

Why we need mechanized collection of rice straw

Harvesting paddy using combine harvesters leads to rice straw being spread in the field, which requires its gathering from the field at increasing collection costs. This is the game changer, having had negative effects on other businesses that use rice straw. There is, therefore, demand for mechanized straw collection and suitable technology is being demonstrated and disseminated by IRRI through activities of the Closing Rice Yield gaps in Asia with Reduced Environmental Footprint (CORIGAP), and the BMZ Rice Straw Management Project.

Technology options

Collection of rice straw involves three main operations: picking up the rice straw, compacting it into bales, and transporting these to the edge of the field. In these operations, a compacting machine, called a baler because it forms the straw into bales, is the main unit. A stationary baler with only a compaction unit can be used to collect straw disposed on a pile by stationary paddy threshers. A mobile baler, either self-propelled or pulled by a tractor, is suitable for collecting rice straw left spread out in the field by combine harvesters.

There are two main baler types as defined by the principle of operation of the compacting unit. The roller-type makes round bales (Fig.1); the piston-type makes square bales (Fig.2).

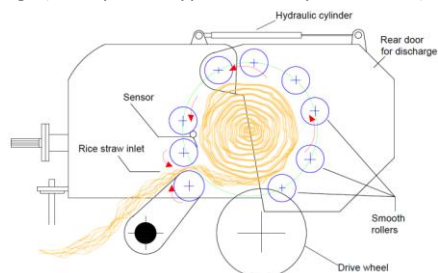


Figure 1. A roller-type rice straw baler (cross section).

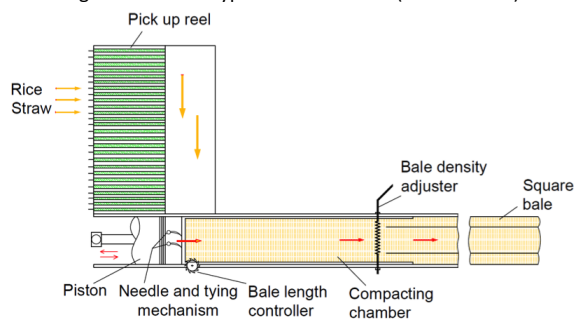


Figure 2. A piston-type rice straw baler (top view).

Balers for rice straw collection commonly used in Vietnam

Features	Roller baler 1 (Fig. 3)	Roller baler 2 (Fig. 4)	Self-propelled baler (Fig. 5)	Square baler (Fig. 6)
Capacity (ton/h)	2–3	1.2–1.7	1–1.3	1.5–2
Bale weight at 14% MC (kg/bale)	500–600	13–15	13–15	15–20
Investment cost (2016, in USD)	19,000–25,000	5,000–8,000	12,000–15,000	16,000–18,000
Engine/pulled by tractor (HP)	80	30	45	50
Fuel (diesel) consumption (lit/ton of straw)	5-6	2-3	4-5	4-5



Figure 3. Roller baler: straw bales (500 kg/bale) left in the field, need heavy vehicles for handling; cannot work in wet field.



Figure 4. Roller baler: straw bales (13 kg/bale) left in the field, need vehicles for handling; cannot work in wet field.



Figure 5. Self-propelled baler: combines baling and transporting rice straw to the bund; workable in wet field.



Figure 6. Square baler: straw bales (18 kg/bale) left in the field, need vehicles for handling; cannot work in wet field.

Major collaborators in training, demonstration, and implementation

Cambodia (Ministry of Agriculture, Forestry, and Fisheries); Philippines (Philippine Rice Research Institute); and Vietnam (Nong Lam University)