

## **No money to waste**

### **Baled silage is an economic option**

*Today's tough economic conditions and highly competitive marketplace mean that farmers must pay close attention to the costs and benefits of all inputs and practices of their businesses including silage storage. Major developments in silage films and machinery have made baled silage cheaper than conventional clamp silage.*

*A new Economic Benefit Tool (EBT) is now available to help farmers predict the costs and benefits of baled silage in comparison to clamp silage. The tool, produced by the Institute of Grassland and Environmental Research (IGER) in collaboration with Dow, the manufacturer of DOWLEX™ Polyethylene (PE) Resins, shows a clear cost benefit in favour of baling.*

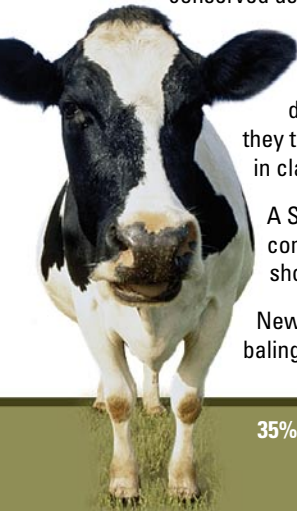
### **A convenient option**

Anyone new to silage production today would look seriously at baled silage as the single most cost-effective and versatile option. It does not require the building and maintenance of clamps or silos and does not involve significant investment. Similarly, where clamps and silos need repair or upgrading, for example to meet environmental standards, the investment may be considered uneconomical in comparison with switching to using bales, with the convenience they can offer.

Some regard baled silage as more expensive per tonne of dry matter (DM) conserved as it is more labour and machinery intensive than clamped silage. However, it is unlikely that these calculations take into account the capital costs of the clamp and the costs involved in providing storage and effluent disposal and collection for clamped silage. Neither do they take into account the significantly higher levels of losses in clamped silage.

A Swedish simulation study of two herds of 30 dairy cows compared costs for ensiling in round bales and clamp: bales showed 35% lower costs per kg silage DM fed to the cows.

New research and analysis of costs at IGER confirm that baling is a cost-effective alternative, improving the profitability



**35% lower costs per kg silage DM fed**

of dairy herds as well as offering an opportunity for higher quality silage with greater flexibility in management of both grazed swards and silage production.

Latest technical developments are also bringing fresh dynamics to the silage market. Where previously a baler was used with a separate wrapper as the standard method, today modern combined wrap-baler machines are available in the market allowing for time and cost savings in the wrapping process and improved silage quality.

### **Comparing costs of bale vs. clamp**

Silage making has become an increasingly expensive process with the value of silage now approaching £70/t DM. However, it still remains the cheapest winter feed for livestock and there is the opportunity to save costs and increase productivity by using bales for silage storage.

Round and square bales now account for 25% of the total silage made in England and Wales. Big bale silage is a flexible and economical system of conserving winter forage for animal production on the condition that high quality forage is ensiled. The feed value of the forage in bales produced under normal circumstances is between £12-18 depending on quality and type of crop ensiled.

An economic benefit model has been recently produced by IGER in collaboration with Dow to compare the costs of production of baled and clamp silage.

### **The Economic Benefit Tool for Bale Silage**

The economic benefit model was designed to produce a realistic comparison of the feed value of baled silage in comparison to forage harvested clamp silage based on three important factors:

- Cost of production of silage systems.
- Available silage for feeding where field and ensiling losses have been reported.
- Dairy and beef production from silage fed as bales or clamp.

The economic model is based on a “null hypothesis theory” that if the net economic benefit in favour of baled silage is zero then there is no difference in livestock production fed baled silage compared to clamp silage. A positive net economic benefit reflects improved livestock production from baled silage.

The model predicts that for high quality ryegrass silage (ME>11.5) and taking into consideration the dry matter losses from bales and clamp of about 7% and 20% respectively, that producing silage for milking there is a cost saving in favour of wrapped, baled silage of £12 per tonne of dry matter harvested. This would

**Feeding dairy cows baled silage is £12 cheaper per tonne DM than clamp silage**

represent an increased margin of feed costs over milk sales of £3,000 from 1,000 tonnes of silage prepared and fed as bales compared to feeding clamp silage.

The main factor influencing the reduced costs was silage dry matter loss observed in the two systems with bales varying between 0.2-13% and clamp silage between 18-25%.

A simulation of the economic benefit of harvesting silage as bales compared to forage harvesting and storage in clamps is shown in Table 1. The simulation presents three scenarios based on the quality of crop ensiled and on a mean estimation of conservation losses in bales and clamp.

**Table 1 – Comparative costs simulation**

Crop Type		Low grass quality (ME 10)	Medium grass quality (ME 11)	Grass/red clover mix (ME 10.5)
Dry Matter losses:	Bales	8%	7%	10%
	Clamp	22%	20%	23%
Cost of silage production (tonne/DM):	Bales	£65.27	£60.39	£60.39
	Clamp	£58.56	£54.29	£54.29
Cost of animal production: Dairy Litres of milk from 1 tDM of harvested grass:	Bales	511.25	585.06	585.15
	Clamp	437.31	517.59	498.41
Economic return:	Bales	£92.02	£105.31	£105.33
	Clamp	£78.72	£93.17	£89.71
Cost of animal production: Beef Live weight gain from 1 tDM of harvested grass:	Bales	34.23 kg	45.89 kg	46.84 kg
	Clamp	29.28 kg	40.59 kg	39.89 kg
Economic return:	Bales	£52.37	£70.21	£71.67
	Clamp	£44.79	£62.10	£61.03
Economic benefit for bales: (per tonne DM of harvested grass)	Dairy	<b>£13.31</b>	<b>£12.14</b>	<b>£15.62</b>
	Beef	<b>£7.58</b>	<b>£8.11</b>	<b>£10.64</b>

## Guide to information contained on the Economic Benefit Tool for Bale Silage:

### Data:

The data was extracted from research trials conducted on different forage crops: high quality ryegrass silage, medium quality ryegrass silage and a mixture of ryegrass and red clover silage.

The 'Cost of silage production' figures are based on a comprehensive literature review in each of the countries reviewed. They assume standard contractor rates where labour is required and include reseeding, lime, fertiliser, additive, polythene, harvesting and storage costs.

### Assumptions:

Costs for forage harvested clamp silage is based on harvesting costs per ha, bale costs are based on individual bales prepared. Average DM content level of bale silage of 33% and four layers of film per bale are used for the calculations.

Financial benefits of using different layers of film have not been included in this model. Production of clamp silage does not include clamp depreciation costs or land rental values for silage areas.

Dairy economic benefit is based on a milk price of £0.18/litre.

Beef economic benefit based on beef carcass value of £1.53 per kg of live weight gain.

### Calculate your savings

Calculate your own costs and see how much you can save with bale silage with the EBT calculator provided in the CD-ROM or on-line:  
[www.dowsilage.com/calculator](http://www.dowsilage.com/calculator)

### Benefits from applying additional film layers

Film wrapping costs varies depending on the number of layers of film wrap used, with the conventional 4 layers (50% overlap) being the cheaper— £1.17 for 4 layers, £1.85 for 6 layers and £2.53 for 8 layers.

Application of an additional 2 layers of film is becoming more popular in recent years as it has been shown to provide a more robust oxygen barrier resulting in less spoilage of bales by yeasts and moulds, as well as more stable and consistent silage at feed out. Recent research at IGER evaluating film layering at different dry matter contents, has given conclusive evidence that increasing film layers result in significant improvements and financial returns.

#### Six vs. four layers:

- Reduced mould coverage
- Greater DM recovery
- Increased sugar content

The IGER experiment shows that applying 6 layers of film significantly reduced mould coverage on the bales compared to applying 4 layers but applying 8 layers resulted only in a small reduction when compared with applying 6 layers.

Increasing the film layers applied resulted in significantly more dry matter being recovered after the ensiling period. The application of 6 and 8 layers of film resulted in respectively 5 kg and 7 kg more silage DM per bale being retained for feeding compared to 4 layers.

Residual sugar was also greater in response to increasing film layers applied. The significant improved sugar content was particularly interesting as previous work at IGER has shown that higher sugar levels improve the way the rumen works enabling better conversion of forage protein into meat and milk. This more efficient utilisation of protein in the silage means not only more production but also gives environmental benefits by reducing nitrogen excretion.

### Financial returns

IGER have assessed the financial returns of applying both 6 layers and 8 layers of film when wrapping. The extra cost which includes the film, its application and disposal was calculated at £0.71 per bale for 6 layers and £1.43 for 8 layers. The cost saving achieved in terms of the value of the extra dry matter and sugar recovered was calculated at £1.37 and £2.52 respectively which means that the applications of 6 layers gives a return on cost of 92% for 6 layers and 76% for 8 layers.

Using 6 layers of film gives 92% return on cost

N. layers	Additional cost	Cost saving achieved	Return on cost
6 layers	£0.71	£1.37	92%
8 layers	£1.43	£2.52	76%

The IGER experiment was jointly funded by bpi.agri, manufacturers of Silotite, and Dow.

### Test your knowledge

When prepared efficiently and with good quality equipment and wrap, baled silage has more to offer financially and in convenience than other conservation methods, even for larger farms.

Test your knowledge of baled silage economics with these questions.

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- 1. What is the average capital cost for building a 500 tonne clamp in the UK?**  
a) £10,000-£14,000      b) £15,000-£18,000      c) £20,000-£24,000
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- 2. What is the average capital cost for a storage area for 700 bales in the UK?**  
a) £1,500-£1,700      b) £2,000-£2,200      c) £2,500-£2,700
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- 3. What is the average cost per bale of baling grass in the UK?**  
a) £8.65      b) £10.65      c) £12.65
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- 4. The feed value of the forage in bales depends on quality and type of crop ensiled. What is the average feed value?**  
a) £5-£10      b) £12-£18      c) £22-£28
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- 5. What is the required dry matter content range for quality baled silage?**  
a) 20-35%      b) 35-55%      c) 45-65%
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- 6. What is the range of average silage losses in clamp silage?**  
a) 12-18%      b) 18-25%      c) 25-30%
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- 7. What is the range of average losses which would be expected in bale silage?**  
a) 0.2-5%      b) 0.2-9%      c) 0.2-13%
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- 8. Baling harvested grass silage rather than clamping can improve the profitability of dairy herds by (£ per tonne DM of grass ensiled):**  
a) up to £12      b) up to £18      c) up to £22

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**9. Film wrapping costs depends on the number of layers of film applied. What is the average cost to cover a bale with four layers (film, contractor, and disposal costs)?**

a) £2.24

b) £2.84

c) £3.14

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**10. Applying six layers of film will result in less spoilage and increased milk production compared to four layers. What is the added cost for applying two additional layers?**

a) £0.61

b) £0.71

c) £0.81

**Answers:**

1)c; 2)a; 3)b; 4)b; 5)b; 6)b; 7)c; 8)a; 9)a; 10)b

Read more about bale silage, pick up guidance and advice from silage experts, find out the latest research and innovations of materials and techniques, and much more on the new silage portal: [www.dowsilage.com](http://www.dowsilage.com)



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