

RCEF Mechanization Program

TECHNOLOGY CATALOGUE





Department of Agriculture

Philippine Center for Postharvest

Development and Mechanization (PHilMech)

CLSU Compound, Science City of Muñoz, Nueva Ecija

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Land preparation

TECHNOLOGIES

Hand tractor

The hand tractor is a self-propelled machine used for plowing, harrowing, and leveling of field. It is designed to pull and propel trailed or mounted agricultural machinery and implements.



Specifications:

Engine	7-10 hp diesel, water cooled
Field capacity	Minimum of 0.125 ha/h
Implements	Disk plow, comb harrow, leveler, cage wheel, trailer, ride-on attachment
Labor requirement	1 person

- $\boldsymbol{\cdot}$ Operates in harder condition than animal or human
- · Suitable in both wet and dry soil condition
- · Fairly simple mechanical design
- Multi-purpose vehicle especially for transport and hauling of farm inputs

Four-wheel drive tractor

The four-wheel drive tractor (4WDT) is a self-propelled vehicle designed to carry, pull or propel agricultural machines and implements.



Specifications:

Engine	50-55 hp (Tier II)	54-58hp (Tier III)
Steering system	Power steering	Power steering
Implements	Rotary tiller	Rotary tiller, PTO-driven disc plow, front loader, levee maker/ridge moulder
Other attachments	Rollover protective structures (ROPs), canopy, seat belt, GPS, ballast	Rollover protective structures (ROPs), canopy, seat belt, GPS, ballast
Field capacity	2-3 ha/day (@ 1 passing; rotavator)	2-3 ha/day (@ 1 passing; rotavator)
Labor requirement	1 person	1 person

- · Makes field operations faster and easier
- $\boldsymbol{\cdot}$ Can work in dry and wet soil condition
- · Has better traction
- Multi-purpose vehicle especially for transport and hauling of farm inputs
- · Recommended for large-scale farm operations

Rotavator/rotary tiller

A rotavator, also known as a rotary tiller, is tractor-driven rotary tillage equipment that uses a series of blades to plow the land by cutting, pulverizing, mixing, and levelling the soil.



Specifications:

Cutting width: 1,600 mm

Main gearbox: Hypoid gear

Maximum wet weight capacity: 500 kg

Side gear type

- · Suitable in both wet and dry land preparation
- · Features powerful and durable super gears
- · Operates vibration-free, with regularly spaced flanges
- · Prevents soil and straw from locking
- · Ensures optimal durability with an automatic rolling rear cover
- · Increases work speed, thereby reducing fuel costs

PTO-driven rotating disc plow

The PTO-driven disc plow ensures that the tractor does not overload during operation. It can be used in both wet and dry fields, cutting bushes, weeds, small trees, and roots, leaving the ground ready for cultivating and planting.



Specifications:

PTO-driven and 3-point hitch-mounted

Spool type

Cutting width: 1,500-1,600 mm

Maximum wet weight capacity: 550 kg

With safety power shaft cover

Frame can be manually folded

- Includes a full-body casting mold gearbox and a powerful side gear system
- · Equipped with hydraulic cylinders featuring automatic valves
- Utilizes center and side-driven gearboxes for excellent deep plowing and perfect turnover of rice straw and soil
- · Capable of effectively pulverizing the soil

Front loader

The front loader facilitates easy loading operations without spilling crops from the bucket. It is a reliable labor-saving solution for transportation and loading tasks.



Specifications:

Bucket capacity: Minimum of 0.32 cu.m

Lift height to pivot pin: Minimum of 2,500 mm

Multi-gear with manual settings

With one (1) set of hydraulic ports, auxillary hydraulic valve, remote hydraulic ports and control mechanism

- Creates irrigation channels and drainage ditches
- Forms dikes and levels land by consolidating through back tilling and excavation
- · Offers excellent compatibility and powerful durability
- Functions as a multipurpose, multifunction front-end loader

Ridge moulder/levee maker

The ridge moulder or levee maker, powered by a controlled disc, efficiently constructs sturdy embankments with precise banking levees and customizable ridges. This tool ensures structural integrity for effective flood protection.



Specifications:

Hydraulic operated and/or PTO-driven

With safety power shaft cover

Maximum wet-weight capacity: 500 kg

Disc material: Made of stainless steel

- Ridges creates hard and firm ridges through the level differences of the disc
- $\boldsymbol{\cdot}$ Prevents weed growth with strong, well-formed earth ridges
- Side-mounted directional wheels ensure the straightness of formed levees and maintain stability
- · Creates beds to enhance soil aeration and drainage

Floating tiller

The floating tiller is a walking-type agricultural tractor commonly used in the waterlogged fields. It is equipped with front-mounted tilling wheels and a floatation structure.



Specifications:

Engine	Minimum of 7 hp air cooled diesel or gasoline engine
Cutting width	Minimum of 1 m
Speed	2.5-4 km/h
Labor requirement	1 person

- Can be used on deep mudded field or called "laboy"
- Portable and simple design
- Fast and efficient
- · Lightweight and can be easily transported

Crop establishment

TECHNOLOGIES

Precision seeder

The precision seeder is a self-propelled and a ride-on type planting equipment that accurately drops or places desired numbers of seeds at a precise depth and spacing.



Specifications:

Number of rows	10
Row spacing	Maximum of 30 cm
Hill spacing	Adjustable
Seeding rate	Adjustable
Planting efficiency	Minimum of 60%
Components	Furrower, seed presser, low bed trailer
Labor requirement	1 person (2-3 ha/day)

- · Reduces labor cost of sowing
- · Provides uniform seed sowing and improved plant population
- · More efficient in terms of seeding rate

Walk-behind rice transplanter

The walk-behind rice transplanter is designed for transplanting rice seedlings into a puddled and levelled field. It is recommended for small to medium sizes of farms.



Specifications:

Engine	Minimum of 4 hp gasoline
Number of rows	Minimum of 4
Row spacing	30 cm
Hill spacing	12-21 cm
Field efficiency	Minimum of 80%
Percent damaged hills and present missing hills	10% max
Component	Seedling tray (3,000 pcs), low bed trailer, manually operated seed sewing machine
Labor requirement	1 person

- · Requires less time than the manual transplanting
- · Minimizes the drudgery and cost of rice transplanting
- · Ensures higher crop productivity
- Provides optimum plant spacing and number of seedlings per hill

Riding-type rice transplanter

The riding-type rice transplanter is designed for transplanting rice seedlings into a puddled and levelled field. It is recommended for medium to large sizes of farms.



Specifications:

Engine	4 stroke diesel
Number of rows	Minimum of 6
Row spacing	30 cm
Hill spacing	Adjustable
Field efficiency	Minimum of 80%
Percent damaged hills and percent missing hills	10% max
Component	Seedling tray (5,000 pcs), low bed trailer, manually operated seed sowing machine
Labor requirement	1 person

- · Faster and more efficient than the manual transplanting
- $\boldsymbol{\cdot}$ Minimizes the drudgery and cost of rice transplanting
- · Ensures higher crop productivity
- Provides optimum plant spacing and number of seedlings per hill

Harvesting & threshing

TECHNOLOGIES

Reaper

The reaper mechanically cuts and lays crop in a windrow which allows easy pick-up of the harvested crops. It is recommended for small to medium sizes of farms.



Specifications:

Engine	3.5 hp, minimum of 4 stroke gasoline
Cutting height	Adjustable
Cutting width	1.2 m
Field efficiency	Minimum of 65%
total machine loss	1.5%
Components	Cage wheel, pneumatic tires
Labor requirement	1 person

- \cdot Makes harvesting easier and faster than the manual harvesting
- \cdot Less dependent on field size
- · Less shattering loss during harvesting

Thresher

The thresher mechanically removes or separates the rice grains from the panicle or straw. It comes in small capacity and large capacity.



Specifications:

Small capacity/mini rice thresher	
- Engine	7 hp, minimum
- Output	0.8 to 1.2 ton/h, minimum
- Type of cylinder	Open-type cylinder, peg tooth
- Threshing efficiency	Minimum of 99.8%
- Component	Lifting bars, retractable towing bar
- Labor requirement	2-4 persons
- Total machine loss	3%, max
- Purity	97%, min
- Mechanically damaged grain	2%, max
- Net cracked grain	3%, max

- · Higher capacity than manual threshing
- · Custom build for performance efficiency
- · Can be trailer-mounted or towed by a carabao
- · Can be hitched to a power tiller or to a jeep

Combine harvester

The combine harvester is a mobile rice harvesting machine that combines harvesting, threshing, cleaning and bagging in one operation.



Specifications:

Engine	65-85 hp diesel, water cooled
Drive system	Rubber crawler track
Cutting system	
- Height adjustment	Hydraulic
- Width	Minimum of 1,600 mm
Output system options	Sack or bag type
Components	Trailer, GPS, water pump
Labor requirement	3 persons
Field capacity	4-5 ha/day
Field efficiency	75%, min
Total machine loss	3.5% max
Purity	97%, min

- · Climate change resilient
- · Saves on time and labor
- · Suitable for local conditions and for major rice producing areas
- Ensures lower postharvest losses compared to manual harvesting

Drying

TECHNOLOGIES/FACILITIES

Mobile grain dryer

The mobile grain dryer is used to reduce the moisture content (MC) of grain to a safe level or desired MC. It can be towed by a farm tractor making it easy to move to another location.



Specifications:

Holding capacity	6 tons wet @ 24 % MC
Drying efficiency	Minimum of 75 %
Heat source	Biomass fuel
Heating system	Direct-fired
Components	Mounting trailer, generator set

- · Provides better control over the temperature and moisture content
- · Can be used day or night
- · Requires less labor attention
- Dries grains evenly
- · Higher milling yield and head rice recovery
- · Easy to transport

Batch recirculating dryer

The batch recirculating dryer is a stationary type of mechanical dryer equipped with a biomass or gas-fed furnace. It can be used for custom drying or commercial scale level and usually needs a 3-phase electrical connection.



Specifications:

Capacities	- 6 tons/batch - 12 tons/batch
Drying efficiency	75% min
Drying rate	0.8 %/h MC reduction, min
Two heating system	Petroleum based fuel and biomass fuel
Drying efficiency	75%, min
Moisture gradient	2%, max
Cracked grain, % increase	3%, max
Hulled/damage grain, % increase	2% max

- · Provides better control over the temperature and moisture content
- · Can be used day or night that requires less labor attention
- $\boldsymbol{\cdot}$ Provides higher milling yield and head rice recovery
- Includes components such as an in-line monitoring system and precleaner dust collection system
- Comes with accessories like a generator set, transformers, moisture meter, and automatic portable bag/sack closer/sewer

Milling

TECHNOLOGIES/FACILITIES

Single-pass rice mill (mobile)

The mobile rice mill is a portable technology designed to bring custom milling services to remote communities. It is equipped with a waste management control system for efficient operation.



Specifications:

Engine	Minimum of 20 hp diesel, water cooled
Input capacity	Minimum of 0.5 ton/h
Hulling efficiency	Minimum of 75 %
Components	Pre-cleaner, whitener, sifter, de-stoner, trailer
Milling recovery index	0.90, min
Percent head rice index	0.85, min
Accessories	Portable bag, sack closer, tachometer, moisture meter

Single-pass rice mill (stationary)

The stationary rice mill designed for custom servicing. It is user-friendly, requires minimal working space, and includes 30 cubic meter rice hull bin for efficient waste management.



Specifications:

Engine	20 hp diesel, water-cooled, min
Input capacity	Minimum of 0.5 ton/h
Hulling efficiency	75%, min
Milling recovery index	0.90, min
Percent head rice index	0.85, min

Brown rice mill

The brown rice mill is a villagelevel rice mill specifically designed to process brown rice. It requires minimal working space of 16 square meters and is easy to operate. It includes a waste control management system.



Specifications:

Power requirement	5 hp
Input capacity	300-350 kg/h
Output capacity	Minimum of 0.3 ton/h
Hulling capacity	293 kg/h
Hulling recovery	72-74 %

Multi-stage rice mill

The multi-stage rice mill is usually used for commercial purposes. It comes in various capacities: 1.5 tons/h, 2-3 tons/h, and 4-5 tons/h.

Specifications:

Capacity: 1.5 tons/h		
Hulling efficiency	79%, min	
Milling recovery index	0.95, min	
Percent headrice index	0.90, min	



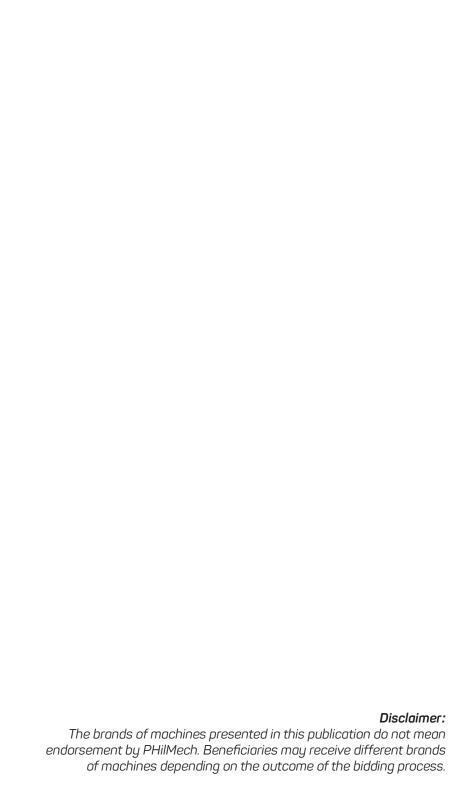
Capacity: 2-3 tons/h		
Hulling efficiency	79%, min	
Milling recovery index	0.95, min	
Percent headrice index	0.90, min	



Capacity: 4-5 tons/h		
Hulling efficiency	79%, min	
Milling recovery index	0.95, min	
Percent headrice index	0.90, min	



- Includes components such as pre-cleaner, de-stoner, husk aspirator, paddy separator, whitener sifter, mist polisher, color sorter, length grader, blending tank, bagging bin, rice hull bin, and dust collection system
- Comes with accessories like transformers, moisture meter, control room, dust room, bran room









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