Reference: - eagri.org

COST OF OPERATION OF FARM MACHINERY

Fixed cost

This cost relates to machine ownership.

Variable cost or operating cost

Those costs which are directly related to the amount of use are called variable costs.

Calculation of fixed cost

a. **Depreciation**: It is the reduction in value of the machine with the passage of time

b. **Obsolescence**: It **is the** state of being which occurs when a person, object, or service is no longer wanted even though it may still be in good working order). Salvage value is the estimated value of an asset at the end of its useful life.

ESTIMATING POWER REQUIREMENTS

Estimating Draft Requirements

Implement	Draft per Unit Width (kN/m)
Chisel plough	4.5-5.5
Blade plough	4.0-4.5
Disc plough	5.0-6.0
Scarifier	4.0-4.5
Cultivator	3.0-3.5
Planter	2.5-3.5

- If a scarifier was used to replace the chisel plough, the draft per unit width would decrease to 4.5 kN/m and the resultant total draft would be 35 kN (3500 kgf)
- Speed has been determined by the initial assumption when working out therequired implement width.

Note: Kilowatts (kW) x 1.34 = Horsepower (hp)
Horsepower (hp) x 0.746 = Kilowatts (kW)

Default Values for Speed, Field Efficiency, and Draft Requirements.

Equipment Name	Speed (mph)	Draft (lb. per unit of width)	Average Range
Tillage			
Moldboard plow (16 in. bottom, 7 in. deep) Light soil Medium soil Heavy soil Clay soil	 5.0 4.5 4.5 4.0	 320 500 800 1200	 220 - 430 per foot t350 - 650 per foot 580 - 1,140 per foot 1,000 - 1,400 per foot
Chisel-plow (7-9 in. deep)	5.0	500	200 - 800 per shank
Disk Single gang Tandem Heavy or offset	 5.5 5.5 5.0	 75 200 325	 50 - 100 per foot 100 - 300 per foot 250 - 400 per foot
Field cultivator	5.0	300	200 - 400 per foot
Spring-tooth harrow	5.0	200	70 - 300 per foot
Spike-tooth harrow	6.0	50	20 - 60 per foot
Roller or packer	5.0	100	20 - 150 per foot
Cultivator Field (3-5 in. deep) Row crop	 5.0 4.5	 250 80	 60 - 300 per foot 40 - 120 per foot
Rotary hoe	7.5	84	30 - 100 per foot
Subsoiler (16 in. deep) Light soil Medium soil Heavy soil	 4.5 4.5 4.5	 1500 2000 2600	 1,100 - 1,800 per 1,600 - 2,600 per 2,000 - 3,000 per

Planting Planter only Planter with attachments Grain drill No-till drill	 5.0 5.0 5.0 5.0	 150 350 5.0 200	 100 - 180 per row 250 - 400 per row 30 - 100 per foot 160 - 240 per foot
Applying Chemicals Anhydrous ammonia applic.	4.5	425	375 - 450 per shank

FARM POWER IN INDIA - HUMAN, ANIMAL, MECHANICAL

- An average man can develop maximum power of about 0.1 hp for doing farm work.
- Power developed by an average pair of bullocks about 1 hp for usual farm work.
- The thermal efficiency of diesel engine varies from 32 to 38 per centwhereas that of petrol engine varies from 25 to 32 per cent.

Seed bed preparation

- Seed bed preparation takes about 10 -25 % of energy used in field operation.
- Selected **Equipment** for Seedbed Preparations

S. No.	Name of the Implement (tractor operated)	Size (mm)	Work Capacity	
			ha/h	h/ha
1.	M.B. plough	2 * 350 3 * 350	0.20-.025 0.30-0.35	4-5 3-4
2.	Disc plough	2 * 350 3 * 350	0.20-.025 0.30-0.35	4-5 3-4
3.	Disc Harrow (16 disc)	2000	0.40 – 0.50	2 – 2.5
4.	Cultivator (9-11)	2500	0.40 – 0.50	2 – 2.5
5.	Rotavator	1500	0.2	5
6.	Sweep cultivator	5 * 500	0.35	3 – 3.5

S. No.	Name of the Implement (animal operated)	Size (mm)	Work Capacity	
			ha/h	h/ha
1.	M. B. plough	150	0.024	40-42
2.	Disc harrow (4-8 disc)	600 – 1200	0.18 – 0.22	5-6
3.	Cultivator (3 tynes)	300-400	0.08	12 - 14
4.	Bhakhar	500	0.06	16-18
5.	Helical Puddler	500	0.06	16-18
6.	Harrow patela	1500 - 1200	0.2-0.25	4-5
7.	Rotavator	500 – 600	0.07 - 0.09	11 - 13

Selected Equipment for Sowing and Planting

Seed drill or seed cum fertilizers drills facilitate line sowing. And 10- 15 % inputs saving and about 30 % loss of fertilizers in the field estimated if not properly applied.

- Dufan (two row), Tifan (three row), Enatigoru and FESPO plough all are animal drawn local sowing devices.
- Tractor drawn seed – cum fertlizers drill equipped with inverted 'T' type furrow openers used **directly** after paddy harvest under zero tillage.

Power tiller operated Equipment for sowing and planting

S.No	Name of the Equipment (power tiller operated)	Size (mm)	Work Capacity	
			ha/h	h/ha
1	Seed – Cum – Fertilizers drill	5 * 225	0.10	10-12
		5 * 300	0.21	5-5.5

Tractor operated Equipment for sowing and planting

S. No.	Name of the Equipment (tractor operated)	Size (mm)	Work Capacity	
			ha/h	h/ha
1.	Seed Cum – fertilizer drill	11 * 225	0.75	1.25 - 1.5
2.	No- till - Drill	11 * 225	0.75	1.25 - 1.5
3.	Strip-till- Drill	1500	0.25	4-5
4.	Sugarcane cutter planter	2 * 900	0.25	4
5.	Potato planter	2 * 900	0.25	4

Manually operated Equipment for sowing and planting

S. No.	Name of the Equipment (Manually operated)	Size (mm)	Work Capacity	
			ha/h	h/ha
1.	Mustard seed drill	1 * 600	0.10	10-12

Animal operated Equipment for sowing and planting

S. No.	Animal Operated	Size, Mm	Work Capacity	
			ha/h	h/ha
1.	CIAE 2-3 row seed cum-fertilizer drill	3 * 225	0.10	10-12
		3 * 300	0.125	8-8.5
		3 * 450	0.155	6-7
2.	CRIDA drill plough	1* 225	0.04	20-25
3.	CIAE mustard drill	2 * 450	.125	8-8.5
4.	CIAE 2-3 row planter	3 * 450	0-.155	6-7
5.	IISR Sugarcane planter	1 * 900	0-125	8
6.	Potato Planter	2 * 450	0-125	8