

Matching Farm Equipment to Farm Size								
Step	Area	Range	Tractors		Combines		Rice Mill	
			2 wheel	4 wheel	Small	Medium	Milling	Small
1	Critical Operation (plow,plant,harvest)		Plow					Milling
2	Area covered (ha)		10.00	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	2500.00	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	0.23	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	0.46	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	(\$)	150.00	2500.00				
<b>Costing of Mechanisation</b>								
<b>Operating Cost</b>								
21	Cost/hr							
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	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>	\$/hr	7.50	23.00	27.00	53.00		5.21	9.50
	<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	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>		5.98	24.58	33.33	80.00		4.13	9.00
32	<b>Total Cost/hr</b>		11.15	47.58	60.33	133.00		9.33	18.50
33	<b>Cost/ha</b>		44.60	47.58	60.33	66.50 (\$/t)		22.40	22.20
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>	Cost/ha*Management	49.06	52.34	78.43	86.45 (\$/t)		29.12	28.86

Variables that should be changed to suit locality



### OTHER FACTORS

8	<b>Field Efficiency</b>	<b>Wet</b>	<b>Dry</b>
	2wheel tractor	30–40%	40–50%
	4 wheel tractor	40–50%	50–60%
	Combine harvester	30–40%	50–60%

	<b>Draft requirements for soil types and plows (kN/M) at 75mm depth</b>					
12	<b>Primary tillage</b>	<b>Sandy</b>	<b>Sandy loam</b>	<b>Loam</b>	<b>Loam-clay</b>	<b>Clay</b>
	Disc plow	3	4	5	6	7

Mouldboard	4	5	6	7	8
Offset or Roan	4	5	6	7	8
Rotovator	5	6	7	8	9
Tine Plow	3	3.5	4	4.5	5
<b>Second tillage</b>					
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

<b>12</b>	<b>Combine Harvester</b>	Wet	Dry
	<b>Draft/Rolling Resistance</b>	5-6 kN/m	3-4kN/m

<b>17</b>	<b>Widths of equipment suitable for tractors</b>							
	<b>Tillage</b>	<b>Primary</b>			<b>Second</b>			
		Mouldboard	Disc	Offset disc	Rotovator	Tine	Disc cultivator	Rotovator
	2-wheel tractor (10-15kw)	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