Options for machinery and labour

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By A. Herbert*

The publicity pamphlet for this seminar began with "machinery is one of the highest costs in farming today". I could not agree more. It is not unusual for capital investment in machinery to be 20 to 30 per cent of the total investment in the farm. On an annual basis, expenditure directly attributable to machinery can be 40 per cent more. Yet in comparison, great effort is made to reduce overall costs in other ways, for example by reducing fertiliser rates, under-insuring the crop, not spraying weeds, or not pickling the seed.

This article cannot be a panacea for everyone to reduce machinery costs — each farm is different. But some of the issues might be of help.

Need for machinery

Development of machinery and technological improvements has allowed increased crop areas to be planted, greater timeliness of operations, and increased productivity per labour unit. This does not necessarily mean that crops can be grown more cheaply.

Everyone needs machinery to grow crops — it is the scale of the plant and the level of investment in it that is of prime concern.

A separate consideration is whether the machinery is wanted, as opposed to needed. I am very mindful of individual's objectives and preferences, and purely economic analyses fail to take account of these. Decisions may be completely irrational on economic grounds (not only in machinery acquisition). And why not?

Case study

The following case study is presented to consider the topic — "options". It discusses a particular farmer and the options available to him. Most importantly, it analyses the advantages and disadvantages of the range of options — and the cost.

The farm is 4,000 ha of which a third is cropped each year. It consists mainly of heavy soil types. Fallowing is done July/October, and cropping land is cultivated with summer or autumn rain, ploughed with the opening rain and seeded immediately.

Plant consists of three tractors (110kW, 75kW and 45kW), but only the 110kW is used for cropping operations. Others are used for raking, with the front-end loader, and as back-up units. The 110kW tractor is two years old with 1,400 hours on the clock. It has dual rear wheels and is valued at $24,000.

Two ploughs are pulled in tandem, covering 6 ha an hour. Fuel usage is 27 litres of diesel an hour. The ploughs are a 22 disc — 11 years old and valued at $3,000, and an 18 disc — bought secondhand five years ago and valued at $2,400.

Two combine harvesters are used for harvesting. One is a 40 run combine three years old and valued at $10,000 and the other is a 24 run, nine years old and valued at $1,800.

From these figures, costs can be calculated. The tractor will do about 700 hours a year, at $15 an hour. The cost of ploughing is $3.75/ha (for each ploughing), cultivating $2.50/ha, and seeding $4.50/ha.

The total cultivation and seeding machinery costs are therefore $14.50/ha.

Advantages of this situation are:

- Costs are very low because of the large area of crop relative to scale of machinery; the overhead costs (depreciation, interest on capital) are not large; and labour is not costed as all operations are done by the farmer.
- Back-up tractors can substitute in the event of breakdown.
- Investment in plant for ploughing is essential on heavy land anyway — to allow later combine penetration.
- The falling operation is not as time-dependent as autumn workings.
- Good ground coverage is achieved with all operations i.e. ploughing — 6 ha an hour, cultivating 9 ha an hour, and seeding 12 ha an hour.

Options for case study

The case study farmer does all operations himself although in most years, two sons assist during the May school holidays. The farmer is also a skilled mechanic. He enjoys the work and the control he maintains over his programme. However, if he wanted to take things a little easier he could employ share-farmer, use a contractor or employ labour.

The only advantage of employing a sharefarmer is to eliminate machinery costs (which are low anyway) and allow more leisure time. However the marginal nature of the district means sharefarmers are difficult to find, and profits are not large. A once-only cash injection could be obtained by sale of his machinery.

Employing a contractor is one way of using specialised equipment that could not be afforded normally. Also (theoretically) it would provide a skilled driver to operate it. There is no worry about expensive breakdowns.

Competition amongst contractors could keep the price down, but the cost is high relative to present operating costs. Contractors would generally be neighbouring farmers who will want their own crop sown first, and timeliness may be critical. A contractor is a direct cash cost at a time of year which will increase peak debt. The most serious problem is that long term crop yield is insufficient to cover contractor's charges.

Employing labour is also a direct cash cost that was not present before, and reliability of labour needs to be considered. It would also mean lack of control of the whole programme. A worker might allow the farmer to become the mechanic and the odd-job man (keeping up supplies) — it might also allow more thinking time.
The decision to employ labour really depends on whether the farmer wants to take it easier; if he does, there is a direct cash cost but it is affordable.

Machinery options
The case study farmer is doing well with present machinery. But when change-over is necessary, should he stay with similar sized plant?
A new 110 kW tractor will cost around $50 000 to $50 000. For another $20 000, increased power could be obtained (150 kW +). This is likely to give improved operator comfort (and status!) and ease of working.
However the new power unit will probably be inefficient with existing cultivation and seeding equipment. The whole plant would need to be upgraded at massive cost if all plant is changed at the same time.
Inefficient working of the tractor, with existing implements will reduce the potential fuel and repair savings and not increase the work rate anyway. With the higher costs of ownership, the new tractor would cause reductions in cropping margin.
If increasing capacity means no more cropping, the only advantage is in timeliness of operations — assuming faster ground coverage is possible. Timeliness can be extremely important and help crop yields markedly, but a suggested 5 per cent increase in yield for every week of earlier seeding before mid-June will probably not pay for the increased investment. In fact, the most likely maximum yield increase is 10 per cent on a low yielding crop of 1t/ha.
To be worth considering, the increased capacity, must mean more crop in the ground. The case study farmer could then plant, for example, half of his farm each year. With the following policy this would leave no room for sheep and their sale could be balanced against the new machinery purchase. However, it then means that all income potential is with the crop — poor seasons or markets could prove difficult.
For the newer farmer, a crop/fallow system may be best; it will not require capital expenditure on yards, shearing sheds, watering points. Numbers of sheep carried in such a marginal area is low anyway, and the crop/fallow system will probably allow some off-farm work to be done.
Long term effects of a crop/fallow system may be detrimental, resulting in reduced crop yield caused by weed infestations, reductions in nitrogen status, possible salt accumulation and decline of soil structure. However if a sheep enterprise is retained, the case study farmer would need to find extra cropping land elsewhere.
There may be real advantages in reducing the scale of plant — even if it means reducing the area cropped. Reducing crop area is generally not seen as progressive yet it could be best.
It may give more leisure time or time for other income-earning activities. Alternatively it may allow some farmers to prune or eliminate the labour cost; it may only eliminate overtime and weekend work for employees.
Reduced area with the same plant means that more of the crop will be planted near the optimum time giving better yields. It may also reduce taxation.
Depending on the financial position, it may not be prudent to place a large amount of working capital at risk in a large crop for the duration of the growing season.
Of course there are limits to how far crop area can be reduced and still maintain sufficient income. The income required will vary with costs, loan repayment programme, development plans, and living standard.
A few other alternatives are possible. An alternative system such as replacing one cultivation with chemical weed control may be an improvement.
It may be possible to rearrange investment in plant. For example, south coast farmers should be critical in selection of harvesting machinery because of poor harvesting weather. Investment in cultivation and seeding plant is not so critical because of the extended seeding period. In contrast, wheatbelt areas have a great urgency to plant crop and seeding equipment deserves more emphasis.
Plant may be suitable for buying on a shared basis. Even a whole farm syndicate may be worth considering. Any bottlenecks should receive particular attention. An extra seeding unit (tractor, combine and casual labour) could overcome delays in planting. Changing to bulk handling equipment, or increasing pump capacities may require investment but could improve timeliness.

Conclusion
A range of options for machinery and labour are available and the choice largely depends on ability to afford machinery, physical capacities, and personal motivation. Many farmers are chasing larger areas of crop with the thought that bigger is best, and once this spiral has started, it is very difficult to stop. They may be justifying machinery purchase on the basis of matching earlier purchases.
For farmers in this situation, a reappraisal is necessary. Whilst profits are easily measured and for many people, profits are all that matter, most farmers would benefit from a critical reassessment. The net margin should have greatest emphasis — not the gross income.
The option finally chosen will be as much a reflection of personal motivation as pure economics.