Climate change adaptation and mitigation techniques in Japanese agricultural sector

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Climate change research in agricultural sector

3 themes:
1) ～ 3)

Agriculture

3) Mitigation

1) Impact assessment

2) Adaptation

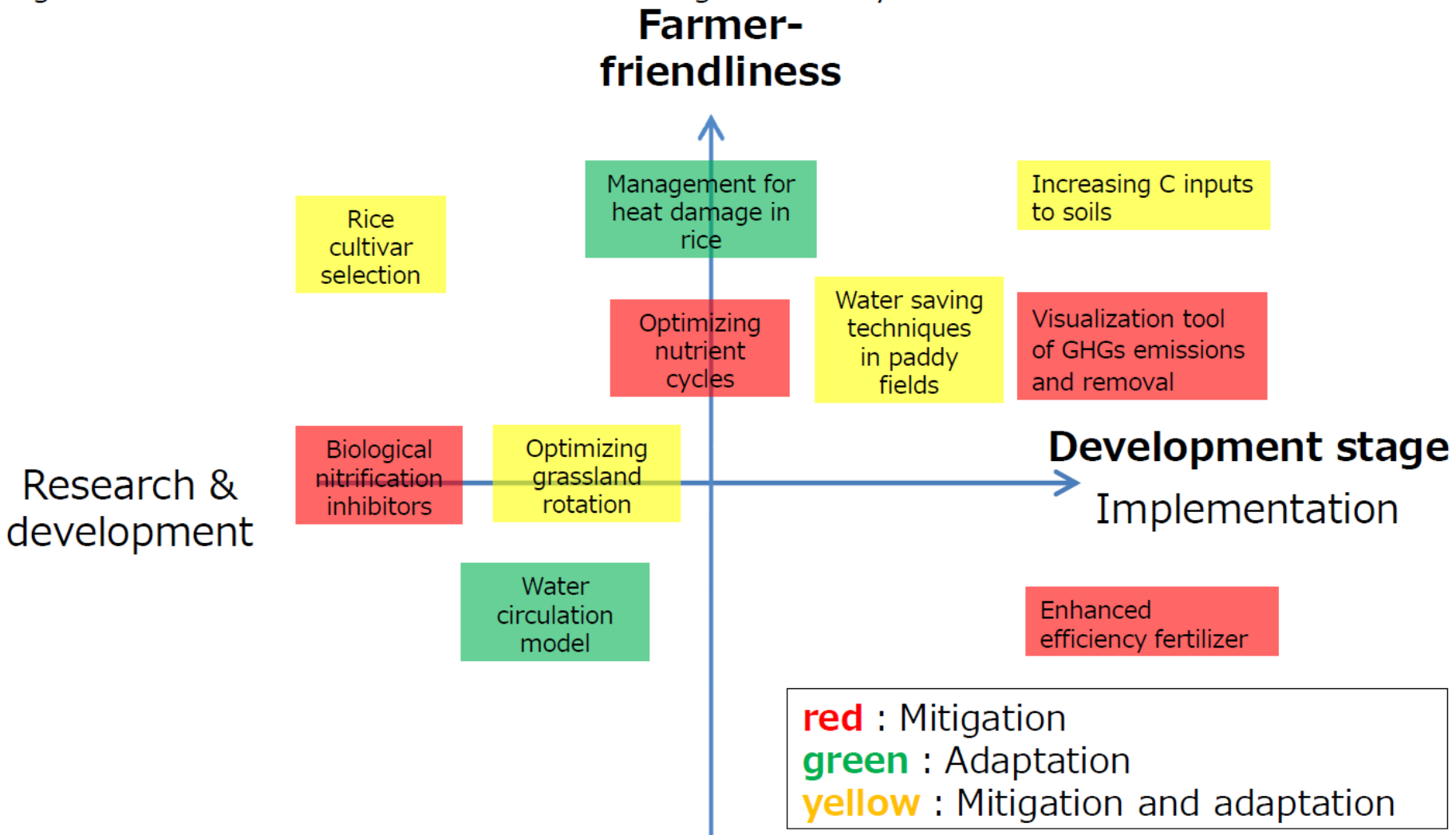
Climate change

3 GHGs:
CO_2, CH_4, N_2O

List and map of technologies

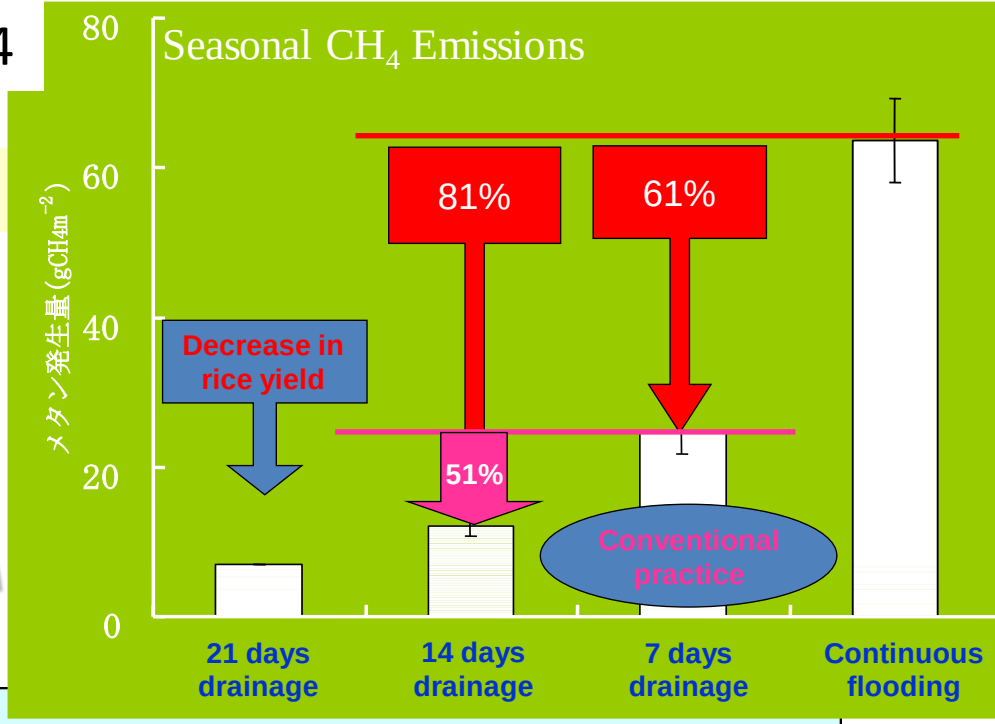
Japan's submission to UNFCCC under Koronivia Joint Work (March 2018)

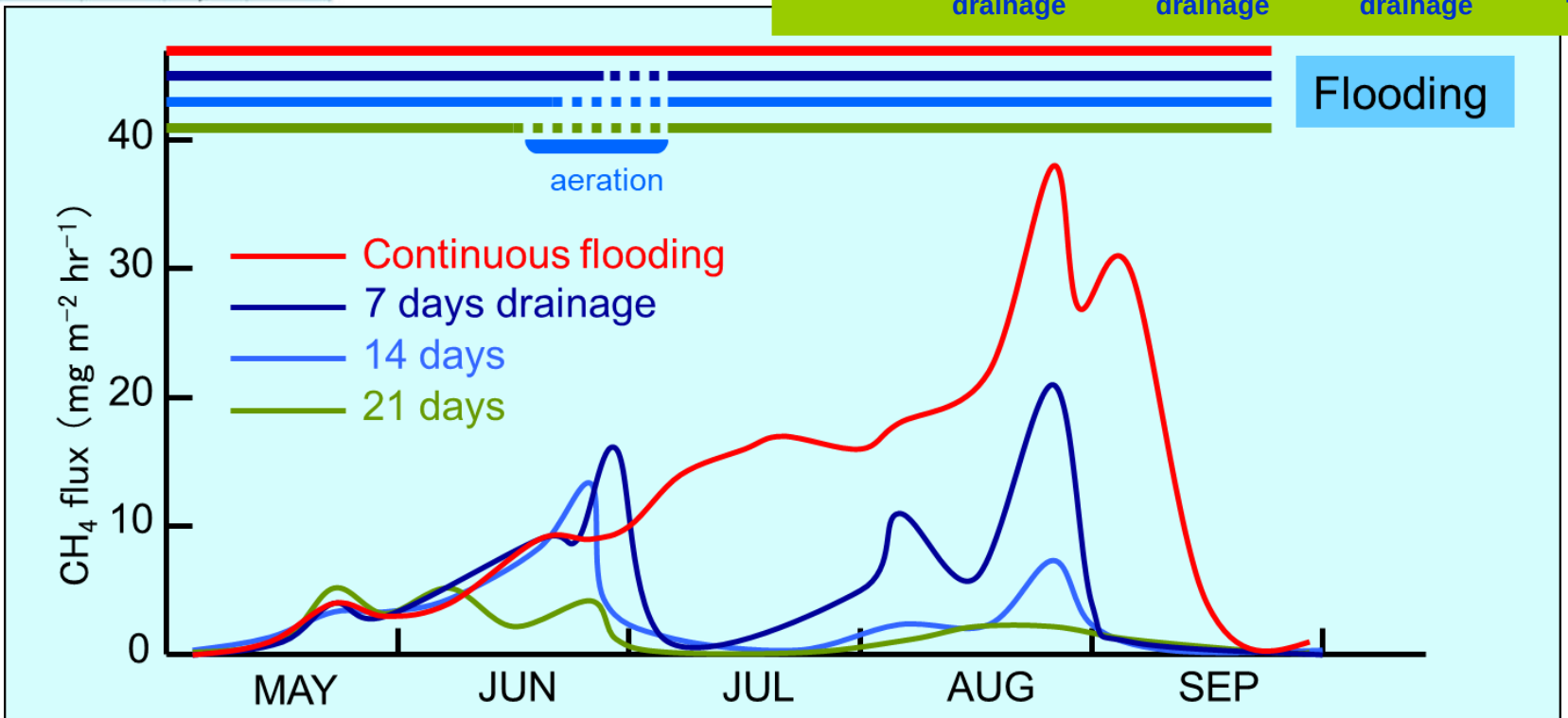
Topic: (c) Improved soil carbon, soil health and fertility under grassland and cropland as well as integrated systems, including water management and (d) Improved nutrient use and manure management towards sustainable and resilient agricultural systems



Water management for mitigating CH4

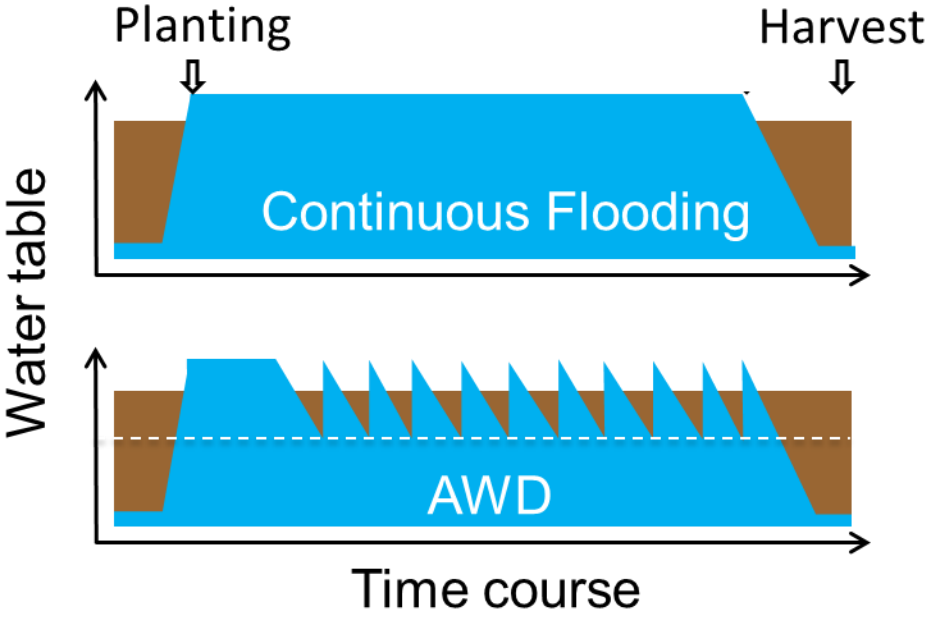
Extending Mid-Season drainage in Japan





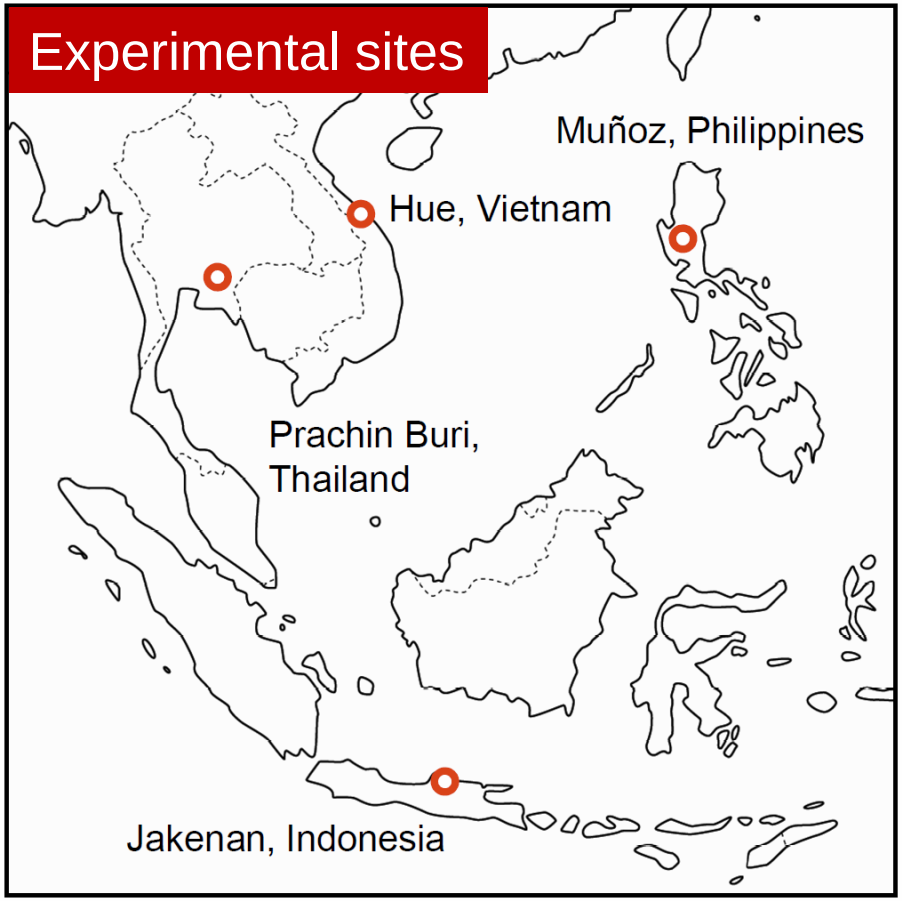
Example in Asia: Alternate Wetting & Drying (AWD)

- Water saving technique originally developed & being extended by the International Rice Research Institute (IRRI).
- Also effective in mitigating paddy CH4 emission due to soil aeration.
- Limited information on the local feasibility in terms of GHG emission, water saving, & rice productivity.

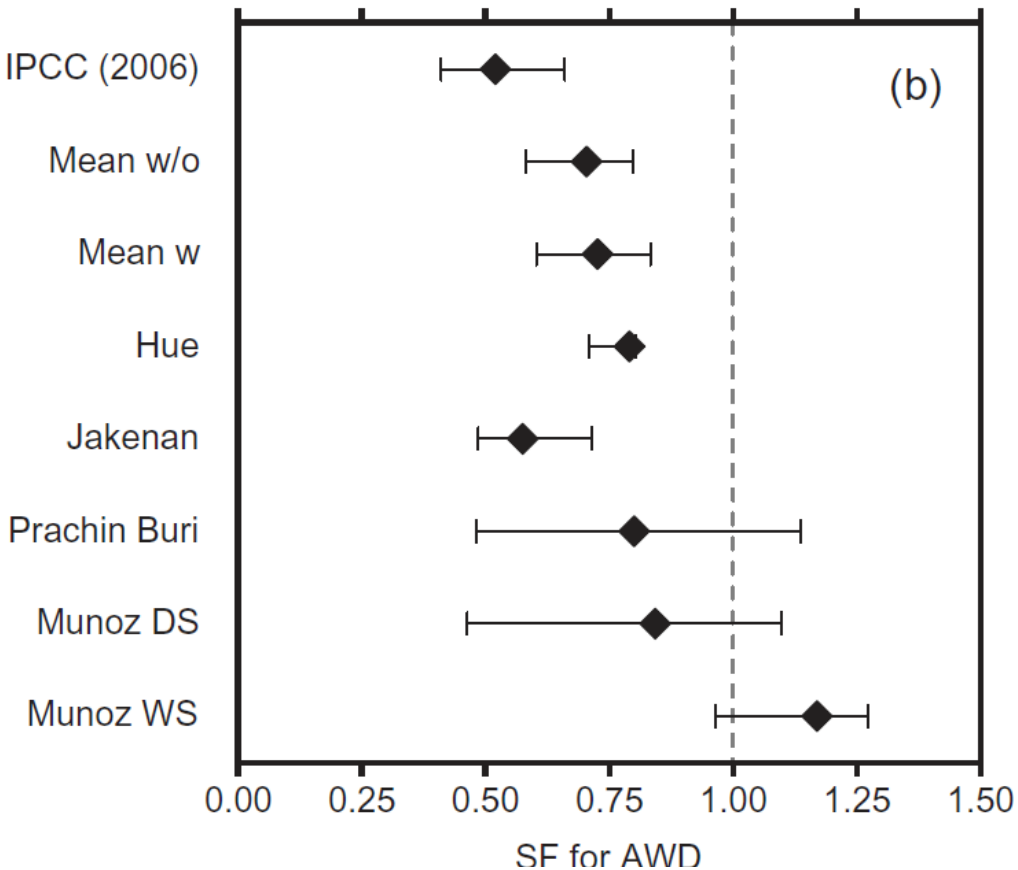


Field experiments in 4 countries (2012~2017)

- **Vietnam**, Hue University of Agriculture and Forestry
- **Thailand**, The Joint Graduate School of Energy and Environment, KMUTT
- **Philippines**, Philippine Rice Research Institute and International Rice Research Institute
- **Indonesia**, Indonesian Agricultural Environment Research Institute
- **Japan**, National Agriculture and Food Research Organization



31% mitigation in average CH_4 Scaling Factor (SF) for AWD was 0.69



Notes

- IPCC's SF for multiple aeration
- Weighted mean ± bootstrapped 95%confidence interval
- Mean w/o & w: without & with Munoz Philippines WS
- DS, dry season; WS, wet season

Lower CH_4 mitigation effect by AWD than IPCC's default SF due to varying weather conditions during the field experiment.

Capacity Building Training

Japan organized a capacity building training on climate smart rice cultivation which was funded by APEC.

AWD etc.

Date: 15-16 November 2018

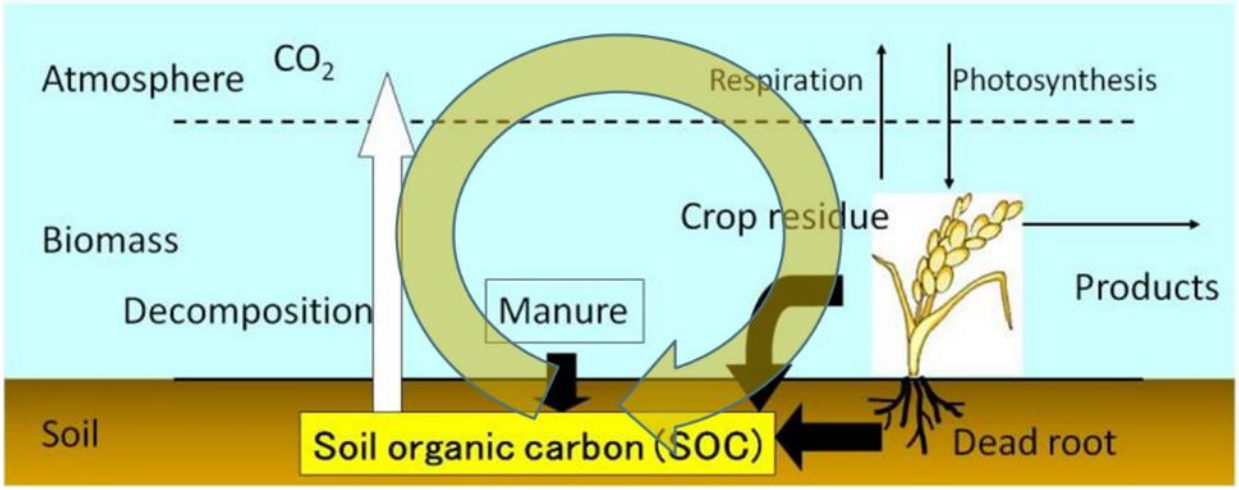
Venue: Parral, Chile

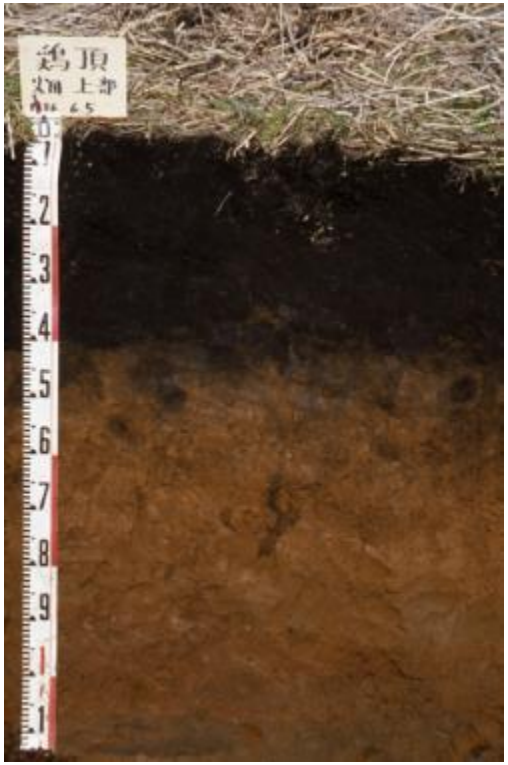
More than 30 people (including extension workers, rice farmers) participated in the training.

Seminar

Experiment in Farmer's field

Soil carbon (C) sequestration & climate change mitigation

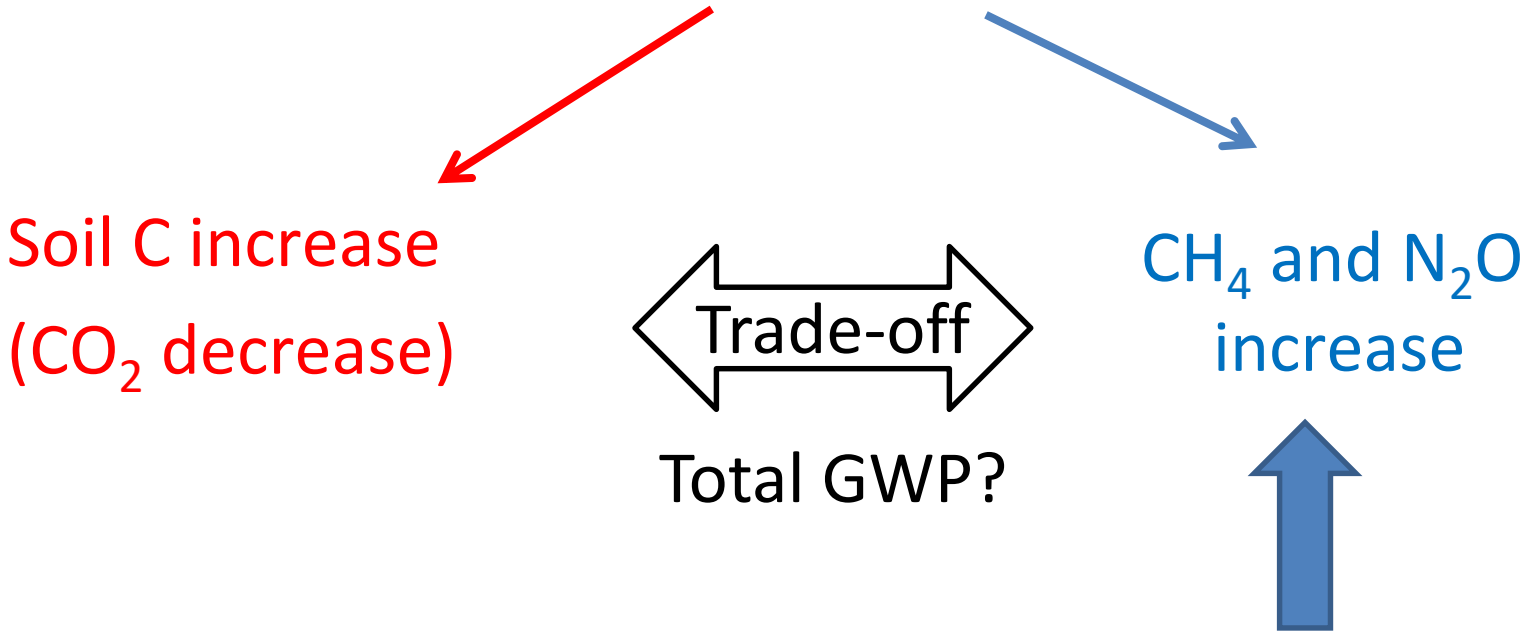




"Carbon" accumulated as black-colored "soil organic matter"

Trade-off:
need to evaluate total Global Warming Potential (GWP)

e.g. Mitigation option: "Increase C inputs to soils"



土壌のCO_2吸収「見える化」サイト

Web-based visualization tool for agricultural soil carbon sequestration and GHGs emission

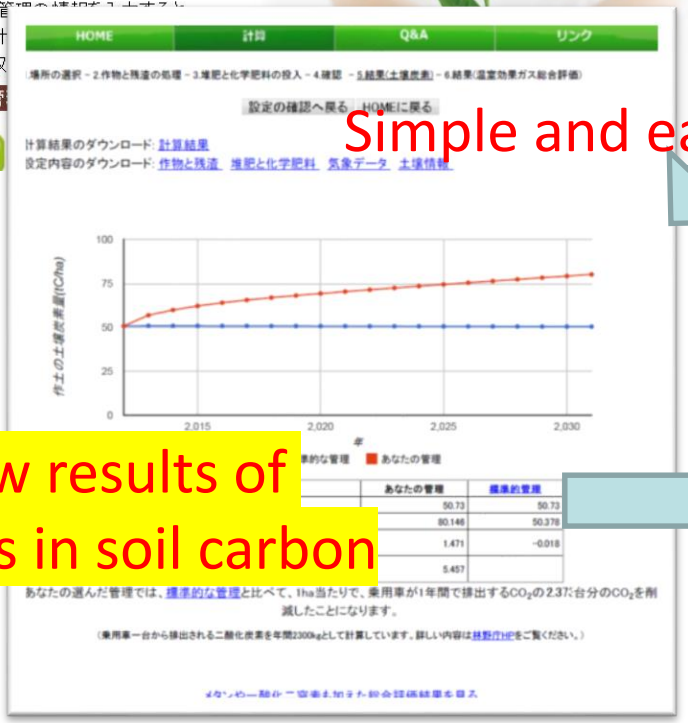
What's New

土壌のCO_2吸収量を簡単に計算できます。

本サイトでは、場所や管理の情報を入力すると
土壌のCO_2吸収量を計
あなたの畑のCO_2吸収

調べたい場所 + 管

▸くわしくはこちら



Click on map ➔ get weather and soil data

Select crop and management

Simple and easy interface

➔ Show results of changes in soil carbon

	あなたの管理	標準的管理
土壌炭素の増減によるCO_2(tCO_2/ha/年) (プラスが排出。マイナスが吸収)	-3.34	0.5
メタン(g-CH_4/m^2/年)	10.00	10.00
CO_2換算(tCO_2/ha/年)	3.40	3.40
N_2O(kg-N_2O/10e	0.13	0.07
CO_2換算(tCO_2		0.20
うち化学肥料由		0.02
CO_2換算(tCO		0.05
うち堆肥由来(k		0.01
CO_2換算(tCO		0.03
うち作物残渣由	0.04	0.04
CO_2換算(tCO	0.11	0.11
化石燃料由来のCO_2(tCO_2/ha/年)	2.02	2.02
合計(tCO_2/ha/yr) (プラスが排出。マイナスが吸収)	2.47	6.12

Total evaluation of 3 greenhouse gases (CO_2, CH_4, N_2O)

Example of introducing new technologies to farmers

<image of demonstration>

②demonstrating the effect of each technologies

business management	tilling, sowing, transplanting	cultivation management	harvesting, processing
			
farm management system	transplanter	water management system	harvesting at the right time by using drone

introducing the technologies which are necessary to solve the problem of farmers

①demonstrating the effect on business management by introducing smart agriculture

<structure>