### Assessing the feasibility of GHG mitigation through water saving techniques (AWD) in irrigated rice fields in Central Vietnam

#### Hue University of Agriculture and Forestry (HUAF)

Bali, October 2019

### Introduction



(Source: Hasan, 2013)

- In Asia, traditional rice cultivation uses CF as water regime, but CF enhances CH<sub>4</sub> emission.
- AWD reduced water input, kept grain yield, reduced  $CH_4$  emission.

### What is Safe AWD?



The threshold of 15 cm water depth (below the surface) before irrigation is called 'Safe AWD" as this will not cause any yield decline.



GC system set up at HUAF, 2011







# **Project timing and incentives**









TRUONG DAY HOC NONG LAM HUE

Land Use and Climate Change Interactions in Central Vietnam

#### An output from LUCCi project

Water Resources Development and Management

UCC

Alexandra Nauditt Lars Ribbe Editors

Land Use and Climate Change Interactions in Central Vietnam Measuring GHG Emissions from Rice Production in Quang Nam Province (Central Vietnam): Emission Factors for Different Landscapes and Water Management Practices

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Fig 6 Total GWP from CH<sub>4</sub> and N<sub>2</sub>O emissions during three seasons of rice cultivation under CF and AWD in **a** DL and **b** HM. "CF" in SA 2012 denotes that CF was not strictly implemented in SA 2012





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JAPAN

MIRSA Ministry of Agriculture, **Forestry and Fisheries** 

(FYs funded by MAFF





NARO

Phase 2: 2013 to 2017

Phase 3: 2019 to 2022

### Phase 2: MIRSA 2 outline **Experimental site**

- Huong An commune, Huong Tra district, Thua Thien Hue Province, Central Vietnam during six consecutive cropping seasons from 2013 to 2016

Quangdien.

Thua Thien Hue

Huongthuy

Namdong

**É**hôngdien

٩lu

6°28'16"N;

107°31'26''E

Laos

Huongtra





### **Treatments**



#### Water level (cm)



### Measurements





#### **Gas sampling:**

- Weekly in mid-morning (8:00-10:00 AM).
- 1, 2, 3, 4, and 5 days after nitrogen (N) fertilizer application.

- The gas samples were collected using a 60-mL syringe fitted with a stopcock at 0, 6, 12, 20, and 30 min after chamber closure and used a 19-mL evacuated glass vials



### Analysis gas sampling



- Gas chromatograph (8610C, SRI Instruments, CA, USA) equipped with a flame ionization detector (FID) for the analysis of  $CH_4$  and an electron capture detector (ECD) for the analysis of  $N_2O$ . - GWP (kg  $CO_2$  ha<sup>-1</sup>) = 28\*CH<sub>4</sub> + 298\*N<sub>2</sub>O (IPCC, 2014)

#### Phase 3: Mirsa 3 outline

#### Location



16.50.07 N; 105.55.75.E

#### **Setup Experiment**

Split-plot design Whole-plot factor: Water Management: CF & AWD Split-plot factor: Organic Amendment: With & Without Split-split-plot factor (only for CF): Rice Cultivar: Conventional (HT1) & IR64 Replication: 4

Chamber (diameter of 50 cm): 2 per plot o

Yield (2 m x 2.5 m): 1 per plot





## Conclusion

- $CH_4$  emission ranged from 500 kg  $CH_4$  ha<sup>-1</sup> in WS to 644 kg  $CH_4$  ha<sup>-1</sup> in SA.
- The AWD with the current criteria reduced the GWP of  $CH_4$  and  $N_2O$  by 26% compared to CF treatment.
- The AWD with the current criteria reduced the water use by 14-15% compared to CF treatment.
- A possibility of AWD's performance on increasing rice productivity. Thus, it will be key to spread AWD to local farmer.

# Acknowledgements

- We would like to thanks:
- LUCCi project
- MIRSA 2 project.
- Prof. Kazuyuki Inubushi (Chiba University, Japan), Dr. Reiner Wassmann, Dr. Bjorn Ole Sander (IRRI, Philippines), Dr. Agnes Tirol Padre (IRRI, Philippines), Dr. Kazuyuki Yagi (NIAES, Japan), Dr. Kanozuri Minamikawa (Japan) for their valuable comments.
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# Thank you for your attention











