Mechanization Prototype Development: Multi crop Millet Planter

ICRISAT
Transforming Dryland Agriculture
INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS
CGIAR
SUSTAINABLE FARMING

Citation: Gajanan Sawargaonkar, Akshay Kumar Yogi, Prasad Kamdi, Yogesh Kumar, Santosh kale and Ramesh Singh. (2025). Mechanization prototype development: Multi-crop millet planter. Technical report, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru 502 324, Telangana, India. 05 pp.

Acknowledgement

This report was developed under the CGIAR Sustainable Farming Program, and the authors gratefully acknowledge the support of CGIAR funders for their financial and strategic guidance. We sincerely thank Mrs. Bhavani K for designing and formatting the report in accordance with the ICRISAT reporting framework. We also acknowledge the contributions of colleagues and partners across CGIAR and collaborating institutions for their technical inputs and feedback. The information, literature, and official statistics referenced in this report are duly acknowledged. Finally, we appreciate the support of field teams and stakeholders whose insights informed this work.

We would like to thank all funders who supported this research through their contributions to the CGIAR Trust Fund: https://www.cgiar.org/funders/

Mechanization Prototype Development: Multi-Crop Millet Planter

Developed by ICRISAT, the Multi-Crop Millet Planter is a field-validated mechanization prototype designed to address the diverse sowing requirements of small and medium holders across dryland systems. The implement enables precise, efficient, and residue-friendly planting across a wide range of crops under both conventional and conservation agriculture.

Crop Compatibility

- **Millets:** Pearl millet, Finger millet, Barnyard millet, Proso millet, Kodo millet, Foxtail millet, Little millet
- **Oilseeds:** Rapeseed–Mustard, Sesame, Linseed
- **Pulses:** Chickpea, Lentil, Greengram, Faba bean
- **Cereals:** Wheat, Maize

Key Advantages

- **Seed efficiency**: Achieves 30–40% seed saving compared with conventional seed drills through precision metering.
- **Crop-specific seed plates**: Interchangeable, customized plates ensure accurate singulation across seed sizes.
- **Precision line sowing**: Smart metering delivers uniform spacing and optimum plant population per hill.
- **Adjustable sowing depth**: Crop- and soil-specific depth control for improved emergence.
- **Simultaneous fertilizer application**: Integrated delivery enhances nutrient use efficiency.
- **Intercropping capability**: Enables simultaneous sowing of multiple crops in defined row configurations.
- **Seed rate flexibility**: Chain-based mechanism allows quick and precise seed-rate adjustment.

Bed-Making and Field Performance

- **Integrated bed maker**: Configurable for narrow and broad bed–furrow systems, supporting moisture conservation and drainage management.
- **Disc attachment with dedicated seed & fertilizer pipes**: Engineered to maintain uninterrupted seed flow.
- **Robust in heavy clay soils**: During extensive testing in sticky, high water-retention soils, a customized disc and delivery system prevented blockage and ensured continuous, one-by-one seed drop.
- **Versatile deployment**: Performs reliably in conventional tilled fields as well as zero-till, stubble-mulched conditions.

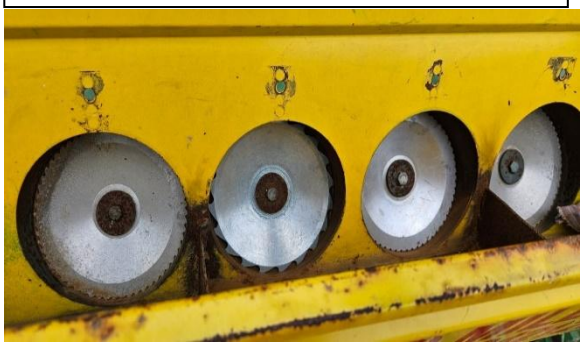
Outcome: The prototype demonstrably improves planting precision, reduces input costs, and expands mechanized options for millet-based and diversified cropping systems—strengthening productivity and resilience in dryland agriculture.

Millet Planter Machine

Bed making segment in machine

Germination in sowing Field

Smart Disc Attachment in MMC Planter



Seed Plate

Different Seed Sowing in field

Field Demonstration and Stakeholder presentation