



Virtual Workshop and Demonstration on Integrated Management of Straw Residue

STRAW MANAGEMENT PRACTICES IN INDONESIA

Indonesian Center for Agricultural Engineering Research and Development ,
IAARD - MOA
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RICE AREA AND PRODUCTION IN INDONESIA

Indonesia total rice area (2019) : 15,955 mil ha/year

Average yield : 5,192 ton/ha

National rice production : 83,037 mil ton

(unhusked rice)

Straw production : 90 mil ton

RICE HARVESTING PRACTICES IN INDONESIA

Manual

Sickles (cut straw 10-15 cm above the ground)

Hand Beating

Pedal thresher

Whole/ Long straw
Stubble 10-15 cm

Semi mechanical

Sickles (cut straw 25-30 cm above the ground)

Trough in thresher machine

Straw 30 cm
Stubble 25-30

Mechanical

Paddy tripper (uncut straw left in the field)

Combine harvester with trough in type thresher (cut straw 25-30 cm above the ground)

Combine harvester with hold type thresher (cut 5-7 cm above the ground, straw are chopped 5 cm and spread to rice field)

TRADITIONAL RICE HARVESTING PRACTICES IN INDONESIA



Manual harvesting



Pedal threshing



Hand beating



Stacked straw in rice field

RICE HARVESTING USING PADDY STRIPPER



Only rice grain are picked up by stripper, uncutted straw left in the field

RICE HARVESTING USING COMBINE HARVESTER



Combine harvester with through in type thresher. The machine cut straw 25-30 cm above the ground



Combine harvester with hold on type thresher. The machine cut straw 5-7 cm above the ground

UTILIZATION OF STRAW RESIDUE IN INDONESIA

- 1. Burning**
- 2. Decomposed and returned back to the field**
- 3. Animal feed / fodder**
- 4. Industrial material (Paper)**
- 5. Energy (burning brick)**

1. STRAW BURNING PRACTICES IN INDONESIA

- Before 2009, 85-90% farmers burn rice straw
- Purpose:
 - Eliminate straw from the field
 - Land preparation can be carried out soon after harvesting
- Impact:
 - Emmission of GHG: CO₂, CO, CH₄, PM, NO_x and SO₂
 - Loss of organic material and soil fertility
- In 2009, Indonesia Act N0 41/2009 on "Protection of Sustainable Food Crops Land" was issued → Farmers are not allow to burn straw
- The number of straw burning practices has decreased, however up to now, some farmers still practice straw burning.

STRAW BURNING PRACTICES IN INDONESIA

Pile straw in rice field



2. RETURNED STRAW BACK TO RICE FIELD

Purpose:

1. Increase organic material
2. Increase soil fertility

1 ha of straw approx. equivalent to: 41.3 kg urea, 5.8 kg SP36 and 89.17 kg KCL atau total 136.3 kg NPK

3. Improve soil phisic
4. Reduce emmission of GHG
5. Sustainable agriculture

2. RETURNED STRAW BACK TO RICE FIELD

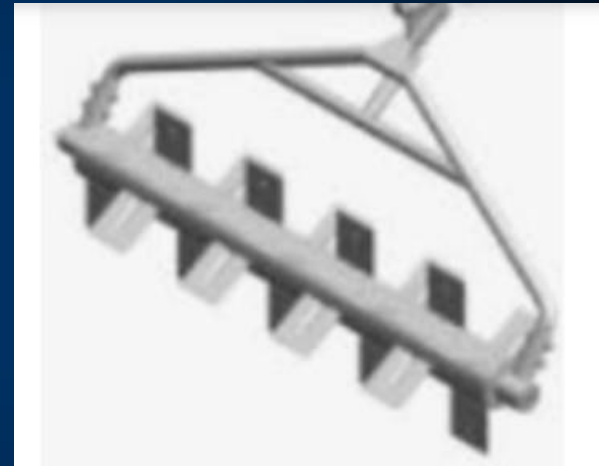
Land preparation using tractor and its equipment

Crimpler/ finned roller → speed up straw to decompose in the soil

Plowing → inverse and buried stubble and straw in the soil

Rotary plow → mixed decomposed straw and soil

Pushing Straw into the Soil



Crimpler/ finned roller → best in very soft soil

Push straw in the soil, speed up straw to decompose

Land Preparation by Machine



Plowing: Inversing soil, burying stubble and straw



Rotavating: chopping soil, and mixing decomposed straw and stubble



4 wheel tractor with rotary tiller



Two Wheel tractor rotary tiller

Direct rotavating on soft/wet soil

Composting Straw for Fertilizer



In Situ Straw Composting Practices



3. STRAW FOR ANIMAL FEED/ FODDER



Transporting straw from field



Direct feeding fresh straw



Feeding of dried straw



Chopped fresh straw

Using Straw for Silage



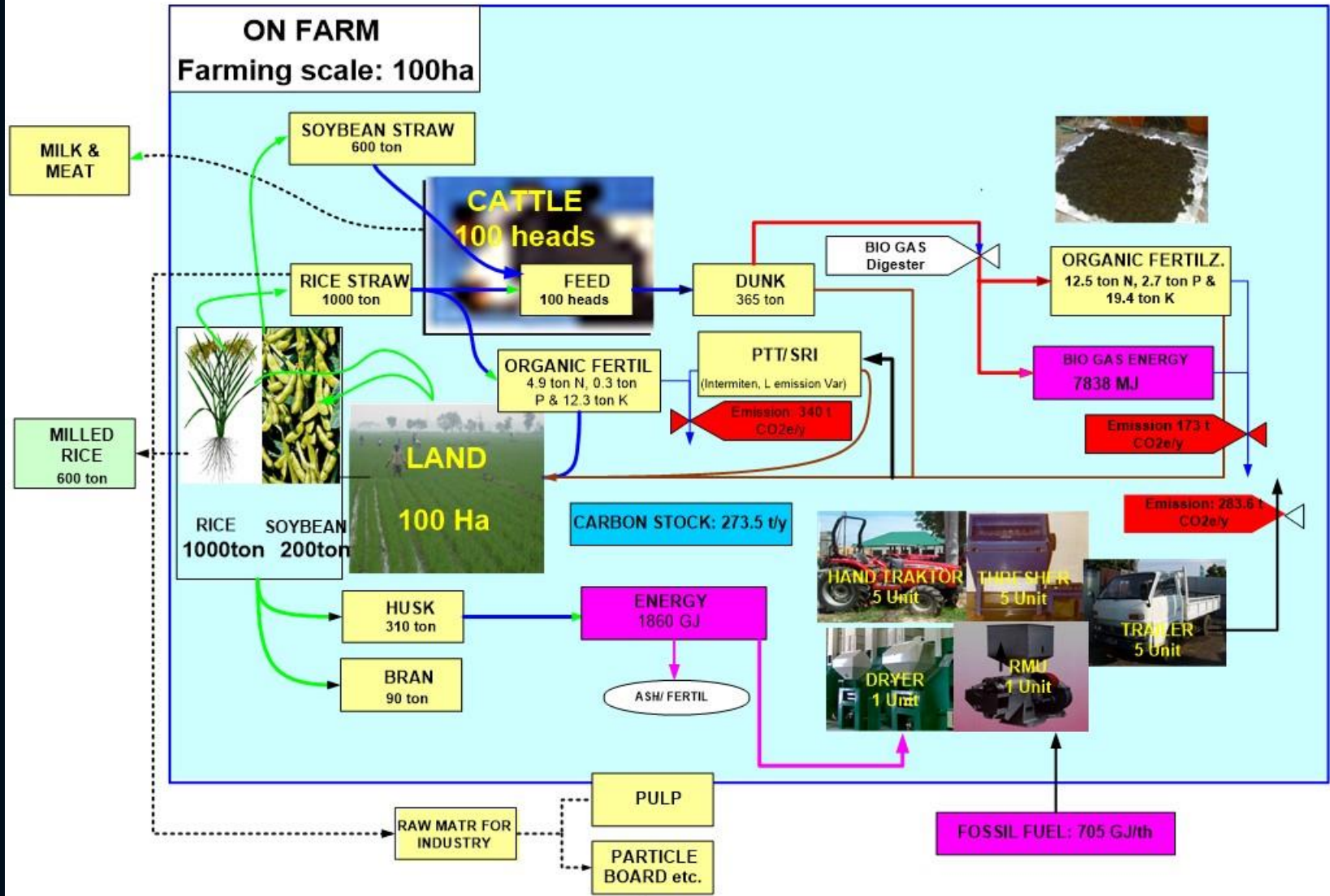
Silage processing



Silage feeding

RICE CATTLE INTEGRATED SYSTEM

A Model in Rice Research Center, Sukamandi



CHALLENGE OF STRAW UTILIZATION

Lack of labor

High labor cost

Farmer awareness

Lack of appropriate machine for straw management

Collecting straw in the field

Trasporting straw from the field

Processing straw into: compost, fodder, silage

Poor farm road

THANK YOU