RETASTE Conference Abstracts
Vol. 3 RETASTE-AFR-434-Oral
Athens, Greece, 27-29 September, 2023

rethink food resources, losses, and waste 2023 retaste

Development and Sustainability Assessment of Rice Straw-based Circular Economy

Hung Nguyen

International Rice Research Institute, Pili Drive, Los Baños, Laguna 4031, Philippines

Abstract

Rice production plays an essential role in food security and the social and economic development of Asian and African countries. However, rice is currently fraught with various issues, such as vulnerabilities in climate change and low productivity. At the same time, rice production has a high environmental footprint. Rice straw burning further exacerbates the problem. Managing rice straw remains a challenge which globally produces about 500 million t of rice and the same amount of rice straw each year. Labor shortage for straw collection, the low economic value of rice straw, and lack of economically viable knowledge lead to the predominant practice of straw burning. In-field burning of rice straw leads to biodiversity loss, soil nutrient loss, and human health problems. This paper introduces a rice straw-based circular economy associated with supporting technical solutions and performance indicators. The circular economy model was developed and tested in the Mekong River Delta of Vietnam. It includes sustainable rice contract farming, straw-based bio-fertilizer, bio-plastics, urban agriculture, and business model developments. Life-cycle assessment was used in analysing the sustainable indicators. The study demonstrated the sustainable benefits of the rice straw-based circular economy through its performance indicators of profitability, nutrient use efficiency, and carbon footprint. In addition, the study also provides recommendations for developing and implementing standards or good engineering practices for sustainable rice straw management.

Keywords: circular economy, sustainability, climate change, carbon footprint, resilience, rice