

Stubble Removal

Technical Brief

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Technology Summary

The Stubble Removing Machine is a tractor-mounted, high-capacity solution designed to manage crop residues sustainably and efficiently. It cuts stubble down to a few centimeters from the ground and simultaneously loads it into a trolley, eliminating the need for manual collection and reducing fuel consumption. Compatible with 40–60 HP tractors and capable of covering up to 1 acre per hour, this eco-friendly, cost-effective technology is ideal for managing both rice and wheat stubble across diverse field conditions.

Background

Post-harvest stubble management is a major challenge in Indian agriculture, especially in rice and wheat cultivation. Conventional methods, particularly stubble burning, have severe environmental consequences, including air pollution, greenhouse gas emissions, and soil degradation. Farmers face increasing pressure to adopt cleaner alternatives, but labor shortages and high operational costs often limit sustainable options. The Stubble Removing Machine addresses these challenges by offering a practical, farmer-friendly solution that improves field preparation while supporting environmental goals.

Technology Description

The machine features a robust mild steel frame, adjustable depth control, safety guards, and a hydraulic lifting system for ease of operation. It works with 40–60 HP tractors and has a working width of 6–8 feet, allowing it to clear approximately 1 acre of land per hour. With fuel consumption of just 1–1.5 liters per acre, it minimizes operational expenses. The chopped stubble is directly collected into a trolley, streamlining the residue management process. Easy blade replacement and low maintenance further add to its appeal for long-term use.

Market Potential / Proposed Deployment

- India Market: Punjab, Haryana, UP, and parts of Madhya Pradesh and Bihar present a massive market due to government restrictions on stubble burning and incentives for eco-friendly machinery.
- Global Market: Stubble management equipment market projected to grow alongside sustainable agriculture and conservation tillage practices.
- Estimated CAGR: Agricultural machinery market in India growing at ~8–10% CAGR; residue management segment expected to see double-digit growth driven by policy support and environmental compliance.
- Target Segments: State Agriculture Departments, Custom Hiring Centres (CHCs), Agri-startups, FPOs, and individual progressive farmers.

Applications

- Post-harvest stubble removal for rice and wheat crops.
- Integration with sustainable and conservation agriculture programs.
- Effective residue collection and transport for biomass processing or composting.
- Suitable for both smallholder and large commercial farms.

Value Proposition

- Eco-Friendly: Reduces air pollution by eliminating the need for stubble burning.
- Fuel-Efficient: Uses only 1–1.5 L of diesel per acre, reducing operating costs.
- High-Throughput: Covers up to 1 acre/hour with minimal labor input.
- Durable: Heavy-duty 2600 kg mild steel frame ensures long-term use.
- User-Friendly: Requires only one operator, with intuitive depth control and hydraulic lifting.
- Sustainable: Supports retention of soil nutrients and improves long-term soil health.

Technology Status

- Readiness Level: TRL 8–9 (ready for commercial deployment).
- Current Deployment: Operational prototypes with positive field feedback; suitable for immediate adoption by farmers and cooperatives.
- Scalability: Customizable for different crop types and farm sizes; potential for manufacturing scale-up and policy-linked deployment through state agriculture schemes.

