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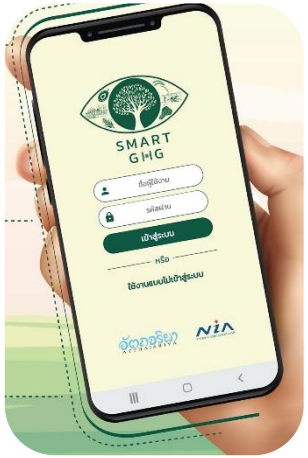
SMART GHG mobile application: A New Agriculture Tracking of Low-Carbon Rice Production in Thailand's Local Community



Nittaya Cha-un, Sirintornthep Towprayoon, Amnat Chidthaisong, Kittipong Chaimanuskul, Suwapat Maiyarach, Panuwat Sangsuwan and Pichit Kiatsomporn

E-mail: Nittaya.cha@kmutt.ac.th, Nidchaun@gmail.com

1. Introduction

- Achievement and maintaining global food security under SDG 2

- Encouraging adaptation, resilience, and mitigation to climate change under SDG 13

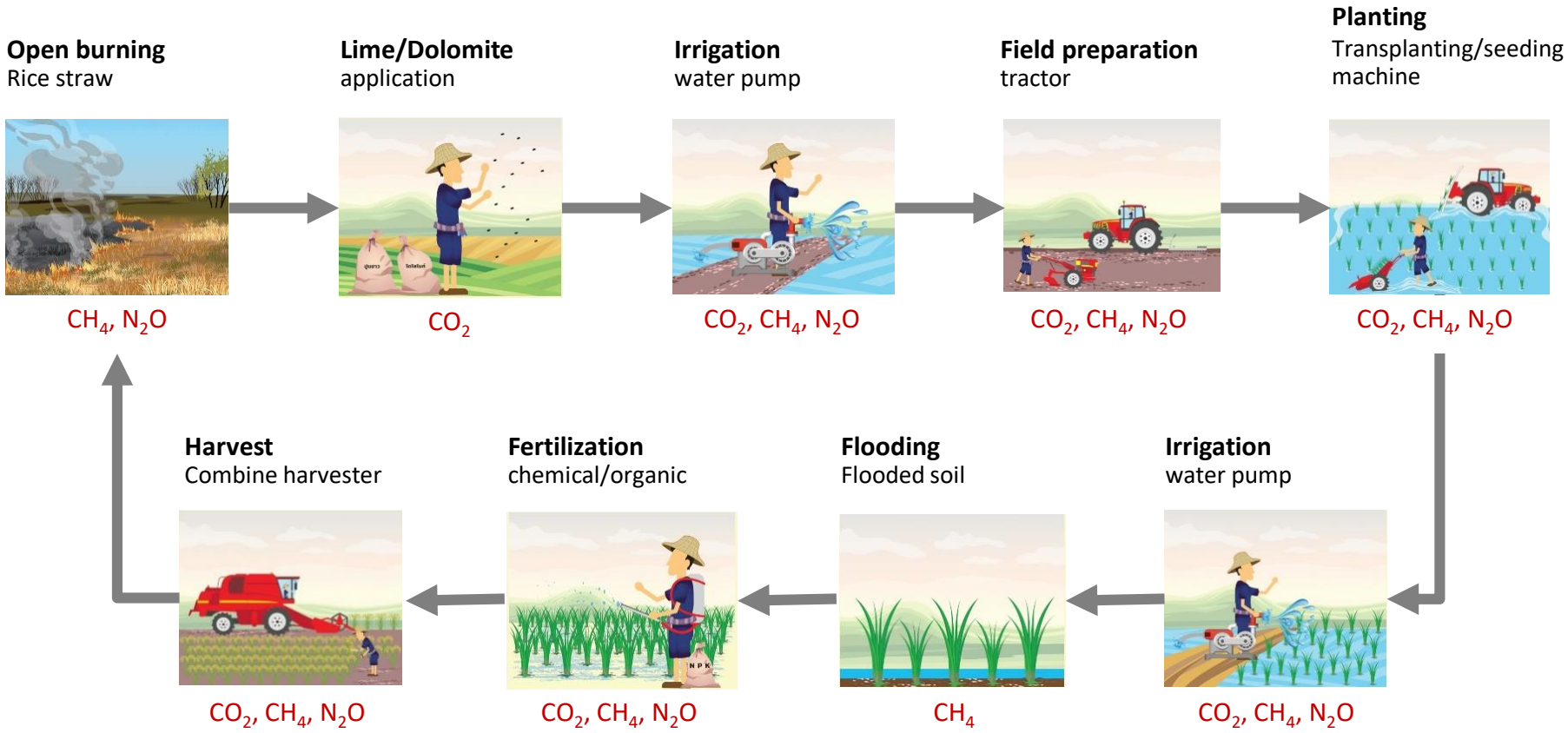
1. Introduction

Agriculture sector is expected to be the most affected by climate change.

- High temperature
- Floods
- Droughts

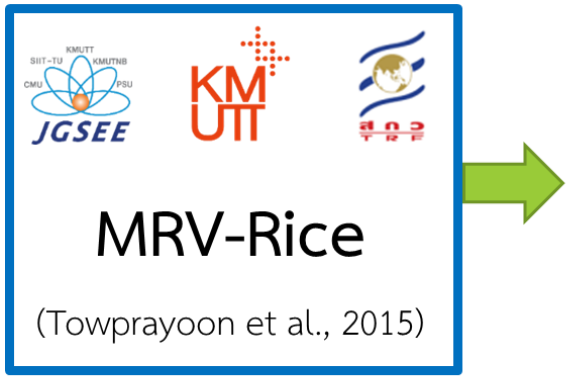
https://www.iberdrola.com/sustainability/climate-change-science

1. Introduction



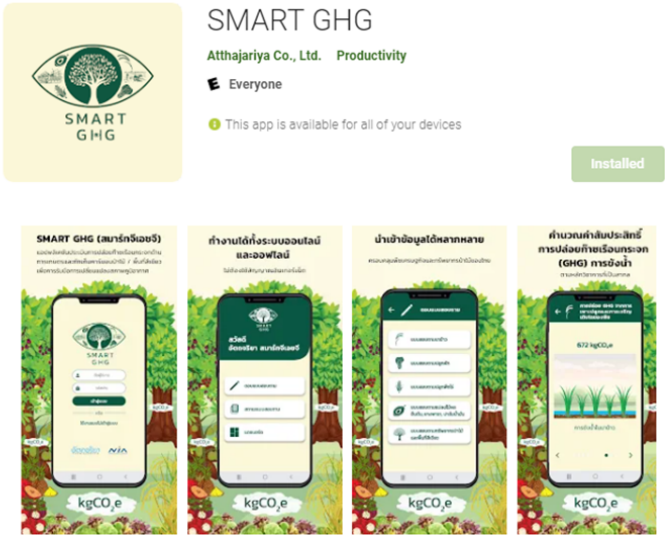
2. Materials and Methods

2.1. Overview of SMART GHG application (SGA)



Towprayoon et al., 2020 and ATTHAJARIYA CO., LTD.

ATTHAJARIYA CO., LTD. and National Innovation Agency (NIA), Thailand, 2021

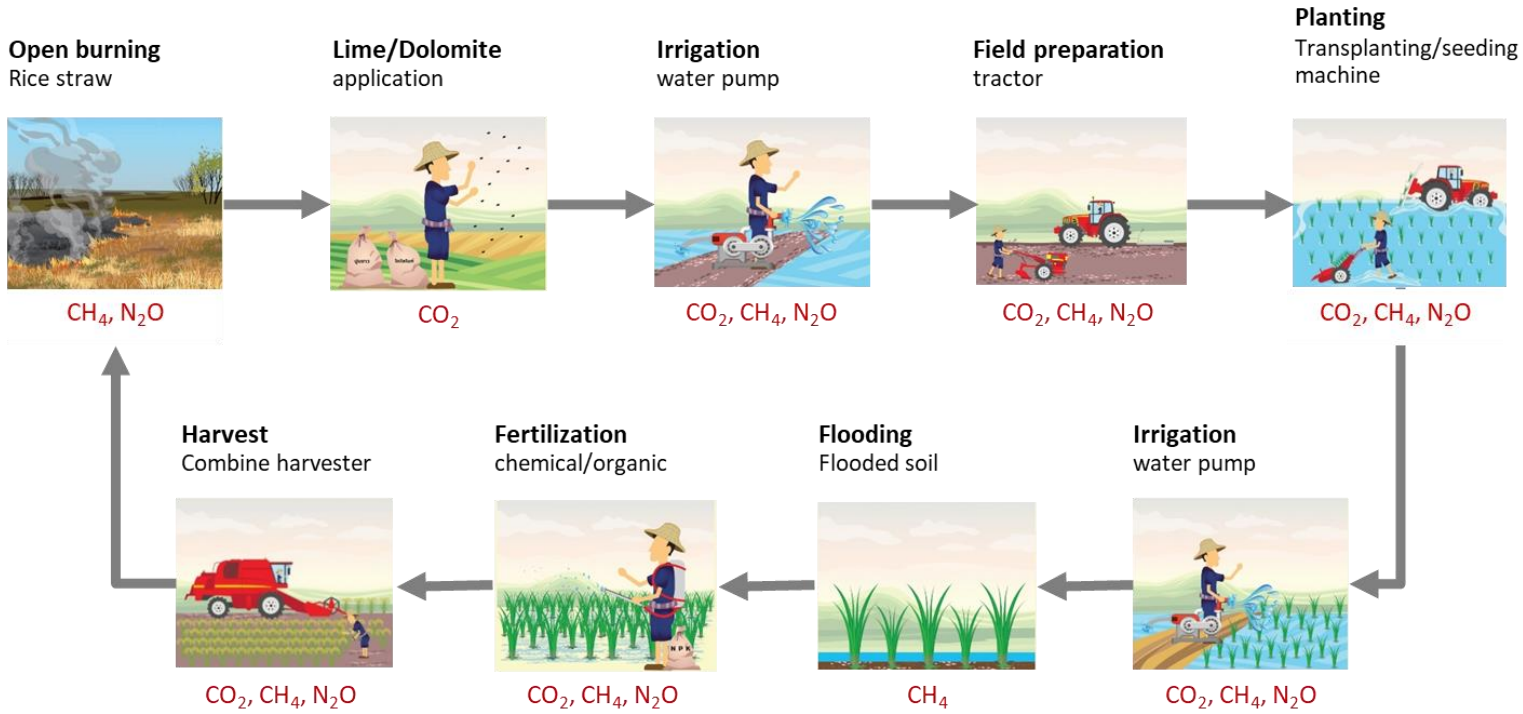


2. Materials and Methods

2.1. Overview of SMART GHG application (SGA)

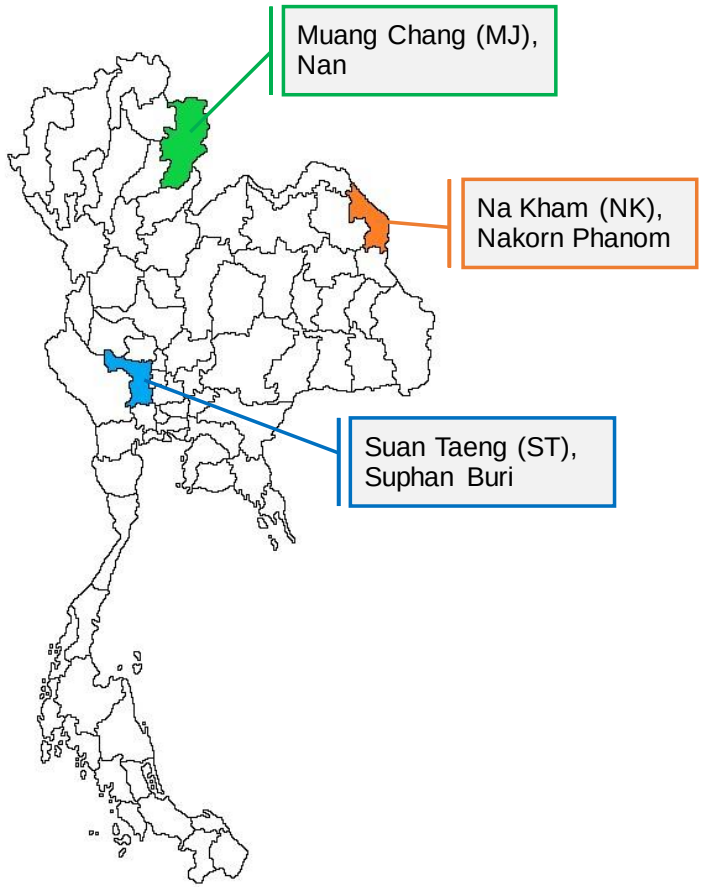
Calculation method in SGA

- 2006 IPCC Guidelines
- 2019 Refinement to the 2006 IPCC Guidelines (for flooded rice cultivation and fertilization)



2. Materials and Methods

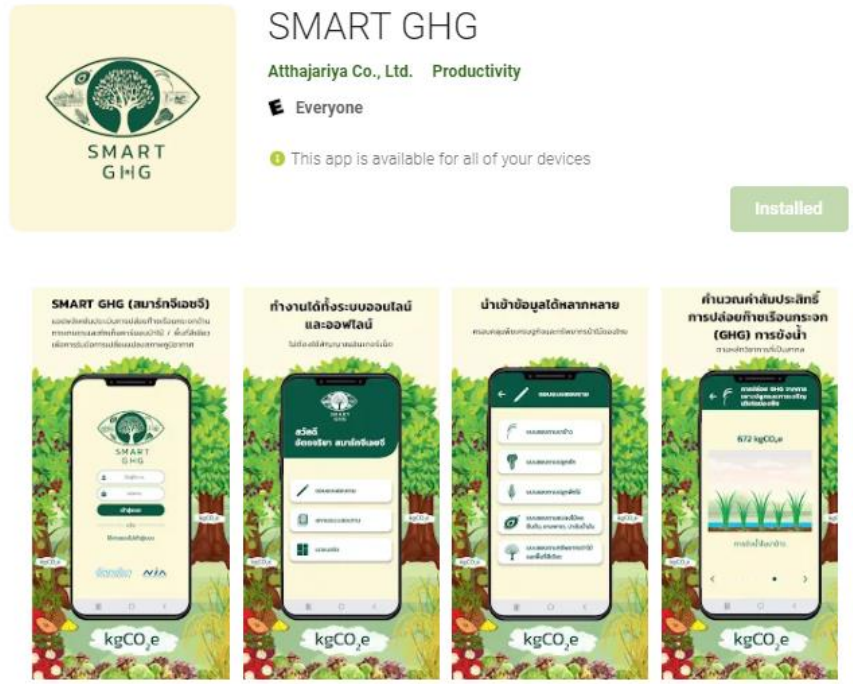
2.2. Study Sites



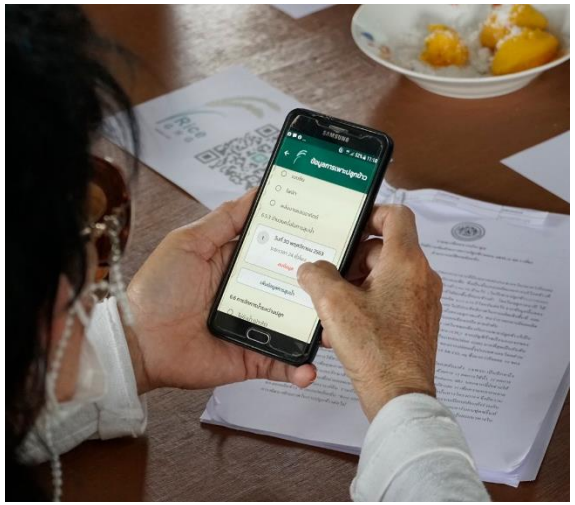
- At the community level, purposive sampling was used, focusing on farmers who have grown rice in three sub-districts from three provinces.
- MJ and NK represented the major rice cultivation areas that were grown in the rain-fed areas (North and Northeast)
- ST represented the irrigated rice cultivation areas (Central)

2. Materials and Methods

2.3. Data collection



- download the SGA from Android Play Store and install on mobile phones
- collecting and recording the activity data in the SGA by farm owners



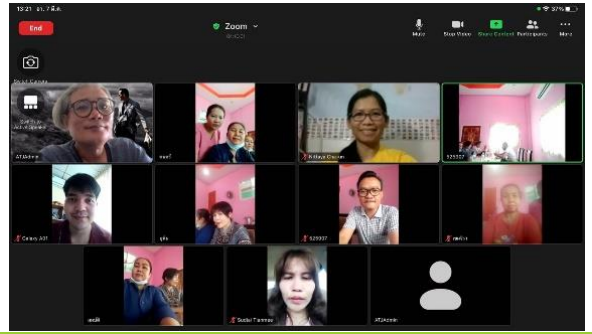
3. Results and Discussion

3.1 Farmer's engagement in data collection

Suan Taeng (ST)

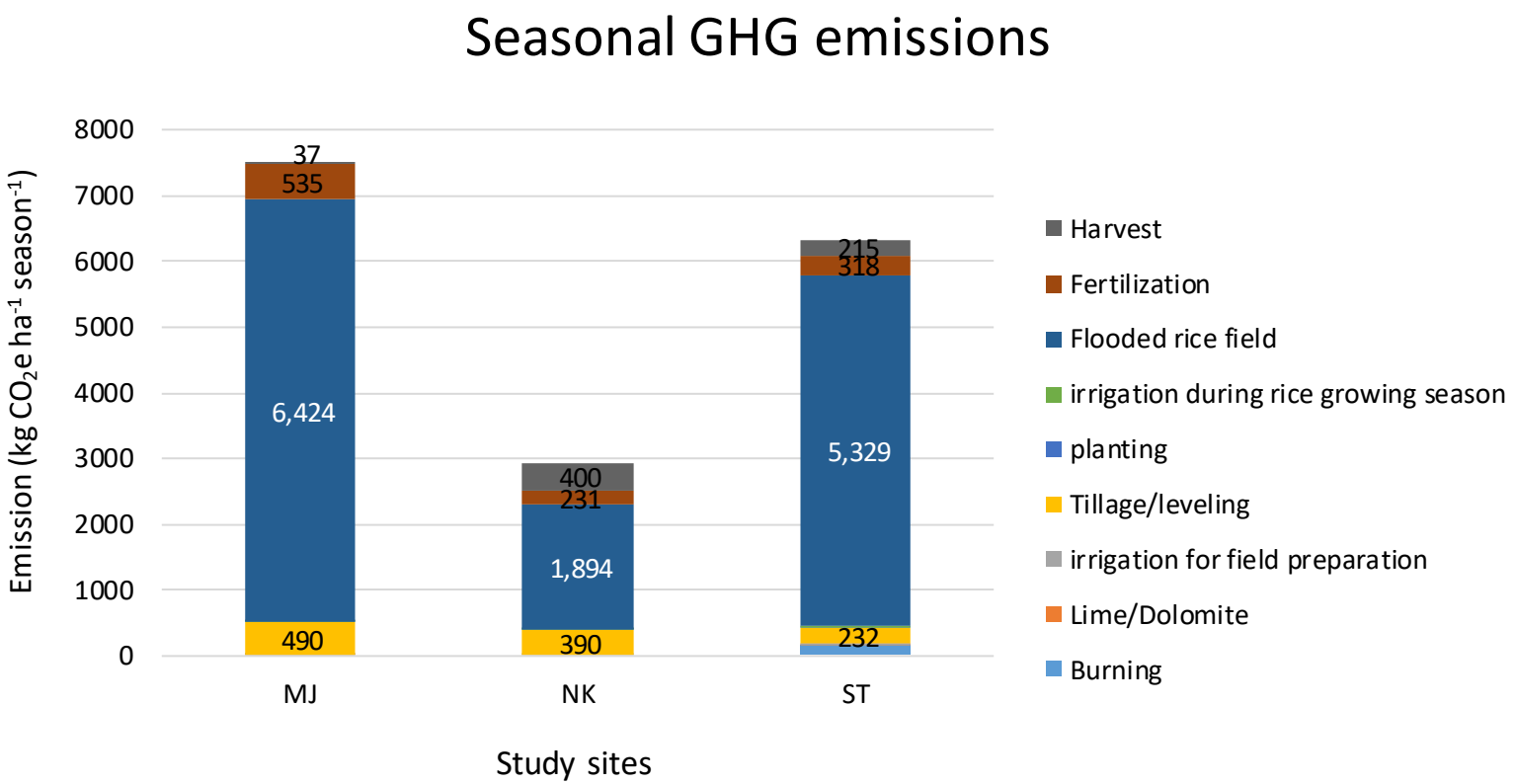
Muang Chang (MJ)

Na Kham (MJ)



3. Results and Discussion

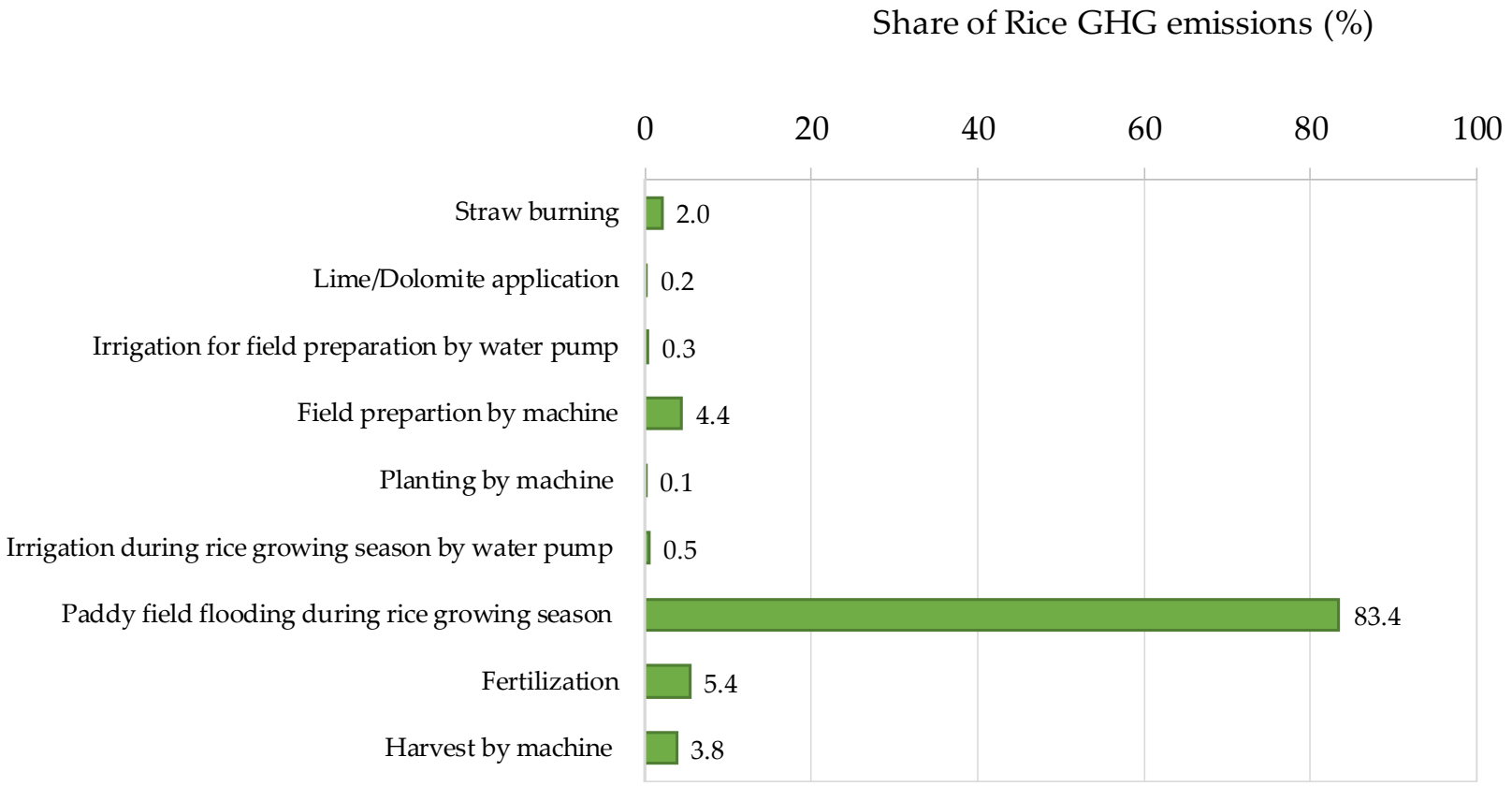
3.2 GHG emissions



- The total GHG emissions of MJ, ST and NK accounted for 7.5, 6.3 and 2.9 tCO_2e ha^{-1} season^{-1}, respectively.
- The water management by continuous flooding during the rice growing season was the significant factor for total GHG emission.
- Straw burning was observed only in ST sites, due to the short fallow period.

3. Results and Discussion

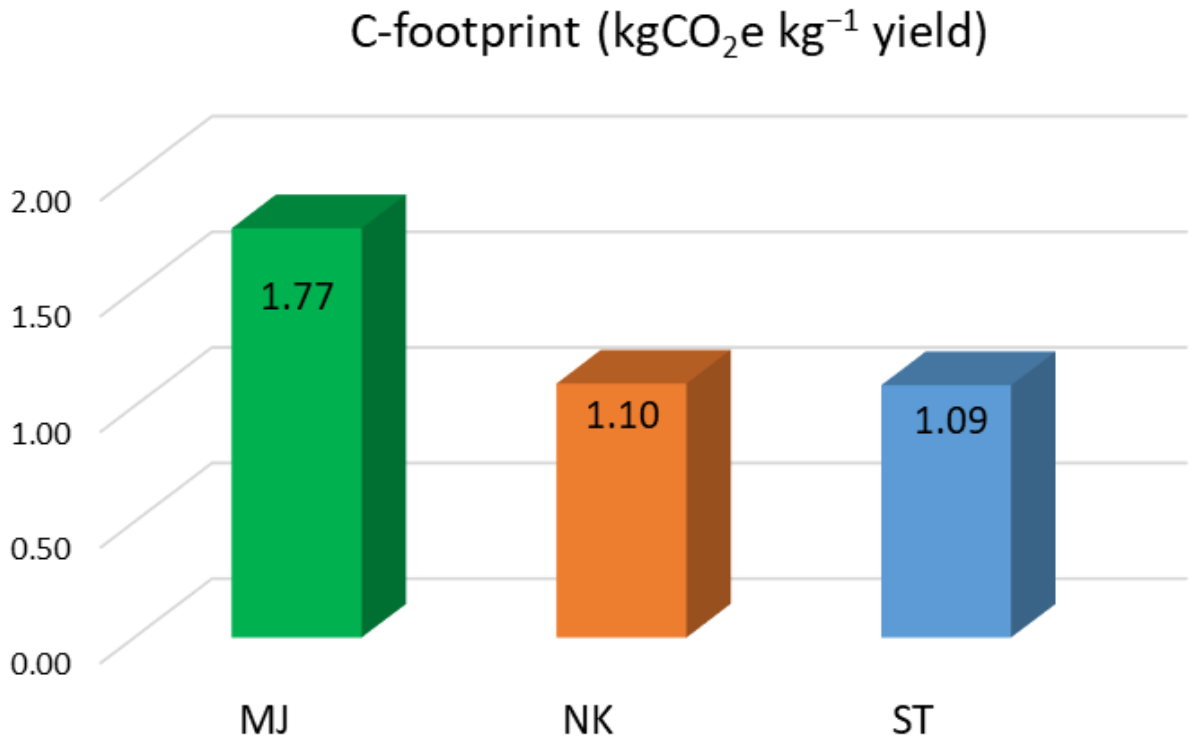
3.2 GHG emissions



- During the rice growing period with continuous flooding, the emission of CH_4 contributed to 83.4% of the total GHG emissions.

3. Results and Discussion

3.3 C-footprint



- C-footprint of paddy yields accounted by 1.77, 1.10 and 1.09 $kgCO_2e$ kg yield^{-1} in MJ, NK and ST, respectively.
- Arunrat and Pumijumnong (2017) also reported that GHG intensity or C-footprint ranged from 0.31 to 1.68 $kgCO_2e$ kg^{-1} yield, with an average value of 0.97 $kgCO_2e$ kg^{-1} yield.

4. Conclusions

- The total GHG emissions ranged from 2.9 to 7.5 $tCO_2e\ ha^{-1}\ season^{-1}$, with an average value of 5.6 $tCO_2e\ ha^{-1}\ season^{-1}$.
- CH_4 emissions contributed to 83.4% of the total GHG emissions.
- The water management by continuous flooding during the rice growing season was the significant factor for total GHG emission.
- Farmers are able to use the SGA on their mobile phones.
- The SGA can demonstrate and well analysis of GHG emissions, fossil fuel consumption, fertilization, water management, seasonal yield, and C-footprint, which can be used to establish a baseline and mitigation options.

Acknowledgments

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Thank you for your kind attention