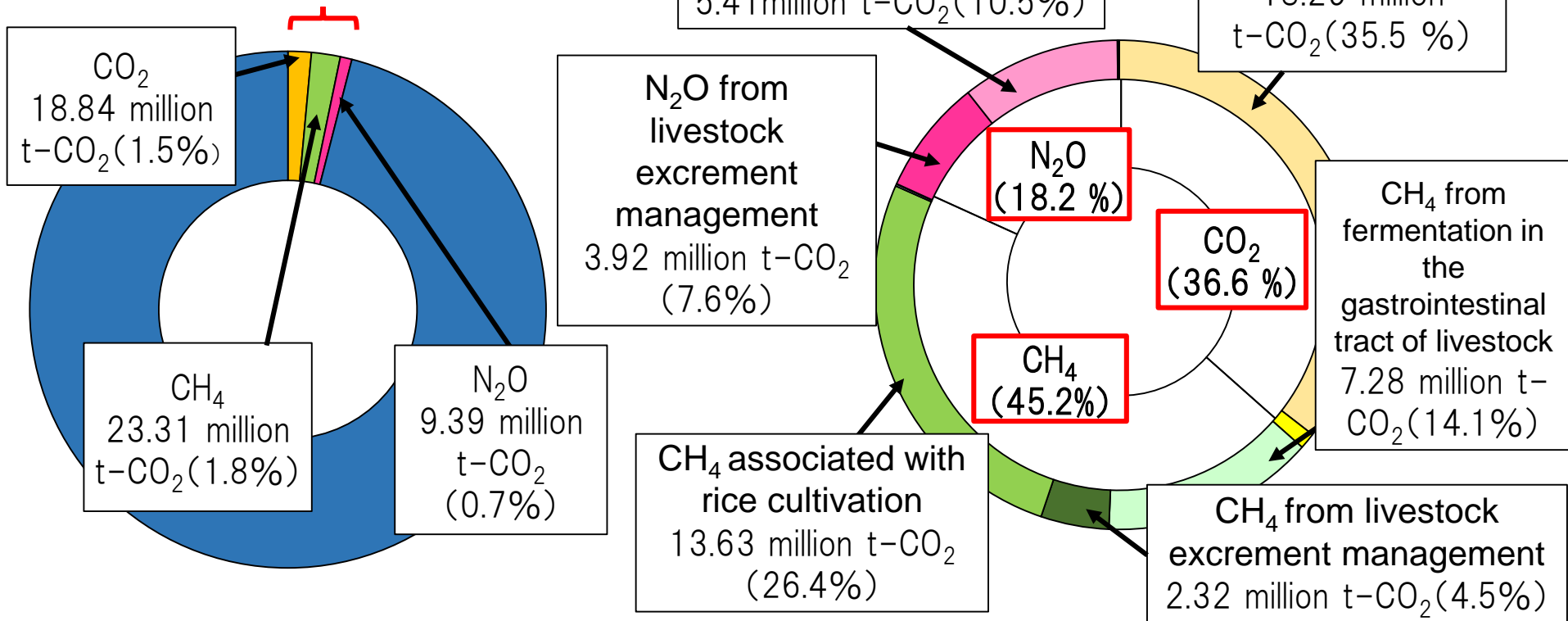


What approach should agriculture take for climate change?

Director, Environment Policy Office,
Minister's Secretariat,
Ministry of Agriculture, Forestry and Fisheries
Maiko Kubo

1. Greenhouse gas emissions in Japan

Emissions in the agricultural, forestry and fishery industries
51.54 million t-CO₂ (4.0%)

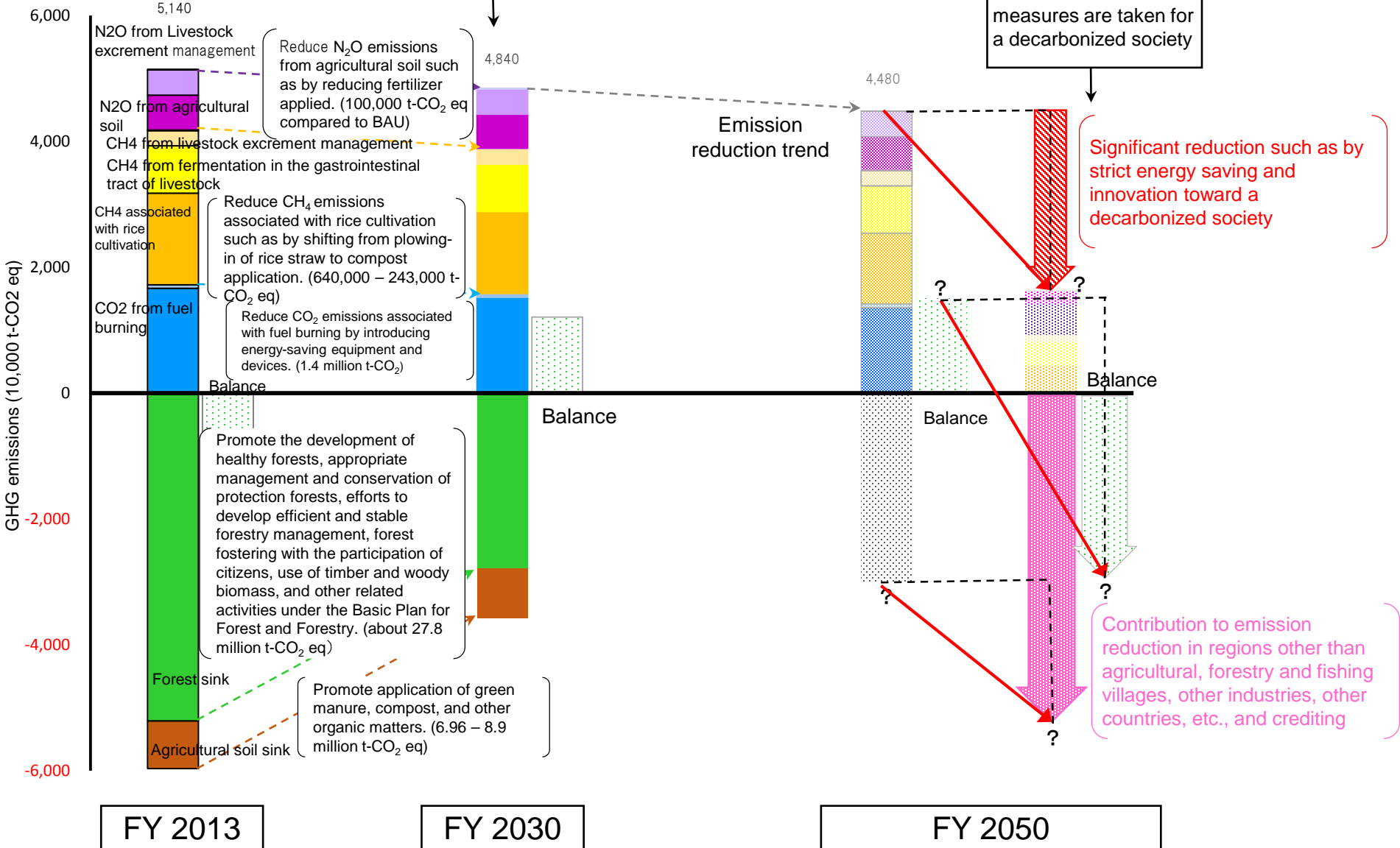


Total emissions in entire Japan in FY2017
1,292 million t-CO₂

Total emissions in the agricultural, forestry and fishery industries in FY2017
51.54 million t-CO₂

2. GHG emission reduction by 2050

Target based on the current global warming response plan
Reduce emissions by 3.04 million t-CO₂ eq from FY 2013



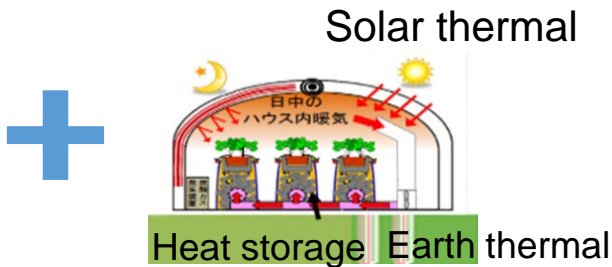
3. Current conditions of emission reduction measures (CO₂)

Energy-saving measures

- Greenhouse horticulture
- Agricultural machinery



Heat pump,
Woody biomass
warming devices,
Multi-layered covering
equipment, etc



New warming system
that efficiently utilizes
unused natural heat
sources (solar thermal,
earth thermal, etc.)



High-speed puddling
machines



Far-infrared grain
dryer

Promotion of the use
of energy-saving
machines

- Recycling of disposed agricultural materials

3. Current conditions of emission reduction

Reduction of CH₄ emissions



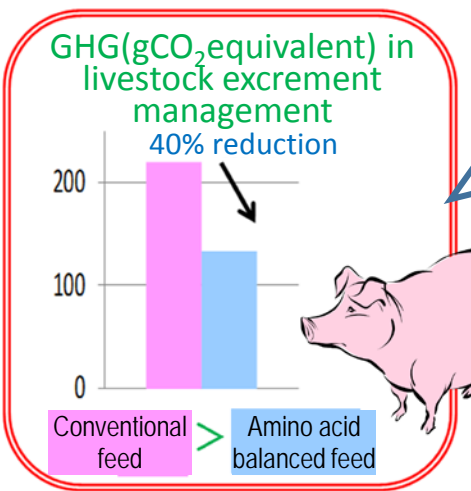
Trench digging for mid-summer drainage



Mid-summer drainage

Reduction of N₂O emissions

Reduction of N₂O associated with fertilization



Approx. 40% reduction of GHG, while maintaining productivity



Proper fertilization based on soil diagnosis

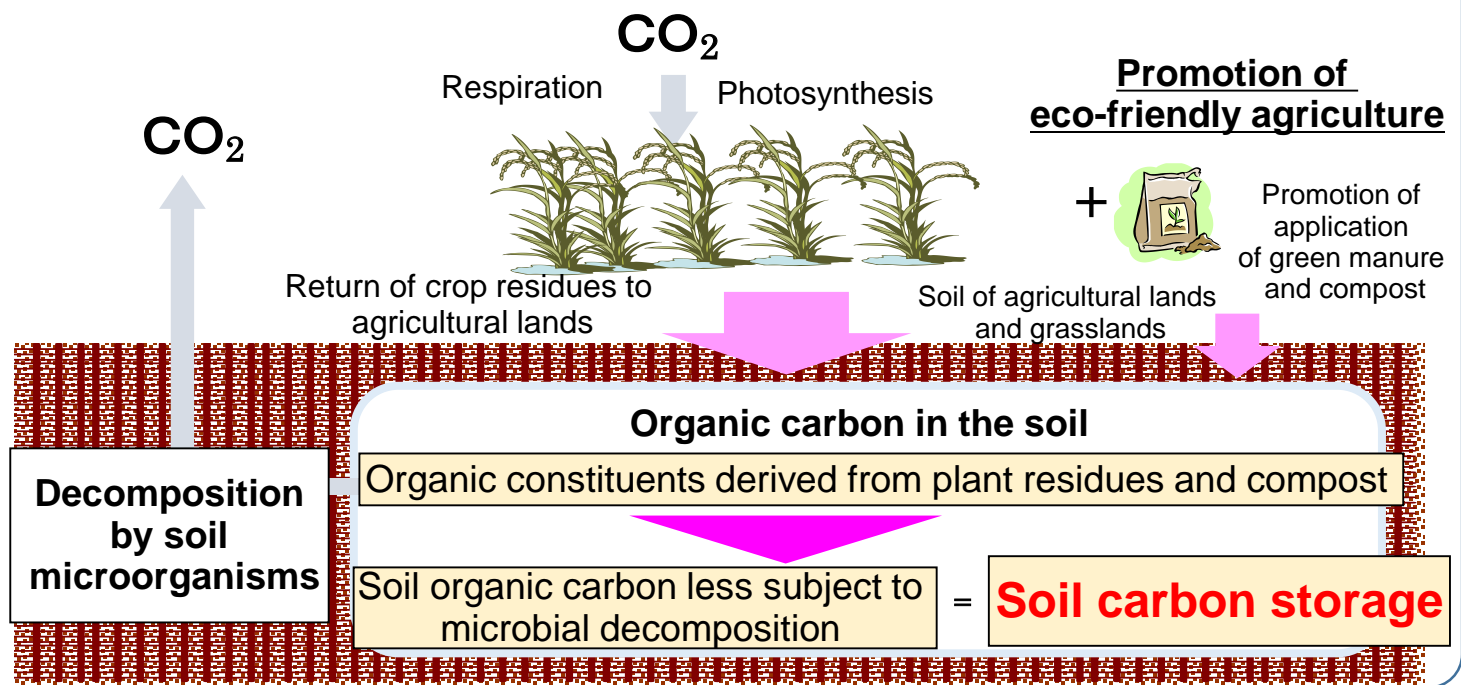
Source: National Agriculture and Food Research Organization

4. Current conditions of absorption

Agricultural soil

- Use of compost
- Zero tillage

【 Carbon balance model for the soil of agricultural lands and grasslands 】



Forests

- Thinning
- Reforestation



5. Long-term strategy as a growth strategy under the Paris Agreement (tentative name) (proposal)

Chapter 1: Basic ideas

- Ambitious vision: **Upholding “decarbonized society” as an ultimate goal, try to ambitiously achieve the goal as soon as possible in the latter half of this century** and work toward 80% reduction by 2050.
- Basic view of policies: In order to achieve the vision, realize a **“virtuous cycle of environment and growth” through business-driven drastic innovation, promptly make** necessary efforts, **contribute to the world**, and create a picture of a **bright society that generates hope for the future** and take action.

Chapter 2: Long-term vision of respective sectors and direction of countermeasures, measures and policies toward the vision

Section 1: Countermeasures, measures and policies for reducing emissions (energies, industries, transportation, community/life)

Section 2: Measures for sinks

Chapter 3: Cross-sectional measures and policies to be focused on

Section 1: Promotion of innovation

Section 2: Promotion of green finance

Section 3: Business-driven international expansion, international cooperation

Chapter 4: Direction of other cross-sectional measures and policies

Chapter 5: Review and practice of long-term strategy

6. Year 2050 vision toward a decarbonized society

Basic approaches to a decarbonized society in the agricultural, forestry and fishery fields

Compiled, in preparation for the establishment of a decarbonized society in 2050, basic approaches in the agricultural, forestry and fishery fields that aim for decarbonization of the agricultural, forest and fishery industries by making full use of resources of agricultural, forestry and fishing villages. (Announced on April 22, 2019)

Year 2050 vision toward a decarbonized society

- 1 To make full use of renewable energy and decarbonize production process in agricultural, forestry and fishing villages
- 2 To promote measures for reducing emissions from agricultural lands and the livestock industry and increase consumers' understanding such as by visualizing the amount of reduction in greenhouse gases
- 3 To promote carbon sequestration and storage, and utilize biomass resources in agricultural, forestry and fishing villages
- 4 To contribute to reduction of greenhouse gas emissions in the overseas agricultural, forestry and fishery industries

(1) To make full use of renewable energy and decarbonize production process in agricultural, forestry and fishing villages

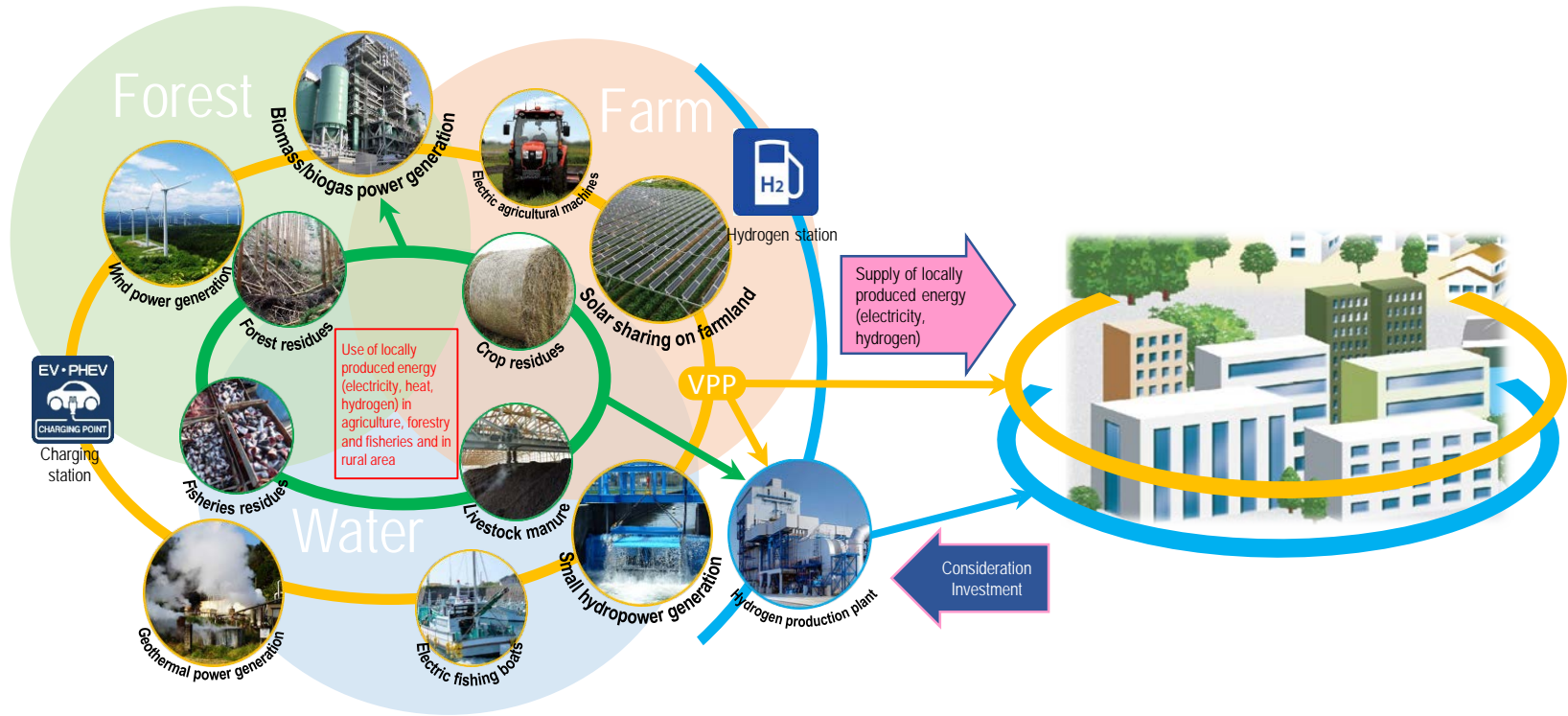
● Utilization of renewable energy available in agricultural, forestry and fishing villages

Provide a stable supply of renewable energy to the agricultural, forestry and fishery industries and within the region by making full use of resources of agricultural, forestry and fishing villages (**realization of RE100 in agricultural, forestry and fishing villages**), and develop the environment to supply to other regions, cities and industries.

● Decarbonization of production process of agricultural, forestry and fishery products

Achieve decarbonization in the agricultural, forestry and fishery industries while increasing the self-sufficiency level and promoting the export of agricultural, forestry and fishery products, by accelerating smart agricultural, forestry and fishery industries and making full use of renewable energy such as by electrification of agricultural and forestry equipment and fishing boats. (**Zero emission of fossil fuel derived CO₂ in agriculture, forestry and fishery**)

To make full use of renewable energy and decarbonize production process in agricultural, forestry and fishing villages



Agricultural, forestry and fishing villages

Other regions, cities and industries

(2) To promote measures for reducing emissions from agricultural lands and the livestock industry and increase consumers' understanding such as by visualizing the amount of reduction in greenhouse gases

- Reduction of non-CO₂ greenhouse gas emissions from agricultural lands and the livestock industry

Reduce and control such as by developing livestock raising management technologies and rice varieties that reduce CH₄ emissions and by developing feed and microorganisms that reduce N₂O emissions

- Providing consumers with opportunities to choose decarbonized agricultural, forest and fishery products and foods

Facilitate communication and promote campaigns to provide companies and consumers with more choices of decarbonized agricultural, forest and fishery products and foods such as by “visualizing” decarbonization across their entire supply chain.

(3) To promote carbon sequestration and storage, and utilize biomass resources in agricultural, forestry and fishing villages

- Carbon sequestration and storage in agricultural lands, forests and oceans

Promote, in agricultural lands, forest and oceans (seaweed beds and tidelands), sequestration and storage of carbon in atmospheric CO₂ as an organic matter while giving consideration to protection of biodiversity and ecosystem.



Agricultural lands



Seaweed beds and
tidelands



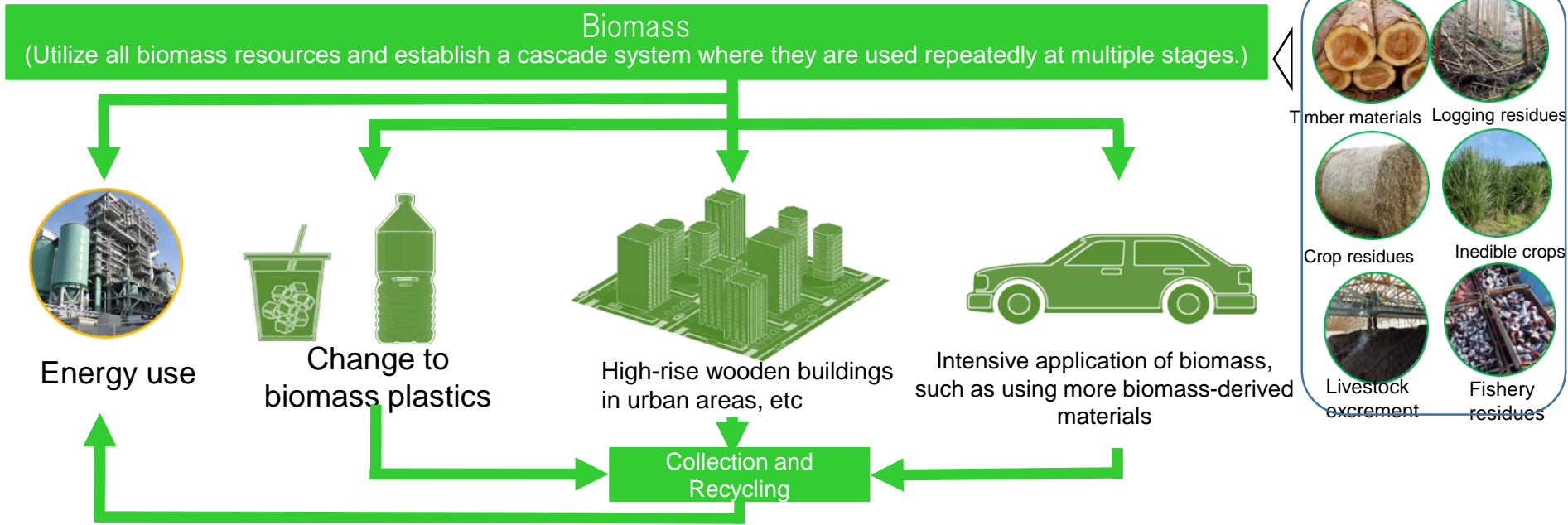
Forests

(3) To promote carbon sequestration and storage, and utilize biomass resources in agricultural, forestry and fishing villages

- Shifting from energy-intensive materials to biomass-derived materials

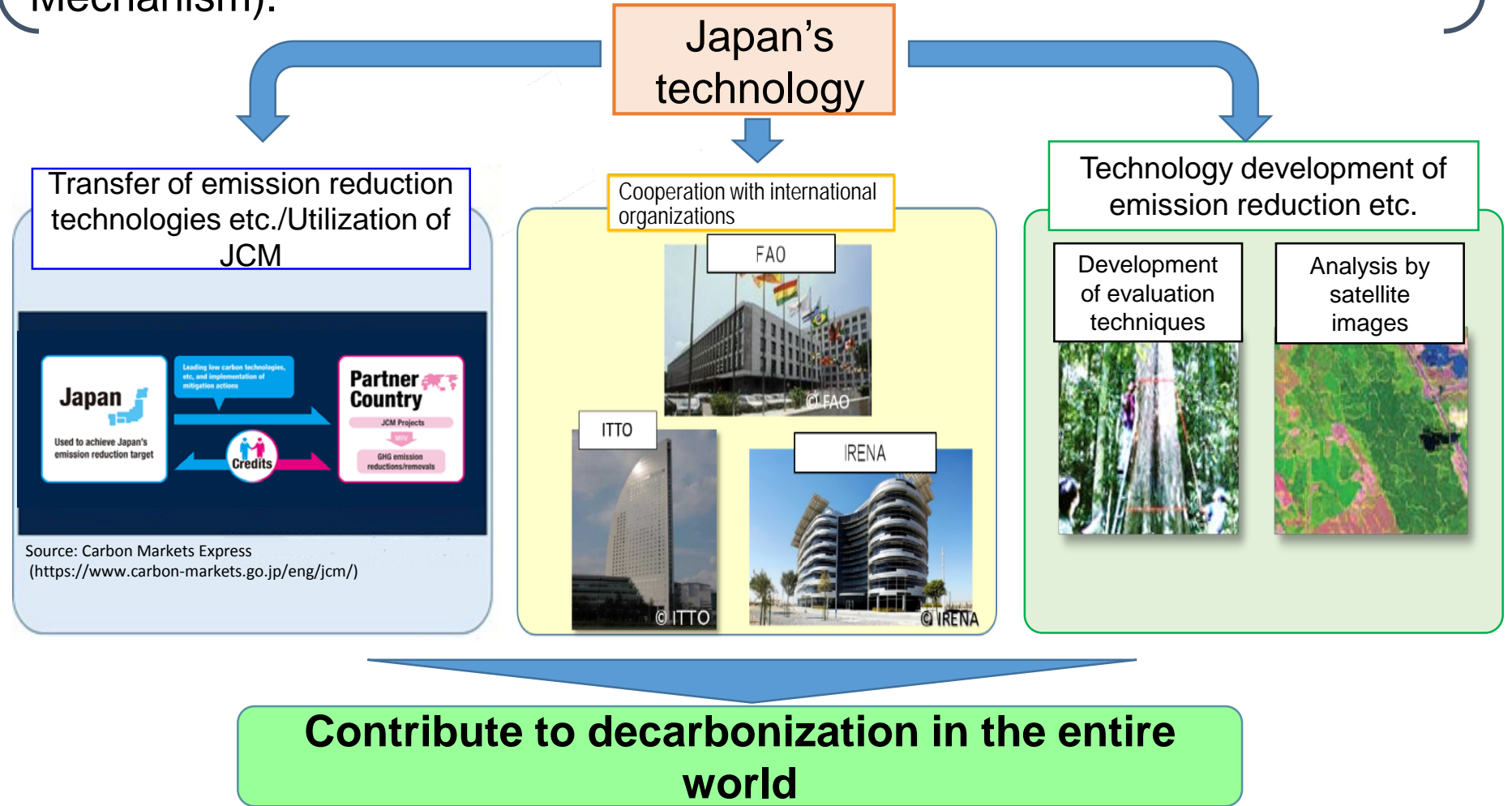
Establish a carbon-recycling society making full use of biomass resources, such as by creating innovation toward utilization of timber materials in high-rise buildings in urban areas and creating new biomass industries.

- Supplying biomass-based renewable energies etc. to regions outside the agricultural, forestry and fishing villages and other industries



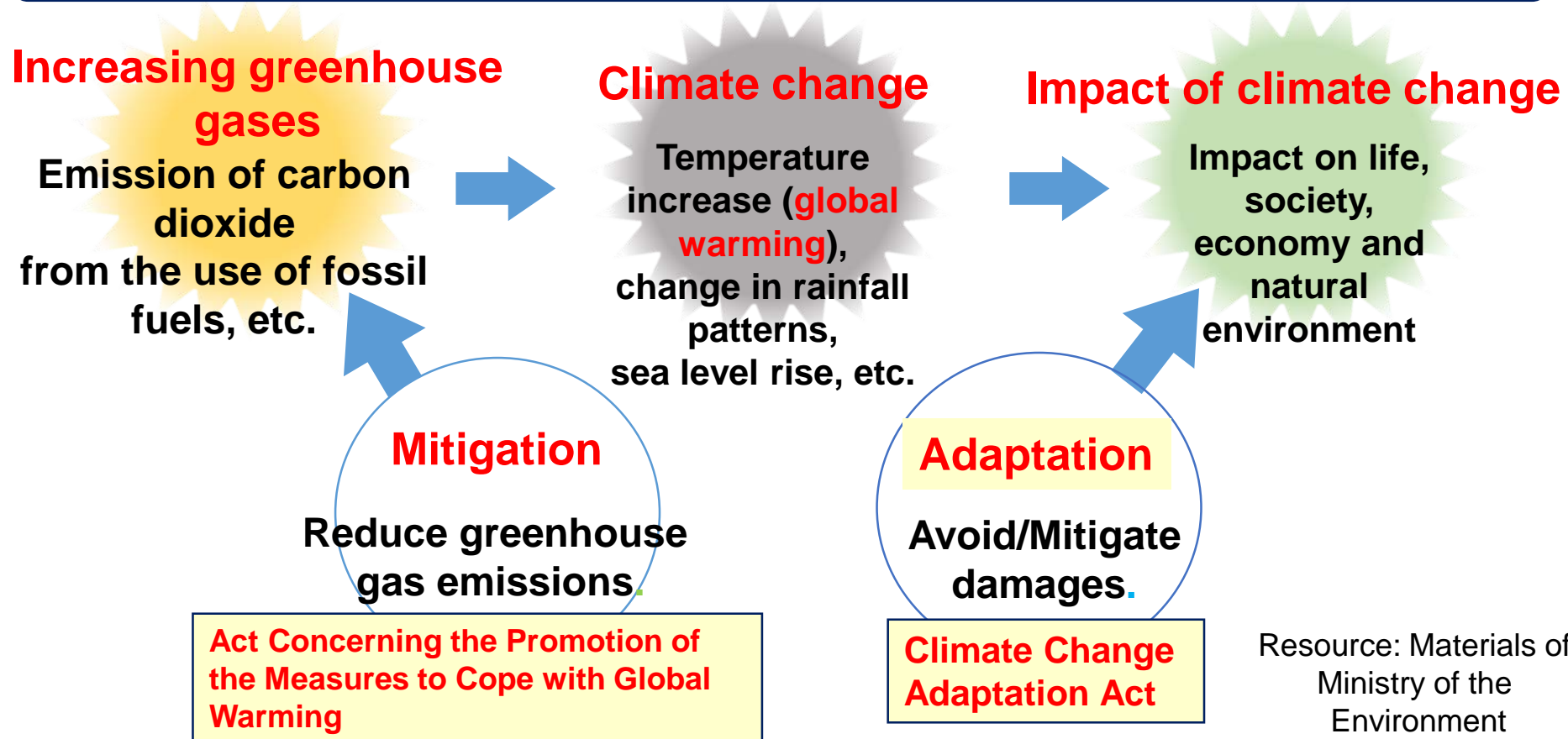
(4) To contribute to reduction of greenhouse gas emissions in the overseas agricultural, forestry and fishery industries

Promote Japan's superior technology to other countries to contribute to reduction of greenhouse gas emissions, such as by cooperating with international organizations and utilizing the JCM (Joint Crediting Mechanism).



7. Adaptation to climate change in the agricultural, forest and fishery fields

- Climate change is a real risk. In response to such change, the “**Climate Change Adaptation Act**” was established. (Enforced on December 1, 2018.)
- On November 27, 2018, the “**Climate Change Adaptation Plan**” was adopted by the Cabinet



Impact of climate change on agricultural, forest and fishery fields

- Agricultural, forest and fishery industries are vulnerable to climate change; growth inhibition and quality deterioration due to high temperatures have already been observed.

(Example) Paddy rice

(Impact of climate change)

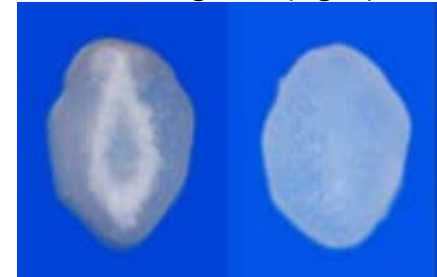
- Quality deterioration due to high temperatures
- Without shifting to high-temperature-tolerant varieties, the proportion of itto-mai (first-class rice) may be decreased throughout Japan.

(Example) Fruit trees

(Impact of climate change)

- Discoloration of apples and grapes, ukikawa (separation of the skin from the fruit part) and sunburn of Unshu mandarin, abnormal germination of Japanese pears have been observed.
- Areas suitable to grow apples and Unshu mandarin may move toward the north each year.

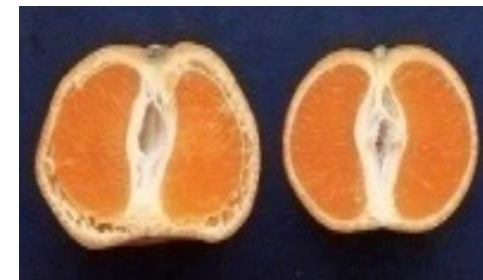
Cross-section of white immature grain (left) and normal grain (right)



Discoloration of apples



Ukikawa of Unshu mandarin



Climate change adaptation measures in the agricultural, forest and fishery fields

- Meanwhile, utilize the opportunities offered by climate change, such as expansion of cultivation areas due to temperature increase.

(Example) Paddy rice

- Develop and promote the use of high-temperature-tolerant varieties
- Thorough practice of basic technology, including manuring practice and water control.

Hiroshima Prefecture: High-temperature-tolerant variety "Koi-no-yokan"



(Example) Fruit trees

- For apples and grapes, introduce higher-coloring strains and yellow-green strains.
- Shifting to intermediate-late ripening oranges (blood oranges etc.) that grow better in a warm climate than Unshu mandarin.

Ehime Prefecture: High-temperature-tolerant brand variety "Blood orange"



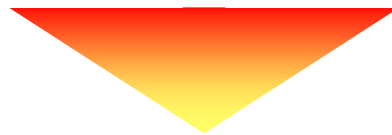
8. Climate change response in the agricultural, forest and fishery industries

Mitigation

- Reduce emissions.
- Increase sinks.

Adaptation

Utilize opportunities offered by climate change



The agricultural, forest and fishery industries have been contributing to the climate change response and food security.

Thank you for your attention

URL : <http://www.maff.go.jp/j/kanbo/kankyo/seisaku/index.html>