

## Project identification (A-2015-48)

Title: Scalable straw management options for improved farmer livelihoods, sustainability, and low environmental footprint in rice-based production systems

Duration: February 2016 to February 2019

## Problems to be addressed

Rice straw is a major rice by-product that is usually burned in the field, causing detrimental effects on the environment and human health. Managing rice straw for different uses can bring opportunities for income to farmers in an environmentally sustainable manner.

## Objectives

The goal of the project is to improve farmers' livelihoods by fostering sustainable rice straw management that adds value to their rice crop and to reduce the environmental footprint from rice production systems.

The purpose is to (1) assess different straw management options, including their value-adding potential and environmental footprint; (2) provide information and training to farmer intermediaries, including the national agricultural research and extension systems, for encouraging and advising farmers to use best straw management practice; and (3) provide information to policymakers for creating an enabling environment for best-practice straw management

## Technology options

- In-field rice straw management: optimized incorporation and mulching.
- Off-field rice straw management:
  - Mechanized collection
  - Using rice straw for non-energy production such as mushroom and cattle feed
  - Carbonization, including innovative technology of hydrothermal carbonization
  - Bioenergy
- Addressing carbon footprint for different rice straw management and proposing mitigation solutions.
- Sustainability analysis and life cycle assessment (LCA) of different rice straw management options to identify best practices in terms of economic benefits and environmental footprint.

## Major partners

- University of Hohenheim
- Nong Lam University, Can Tho University, Loc Troi group
- Ministry of Agriculture, Forestry, and Fisheries; Don Bosco; Royal University of Agriculture
- Philippine Rice Research Institute
- Better Rice Initiative Asia (BRIA)
- CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) Southeast Asia Regional Program

## Project sites

- Cambodia, Philippines, and Vietnam

## Expected outputs

1. Innovative technologies, management options, and farmer business models for rice straw management.
2. Carbon footprint analysis of alternative rice straw management against a baseline of greenhouse gas emissions from straw burning.
3. Carbonization of straw (biochar) as a pioneering approach for lowering the carbon footprint and increasing income.
4. Methodologies for and results from sustainability assessment for promising rice straw management options.
5. Communication and outreach strategies for dissemination of results.

## Link to other IRRI projects

- Closing Rice Yield Gaps in Asia with Reduced Environmental Footprint (CORIGAP)
- Rice straw for energy project (SUPERGEN)
- Mitigation options to reduce methane emissions in paddy rice
- "No regret" mitigation strategies in rice production

## 2016 Activities and milestones

### IRRI and Philippines (Philippine Rice Research Institute)

- Carbon footprint and LCA for different rice straw management options (in-field and off-field)
- Develop technology of biogas production using rice straw
- Demonstration and dissemination of rice straw collection, mushroom production, and rice straw for cattle feed (Philippines)

### Cambodia (Ministry of Agriculture, Forestry, and Fisheries)

- Demonstration, training, and dissemination of rice straw collection
- Training and demonstration of using rice straw for mushroom production and rice straw for cattle feed

### Vietnam (Nong Lam University and Loc Troi Group)

- Rice straw value chain analysis
- Development of good practices for mushroom production and training materials
- Rice straw pellets for cattle feed
- LCA of rice straw applied with *Trichoderma*
- Carbon footprint and LCA of using rice straw for cattle feed
- Business models of rice straw supply chain



Demonstration of rice straw balers and management options in Vietnam and Cambodia



Business model (left), LCA of rice straw for cattle feed (middle), and mushroom production (right)