

Getting started in Arable Agriculture

Machinery Appraisal



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Machinery cost on farms can be a major contributor to high levels of fixed costs.

In 2020, it was estimated that £1.8-1.9 billion was spent on new farm machinery in the UK. This factsheet will compare the costs of doing the job in-house against paying a contractor.

Tractors play a crucial role in day-to-day working on the farm, the size of machinery needed on a farm depends on the size and type of farm. The size, functionality and prices of tractors can vary depending on what you need them to do. Tractor sales make up nearly half of the total amount spent on equipment each year.



Most farmers will run their own fleet of necessary machinery (tractors and telehandlers), with lesser-used equipment more likely to be hired or contracted in. To be able to compare buying equipment, hiring or bringing in a contractor, a full budget should be calculated up to ensure like with like is compared, machinery replacement should be planned over a 5-year cycle for tractors. Ploughs might be kept for up to 15 years depending on how much it is used. AHDB use an average of 10 years when planning machinery replacements.

Buying

Before any equipment is bought two questions must be answered:

- 1. Is the piece of equipment vital to the farming enterprise?**
- 2. Can it pay for itself in five years?**

When it comes to replacing old machinery, if depreciation and maintenance costs are higher than a replacement or contractor then you should think about replacing the machine.

On top of the purchase price, interest or finance payments, fuel, repairs and labour should all be included in a budget at realistic rates.

Buying machinery outright can be means having all the money in the bank. It is unusual to be able to pay for larger machinery outright. An average sized tractor for an arable farm is 170HP, which would cost £112,000 to £154,000 depending on the make and model chosen. So other options for purchasing machinery should be looked in to.

Hire Purchase

A common choice for buying machinery currently is hire purchase. Hire purchase allows the farmer to spread the cost of the machinery whilst still owning the machinery. Instead of having to pay all the money upfront, a deposit will be paid then a fixed schedule of payments will be drawn up over and agreed amount of time. More information on purchasing options for machinery can be found at (https://www.fas.scot/publication/funding-your-dream-fact-sheet/?fbclid=IwAR2juEbTIXNkZ5MDUUGH7IgdT6Xr1d8UMn-Z_T45DHy_EUNmUVQZq86tdgk)

Hiring

An alternative to buying machinery, is to hire it. Hiring is a useful option for a farm where there is sufficient labour available within the work force, but the machinery is only required for a short period of time so costs don't justify owning that item.

Hiring equipment can also be a good opportunity to compare different makes and specifications of equipment prior to purchase when demonstrator models are not available.

Hiring a tractor can cost approximately £500/week, prices can depend on the size and specification of the tractor, ranging from £250/week to £1700/week.

Contactors

The most common alternative to buying new machinery is to hire a contractor to do the job. One advantage of using a contractor is that they often have specialised machinery, such as a forage harvester or drill. Other benefits include a reduced workload and the minimised up-front capital required to purchase machinery. It is crucial to work out if it is cheaper to use a contractor, to do this work out the financial costs as well as the time saved.

When considering price other factors should be considered, such as timeliness and reliability. These can have further effects on grain quality if crops are left too long. Labour requirements should also be considered as you will have to hire in labour to operate equipment if you don't have enough labour on farm.

	Hire Purchase	Purchase out right	Contractor
Depreciation	No	Yes	No
Repair costs	Not usually but may depend on who's at fault. Tractor hours may be limited	Yes	No
Insurance	Depends on agreement	Yes	No
Labour & Expertise	Yes	Yes	No
Summary	Need for skills and labour to operate machinery but good if you only need it for a short time. Enables you to try out new kit.	Vital kit that is used daily.	A contractor will generally save you time and can provide specialist expertise and, which can make the job more efficient.
Examples of machinery	Topper, sprayer, slurry tank with dribble bar, baler, muck spreader	Main tractor, bale trailer, plough, fertiliser spreader	Combine, grain trailer, hedge trimmer

Costing out your owning machinery compared to having a contractor do the work is the best way to decide which is the best for your own farm. Below is an example calculation of purchasing a second hand combine versus using a contractor:

Cost element	Value	Ref	Factor	Calculation
Area Harvested (Ha)	200	A	-	-
Work rate (ha/hr)	2.75	B	-	-
Annual Hours covered (hr)	72	C		A/B
Machine life (years)	6	D	-	-
Purchase price (£)	65,000	E	-	-
Forecast 5year selling price (£)	7,800	F	12%	E*depreciation%
Average value (£)	36,400	G		(E+F)/2
Depreciation (£)	9,533	H		(E-F)/D
Interest (£)	1820	I	5%	G*interest rate (%)
Insurance (£)	546	J	£15	G*£ per £1K
Annual fixed costs (£)	11,893	K	-	H+I+J
Fuel use (L/ha)	12	L	-	-
Fuel costs (£)	1,032	M	£0.43	A*L*fuel price (£/L)
Spares and repairs (£)	1,625	N	2.5%	E*%
Labour (£)	900	O	£12.50	Labour(£/hr) *C
Annual operation costs (£)	3,557	P		M+N+O
Annual cost (£)	15,450			K+P
Annual cost (£/ha)	77.25			Q/A
Contractors Charge (£/ha)	96			(incl. Fuel)

Ref	Description
A	The number of hectares that the equipment would be used on.
B	Work rates for different equipment can be found in the Farm Management Handbook (https://www.fas.scot/publication/fmh2021/)
C	The annual hours covered is worked out by dividing the area harvested by the work rate. This gives the number of hours the equipment is used each year.
D	Machine life is the number of years that the machine is to be use for. In the example above the combine is being kept for 6 years.
E	Purchase price is the price paid for the equipment
F	The forecasted 5 year selling price, is the price that should be received in 5 years for the machine. Depreciation rates differ depending on the machine and its use. Depreciation rates can be found in the Farm Management Handbook (https://www.fas.scot/publication/fmh2021/)
G	The average value is worked out by adding the purchase price and the forecasted selling price together then dividing by 2.
H	Annual deprecation is worked out by taking the purchase price and subtracting the forecasted selling price then dividing it by the machine life.
I	Interest is calculated by taking the average value of the equipment and multiplying it by the interest rate (which in the example was 5%). Interest rates will depend on the agreement when the machinery is bought. Interest is only applied when the money is borrowed.
J	Insurance is calculated in the example as the average price of the equipment multiplied by £15 for every £1000. So, for the example the calculation was: $\frac{£36,400}{1000}=£36.40$ $£36.4 \times £15=£546 \text{ per year}$
K	The annual fixed costs are the total of the depreciation, interest and insurance added together.
L	Fuel usage average figures can be found in the Farm Management Handbook (https://www.fas.scot/publication/fmh2021/)
M	Fuel cost is calculated by multiplying the area harvested by the fuel usage (l/ha) then multiplying that by the fuel price. In the example calculation the fuel price used is 43p/l. Fuel price will fluctuate throughout the year, so it is best to speak to a fuel company for up-to-date fuel prices.
N	Spares and repairs are estimated by multiplying the purchase price of the equipment by 2.5% (this can vary depending on the annual hours used). See page 377 of the Farm Management Handbook (https://www.fas.scot/publication/fmh2021/)

Ref	Description
O	Labour is calculated by multiplying the rate of pay (£/hr) (wage rules for agriculture in Scotland can be found at (https://www.gov.scot/publications/agricultural-wages-scotland-twenty-fifth-edition-guide-workers-employers/documents/) by the area harvested divided by the work rate (giving you how many hours it should take to harvest the area)
P	The annual operating cost is the fuel cost, spares and repairs and labour added together.
Annual Costs	The annual cost of the equipment is the annual operating costs plus the annual fixed costs.
Annual cost (£/ha)	The annual cost is then worked out by dividing the annual cost by the number of hectares harvested

Contractors' charges can be found in the:

- **Farm Management Handbook** (<https://www.fas.scot/publication/fmh2021/>)
- **Speaking to local contractors**
- **Speaking your local machinery ring office** (<https://scottishmachineryrings.co.uk/contact/>)

Being able to calculate the annual cost of owning your own machinery allows you to compare the price to the price a contractor is charging. In the example, the contractors charge is higher than buying a second-hand combine.

Therefore, other factors such as the availability of capital and suitable labour should be considered.

The process can be repeated for each machine, and then a machinery replacement schedule can be developed, so that not all machines are replaced at once.

Conclusion

The machinery needed on a farm will depend on the farming operation. To be able to consider all options, a budget should be drawn up to an accurate comparison can be made. Talking to local contractors can help to understand what services they offer and to machinery dealerships, to decide what options is best for your farm.

The main considerations to think about are to:

- **Assess what machinery is need on your farm** (Farm Advisory Scotland have a booklet on acquiring Farm Machinery or Livestock <https://www.fas.scot/downloads/acquiring-farm-machinery-or-livestock-the-procurement-process/>)
- **Prepare a machinery budget to be able to compare options**
- **Assess the labour and capital available to the farm**