

Step	Area	Range	2 wheel	4 wheel	Small	Medium		Small	Medium
	<b>Matching Farm Equipment to Farm Size</b>								
			<b>Tractors</b>	<b>Tractor</b>	<b>Combines</b>			<b>Rice Mill</b>	
1	Critical Operation (plow,plant,harvest)		Plow					Milling	
2	Area covered (ha)		20.00	40.00	50.00	200.00	tons/year	500.00	1000.00
3	Number days to do job		5.00	5.00	5.00	10.00	days	200.00	200.00
4	Number working hours per day		8.00	8.00	10.00	10.00	hr	6.00	6.00
5	Area require to covered (m2)/hr	Area/days/hrs/dayx 1000	5000.00	10000.00	10000.00	20000.00	kg/hr	416.67	833.33
	<b>Equipment size</b>								
6	Speed operation (km/hr)	2-8km/hr	3.00	8.00	3.00	3.00			
7	Width equipment (m)	Area (hr)/ operating speed/3600	0.46	0.35	0.93	1.85			
8	Field efficinecy (%)	40-70%	50.00	60.00	60.00	70.00			
9	Actual width required (m)	Width/ 100/Fe	0.93	0.58	1.54	2.65			
10	Check sizes commercially available	(metre)	0.50	1.00	1.80	3.00	kg/hr	500.00	1000.00
	<b>Power requirement</b>								
11	Equipment Width (m)	0.5m	0.50	1.00	1.80	3.00			
12	Draft (kN/m)	Disc 5-8, Moldbord 6-8, Tine 5-6	7.00	7.00	4.00	4.00			
13	Speed (kM/hr)	km/hr	3.00	8.00	3.00	3.00			
14	Drawbar power(kW)	Width x Draft x Speed/3.6	2.92	15.56	6.00	10.00			
15	Mechanical efficiency (%)	dry 40%, wet 30%	30.00	40.00	30.00	30.00			
16	Engine power (kW)	Drawbar power/ME	9.72	38.89	20.00	33.33			
17	Commercially available (kW)		10.00	40.00	20.00	40.00		12.50	25.00
18	Purchase price	(\$)	3500.00	20000.00	20000.00	60000.00		5500.00	12000.00
19	Usage (hrs/year)	hrs	100.00	200.00	100.00	150.00		1200	1200
20	PlowPurchase price	(\$)	150.00	2500.00					
	<b>Costing of Mechanisation</b>								
	<b>Operating Cost</b>								
21	<b>Cost/hr</b>								
22	Engine power	kW	10.00	40.00	20.00	40.00		12.50	25.00
23	<b>Fuel cost</b>	\$/l	1.20	1.20	1.20	1.20		1.20	1.20
24	Fuel use (l)	Engine kW x0.25l	2.50	10.00	5.00	10.00		3.13	6.25
25	<b>Fuel cost/hr</b>	\$/hr	3.00	12.00	6.00	12.00		3.75	7.50
26	Repair and maintenance	10% Initial cost /hrs per year	3.50	10.00	20.00	40.00		0.46	1.00
27	Labor	\$1/hr	1.00	1.00	1.00	1.00		1.00	1.00
28	<b>Total Operating cost</b>	<b>\$/hr</b>	<b>7.50</b>	<b>23.00</b>	<b>27.00</b>	<b>53.00</b>		<b>5.21</b>	<b>9.50</b>
	<b>Fixed cost</b>								
29	Tractor Depreciation (\$/hr)	Initial cost/10 years/hrs per year	3.50	10.00	20.00	40.00		0.46	1.00
30	Plow Depreciation (\$/hr)	Initial cost/10 years/hrs per year	0.15	1.25	0.00	0.00		0.00	0.00
31	Investment cost (%)	Actual borrowing or opportunity cost(%)	15.00	15.00	15.00	15.00		15.00	15.00
32	Investment cost (\$/hr)		2.33	13.33	13.33	40.00		3.67	8.00
31	<b>Total Fixed cost</b>		<b>5.98</b>	<b>24.58</b>	<b>33.33</b>	<b>80.00</b>		<b>4.13</b>	<b>9.00</b>
32	<b>Total Cost/hr</b>		<b>11.15</b>	<b>47.58</b>	<b>60.33</b>	<b>133.00</b>		<b>9.33</b>	<b>18.50</b>
33	<b>Cost/ha</b>		<b>22.30</b>	<b>47.58</b>	<b>60.33</b>	<b>66.50</b>	(\$/t)	<b>22.40</b>	<b>22.20</b>
34	<b>Contract Pricing</b>	Return to Management 20-30%	10.00	10.00	30.00	30.00		30.00	30.00
	<b>Contract Rate(\$/ha)</b>	<b>Cost/ha*Management</b>	<b>24.53</b>	<b>52.34</b>	<b>78.43</b>	<b>86.45</b>	(\$/t)	<b>29.12</b>	<b>28.86</b>

**OTHER FACTORS**

Step 8

Field Efficiency	Wet	Dry
2wheel tractor	30-40%	40-50%
4 wheel tractor	40-50%	50-60%
Combine harvester	30-40%	50-60%

**Draft requirements for soil types and plows (kN/M) at 75mm depth**

Primary tillage	Sandy	Sandy loam	Loam	Loam-clay	Clay
Disc plow	3	4	5	6	7
Mouldboard	4	5	6	7	8
Offset or Roan plow	4	5	6	7	8
Rotovator	5	6	7	8	9
Tine Plow	3	3.5	4	4.5	5
Second tillage					
Tine cultivator	2	2.5	3	3.5	4
Disc cultivator	2	2.5	3	3.5	4
Rotovator	3	4	5	6	7
Puddling	4	4.5	5	5.5	6

Step 12

Combine Harvester	Wet	Dry
Draft/Rolling Resistan	5-6 kN/m	3-4kN/m

Step 12

Step 17

Widths of equipment suitable for tractors							
Tillage	Primary				Second		
	Mouldboa	Disc	Offset	Rotovat	Tine	Disc cult	Rotovater
2-wheel tractor (10-15)	0.25-0.40	0.40-0.50			1.5m		0.50-0.75
4 wheel tractor (40kw)	1.0-2.0	1.5-2.5	1.5-2.5	1.5-2.0	2.0-5.0	2.0-3.0	1.5-2.5

Variables that should be changed to suit locality [redacted]