Machines for rice straw management

Self-propelled baler

Square Baler

Loose straw collection machine

Roller baler

IRRI CCAFS CGIAR RESEARCH PROGRAM ON Rice

Federal Ministry for Economic Cooperation and Development

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Self-propelled baler

Self-propelled baler: operating

This machine makes bales and transports them to the bund as shown in the photos below. Although it has a higher capacity than the roller baler, its collection capacity is lower because it moves on rubber chain wheels that allows it to be used on wet fields.

Self-propelled baler: unloading

Features:

- Produces 13-kg bales and transports them to the bunds
- Capacity: 1.0–1.5 t/hr
- Investment cost: 15,000–20,000 USD/unit
- Life span: 3–5 years
- Service cost: 13–16 USD/t of straw
- Net profit: 2–3 USD/t of straw
- Fuel consumption by the baler's engine contributes to GHG emissions

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Square Baler

This machine works similar to the roller baler except that it has a piston mechanism that compresses the rice straw into square bales and can operate continuously. This machine is usually pulled by a tractor.

Features:

- As an example, the CLAAS Markant 55 produces 15- to 20-kg square bales and leaves them in the field
- Capacity: 1.5–2.0 t/hr
- Investment cost: 15,000–18,000 USD/baler (excluding tractor)
- Service cost: 15 USD/t of straw
- Net profit: 1–3 USD/t of straw
- Fuel consumption by the tractor contributes to GHG emissions

Loose straw collection machine

This machine (left photo) is used to collect scattered straw in the field. It is usually self-propelled and is easy to operate.

Features:

- Collected straw is transported to the bunds
- Capacity: 2.0–2.5 t/hr
- Investment cost: 10,000–15,000 USD/ unit
- Service cost: 15 USD/t of straw
- Net profit: 2–3 USD/t of straw
- Fuel consumption of the engine contributes to GHG emissions

Roller baler

The small-scale roller baler collects and compacts rice straw into round bales. It can be pulled by a tractor or be self-propelled, such as the Japanese STAR baler, pictured above.

Features:

- Produces 13-kg bales that are left in the field (second photo above)
- Capacity: 1.5–2.0 t/hr
- Investment cost: 5,000–8,000 USD/baler (excluding tractor)
- Service cost: 9–11 USD/t of straw
- Net profit: 3–5 USD/t of straw
- Fuel consumption by the engine of self-propelled units or tractor-pulled balers contributes to greenhouse gas (GHG) emissions

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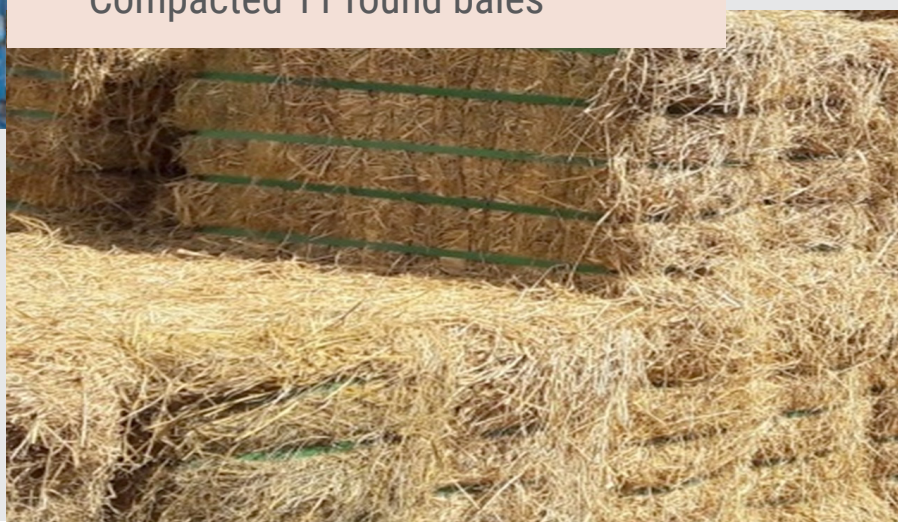
Rice straw compacting

Compacting reduces the volume of collected rice straw, thus, minimizing transportation costs.

- Compacts 11 round bales into a square 130-kg bale
- Capacity: 1–1.5 t/hr
- Reduces transportation cost ≈ 6 times for a distance of about 1,000 km
- Investment cost: 30,000–35,000 USD per system including conveyors and compacting machine
- Service cost: 20 USD/t
- Net profit: 38,000 USD/yr for a Vietnamese business model
- Fuel consumption contributes to GHG emissions

Compacting system

Compacted 11 round bales



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