



Tropentag, September 9-11, 2020, virtual conference

“Food and nutrition security and its resilience
to global crises”

Zonal and Seasonal Methane Emissions from Rice Production in the Vietnamese Mekong Delta

THI BACH THUONG VO¹, FOLKARD ASCH², REINER WASSMANN³, BJOERN OLE SANDER⁴

¹*Hohenheim University, Inst. of Agric. Sci. in the Tropics (Hans-Ruthenberg-Institute), Germany*

²*University of Hohenheim, Inst. of Agric. Sci. in the Tropics (Hans-Ruthenberg-Institute), Germany*

³*Karlsruhe Institute of Technology, Garmisch-partenkirchen, Germany,*

⁴*International Rice Research Institute (IRRI), Vietnam Office, Viet Nam*

Abstract

In Vietnam rice is produced on 7.7 million ha making Vietnam the world's 6th largest rice producer. In the Mekong River Delta (MRD) comprises lowland rice with MRD providing 55 % of all Vietnamese rice production. Lowland rice production is a source of greenhouse gases (GHG) due to emissions of methane (CH₄) and – to a lesser extent nitrous oxide (N₂O). Rice production in the MRD can be classified according to seasons and zones: early year (October to June), mid-year (May to November), and late year season (December to April) as well as saline zone (close to the sea), alluvial zone (mid-delta) and the flood-prone zone (upper delta, close to the river). So far, these seasonal and environmental differences have not been reflected in the generic IPCC guidelines that provide default emission factors at the sub-continental scale. We present here a database derived from field measurements conducted with the closed chamber method and standardised crop management at 12 sites with 24 cropping seasons. Reflecting a large variation in total, emissions in the saline zone (31 to 357 kg CH₄ ha⁻¹ season⁻¹) were lower than in the alluvial zone (150 to 440 kg CH₄ ha⁻¹ season⁻¹) and the flooded zone (80 to 914 kg CH₄ ha⁻¹ season⁻¹). While saline conditions are known to inhibit microbial methane production, it was surprising that the differences were not more pronounced. This can be attributed to adjusted cropping calendars in the saline zone to avoid a standing crop in the critical time window (February to April). At the peak of salinity levels, rice production is limited to locations with improved infrastructure to control salt intrusion into the canals. In those areas with persistent salt intrusion, the dominant land use is shrimp farming instead of rice. Thus, the actual rice seasons in this zone are characterised by similar conditions for microbial methane production as in other zones – even though the name of the zone suggests otherwise. Finally, the newly generated data is set into the context of GHG estimates for the Mekong Delta using the IPCC guidelines.

Keywords: Emission factor, greenhouse gas, IPCC Tier 2, methane, salinity zone