About the Contents of Technology Catalog

The configuration of this catalog is as follows.

Title indicating the name and potential use of the technology

Area of contribution to the sustainable food systems

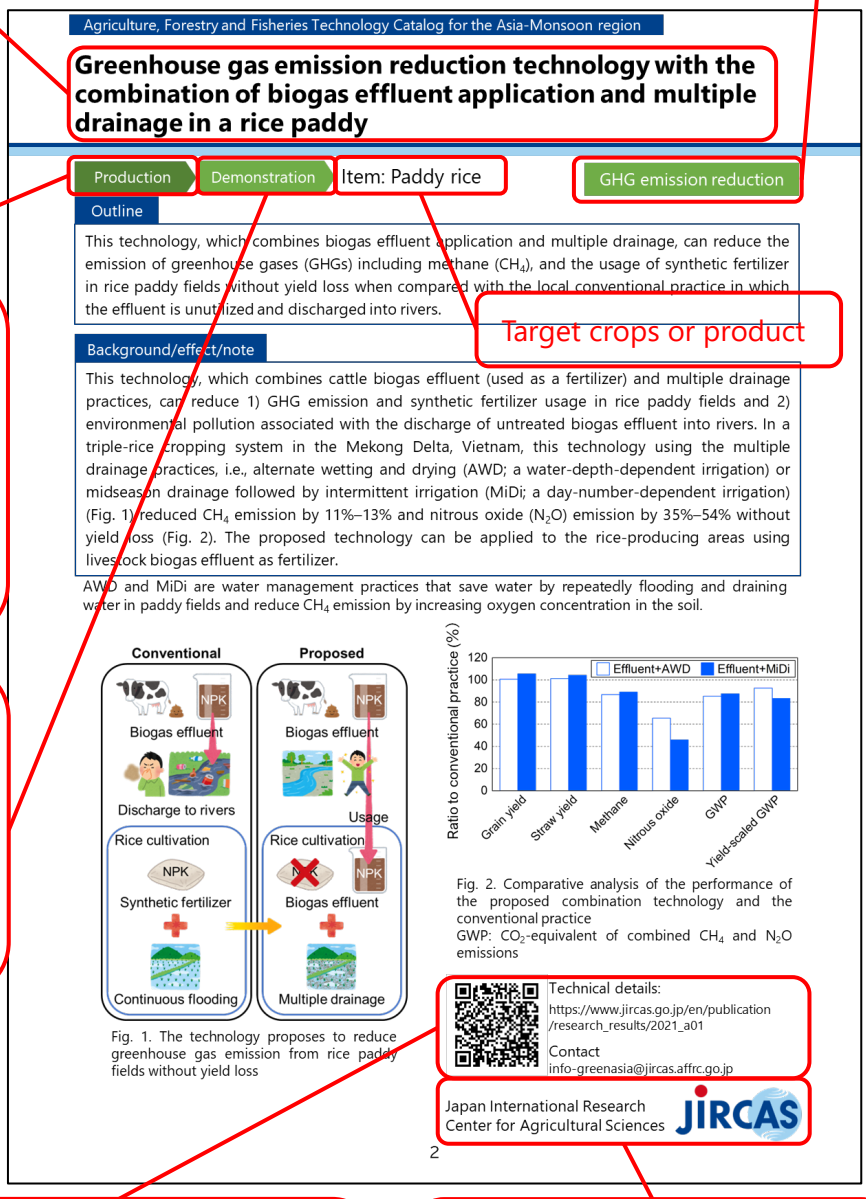
Target process within the supply chain (Production, Input, Processing and Distribution, or Consumption) for utilization of the technology

Present status of achievement in the development of the technology (Demonstration or Implementation)

Target crops or product

Link for details on the technology and information on institute(s) involved in the research.
Contact e-mail address for inquiry about technology

Representative institute in Japan involved in the development of the technology



Agriculture, Forestry and Fisheries Technology Catalog for the Asia-Monsoon region

Greenhouse gas emission reduction technology with the combination of biogas effluent application and multiple drainage in a rice paddy

Production | Demonstration | Item: Paddy rice | GHG emission reduction

Outline

This technology, which combines biogas effluent application and multiple drainage, can reduce the emission of greenhouse gases (GHGs) including methane (CH_4), and the usage of synthetic fertilizer in rice paddy fields without yield loss when compared with the local conventional practice in which the effluent is unutilized and discharged into rivers.

Background/effect/note

This technology, which combines cattle biogas effluent (used as a fertilizer) and multiple drainage practices, can reduce 1) GHG emission and synthetic fertilizer usage in rice paddy fields and 2) environmental pollution associated with the discharge of untreated biogas effluent into rivers. In a triple-rice cropping system in the Mekong Delta, Vietnam, this technology using the multiple drainage practices, i.e., alternate wetting and drying (AWD; a water-depth-dependent irrigation) or midseason drainage followed by intermittent irrigation (MiDi; a day-number-dependent irrigation) (Fig. 1) reduced CH_4 emission by 11%–13% and nitrous oxide (N_2O) emission by 35%–54% without yield loss (Fig. 2). The proposed technology can be applied to the rice-producing areas using livestock biogas effluent as fertilizer.

AWD and MiDi are water management practices that save water by repeatedly flooding and draining water in paddy fields and reduce CH_4 emission by increasing oxygen concentration in the soil.

Fig. 1. The technology proposes to reduce greenhouse gas emission from rice paddy fields without yield loss

Fig. 2. Comparative analysis of the performance of the proposed combination technology and the conventional practice
GWP: CO_2-equivalent of combined CH_4 and N_2O emissions

Technical details:
https://www.jircas.go.jp/en/publication/research_results/2021_a01

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