Blue carbon inclusion into the National GHG inventory in Japan

- How GHG inventory experts support this work-

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Introduction

- There are some issues country needs to be careful about inclusion of blue carbon into GHG inventory in the context of GHG inventory preparation.
- This presentation includes concrete examples about this based on Japan's experience and lesson learnt.

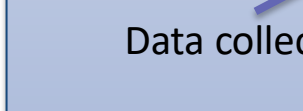
International rules and guidance for GHG inventory

UNFCCC MPGs

Decision 18/CMA.1

Decision 5/CMA.3

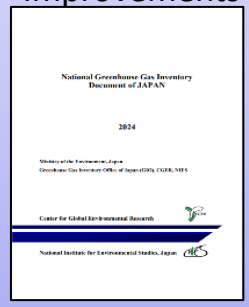
IPCC guidelines



National GHG inventory

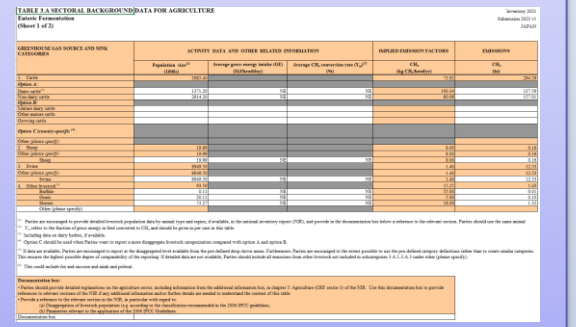
National inventory document

Report explaining trend, methodologies, improvements etc.



Common Reporting Tables

Standard spreadsheets filling data.



Estimation files, tools, software

Data collection

Methodology consideration

Institutional arrangement

National GHG inventory system

Main barriers and challenges: limitation of sink usage under the Kyoto Protocol

Issues

- Under the Kyoto Protocol, inter-governmental negotiation was needed for introducing new sink activity in national emission reduction target under the Kyoto Protocol.

How it resolved

- Inclusion of blue carbon into NDC/GHG inventory have accelerated under the scheme of the Paris Agreement transparency framework.

Treatment of the LULUCF

Kyoto Protocol (until 2020)

- Annex I countries must follow the **very strict rules need to be negotiated** and adopted by COP/CMP.
- Inclusion of new sink activity(ies) has to be negotiated and decided before the start of a specific commitment period.

Paris Agreement (since 2020)

- Commitment is **nationally determined nature**.
- All country must follow the rules mainly **focus on ensuring transparency reporting**.

Main barriers and challenges: Mangrove and forest land definition

Issues

- For many countries, mangrove is a part of forest land based on their national forest definition. So as in Japan.
- In this case, double counting of mangrove carbon stock changes must be avoided between forest land and coastal wetlands calculations.

How it resolved

- GHG inventory experts implemented special survey about mangrove area and assessed forest land mangrove and non-forest land mangrove. (about 1/3 of mangrove habitat is considered located out of forest land in Japan)

Example of forest map used.
Source: Miyako-Yaeyama forest planning map (Forest Agency)

Main barriers and challenges: new science after the 2013 IPCC WL guidelines

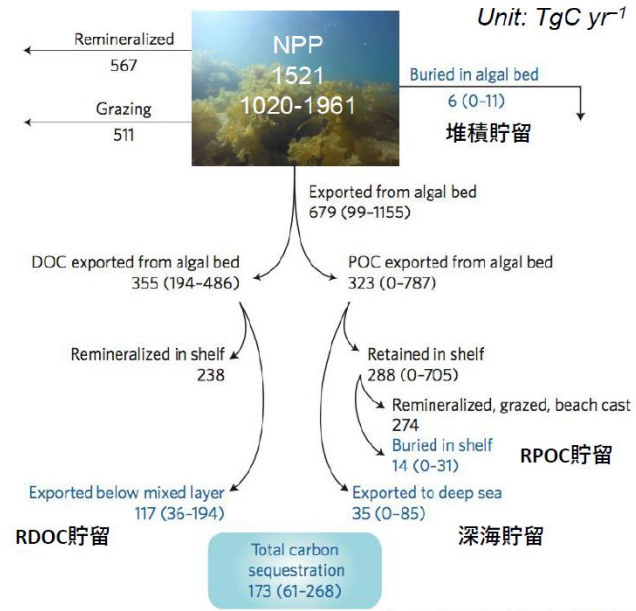
Issues

- Main blue carbon habitat is macroalgae in Japan. But this is not covered by the 2013 IPCC wetland supplement.
- Long term carbon sequestration through exports from seagrass and macroalgae habitat is the main contributior of CO_2 removals from blue carbon ecosystem. But the 2013 IPCC wetland supplement only covers burial of on-site sediment in seagrass meadows.

How it resolved

- Scientific community of blue carbon in Japan developed country-specific ecosystem model to estimate long-term carbon sequestration through exports from seagrass meadows and macroalgae beds.
- This is allocated as Tier 3 estimation and decided to include in the GHG inventory.

The science basis for the CS model



Krause-Jensen and Duarte 2016, *Nature Geoscience*

Main barriers and challenges: Time series estimation

Issues

- Time series estimation since 1990 to two years before submission is needed for GHG inventory.
- Scientists usually focus on specific/recent years' assessment.
- It is fortunate that Japan has seagrass and macroalgae surveys in 1990's but these are not comparable to recent assessments as survey methods and/or quality of data have improved since then.

How it resolved

- GHG inventory experts requested blue carbon scientists for making annual time series area data estimation of seagrass and macroalgae habitat using existing data set (1990 and 1999) and the recent area assessment (2018-2021).

Seagrass and macroalgae time series area construction 2024 GHG inventory of Japan

Year	Data used
1990	MOE survey – data was reanalyzed by BC scientists
1991-1998	Linear interpolation in each sea-area and vegetation types
1999	MOE survey – data was reanalyzed by BC scientists
2000-2017	Linear interpolation in each sea-area and vegetation types
2018-2021	Spatial distribution model for seagrass meadows and macroalgal beds
2022	Extrapolation of 2020-2021

Main barriers and challenges: Managed land and anthropogenic

Issues

- GHG inventory covers anthropogenic emissions and removals only as a rule. The 2013 IPCC wetland supplement provides the methodologies about direct human effects to mangrove, tidal marsh and seagrass meadows (such as land use changes).
- Japanese country specific Tier 3 ecosystem model covers all seagrass meadows and macroalgae beds and not represents direct human effects only. How to consider anthropogenic emissions and removals in this case is unclear based on the IPCC Guidelines and the MPGs.

How it resolved

- All carbon sequestration through seagrass and macroalgae are reported under the GHG inventory considering laws and management undertaken along coastal wetland area in Japan.

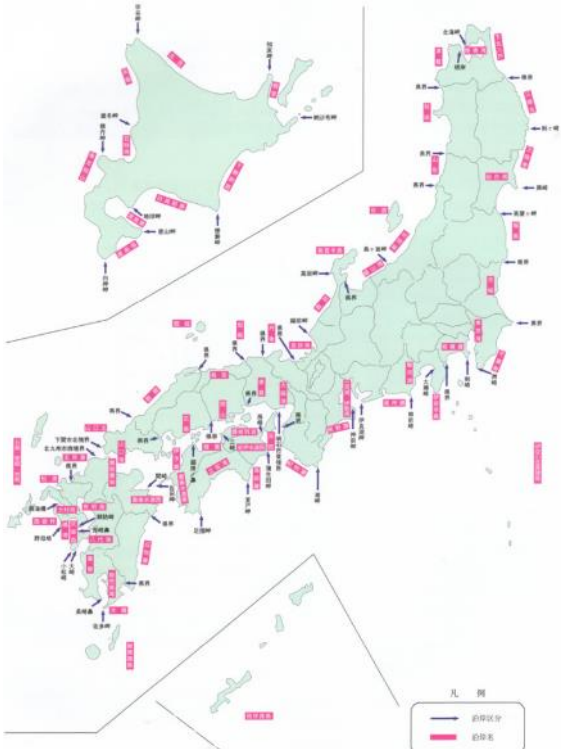


Figure: Coastal areas for "*Basic Plan on Ocean policy*" from MLIT HP

Summary

- Countries may face some difficulties when including blue carbon into their GHG inventory. GHG inventory reporting requirements are not completely addressed by academic or policy aspects.

- Cooperation among scientists, policy makers and GHG compilers is very important in order to include emissions and removals from blue carbon ecosystem with meeting the reporting requirement of the GHG inventory.