that add value to their company's own GHG reduction efforts.[3] MAFF also anticipates that participation in the labeling system will give producers opportunities to expand sales channels with businesses committed to GHG emission reduction efforts, as well as provide a competitive advantage when seeking investments and loans. MAFF clarified that the potential relationship between use of the label and carbon credits is not yet determined.

Biodiversity Conservation Label for Rice:

In addition to the GHG reduction label, MAFF also created a labeling system for biodiversity conservation for rice, which is applied in conjunction with the GHG reduction label (Image 2). According to the Guidelines, both labels can be attached on a product, packages of a product, posters,

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[1] According to the Guidelines, self-declared environmental claims are standardized under ISO14021 Type II environmental labeling. However, MAFF said calculations and labeling in accordance with the Guidelines alone do not constitute compliance with ISO14021.

[2] The *Act against Unjustifiable Premiums and Misleading Representations* prohibits misleading representations and allows the government to order the relevant businesses to cease misleading representations, or to take the measures necessary to prevent the reoccurrence of the violation, or to take any other necessary measures including public notification related to the implementation of the measures.

[3] MAFF expects that food processors and distributors may use producers' results of their calculated GHG emission reduction as upstream emissions in their entire value chain in accordance with guidance from the Greenhouse Gas Protocol's framework, *Corporate Value Chain (Scope 3) Standards (Scope 3 Category 1 data)* of the and Science Based Targets initiative.

point of purchase advertising, restaurant menus, and websites, etc. In addition to the labels, the Guidelines allow producers to mention specific GHG mitigation measures and biodiversity conservation activities that were used during cultivation. MAFF sets the eligible biodiversity conservation activities and corresponding scores (Table 4). The stars on the label indicate the number of biodiversity conservation activities that a producer has implemented (Table 5).

Image 1. GHG Reduction Label

Source: MAFF

Image 2. GHG Reduction Label Combined with Biodiversity Conservation Label

Source: MAFF

Product Coverage:

The labeling system currently covers 23 domestically-produced agricultural products and can be applied to both fresh and processed foods that include one of these 23 eligible products as raw materials (Table 1). When labeling processed foods, MAFF advises retailers to communicate to consumers that the scope of evaluation for labeling is limited only up to the production stage of the raw materials and that GHG emissions and other environmental impacts are also generated in the processing, distribution, consumption, disposal, and recycling stages. While currently the GHG label cannot be applied to livestock and dairy products, MAFF has established a livestock working group to formulate GHG emission calculation tools for beef and dairy cattle to eventually make these products eligible for the label as well.

According to MAFF, there are over 200 products eligible for the labels and as of June 2024, over 350 retail outlets are selling these products. MAFF stated that these numbers have steadily grown since the launch of the labeling system.

Table 1. Products Eligible for the GHG Reduction Label

	Outdoor Cultivation	Greenhouse Cultivation	Outdoor and Greenhouse Cultivation
Grains	Rice	-	-
Vegetables	Spinach, Leeks, Onions, Chinese Cabbage, Potatoes, Sweet Potatoes, Cabbage, Lettuce, Daikon (Japanese white radish), Carrots, Asparagus	Cherry Tomatoes, Strawberries	Tomatoes, Cucumbers, Eggplants
Fruit	Apples, Japanese Pears, Peaches	-	Mandarin Oranges, Grapes
Other	Green Tea (roughly processed)	-	-

Source: MAFF

GHG Emission Label Registration Procedure:

Producers who wish to participate in the labeling system must register with MAFF. Once producers register, MAFF grants access to its GHG emission calculation tool, "Simplified Calculation Sheets (SCS)." Producers then use the SCS tool to calculate their GHG emissions and submit the data to MAFF. After submission, MAFF assigns a registration number to the product, and publishes the registration number on the MAFF website, which displays traceability between the label and the SCS data, as well as the producer and production region.

GHG Emission Reduction Calculation:

MAFF formulated its Guidelines based on the concept of GHG life cycle assessments and covers emissions from production and procurement stages. The Guidelines take into account the agricultural production stage, the procurement of agricultural inputs and materials (e.g. pesticides, fertilizers, plastics,), and fuel and energy—including the extraction of raw materials and transportation of agricultural inputs. MAFF estimates the production stage accounts for 80-90 percent of GHG emissions of the entire life cycle.

Producers enter cultivation data into the SCS tool, as shown in Table 2. The SCS tool calculates the GHG emissions by multiplying the amount of agricultural input and materials, electricity, and fuel used (labeled as "the amount of activity"[4]) by the "GHG emission factor." The SCS tool covers carbon dioxide (CO^2) emissions, methane (CH^4) emissions, and nitrous oxide (N^2O) emissions and calculates GHG emissions as the CO^2 equivalent. The SCS tool estimates CO^2 emissions per year by multiplying the amount or value of agricultural chemicals, fertilizer, plastic materials, fuel, and energy used by the emission factors using the Inventory Database for Environmental Analysis (IDEA). The SCS tool estimates CH^4 emissions from paddies based on the farmer's paddy management information, and takes

[4] The Guidelines defines "the amount of activity" as product output, and the amount of pesticides, fertilizers, electricity, fuel, etc. used which producers enters into the SCS.

into account practices such as mid-season drainage, intermittent irrigation, and after harvest rice straw plow-in (Reference Table 6). The SCS tool estimates N^2O emissions by multiplying the amount or value of nitrogen fertilizer use by the emission factors from the National Greenhouse Gas Inventory Report of Japan 2023 (Reference Table 7).

MAFF sets the "standard GHG emissions" based on statistics, conventional cultivation data from prefectures, and data from research institutes, while also taking into account differences in cultivation areas and regions. Depending on the availability of data for each product, the Guidelines sets a "standard use amount" by region,[5] whether its cultivated in eastern or western Japan, or by a uniform value for the entire country if region-specific information is not available. The "standard use amount" covers use of agricultural chemicals, fertilizer, plastic materials, and fuel and energy. Producers can enter their own data or use the standard amounts.

The SCS tool takes the mitigation measures entered (from Table 3) and applies the following formula to calculate the GHG emission. The SCS tool also calculates the GHG emissions if conventional cultivation practices were used. Finally, the two emission rates are compared and a reduction contribution rate is calculated using the following formula:

$$\textit{Reduction contribution rate (\%)} = 100\% - \frac{\textit{Individual producer's GHG emission from production of a product per year}}{\textit{Standard GHG emission from conventional cultivation of a product in a region per year}}$$

The Guidelines define "reduction contribution (avoided emission)" as quantified contribution a producer has made to emission reductions in a region through production activities that lowered GHG emissions, in comparison to GHG emissions from conventional cultivation. The Guidelines state the label indicates "GHG reduction" as reduction contribution (avoided emission) is quantified based on "Guidelines for Quantifying GHG Emission Reductions of Goods or Services through Global Value Chain" by the Japanese Ministry of Economy, Trade and Industry.

The Guidelines allow producers to calculate GHG emissions and label the grade based on the cultivation management plan using past records before the harvest is completed. The Guidelines allow geographically cohesive producers' groups whose members implement the same cultivation management methods, including GHG emission mitigation measures, to calculate GHG emissions and label the grade jointly as a group.

[5] MAFF classifies Japan into nine regions, Hokkaido, Tohoku, Kanto/Higashiyama, Hokuriku, Tokai, Kinki, Chugoku, Shikoku and Kyushu/Okinawa.

Table 2. SCS Data Coverage

		Data Entry
Basic Information	Product	Select product
	Prefecture	Select prefecture
	Cultivation area of a product	Are (0.1 hectare)
	Output per year of a product	Kilogram
Residue Management	Residue management of a product	Select either "plow-in", "incineration" or "effective use (such as feed)"
Paddy Management for Rice Production	Water management	Select "intermittent irrigation" or "always flooding"
	Extension of mid-season drainage in paddies*	Select "yes" or "no" for intermittent irrigation
	Rice straw plow-in after harvest in autumn	Select "yes" or "no"
Carbon Sequestration Measures	Biochar application in soil	Select "yes" or "no"
	Biochar types	Select biochar type
	Amount of biochar applied in soil	kg/10 are per year
	Application of green manure	Select crop type
Agricultural Chemical Use	Pesticides	Amount (kg) or value (yen) used per year per 10 are
	Fungicides	
	Other agro-chemicals	
	Herbicides	
Fertilizer Use	Nitrogen fertilizer (N amount)	Amount of use per year per 10 are (kg)
	Phosphorus fertilizer (P2O5 amount)	
	Potassium fertilizer (K2O amount)	
	Compost (including other organic fertilizer)	
Plastic Material Use	Agriculture polyvinyl chloride film	Amount (kg) or value (yen) used per year per 10 are
	Other plastic materials	
Fossil Fuel and Electricity Use	Gasoline	Amount (liter, m3, kWh) or value (yen) used per year per 10 are
	Diesel oil	
	Kerosene	
	Heavy oil A	
	LPG	
	City gas	
	Electricity	

Source: MAFF

* MAFF regards “extension” as seven or more days compared to the number of days in conventional cultivation practices in a region.

Table 3. GHG Emission Mitigation Measures

Measure	Crop	Effect
Extension of mid-season drainage in paddies	Rice	CH4 emission reduction from paddies
Rice strow plow-in after harvest in autumn	Rice	
Continuous compost application	Vegetables, Fruit trees, Tea	Soil carbon sequestration of continuous use *1
Biochar application to farmland	All	Soil carbon sequestration *2
Residue plow-in	Vegetables	Soil carbon sequestration *1
Green manure and cover crop	Vegetables, Fruit trees	
Application of fertilizers containing nitrification inhibitor into tea plantation orchard	Tea	Emission reduction of N2O derived from nitrogen fertilizer *3
Reduction of chemical fertilizer	All	Reduction of CO2 emission from chemical fertilizer production and reduction of N2O emission derived from nitrogen fertilizer in soil
Reduction of agricultural chemicals		Reduction of CO2 emission from agricultural chemical production
Use of energy-saving agricultural machinery		Reduction of CO2 emission from energy (fuel and electricity) used for agricultural machinery
Use of heat pump in greenhouses		Reduction of CO2 from heavy oil used for heating greenhouse
Use of multilayer coverage for greenhouse		Reduction of CO2 from energy reduction through heat insulation
Yield improvement		GHG emission reduction per shipment
Reduction of plastic materials for cultivation		GHG emission reduction from production and disposal of plastic materials

Source: MAFF
*1: MAFF calculates the amount of carbon sequestration in farmland soil based on CO2 Soil Absorption Estimate by National Agriculture Research Organization
*2: MAFF calculates the amount of carbon sequestration in farmland soil based on J-Credit scheme methodologies.
*3: National Greenhouse Gas Inventory Report of Japan 2023

Table 4. Biodiversity Conservation Activities and Score for Rice

Activity	Score
No use of chemical fertilizer or agricultural chemicals	2
Reduction of chemical fertilizer and agricultural chemicals by more than 50% but less than 100%	1
Winter flooding	1
Extension or suspension of mid-season drainage	1
Installation of ditch in paddies and flooding ditch	1
Protection of fish	1
Management of ridge between rice fields	1

Source: MAFF

Table 5. Score and Grade in Biodiversity Conservation Label for Rice

Total score	0	1	2	3 or more
Grade	-	★	★★	★★★

Source: MAFF

Reference

Table 6. CH^4 Emission Factor and Reduction Rate

Methane Emission Factor = *aX + b*

a = Inclination (kg-CH_4/kg-C)
b = Intercept (kg-CH_4/ha)
X = Amount of application of organic matter derived from compost, green manure and residue plow-in (kg-C/ha)

From the regression equation between the amount of organic matter applied and the methane emissions produced by the DeNitrification-DeComposition (DNDC)-Rice model

Source: Katayanagi et al. (2016), "Development of a method for estimating total CH4 emission from rice paddies in Japan using "DNDC-Rice model", Science of the Total Environment.
Fumoto et al. (2010), "DNDC-Rice model".

Based on National Greenhouse Gas Inventory Report of Japan 2023, MAFF sets CH^4 reduction by 30 percent for extension of mid-season drainage in intermittent irrigation and by 10 percent for after harvest rice straw plow-in.

Source: MAFF

Table 7. N^2O Emission Factors for Nitrogen Fertilizer to Agricultural Soil

N_2O Emission per kg-N		
Direct Emission	**Paddy Rice**	**Other**
N_2O (kg-N_2O/kg-N)	0.00487	0.00974
CO_2 Conversion (Kg-CO_2e/Kg-N)	1.29	2.58
Indirect Emission (atmospheric deposition)	**All Crops (synthetic fertilizer)**	
N_2O (kg-N_2O/kg-N)	0.00242	
CO_2 Conversion (Kg-CO_2e/Kg-N)	0.641	
Indirect Emission (leaching, run-off)	**All Crops**	
N_2O (kg-N_2O/kg-N)	0.00414	
CO_2 Conversion (Kg-CO_2e/Kg-N)	1.10	

Source: MAFF, National Greenhouse Gas Inventory Report of Japan 2023

Attachments:

No Attachments.