

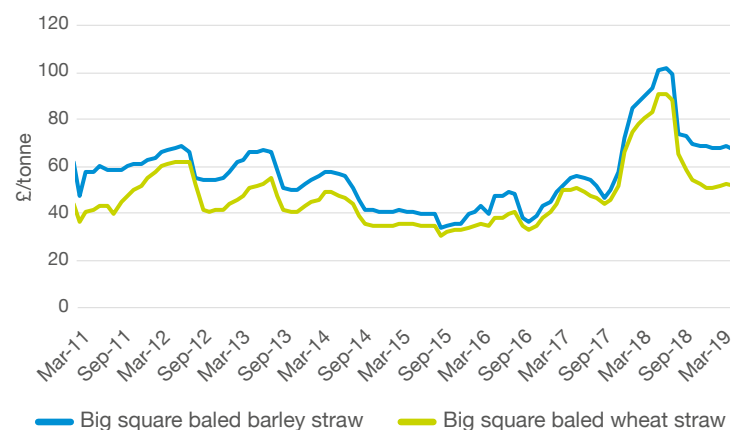
Cereal straw – incorporate or sell?



Cereal straw has become an increasingly versatile and valuable commodity. Today, straw markets include renewable energy systems, for both domestic heating and power generation, overwinter carrot production and mushroom production. This is in addition to its traditional use as livestock bedding. At the same time, the incentives to chop straw have increased. Soil health is one of the main drivers, with many aiming to reap the longer-term benefits associated with straw incorporation. Another key reason cited for incorporating straw is that it is an 'easier' option, for some.

The increase in demand for straw has seen prices respond. In the last decade, big bale straw prices in excess of £40/t have become more frequent. Volatile demand (e.g. spikes in consumption for animal bedding during long, cold winters) and supply also result in significant short-term price fluctuations.

This publication looks at the pros and cons associated with the decision to either incorporate or sell straw. It provides examples of how to value straw, especially its nutrient value, and looks at the implications to other



Big bale straw prices

Source: British Hay & Straw Merchants' Association/Defra, British Hay & Straw Merchants' Association/Farmers Weekly

farm operations. Armed with a better understanding of the monetary and non-monetary implications, this publication will help you decide on the best option for your farm business.



Main advantages and disadvantages

Incorporate straw

Advantages

- Returns nutrients and organic matter to the soil
- Reduces nutrient and soil particulate loss
- Improves soil health (e.g. measured by earthworm numbers)
- Removes compaction risk associated with straw removal
- No delay in accessing the field for the next crop

Disadvantages

- Increases fuel costs
- Contributes to combine wear-and-tear costs
- Provides a 'green bridge' through crop residue (e.g. increases threats from some pests and diseases)
- Causes nutrient lock-up issues associated with crop residues
- Crop residue can limit in-field operations

Sell straw

Advantages

- Provides useful cash flow from sale
- Facilitates easy entry for the following crop
- Reduces pest pressure (including slugs) and disease pressure

Disadvantages

- Weather can interfere with plans (e.g. wet conditions can delay removal and reduce the window for establishment of the following crop)
- Risk of compaction (especially if operation needs to be carried out on suboptimal ground)
- Nutrients are removed from field
- Less organic matter is returned to the field
- Problems can spread from one field to another (e.g. weeds*)

*Whether buying or selling straw, it is important to understand the quality of the product. Distribution of weed seeds, in particular, can be associated with straw use. Be sure you are aware of the risks. Search 'weeds' at ahdb.org.uk/knowledge-library

Other points to consider

Incorporate straw

- Soils with low levels of organic matter (e.g. less than 5%) will respond more positively to incorporated straw, especially if no other sources of organic material are applied regularly on the farm
- Is the combine straw cropper and chaff spreader effective enough, especially with wide headers? Will raking be needed at extra time and cost?

- A short chop length will promote quicker decomposition but can lead to greater nutrient lock-up at the time of next crop establishment. Use the longest chop length possible, without compromising spread width, to reduce nutrient lock-up, save fuel, and reduce wear and tear
- Consider whether your cultivation/drilling equipment can deal with the residue, especially in wet weather
- Reduced cultivation supports worm populations and straw decomposition. Ploughing in poor conditions can bury straw into anaerobic conditions and slow/prevent decomposition
- With slug control options becoming increasingly limited, it is essential to assess the risk from this pest to the following crop. Where risk is high, consider selling straw

Sell straw

- Be clear who is baling, carting, stacking and loading the straw. This includes understanding the capacity to clear fields (by farm staff or contractors) as harvest progresses
- Have an agreed policy on how to proceed if the weather turns 'catchy'. Planning will help ensure fields are prioritised and reduce the risk of straw swaths being left to the weather. Know whether you can afford to delay the following crop, if straw is not removed as per the original plan



- Is the soil dry enough to handle removal of straw without excessive compaction? It is important to factor in the potential costs of compaction and soil restructuring associated with straw removal
- Large, high-capacity combines tend to leave straw in a 'tight' swath. This prolongs drying, particularly if the straw is not ripe
- Is a muck-for-straw deal available? But consider whether straw removal and the return of farmyard manure (FYM) is worth the compaction risk
- In Controlled Traffic Systems, extra thought on bale removal is required
- If the farm runs its own baler, calculate the cost of operation with the AHDB Machinery Costing Calculator ahdb.org.uk/machinery-costing-calculator



Nutrient content

There are two main ways to calculate the cash value of nutrients – phosphate (P_2O_5), potash (K_2O) and magnesium (MgO). The first requires the weight of straw removed to be known, and is the most accurate measure. The second, where the weight of straw removed is unknown, uses grain yield to provide an estimate of the amount of nutrient in the straw.

Up-to-date nutrient values are published in the AHDB Nutrient management guide (RB209) (ahdb.org.uk/rb209). It is important to note that actual values can vary substantially. For example, higher-than-average rainfall between crop maturity and baling will reduce straw potash content.

Removed straw weight known (example)

5 t/ha of winter cereal straw is estimated to contain:

5 t/ha x 1.2 kg = 6.0 kg/ha phosphate

5 t/ha x 9.5 kg = 47.5 kg/ha potash

5 t/ha x 1.3 kg = 6.5 kg/ha magnesium

Removed straw weight unknown (example)

A hectare of spring cereal straw from a 6 t/ha grain yield is estimated to contain:

6 t/ha x 0.8 = 4.8 kg/ha phosphate

6 t/ha x 6.3 = 37.8 kg/ha potash

6 t/ha x 0.8 = 4.8 kg/ha magnesium

Table 1. Removed straw weight known

Crop material	Nutrient content (kg/t of fresh material)		
	Phosphate	Potash	Magnesium
Winter wheat and winter barley straw	1.2	9.5	1.3*
Spring wheat and spring barley straw	1.5	12.5	1.2*
Oat straw	1.6	16.7	2.2*
Rye straw	2.1*	10.0*	1.0*
Oilseed rape straw	2.2	13.0	[]
Pea haulm	3.9*	20.0*	1.7*
Bean haulm	2.5*	16.0*	[]
Linseed straw	1.6*	9.2*	[]

*Limited data. [] No data.

Table 2. Removed straw weight unknown

Crop material	Nutrient content (kg/t equivalent/t of grain)		
	Phosphate	Potash	Magnesium
Winter cereal straw	0.6	4.8	0.6
Spring cereal straw	0.8	6.3	0.8

Straw value

Once the nutrient content per hectare is known, the equivalent market value of the nutrients can be calculated. This value can be compared with the market value of straw, allowing a decision on whether it is better to sell or incorporate straw to be made, based on financial data. These figures can be used alongside non-monetary measures, such as attitudes to risk (e.g. compaction risk), to make a final decision. An example based on 5 t/ha of winter cereal straw is given in Table 3.

Table 3. Calculating the value of phosphate and potash nutrients removed and the total income from straw sales

Nutrient	Crop material nutrient content/ha*	Single fertiliser price/t**	Single fertiliser value/kg	Value (£) of nutrient in straw removed/ha
Phosphate	6.0 kg	Triple super phosphate (TSP), 46% phosphate £337 x 0.46 = £155	£155/1000 = £0.16/kg	£0.16 x 6.0 kg/ha = £0.96/ha
Potash	47.5 kg	Muriate of potash (MOP), 60% potash £280 x 0.60 = £168	£168/1000 = £0.17/kg	£0.17 x 47.5 kg/ha = £8.08/ha
Total value of phosphate and potash nutrients removed in straw				£9.04/ha
Typical cost of baling at £7.25 per 1200 x 1200, 500 kg bale. 10 bales/ha.				£72.50/ha
Other typical costs				£8.62/ha
Income from big square baled barley straw sales 5 t/ha at £67/t market value***				£335/ha
Total income from straw sales				£253.88/ha

*See nutrient content section. Value excludes application costs. **Fertiliser price information ahdb.org.uk/fertiliser-information.

Note: Figures based on phosphate and potash, as single fertiliser values can be calculated. Magnesium is excluded from the calculation.

***Straw price information ahdb.org.uk/markets-and-prices

Straw and bedding

Straw is the most frequently used bedding material. It has good thermal properties and moderate absorption capacity. Barley, wheat and oat straw are the most commonly used, although rye and triticale straw may be available in some areas. For further information, see the AHDB Bedding materials directory.



Muck-for-straw deals

Exchanging muck for straw is a relatively simple and convenient arrangement. The arable business provides straw for bedding. In return, the stockperson provides an enhanced product that is rich in nutrients and organic matter. Agreements can vary significantly. The key things to agree on are how much muck and straw will change hands and who will pay for and carry out baling, transportation and spreading. Further details on such deals are published at ahdb.org.uk/livestock-and-the-arable-rotation

Further information

For the full range of straw resources from AHDB, visit ahdb.org.uk/knowledge-library and search for 'straw'.

Author

Harry Henderson – AHDB, Knowledge Exchange
Technical Manager (Arable)

Produced for you by:

AHDB
Stoneleigh Park
Kenilworth
Warwickshire
CV8 2TL
T 024 7669 2051
E comms@ahdb.org.uk
W ahdb.org.uk
@TheAHDB

If you no longer wish to receive this information, please email us on comms@ahdb.org.uk

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