

# POWER SOURCES FOR RICE PRODUCTION

## Introduction

All farm operations require a specific amount of energy. The time taken will vary according to the size and type of power source used. Power can be supplied by human, animal and machine.

### 1. Human Labor

In some instances manual labor is more cost efficient than a machine.

- One person can shift 2-3  $m_3$ /day or cultivate 60  $m_2$ /day
- One person will take approximately 160 days to cultivate 1 hectare.
- One person will hand weed 1 hectare of rice in 30-35 days.
- One person can transplant 1 hectare in 30-60 days



### 2. Animals

Animals are still widely used in many countries. A pair of animals will take 8-10 days to plough 1 hectare.

#### Advantages:

- Cheap to maintain
- Multi-purpose
- Self replacement

#### Disadvantages

- Limited daily working hours
- Slow
- High person/power ratio



### 2. Two Wheel Tractor

Two wheel tractors are normally powered by 6-12 kw gasoline or diesel engines and are fitted with either rubber tires or steel cage wheels. A two wheel tractor can plough 1 ha/day.

#### Advantages:

- Multi-purpose vehicle (can be used for transport)
- Operate in harder conditions than animals or humans
- Operate in both wet and dry conditions
- Fairly simple mechanical design



#### Disadvantages

- Cost of owning and operating
- Operator fatigue, although ride-on versions are now available

### 4. Four Wheel Tractor

Four wheel tractors can be divided into 2 categories: 2-wheel drive, and 4-wheel drive tractors. One 45 kw tractor will plough 1 ha/1 hr.

#### (a) 2 Wheel Drive

##### Advantages

- Smaller turning circle
- Simplicity of design
- Fewer mechanical parts
- Lower purchase price



##### Disadvantages

- Inability to work in wet and muddy conditions

#### (b) 4-Wheel Drive

##### Advantages

- Ability to work in wet condition
- More efficient

##### Disadvantages

- Higher purchase cost

### 5. Track Layer

Used mainly for civil work but can be used for tillage.

#### Advantages

- Good traction
- High power availability at draw bar
- Lower operating cost

#### Disadvantages

- Poor maneuverability
- High purchase cost



For more information:

Joseph F. Rickman  
Agricultural Engineering Unit,  
IRRI, DAPO Box 7777, Metro Manila, Philippines.  
Tel.: (63-2) 580-5600 loc. 2447  
Fax: (63-2) 580-5699  
Email: J.Rickman@cgiar.org

**IRRI** INTERNATIONAL RICE RESEARCH INSTITUTE

