Southland Environment Advance Party

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Wintering Barns and Forage Crops

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The Southland Environment Advance Party

Five members of the Advance party are wintering indoors, using 13 different options. The table below summarises the range of costs they are incurring.

Feed costs are relatively constant when expressed on a per kg DM basis. Those using home-grown silage or baleage as the major source have the lowest feed costs.

We have expressed costs on a per stock unit basis to ensure others can use the numbers on a comparative basis, as the enterprises cover weaners to mixed age velvet stags, and cover different numbers of days fed. The stock units for each class of stock are on the next page.

Feed out costs can vary greatly depending on the set up of sheds and the use of tractors. In these examples labour has been valued at $30/hr and tractor time at $55/hr. The lowest costs come from sheds set up to have significant self-feeding facilities. These are with self-feed silage pits adjacent, or with multiple feeders that only need topped up every two or three days.

Bedding costs are significant and on-going. They cannot be avoided, and from an animal welfare perspective should be of high standard. This is for two reasons. One is animal comfort. The second is that animals that are warm, dry and comfortable eat less feed, fight less and are more settled, reducing bullying and potential animal health risks and cost.

It is interesting to note that the example using an average crop on the next page puts the winter forage cost at $31.15/SU, so similar to the average of the indoor groups.

Table 2

	Group Results 2020			Group Results 2022		
	Low	**Average**	**High**	**Low**	**Average**	**High**
Feed cost (c/kgDM)	15	23	24	17.4	31.3	49.6
Days fed	67	83	94	37	85	105
Feed cost ($/SU)	$10.64	$22.36	$38.69	$2.99	$10.59	$26.81
Feed out costs ($/SU) [4]	$2.60	$7.00	$22.80	$2.04	$5.83	$17.50
Bedding costs ($/SU)	$3.60	$10.00	$15.00	$3.07	$7.63	$13.12
Total Costs ($/SU)	**$16.80**	**$34.40**	**$76.50**	**$12.95**	**$34.28**	**$58.33**
Cost ($/SU/d)	**$0.25**	**$0.41**	**$0.81**	**$0.17**	**$0.42**	**$0.69**

Wintering barn -one example

This farm winters mixed age stags to mid-August, followed by hinds until late September. Two-year-old stags are indoors till the end of August. All are fed on a mix of home grown silage and bought in baleage,. The accompanying table outlines the costs of their indoor wintering system and compares that to using winter crops to grow the feed required instead.

The amount of feed that needs to be eaten is the same in each example, but the amount that needs to be offered varies significantly. With the indoor system the utilisation is approximately 90% and so the total amount offered is 58 t. In the cropping systems there are two issues. One is utilisation, which at best is 80% (calculated here). The second is that the animals are outdoors in the cold, wet and muddy conditions. Our estimates are that this increases the feed requirements by at least 20%.

Another thing often underestimated is the need for further supplement to balance a crop diet. These allowances have been made in this table. Further, there are variations in yield of crops. Here we have calculated the costs based on low, medium (both kale or swedes) and high (fodder beet) yield. Within the crop costs we have allowed a conventional cultivation programme, weed and pest control and the cost of re-grassing after the crop, as well as the opportunity cost (using the gross margin for deer/ha). It is important to account for all of these, as in the indoor system you don't have any of those costs as a requirement of that system, so they would be a direct cost if you changed from one to the other.

Feeding out costs are often relative to the amount fed, though we have allowed 1.5 hours per day for shifting winter break fences. These will depend on individual circumstances and set ups. These variations are documented on the next page.

An indoor system has the extra cost of bedding, both in providing it and removing it. These can be quite high. Overall a direct cost comparison suggests that this farm is running an efficient and cost-effective wintering system.

Table 2	**One real farm example**	**Comparative cropping costs**		
Animals wintered = 530	**Indoors[2]**	**Swedes/Kale**		**Fodder Beet**
Crop yield (t/ha)		8	14	20
Crop Costs ($/ha)[1]	$4,434	$4,108	$4,452	$5,175
Feed cost (c/kgDM grown)	21	51	32	29
Feed offered (t)	58	58	58	58
Supplement requirement (% of diet)	100	10	15	25
Baleage required (bales)	150	25	37	63
Environmental feeding requirements[3]	58	69	69	69
Area required (incl 20% wastage)	0	9.7	5.3	3.2
Feed out costs ($) [4]	$6,874	$4,600	$4,600	$4,600
Bedding costs ($)	$5,285			
Total wintering costs	**$13,593**	**$47,448**	**$32,636**	**$28,720**
Wintering cost/head	**$25.65**	**$89.52**	**$61.58**	**$54.19**

[1]Includes Direct crop costs, pasture renovation and opportunity cost

[2]Crop costs for silage making at contract rates of $37/t + $12/t for fertilizer replacement

[3]Outdoor requirements estimated to be 20% greater than indoors

[4]Estimated by farmer for actual indoor feeding 50 minutes/day and tractor costs at 20 minutes/d

Capital Costs – across the AP Group

Providing housing can have a range of costs, depending on where you start. Many of the sheds within this group have been converted, relatively inexpensively, from other purposes. However, for a full comparison, the costs associated with building a new shed are usually needed to gain a full understanding of potential costs.

We have costed two options. One, the Full cover, would be fully enclosed, like a set of covered yards and a permanent structure. The other is the PVC tunnel-house style. The two main differences between these structures are the initial cost, and the on-going maintenance. These costs are indicative only. The bigger the shed, the lower the price per square metre.

The potential cost of a shed depends on which stock class you are housing. The following minimum areas are found in the Animal Welfare guide for Deer. We would recommend that sheds be built with some flexibility in mind, and at least 3 m^2 per animal. If they can be configured with outdoor loafing areas then this is even better.

For comparison, again we have provided the numbers as a per head figure. We have provided the servicing costs as the annual commitment that a farmer would need to pay. We have not included depreciation, as this is often written off against income, so might be considered a good thing. However, we would consider that the working life length of these sheds be around 20 years. The PVC shed would probably need recovered after 10 years.

Table 3

	Weaners	Hinds	<R4 Stags	>R4 Stags
Stock Units	1.7	2.2	3.5	4
Minimum Area required/animal (m2)	1.8	2.1	2.8	3.2
Full cover Capital ($210/m2)	378	441	588	672
Interest (6%)	22.68	26.46	35.28	40.32
Maintenance (1% capital value)	3.78	4.41	5.88	6.72
Insurance ($4.50/$1000)	1.70	1.98	2.65	3.02
Total Annual costs (per head)	**28.16**	**32.85**	**43.81**	**50.06**
PVC barn type Capital ($130/m2)	234	273	364	416
Interest (6%)	14.04	16.38	21.84	24.96
Maintenance (1% capital value)	4.68	5.46	7.28	8.32
Insurance ($4.50/$1000)	1.05	1.23	1.64	1.87
Total Annual costs (per head)	**19.77**	**23.07**	**30.76**	**35.15**

The potential environmental costs of winter crops

Winter cropping provides a relatively cheap option and concentrates a lot of stock on a small area in winter, sparing the rest of the farm. However, that concentration creates a potential hotspot of nutrient and soil loss. Figures collected at the Southland Focus farm of John McLean have been used to demonstrate the potential nutrient and soil losses associated with feeding off the winter crop.

We know from experimentation that the longer the animals are on the paddock grazing any particular hectare, the greater the damage. Therefore, crops with higher yields will have greater potential damage. We have adjusted losses to represent that.

We also know that crops where grazing time is restricted, and that are grazed in appropriate patterns to minimise damage in critical areas of the paddock can have much reduced losses. These are all represented in our potential losses. Again, the amount of rainfall, and the intensity of that rain are important factors, as well as slope, so these figures are potential estimates only, and are provided to generate discussion.

The crop yields chosen here represent an average hill country swede crop, a lowland swede crop, and the average fodder beet crop.

Overall, we see that high yielding crops can be particularly leaky. These losses of 5t/ha have been recorded in commercial situations. The loss of soil is valued at $140/t. This value includes both the nutrient value in the soil and the capital value of the land being lost.

Best practice methods for grazing can reduce these losses to 10% of unmanaged situations. Techniques as simple as back fencing, providing stand-off areas and protecting swales from grazing can all be applied.

Table 4

Comparative Crop Environmental Impacts				
Crop yield (t/ha)		8	14	20
Average	P loss (kg/ha)	1.28	3.92	8
	N loss (kg/ha)	2	6.125	12.5
	Sediment loss (kg/ha)	800	2450	5000
	Potential cost of soil loss ($/ha)	$ 112	343	$ 700
Best practice	P loss (kg/ha)	0.128	0.392	0.8
	N loss (kg/ha)	0.2	0.6125	1.25
	Sediment loss (kg/ha)	80	245	500
	Potential cost of soil loss ($/ha)	$ 11	$ 34	$ 70

Feed types

Many types of feed are available for winter feeding. When feeding indoors it is important to ensure that diets are fit for purpose. They need to be able to meet the physiological demands of the animal (maintenance, growth, pregnancy etc.). They also must meet the aims of the farmer to meet future production targets.

Generally, silage and baleage are of moderate quality and often only able to meet maintenance requirements if fed over long periods of time. Silage quality and intake are affected by how wet the crop is when made, with optimum intake and lowest losses occurring when the cut pasture has been wilted down to between 25 and 30% DM. This ensures the best fermentation as well as the highest potential intake. Silage made in late spring generally has the highest quality, in summer the lowest, and autumn intermediate.

Baleage is often made later than silage meaning there is potential more seed head and dead material. This lowers the overall quality of the feed. However, the higher dry matter and higher pH of the baleage often means that intake is good. If baleage is made without chopping, the long stem lengths can reduce intake.

If production targets are more than maintenance, then silage and baleage need some supplementation. This is partly because intake will be relatively low, and also because effective protein is also often low, even if the feed test suggests otherwise. This is because the 'protein' measured not effective, and because the fermentable energy in silage and baleage is lower than other feeds, leading to low protein yields in the rumen. Supplements are generally priced according to their relative quality and protein content. Higher priced supplements such as deer nuts can be fed at lower levels to balance a diet, and so the effective cost per animal can be quite similar between feeds. This is seen in the costs in Table 2, as there were a range of supplements fed, yet the range of prices of the overall diet was relatively similar.

The general principles of feed balancing are presented in the 'Balancing the diet' factsheet and can be applied to all diets.

Some diets can be low or high in various minerals and trace elements. Bought in feeds may also have a different mineral profile than home-grown feed. A feed test can often be useful in identifying potential problems. Generally, grains are low in calcium and should have calcium added to the diet if they are used as more than 30% of the diet. Silages and baleage are often low in vitamins A, D and E, and supplementation may be needed if these diets are fed for longer than 60 days.

Palm kernel expeller (PKE) is a relatively well-balanced feed of moderate quality and low cost. It is high in Copper (approximately 15ppm) which suits deer, as winter copper reserves are often reduced due to low copper in winter feed diets, and the potential for high soil ingestion on crops (the iron in the soil also strips copper out of the animal). Its small particle size means that it needs to be fed with an effective fibre source and can't be fed alone.

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