The Farm Management Handbook

Farm Advisory Service

Forage Crops

The UK reference for farm business management

SAC CONSULTING

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Introduction

Home-grown forage crops offer high yielding alternatives to grass, but establishment cost, crop failure risk and time out of pasture production must be considered. Yield, quality, and utilisation are key to cost-effective forage crop production. Increasing the amount of grazed forage in the diet reduces reliance on expensive purchased feed and aids with filling the forage gap in the winter months.

Forage crops can be useful in both arable and grazing rotations; they make a good break crop between grass-to-grass re-seeds and provide time to correct deficiencies in pH, P and K, soil compaction and weed control. They can also be used as a pioneer crop in uncultivated areas.

Crops can be either full-season crops or quick growing catch crops. To ensure high yields and to justify the cost of production and length of time taken out of production a full-season crop should be grown on good land with correct agronomy. A catch crop can be grown after silage, wholecrop cereal or early harvested cereals to give a bonus crop of forage and allow an early re-seed the following spring. Catch crops can be very cost-effective and aid in filling the forage gap when grass growth slows in the late Autumn/early winter.

Wholecrop silage

Wholecrop silage can provide a high-starch, high-fibre feed, replacing some, or all, of the grass silage in the ration. As it is high-yielding, production costs per kilogram of dry matter (DM) are competitive with other forages. Although the crude protein can be lower, unless using a legume or a cereal-legume mix. The earlier harvest reduces risk of bad weather at harvest time and provides time for winter cropping.

Brassicas and root crops

Brassica and beet crops such as kale, forage rape, rape/kale hybrids, fodder beet, grazing turnips, swedes and stubble turnips provide nutritious, cost-effective feeds. Out-wintering on brassicas and beet crops can extend the grazing season and allow for more animals to be kept, with minimal extra infrastructure investment. However, a contingency plan must be in place for when ground conditions/weather make grazing challenging.

Leafy forage crops are generally high in protein while roots/bulbs are higher in energy. Fodder beet is the highest yielding energy crop for livestock, allowing high stocking densities – some farmers will manage over 100 ewes per hectare for around two and a half months (Jan- Mar).

Forage brassica and root crops should comprise up to 70% of the total DM intake of livestock. A grass runback and drier lying area with fresh water should always be provided. Livestock should be transitioned slowly and carefully onto forage crops to allow for rumen adaption. In addition, another source of forage should be supplied such as straw for dry cows

and silage for more productive stock. For lamb finishing, concentrates can help balance the diet. Correct mineral/trace element supplementation is important when feeding forage crops.

The use of an electric fence is advisable to encourage stock to eat the whole crop evenly for high utilisation and to ensure the ration has an adequate mix of energy and protein.

It is important to assess the yield of the crop by cutting and weighing several $1m^2$ sections and then accurately calculating the area the group of stock require each day. To assess the yield, make a frame that is $1m^2$ and cut several representative samples of the crop. Place the sample in a bag and weigh using a scale. Multiply the average of your samples by 10,000 to give a fresh weight per hectare then again by the DM% (from the following tables - overleaf) to give DM yield/ha. The crop can then be rationed to the stock based on their nutritional requirements, taking into account the likely utilisation (%) and any other forages provided.

The yield for fodder beet is assessed differently and will depend on the width of the rows. If the rows are 45cm apart, then measure 5.5 metres along a drill, if they are 50cm apart, then measure 5 metres along a drill. Lift the whole plant (bulb and leaf) from both sides of the area measured, lifting 2 rows of beet at either 5m or 5.5 metres length (depending on row width). Weigh the leaf and the bulb separately. Repeat this over 5 different sample areas, to sample $25m^2$ in total. Calculate the total fresh weight of the bulb and leaf over the 5 sites. Multiply this by 400 and divide by 1,000 to get the tonnes of fresh weight per hectare. Then multiply this figure by the dry matter (bulb ~15%, leaf ~10%) to calculate the tonnes of dry matter/ha. Dry matter analysis is recommended to understand the actual values for the crop.

Forage Crop Technical Data

The following tables provide technical data that can be used in conjunction with the variable cost data for all the crops illustrated later in the section.

Variable costs include seed, chemical and fertiliser as per variable cost data for each crop. Costs of establishment are not included and will vary enormously depending on previous cropping, nutrients in the soil, whether it is a full season or catch crop and past experience of the various methods of establishment. Machinery costs (Labour and Machinery section) can be referred to for typical ploughing, cultivation and drilling costs.

	Kale	Forage rape	Kale/rape hybrid	Forage Rye
Sown	May- Jul	Apr- Aug	Apr-Aug	Aug-Oct
Utilised	July-Mar	Aug- Dec	Jun-Jan	Mar-Nov
Variable cost (£/ha)	554	328-456	318-554	393
Grazings	1	1	1-2	Several
DM (%)	14-16	10-14	12-13	20
ME (MJ/kgDM)	10.5	9.5	10.5	10
CP (%)	16-17	19-20	19-20	11
% utilisation	80	80	80	70
Av DM yield (t/ha)	7.5	4.5	6	5.5
Cow graze days/ha [1]	1,260	684	1,008	1,680
ha/50 cows/100days [1]	4.0	7.3	5.0	3.0
Lamb graze days/ha [2]	6,000	3,600	4,800	3,850
ha/250 lambs/100days [2]	4.2	6.9	5.2	6.5

	Swede	Turnips	Stubble turnips	Fodder beet
Sown	Mar-May	Apr- Jun	May-Sept	Mar-May
Utilised	Oct-Apr	Sep-Apr	Aug-Dec	Oct-May
Variable cost (£/ha)	275	309	511	865
Grazings	1 or lifted	1	1	1
DM (%)	10-13	9-10	8-9	13-16
ME (MJ/kgDM)	13	13	11	13
CP (%)	10-11	10-12	17-18	6-8
% utilisation	80	80	80	80
Av DM yield (t/ha)	8	5	4	15
Cow graze days/ha [1]	1,664	1,040	704	-
ha/50 cows/100days [1]	2.6	4.6	7.9	-
Lamb graze days/ha [2]	6,400	4,000	3,200	12,000
ha/250 lambs/100days [2]	3.9	6.3	7.8	2.1

[1] Cows getting 50MJ/day from crop and the rest from other forage.

[2] Lambs allowed 1kg DM/day of crop.

The nutritional qualities shown above represent an average; crops vary, and it is advised to analyse high value crops for dry matter (DM), Metabolisable Energy (ME) and protein (CP) to ensure appropriate allocations are being made.

Dry cow wintering example - A herd of dry suckler cows require 75MJ/hd/day ME. On a diet of kale and straw, 50MJ is expected to come from kale. At 7.5tDM/ha, 10.5ME and 80% utilisation each m^2 of kale will

contain 6.3 MJ. Therefore, the herd of 50 cows require 397m^2 of kale per day.

Ewe grazing example - 100 ewes are given an allowance of 1kg DM of forage rape per head/day. With a yield of 4.5tDM/ha and utilisation of 80%, the group will require 278m^2/day or approximately 0.19ha (0.5 acres) per week.

Preserved Forage Crop Technical Data and Production Costs

The following table shows the cost of preserving forage crops including arable silage, forage maize and wholecrop wheat.

Assumptions:

- All crops ensiled.
- Yield potential will vary depending on site, timing, weather conditions and wastage at feeding.
- For breakdown, see variable cost data for each individual crop.
- Establishment and production costs based on contractor charges, and fuel use (l/ha) and fuel cost – See Labour and Machinery section.
- Total cost per annum does not include land rent and maintenance or finance charge associated with a silage clamp. The true cost will be higher due to wastage.

	Arable silage pea/ cereal mix ensiled	**Forage maize** under plastic ensiled	**Wholecrop ferm'd** winter wheat ensiled	**crack'd** winter wheat ensiled
Yield (t FW/ha)	30	40	25	15
Yield (t DM/ha)	8	15	10	12
ME (MJ/kgDM)	10	10.5	10.5	10.5
CP (%)	16	9	9.5	9.5
		£/ha		
Variable costs	374	718	495	679
Establishment costs				
Plough	73	73	73	73
Sow	75	163	75	75
Roll and de-stone	21	21	21	21
Fuel	50	50	50	50
	219	307	219	219
Production costs				
Spray	15	15	46	46
Fertilise/Slurry/FYM	12	18	37	37
Lift, cart and clamp crop	194	206	194	194
Other crop expenses	3	3	3	3
Fuel	19	43	23	23
	245	285	304	304
Total cost per annum (£/ha)	**837**	**1,310**	**1,017**	**1,201**
Cost per t FW (£/t)	**28**	**33**	**41**	**80**
Cost per t DM (£/t)	**105**	**87**	**102**	**100**

Forage Peas and Pea/Cereal Mixtures (Arable Silage)

PHYSICAL DATA

(a) System

Forage peas (sown Mar-Jun) are grown as a catch crop to be grazed *in situ*, zero-grazed or ensiled/baled (harvested at flowering when pods have formed but not yet filled and wilted for 1-2 days). Peas can be grown alone, or in mixtures with barley or oats and undersown with grass for arable silage. Peas are highly palatable to livestock so must be introduced gradually and monitored to prevent bloat. Total production costs including establishment and harvest are described on page 6.

(b) Yield (in 12-16 weeks)

	Fresh t/ha (t/acre)	Dry matter t/ha (t/acre)
Forage peas	20-30 (8-12)	6-8 (2.4-3.2)
Arable silage	20-35 (8-14)	6-10 (2.4-4.0)

(c) Seed rates (kg/ha)

Forage peas:		Arable silage undersown with grass:	
direct drill	125	peas	40-60
(broadcast	150)	cereal	60-80
		total	100-140

Seed mixtures cost (p/kg):

Cereal	38.3
Peas	57

(d) Fertiliser – kg/ha (units/acre)

	Forage peas		Undersown arable silage at sowing		after harvest	
N	0	(0)	40-60	(32-48)	50	(40)
P_2O_5	50	(40)	90	(72)	25	(20)
K_2O	50	(40)	90	(72)	25	(20)

Apportionment of the cost of fertiliser in the seed bed and the residual value of nitrogen to the subsequent crop may be justified. See Crop Inputs section for more information on nutrient planning.

(e) Sprays

Pre emergence herbicide for forage peas can be used. There are no broad-spectrum post emergence herbicides available for this crop. Varietal tolerance to a proposed spray should be ascertained.

A silage additive (£1.00-£1.60 per tonne silage – depending on the product chosen and its rate of application) is recommended for silages with a high pea content.

Forage Peas and Pea/Cereal Mixtures (Arable Silage)

VARIABLE COST DATA

	Forage Peas		Arable silage undersown	
VARIABLE COSTS		£/ha (acre)		
Seed	104		80	
Fertiliser	81		294	
Sprays	-		-	
Other expenses	-		-	
	185	(75)	374	(151)
FERTILISER PRICE SENSITIVITY (+/-)				
10 p/kg N	0	(0)	10	(4)
10 p/kg P_2O_5	5	(2)	12	(5)
10 p/kg K_2O	5	(2)	14	(6)

Forage Maize

PHYSICAL DATA

(a) System

Forage maize is ensiled and the clamp should be monitored for overheating. Introduce gradually into the animal's diet, ensuring there is an adequate source of long fibre in the ration and protein supplementation is essential. Contractor costs for establishment and harvest are described on page 6.

(b) Yield

	Without plastic	With plastic
Fresh (t/ha)	40	50
DM (t DM/ha)	12	15

(c) Seed

Target established plant density 100,000 plants/ha; sow at 15% above target plant density. Do not sow too early (soil temperature 8-10ºC, 10 cm depth for 7 days).

(d) Fertiliser

	kg/ha	(units/acre)
N	120	(96)
P_2O_5	60	(48)
K_2O	165	(132)

(e) Sprays

Pre-emergence herbicide, then later before 8 leaf stage (without plastic).

In some years, slugs can be a problem.

Maize silage generally ferments effectively on its own, and additives are not usually necessary. However, using additives can help minimise aerobic spoilage, especially in situations where the silage clamp is large, and the maize is removed slowly

Forage Maize

VARIABLE COST DATA

	Without plastic		With plastic	
VARIABLE COSTS		£/ha (acre)		
Seed	212		212	
Fertiliser	275		-	
Sprays etc.	91		91	
Other expenses	-		415	
	578	(234)	718	(290)
FERTILISER PRICE SENSITIVITY (+/-)				
10 p/kg N	12	(5)	-	
10 p/kg P_2O_5	6	(2)	-	
10 p/kg K_2O	17	(7)	-	

Whole Crop Cereal - Winter Wheat

PHYSICAL DATA

(a) System

Whole cropping of wheat provides an alternative feed to silage providing a good source of starch and fibre. The crop can be harvested at various growth stages creating different products. Additives can be used to improve preservation and feed quality. For example, grain moisture >45% (soft dough, soft cheese) fermented whole crop, grain moisture 30% (hard cheese) crimped grain or urea treated whole crop and <30% treated and processed whole crop. See Arable section for more detail on growing winter wheat.

(b) Yield

	Fermented whole crop	Cracked whole crop
Fresh (t/ha)	29	14
DM (t DM/ha	10	12

(c) Seed

Certified seed second generation (C2) sown at the rate of 220 kg/ha.

(d) Fertiliser

See Crop Inputs section for more information on nutrient planning.

	kg/ha	(units/acre)
N	200	(160)
P_2O_5	67	(54)
K_2O	83	(66)

(e) Sprays

Herbicides Autumn residual herbicide to control annual meadow grass and broad leaved weeds.

Fungicides Two applications at GS31-32 and GS39 for eyespot, leaf diseases (e.g. septoria).

For sprays against other hazards see Arable section.

(f) Other crop expenses

Fermented whole crop wheat can be made successfully without an additive, but the use of additives can improve aerobic stability. Additive costs range from £1.00-£1.60 per tonne - depending on the product chosen and its rate of application. Refer to page 6 for other crop expenses such as plastic covers.

Whole Crop Cereal - Winter Wheat

VARIABLE COST DATA

	Fermented whole crop		Cracked whole crop	
VARIABLE COSTS	£/ha (acre)			
Seed @ £455/t	100		100	
Fertiliser	310		310	
Sprays etc.	85		85	
Other expenses	-		184	
	495	(200)	679	(275)
FERTILISER PRICE SENSITIVITY (+/-)				
10 p/kg N	20	(8)	20	(8)
10 p/kg P_2O_5	7	(3)	7	(3)
10 p/kg K_2O	8	(3)	8	(3)

Forage Rye

PHYSICAL DATA

(a) System

A catch crop of winter rye sown after early harvested cereal (Sep/Oct) and followed by light grazing at the end of the calendar year and subsequent cropping.

(b) Yield

Can be variable but, given early sowing, dry matter yields of up to 0.75t DM/ha in autumn and 2.25t DM/ha in spring can be achieved. Total dry matter yields up to 5.5t DM/ha can be achieved.

Forage rye can provide early spring grazing for 15-20 cows or 50-60 sheep per hectare over a three-week period.

(c) Seed

Rate – 185 kg/ha.

Early sowing is important. Rye seed for grazing is large and should be sown at a depth of 2-3 cm. After sowing, the soil should be rolled to enhance contact between the soil and the seed.

(d) Fertiliser

See Crop Inputs section for more information on nutrient planning.

	kg/ha (units/acre)					
	Seed bed		**Early spring**		**Total**	
N	-	-	80	(64)	80	(64)
P_2O_5	30	(24)	-	-	30	(24)
K_2O	30	(24)	-	-	30	(24)

Forage Rye

VARIABLE COST DATA

VARIABLE COSTS	£/ha (acre)	
Seed	141	
Fertiliser	125	
Sprays etc.	-	
Other expenses	-	
	266	(107)

FERTILISER PRICE SENSITIVITY (+/-)		
10 p/kg N	8	(3)
10 p/kg P_2O_5	3	(1)
10 p/kg K_2O	3	(1)

Kale

PHYSICAL DATA

(a) System

Strip grazing behind an electric fence is recommended for optimal utilisation. Often grazed with cattle but can be grazed by sheep. Allow at least 3m of space per cow and a runback including hay/straw, minerals (unless bolussed) and water. Kale can be fed as part of a catch crop mixture with stubble turnips and forage rape.

The advantages of kale include winter hardiness and a prolonged utilisation period of the crop. Early and late-maturing varieties are available. Watch out for flea beetle, a problem for Kale due to its slow early establishment.

(b) Yield

	Fresh		DM t/ha (t/acre)	
Autumn kale	70	(28.3)	8	(3.2)
Winter kale	50	(20.2)	7	(2.8)

(c) Seed

Rate – 5.0 kg/ha.

Seed treated with neonicotinoid which is still approved for animal feed, game and seed.

(d) Fertiliser

	kg/ha	(units/acre)
N	160	(128)
P_2O_5	50	(40)
K_2O	170	(136)

Fertiliser rates will vary greatly with circumstances. Assume following grass, greater N requirements if following harvested crops. Some farmers may also choose to top dress some of the N. See Crop Inputs section for more information on nutrient planning.

(e) Sprays

Herbicides Stale seed bed and a pre-emergence herbicide.

Slugs Slug pellets may be broadcast or drilled with the seed.

Flea Beetle Insecticide may be required.

Kale

VARIABLE COST DATA

VARIABLE COSTS	£/ha	(acre)
Seed	84	
Fertiliser	182	
Sprays etc.	29	
Other expenses	-	
	295	(119)

FERTILISER PRICE SENSITIVITY (+/-)		
10 p/kg N	12	(5)
10 p/kg P_2O_5	3	(1)
10 p/kg K_2O	7	(3)

Forage Rape & Hybrids

PHYSICAL DATA

(a) System

Grazed system which must be introduced gradually with an area of runback with alternative forage, e.g. grass/hay/straw, as well as free access minerals and water.

There are several hybrids (rape/kale) on the market which are quick to establish and can be utilised within 10-12 weeks after sowing. They offer the benefit of early grazing in summer/autumn if other forage supplies are limited. Hybrid crops can be managed for multiple grazings with sheep by sowing at a higher seed rate for greater leaf cover.

White-faced sheep breeds are prone to photosensitisation on this crop, be vigilant and remove any affected.

(b) Yield

Total dry matter yield of approximately 4.5t DM/ha. About 50 lambs/ha (20 lambs/acre) (starting weight approx. 27 kg) will finish off rape, with a suitable 'run back' on to grass or stubble.

(c) Seed

	kg/ha	(lb/acre)
Drilled	6	(5.3)
Broadcast	8	(7.1)

These rates will need to be varied with soil condition.

Seed cost – £4.78/kg.

(d) Fertiliser

	kg/ha (units/acre)			
	Drilled/broadcast		Direct drilled	
N	100	(80)	140	(112)
P_2O_5	25	(20)	25	(20)
K_2O	35	(28)	35	(28)

Catch crops after early potatoes would require less fertilisers. See Crop Inputs section for more information on nutrient planning.

(e) Sprays

Burn off land pre-drilling for direct drilled crops only.

Insecticide for flea beetle may be required.

Forage Rape & Hybrids

VARIABLE COST DATA

	Broadcast		Drilled		Direct drilled	
VARIABLE COSTS			£/ha (acre)			
Seeds	38		29		38	
Fertiliser	123		123		162	
Sprays etc.	-		-		14	
Other expenses	-		-		-	
	161	(65)	152	(62)	214	(87)
FERTILISER PRICE SENSITIVITY (+/-)						
10 p/kg N	8	(3)	8	(3)	12	(5)
10 p/kg P_2O_5	3	(1)	3	(1)	2	(1)
10 p/kg K_2O	4	(2)	4	(2)	3	(1)

Stubble Turnips

PHYSICAL DATA

(a) System

Grazed system which must be introduced gradually with an area of run-back with alternative forage e.g. grass/hay/straw as well as free access to minerals and water. Strip grazing is preferred to reduce wastage.

It can be grown with other brassicas e.g. rape, which would offer an element of protection for the stubble turnip from frost prior to grazing.

(b) Yield

Can be highly variable particularly affected by date of sowing; but drilled crops sown in early July can finish 50-70 lambs/ha (20-28 lambs/acre) (starting weight approx. 27kg), although often requiring cereal supplementation. Total dry matter yield approximately 4-5t DM/ha.

(c) Seed

Seed rates can be varied to alter the proportions of leaf to bulb.

	kg/ha
Direct drilled	5.0

Seed cost – £6.36/kg

(d) Fertiliser

These rates are variable, higher N rates increase the leaf to bulb ratio. See Crop Inputs section for more info on nutrient planning.

	kg/ha (units/acre)	
N	50	(40)
P_2O_5	25	(20)
K_2O	50	(40)

(e) Sprays

Burn off land pre-drilling for direct drilled crops only.

Insecticide for flea beetle may be required.

Stubble Turnips

VARIABLE COST DATA

	Drilled		Direct drilled	
VARIABLE COSTS		£/ha (acre)		
Seed	29		29	
Fertiliser	219		219	
Sprays etc.	-		14	
Other expenses	-		-	
	248	(100)	262	(106)
FERTILISER PRICE SENSITIVITY (+/-)				
10 p/kg N	9	(4)	9	(4)
10 p/kg P_2O_5	10	(4)	10	(4)
10 p/kg K_2O	5	(2)	5	(2)

Swedes and Turnips

PHYSICAL DATA

(a) System

Hardy winter forage options which can be grazed or lifted and stored in a clamp. With any bulb crop, conserving the protein-rich leaf can be valuable to maintain a balanced diet, hence strip grazing is beneficial as it stops the animals grazing off the leaf first. A hard frost will kill the leaf, in which case additional protein will be required. For lifting and storing, roots must be clean and undamaged to prevent the risk of fungal disease.

(b) Yield

	Swedes				Turnips			
	Fresh		DM		Fresh		DM	
	roots, t/ha (t/acre)							
Average	75	(30.4)	8.0	(3.2)	60	(24.3)	5.0	(2.0)
Premium	100	(40.5)	9.5	(3.8)	80	(32.4)	7.5	(3.0)

In addition, turnips will yield 15 to 30 t leaf/ha (1.5 to 3.0 t DM).

(c) Seed

Swede sown at 3.75kg/ha. A precision drill can be used if available to reduce the amount of seed to 0.4 to 1 kg/ha.

Turnip sown at 2.5 to 5kg/ha.

Seed cost (£/kg):

Swedes – graded	100
Turnips – treated	14.00

(d) Fertiliser

See Crop Inputs section for more info on nutrient planning.

	Swedes		Turnips	
	kg/ha (units/acre)			
N	90	(72)	90	(72)
P_2O_5	200	(160)	200	(160)
K_2O	150	(120)	125	(100)

(e) Sprays

Pre-emergence herbicide for annual grass and broad-leaved weeds.

Insecticide for flea beetle may be required.

Swedes and Turnips

VARIABLE COST DATA

	Swedes		Turnips	
VARIABLE COSTS		£/ha (acre)		
Seed	41		70	
Fertiliser	94		94	
Sprays etc.	28		28	
Other expenses	-		-	
	163	(66)	192	(78)
FERTILISER PRICE SENSITIVITY (+/-)				
10 p/kg N	4	(2)	4	(2)
10 p/kg P_2O_5	2	(1)	2	(1)
10 p/kg K_2O	5	(2)	5	(2)

Multi-Species Sward

PHYSICAL DATA

(a) System

Reseed incorporating various grasses, herbs and legumes such as chicory, plantain and white clover. The crop is best utilised in a rotational grazed system. Around five days longer rest period and greater residuals required compared with ryegrass and white clover swards. Longevity of the sward is better when not winter grazed. The crop should be rested, typically by mid-September in the year of establishment and by November thereafter. Additional animal health benefits provided, along with drought resilience benefits.

(b) Yield

Variable, better in warmer soils. Adopt a restricted grazing period in year one. 10-20 ewes and twins/ha (4-8 ewes and twins/acre) can be grazed in years 2 and 3, typically from June, and lambs during that autumn.

(c) Seed

Rate – 10 kg/ha.

Sow into a fine, warm and firm seedbed by early June.

Seed costs: Cost annualised over an assumed three-year rotation.

(d) Fertiliser

	kg/ha	(units/acre)
N	50	(40)
K_2O	25	(20)
P_2O_5	25	(20)

Little or no fertiliser is required where established on a prime site using legumes. See Crop Inputs section for more info on nutrient planning.

(e) Sprays

An annual charge to cover pre-drilling stale seed bed preparation.

Otherwise, few clover-safe herbicides available for use. Poor competitor so good establishment is critical. The only option to control tall weeds post-emergence is topping.

Multi-Species Sward

VARIABLE COST DATA

VARIABLE COSTS	Direct drilled £/ha (acre)	
Seed	55	
Fertiliser	88	
Sprays etc.	5	
Other expenses	-	
	148	(60)
FERTILISER PRICE SENSITIVITY (+/-)		
10 p/kg N	5	(2)
10 p/kg P_2O_5	3	(1)
10 p/kg K_2O	3	(1)

Fodder Beet

PHYSICAL DATA

(a) System

Fodder beet can be grazed behind an electric fence or harvested and fed as chopped or whole. If harvesting the crop, try to minimise soil contamination. It has a large yield potential, for a palatable, digestible feed for animals through the winter. This crop is not a brassica.

Transition of animals on and off the crop requires careful consideration, especially that of cattle *(continued on next page).

(b) Yield

	Roots - t/ha (t/acre)			
	Fresh		DM	
Average	60	(24.3)	10	(4.0)
Premium	90	(36.4)	14	(5.7)

In addition, fodder beet will yield 35 t leaf/ha (3 to 4 t DM at 18-20%CP); as winter progresses this may die off with frost and snow damage, additional protein should be fed.

(c) Seed

Pelleted monogerm seed precision drilled at 15 cm spacing in 55 to 65 cm rows (approx. 3-4 kg/ha). Treated seed is available at a premium cost.

(d) Fertiliser

	kg/ha	(units/acre)
N	100	(80)
P_2O_5	60	(48)
K_2O	150	(120)

Potash level may be reduced to 75 kg/ha where agricultural salt (400 kg/ha) is applied.

All or part of the nutrient requirement can be satisfied with slurry or FYM. See Crop Inputs section for more info on nutrient planning.

(e) Sprays

Pre-emergence broad leaved weed control and then up to four post emergence applications at low rates.

Fodder Beet

VARIABLE COST DATA

VARIABLE COSTS	£/ha (acre)	
Seed	200	
Fertiliser	247	
Sprays etc.	184	
Other expenses	-	
	631	(255)

FERTILISER PRICE SENSITIVITY (+/-)		
10 p/kg N	10	(4)
10 p/kg P_2O_5	6	(2)
10 p/kg K_2O	15	(6)

* Cattle should be transitioned over 21 days, starting with 1kg DM per animal per day until all cattle are eating bulbs readily, then increase by 1kg DM every two days until they start to leave some beet behind.

Ensure animals have received vaccinations for clostridial infections prior to grazing the crop, as beet can increase the chance of such infections due to the high sugar load in the intestines. See Fodder Beet page on the FAS website (www.fas.scot) for more information.

Red Clover

PHYSICAL DATA

(a) System

Red clover-ryegrass mixtures provide a good silage crop whilst offering high quality aftermaths for finishing lambs. Up to 300g per day growth rate is possible for weaned lambs grazing red clover. Not suitable for winter grazing or intense autumn grazing. Be vigilant of digestive issues such as bloat or twisted gut.

Phyto-oestrogens affect ewe fertility so avoid grazing 6 weeks either side of tupping and limit the grazing of replacement breeding animals on swards with over 30% red clover as there is some evidence that it affects reproductive tract development.

(b) Yield

	t/ha (t/acre)	
	Fresh	**DM**
Average	37	10
Premium	56	15

(c) Seed

For a high red clover sward:

15kg/ha (6kg/acre) red clover
5kg/ha (2kg/acre) grass seed

Spring sowing at 10-15mm depth when soil temperatures exceed 10°C works best.

(d) Fertiliser

	kg/ha	**(units/acre)**
N	0	(0)
P_2O_5	70	(56)
K_2O	70	(56)

P and K application should be guided by recent soil analysis. Clover require higher pH than grasses, target 6-6.5. Nitrogen application is not required. See Crop Inputs section for more information on nutrient planning.

(e) Sprays

Do not use residual herbicides on previous crops that could affect germination of clover.

Red Clover

VARIABLE COST DATA

VARIABLE COSTS	£/ha (acre)	
Seed @ £10.6/kg	183	
Fertiliser	113	
Sprays etc.	-	
Other expenses	-	
	296	(120)

FERTILISER PRICE SENSITIVITY (+/-)		
10 p/kg N	0	(0)
10 p/kg P_2O_5	7	(3)
10 p/kg K_2O	7	(3)