

Crop, feed and by-product supply and use in Scotland

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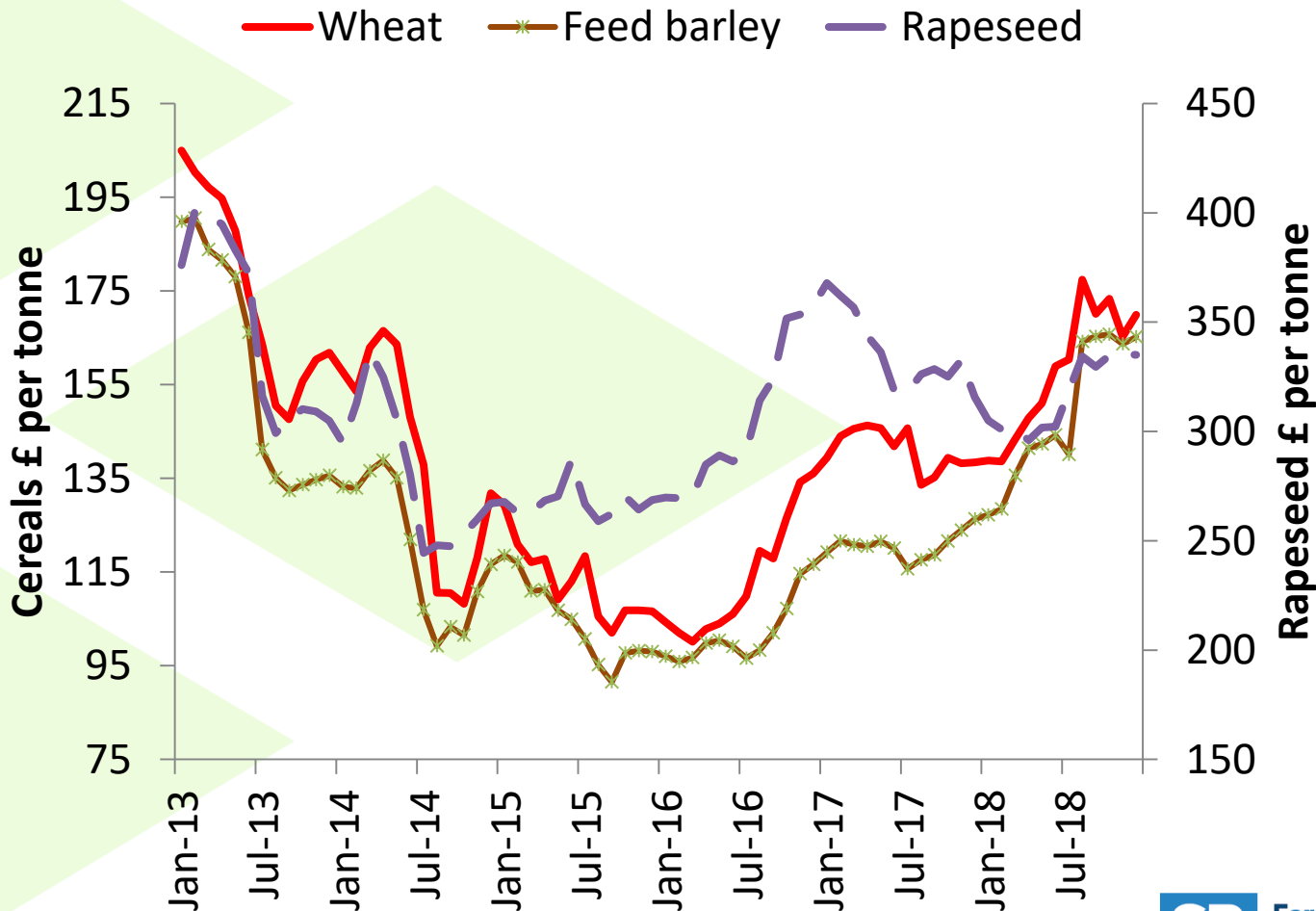
Outline



- 1) Introduction
- 2) Crop production
- 3) Agricultural arisings
- 4) Livestock feed use
- 5) Cost and business issues

Grain and feed prices are volatile – driven by world events

prices at 5 yr high in 2018



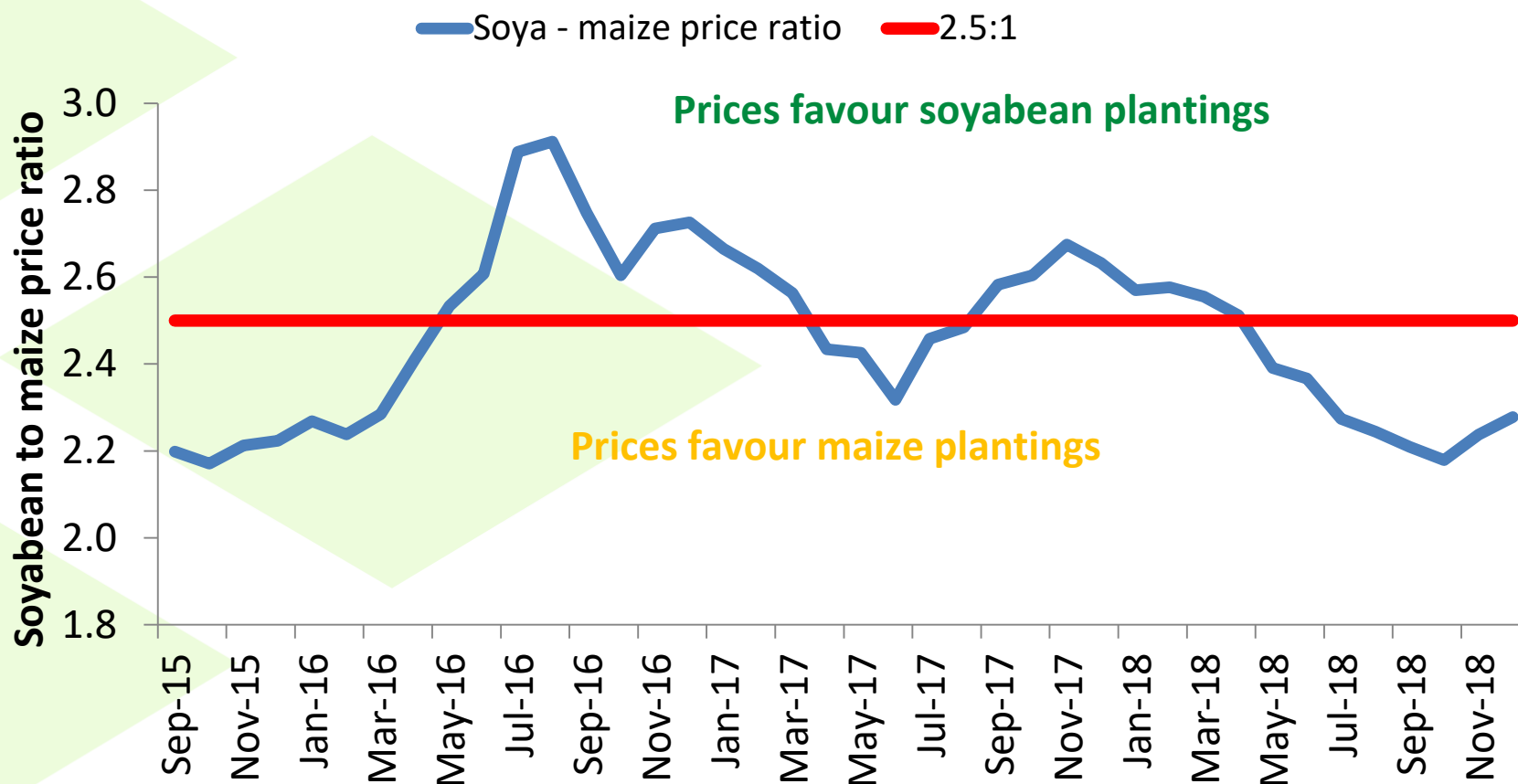
Source: AHDB, SAC Consulting



Farmers respond to price – if growing cricket food pays; they'll plant it!



- e.g. grain / oilseed area changes on relative prices

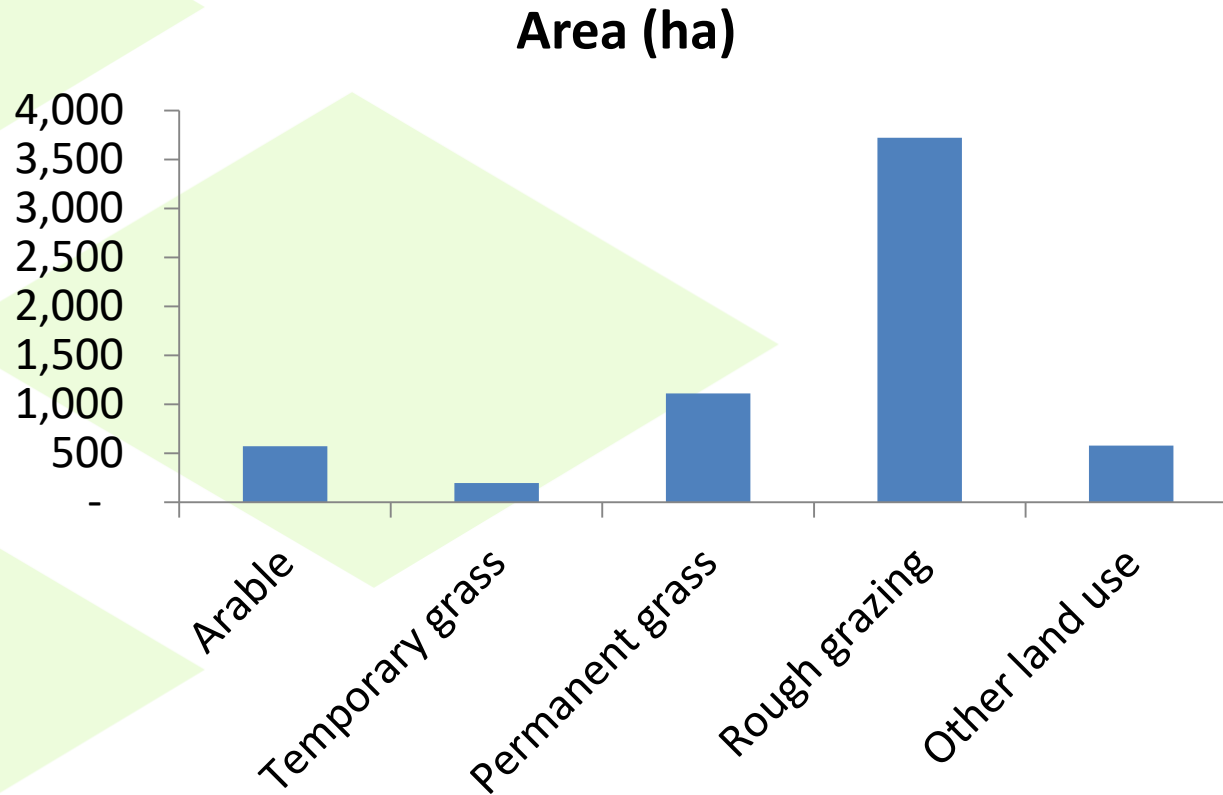


Source: AHDB, SAC Consulting

Scottish land use – agriculture 73% of total



Agricultural land use

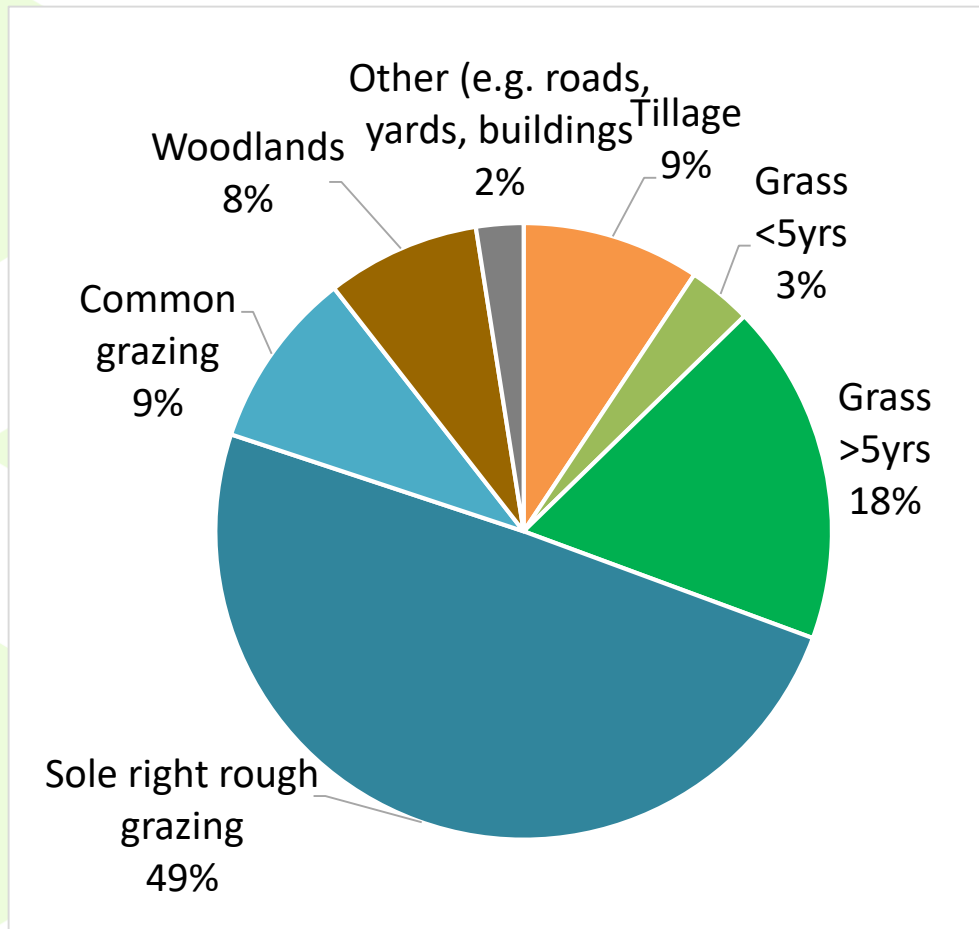


Source: Scottish Government

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Agricultural land use

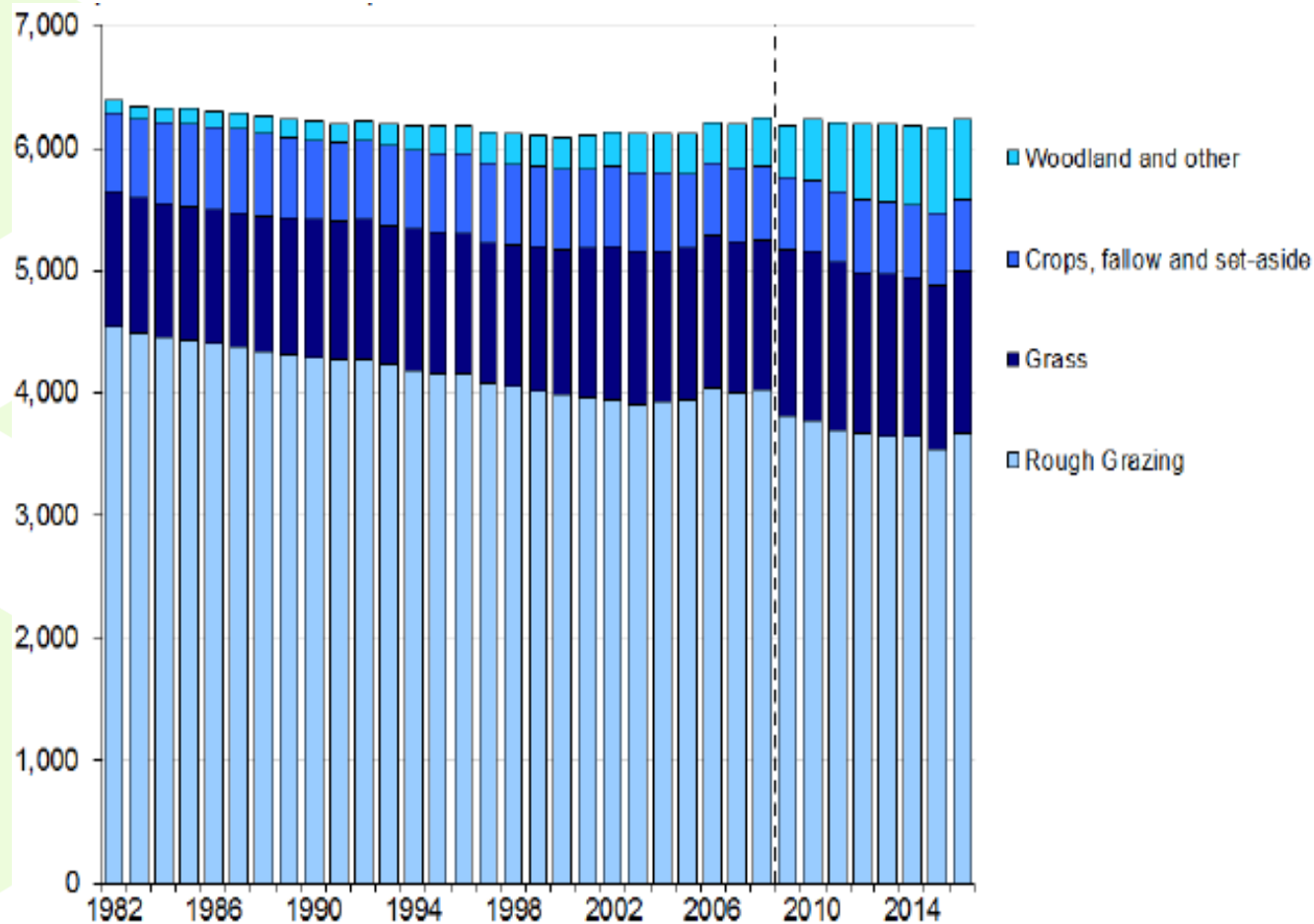


Source: Scottish Government

Scottish agricultural land use trends – loss of rough grazing, rise in woodland



Agricultural land use



Source: Scottish Government

Scottish land use – arable cropping – cereals dominate



Arable crop area 2018

	Area ('000's ha)	Share (%)
Barley	288	50%
Wheat	100	17%
Other cereals	38	7%
Oilseed rape	33	6%
Pulses	2.5	0%
Potatoes	27.4	5%
Forage crops	16	3%
Vegetables	18.9	3%
Soft fruit	2.1	0%
Other crops	9.9	2%
Fallow	37	6%
	572.8	

Source: Scottish Government

Grass dominate overall feed stock output

- grass 63%, cereals & straw 37%



Estimated production of crops, grass and timber

	Fresh weight (t)	DM (%)	Dry weight (t DM)	Share of total resource (%)
Cereals	2,859,000	85%	2,430,150	24%
Straw	1,666,000	80%	1,332,800	13%
Preserved forage	6,779,196	28%	1,882,788	18%
Grazed grass	19,997,568	23%	4,599,441	45%
	31,301,764		10,245,179	

Source: SAC Consulting

Estimated feed demand in Scotland 8.3mt DM

- concentrates (cereals, oil and protein meals)

- forage – grass, preserved grass (hay/silage), straw



SRUC

CONCENTRATE

Barley	1,278,984	1,087,137	85%
Wheat	307,429	261,315	85%
By-products	81,383	73,244	90%
Soyameal	242,014	217,813	90%
Other proteins	342,656	308,390	90%
Fishmeal	4,692	4,223	90%
Vegetable oil	11,782	11,782	100%
		<hr/>	
		1,963,903	

FORAGE

Silage	6,273,614	1,380,195	22%
Hay	505,582	429,745	85%
Straw	322,576	274,189	85%
Grazed grass	19,213,398	4,226,947	22%
		<hr/>	
		6,311,077	

Total feed

8,274,980

Source: SAC Consulting

Cattle represent 67% of feed demand

- grazing and forage main energy source
- concentrate feeds essential for pigs, poultry dairy and beef finishing, sheep at lambing



Share of the diet by source						%
	Poultry	Pigs	Dairy	Beef	Sheep	TOTAL
Energy from Concentrate	100%	100%	31%	21%	5%	24%
Energy from Silage & Hay			36%	23%	16%	22%
Energy from straw				3%	0%	2%
Energy from grazing			33%	53%	79%	53%
Total Energy Required	100%	100%	100%	100%	100%	100%
Share of national energy	5%	2%	15%	52%	26%	

Source: SAC Consulting

Feed prices – proteins

– highest quality and value in aquaculture, pigs and poultry

- ruminant proteins can be lower quality as they (gut microbes) make their own amino acids

- Fishmeal - £1,300/t
- Soyameal - £320/t
- Rapemeal - £240/t



Agricultural arisings – ZWS study; Biorefinery potential for Scotland – SRUC estimates with Ricardo



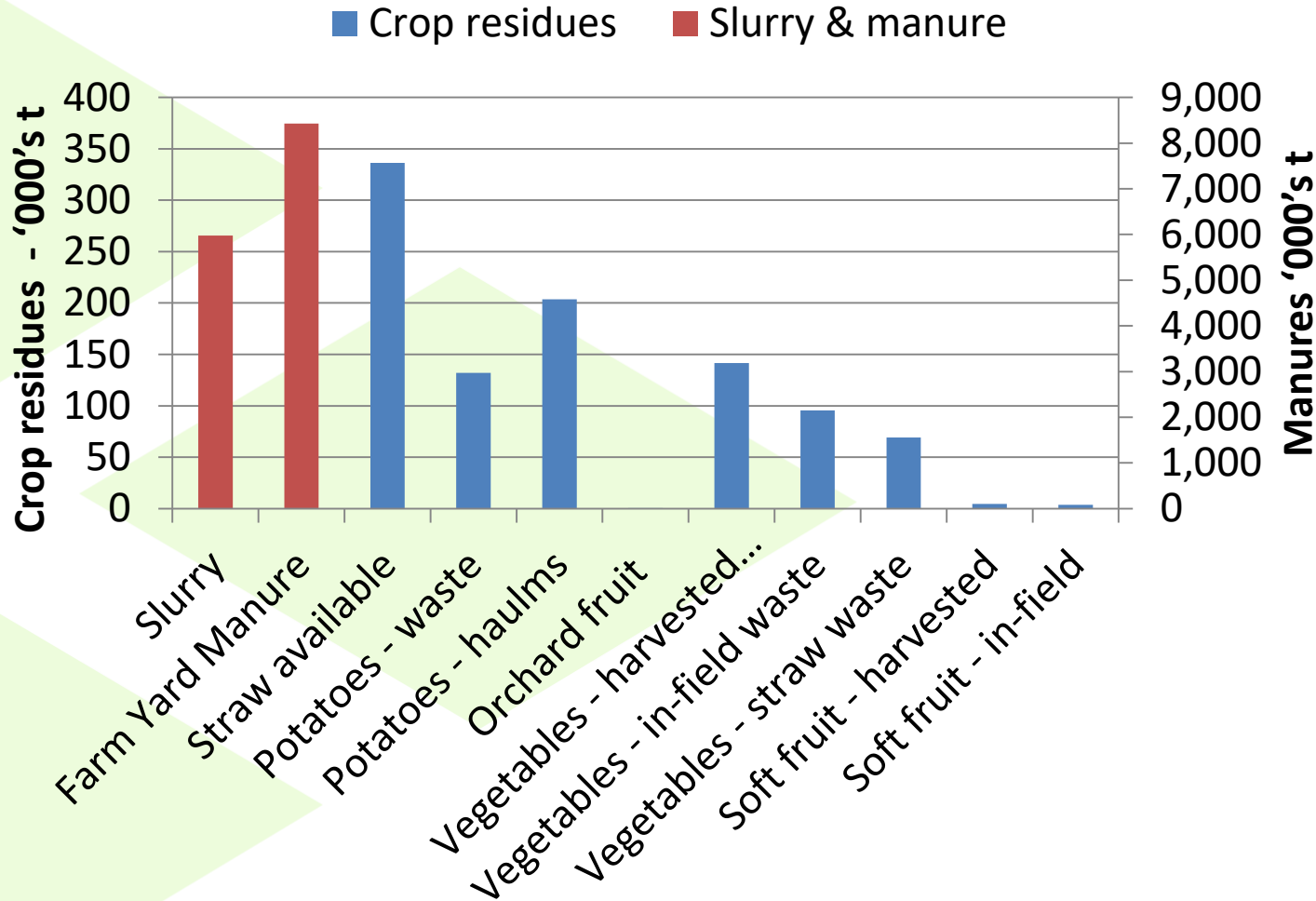
1) Manures and slurries

- Slurry - beef, dairy, pigs – mainly West st
- Manures – beef and pigs – mainly East
- Poultry litter

4) Crop by-products

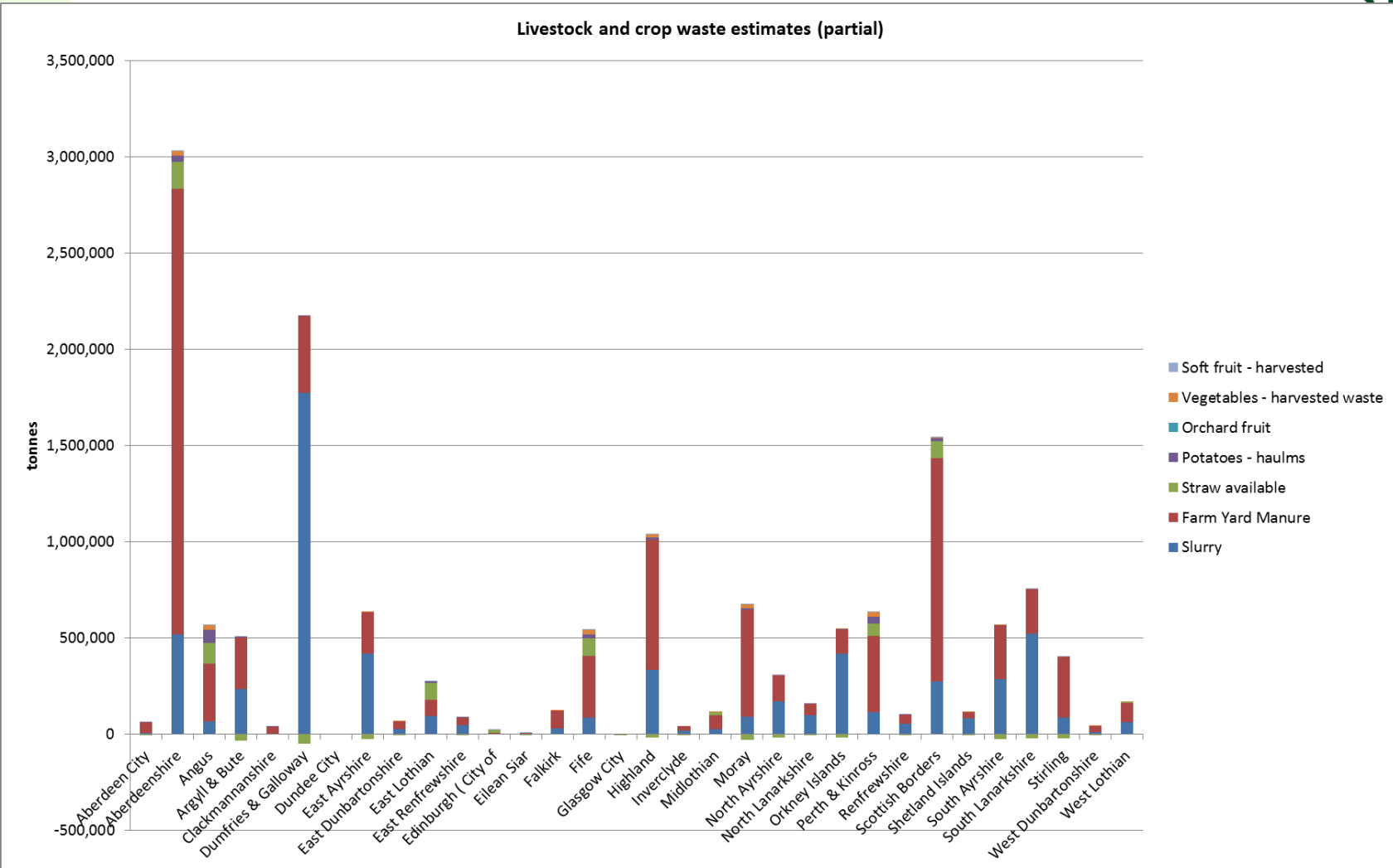
- Cereal straw
- Crop stems and residues – potatoes, vegetables
- Outgrades – potatoes, vegetables, fruit

Agricultural arisings – crop residues and livestock manures –



Source: SAC Consulting, Scottish Gov, for Ricardo and ZWS

Agricultural arisings – regional spread of resources



Source: SAC Consulting, Scottish Gov, for Ricardo and ZWS

Scottish regional straw production and use

- only a small surplus in a good year
- essential feed and bedding for livestock
- use in high value crops e.g. carrots



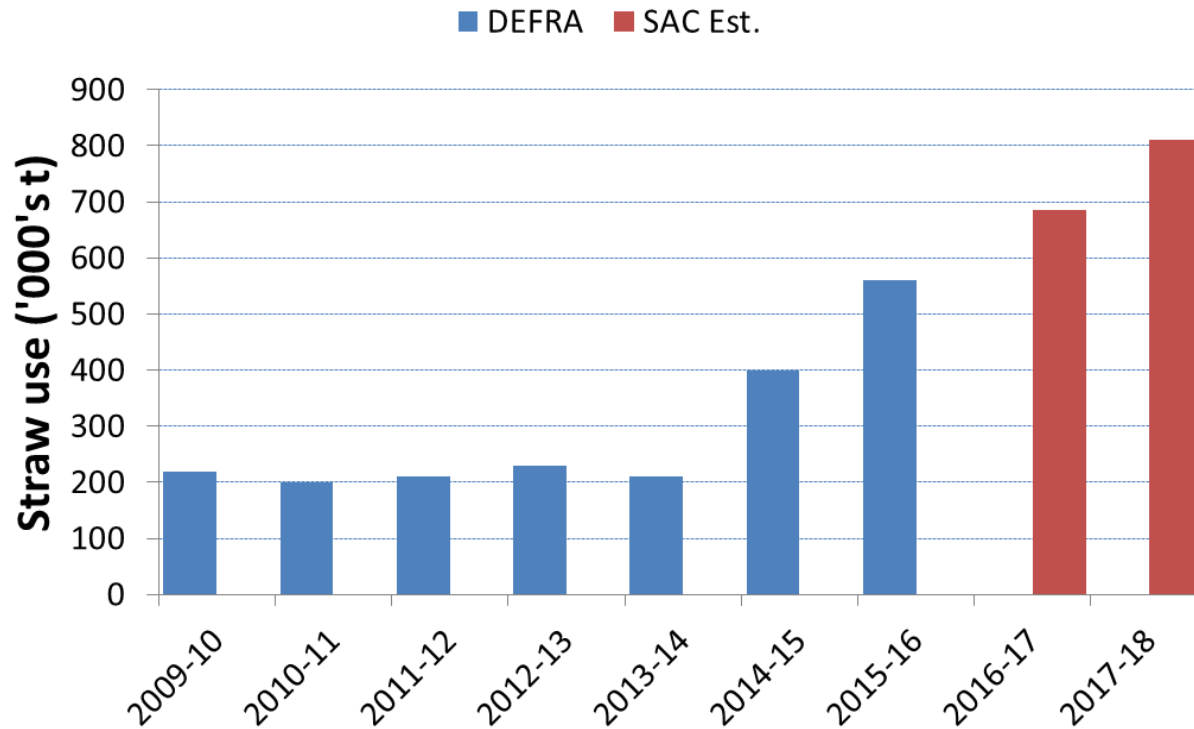
Region	Potential total straw production *	Straw use in bedding	Straw use in feeding	Straw use in carrots	Straw use total	Potential straw balance
North West	112,326	84,480	47,620	20,086	152,186	-39,860
North East	521,004	286,416	77,157	51,028	414,601	106,403
South East	877,771	231,926	70,708	99,948	402,582	475,188
South West	149,180	219,094	133,766	1,576	354,437	-205,256
Total	1,660,281	821,917	329,252	172,637	1,323,806	336,475

Source: DEFRA, SAC Consulting

UK* straw use for bio-energy growing – now accounts for ~ 10% of production – (*England)



Straw use in UK power stations



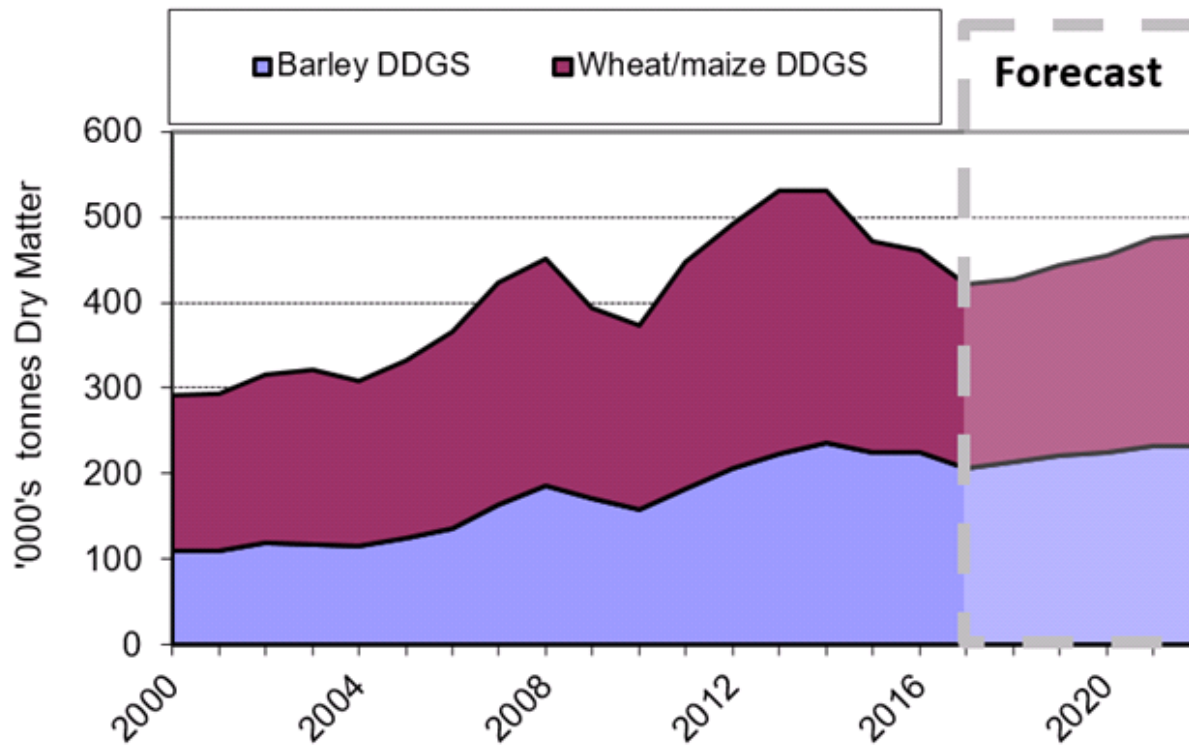
Source: SAC Consulting

Supply of distillery by-products - 443,000t in 2019



- Existing uses in livestock feed and AD
- see forthcoming report for Scottish Government

Figure 1: Estimated by-product feed output from Scotch whisky distilling



Distillery By-products Output

	000's t DM
2010	374
2011	448
2012	493
2013	531
2014	530
2015	472
2016	460
2017	422
2018	427
2019	443
2020	455
2021	474
2022	478

Source: SRUC

& Scotch Whisky Industry Review, 2017

Distillery by-products – report for Scottish government



Distillery by-products, livestock feed and bio-energy use in Scotland

A Review commissioned under the Scottish Government RESAS Policy Underpinning: Special Economic Studies - 2018/19

Prepared by SRUC

Julian Bell, John Farquhar, Mary McDowell
December 2018

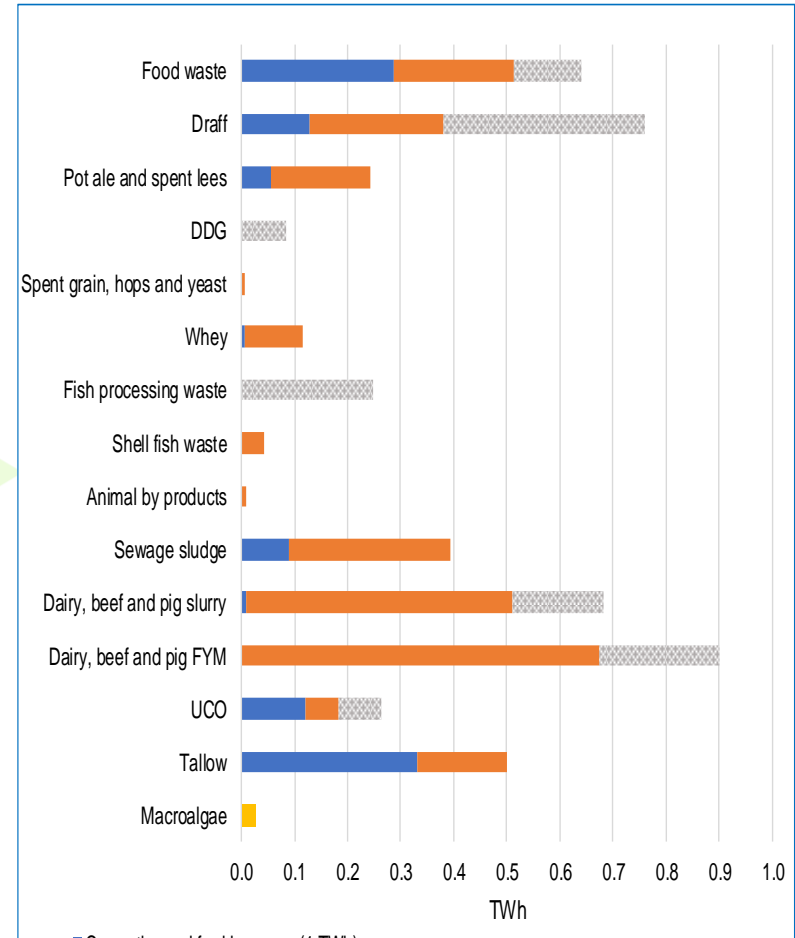
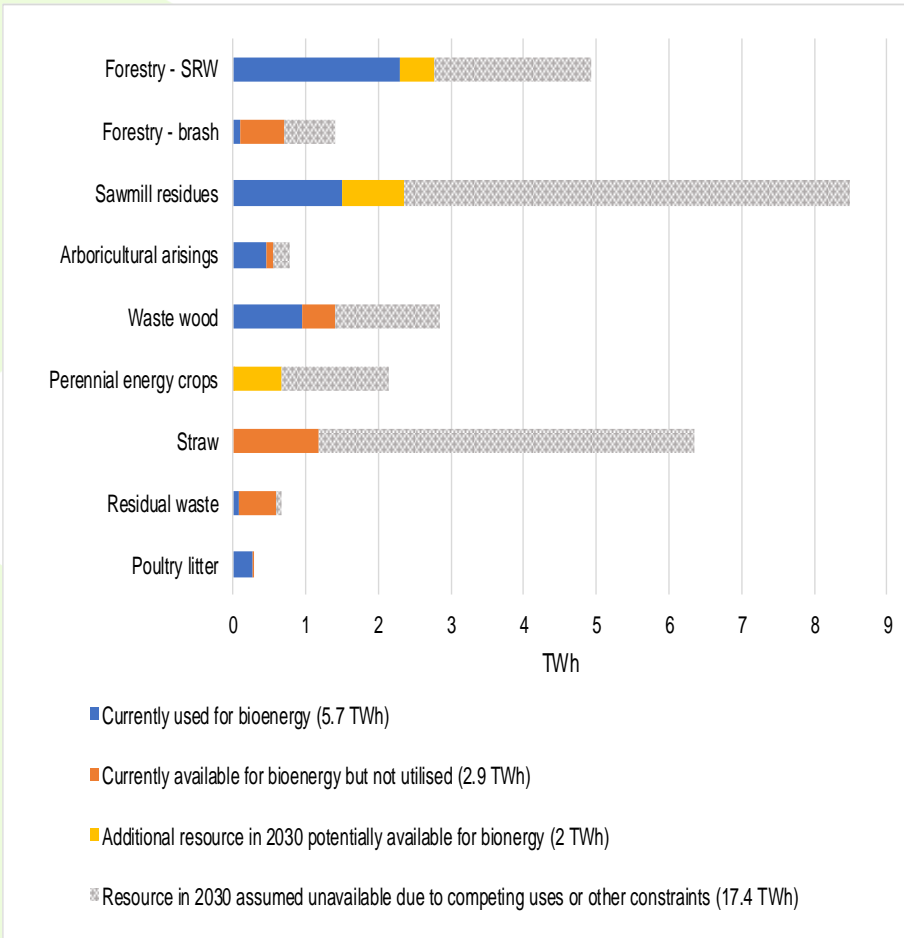


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Potential Contribution of Bioenergy in Scotland to 2030, Ricardo report for CxC, 2018



'Drier' and 'Wetter' bioresources



Potential Contribution of Bioenergy in Scotland to 2030, Ricardo report for CxC, 2018

* Resource in 2030 assumed unavailable due to competing uses or other constraints (1 TWh)

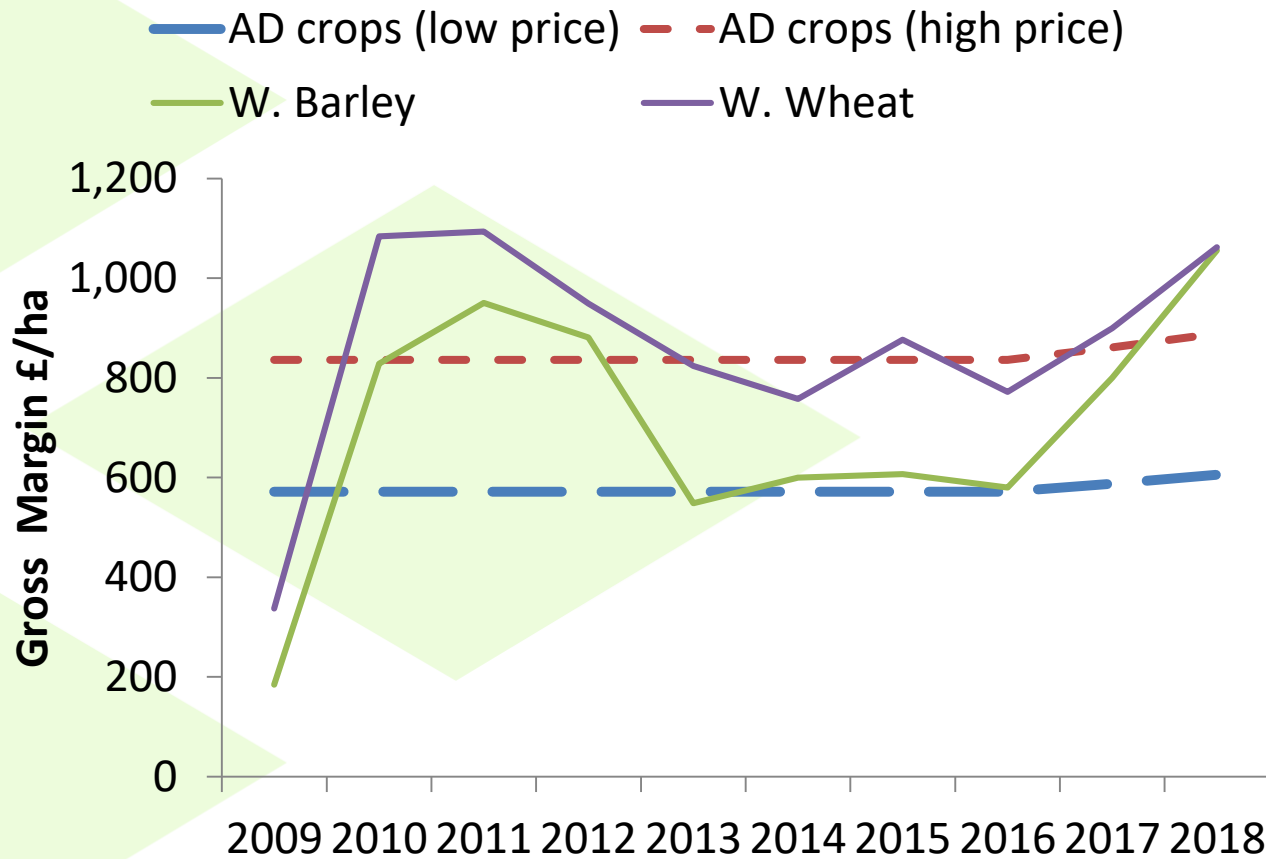
Relative crop returns - AD crop returns and contracts



- **Prices for feedstock vary widely reflecting:**
 - Crop type and dry matter
 - Price basis – standing, delivered, area payment
 - Plant specific - machinery operations, digestate value
 - FIT/RHI Tarriff rate of AD plant
- **Indicative price range – market not well defined:**
 - standing £65 to £85/t DM,
 - delivered £85 to £105/t DM
 - (vs wheat at £185/t DM, straw at £130/t DM delivered)*
- **Spreading the workload:**
 - Wholecrop cereals - early entry for rape
 - Grass silage, use of contractors

AD crop contracts

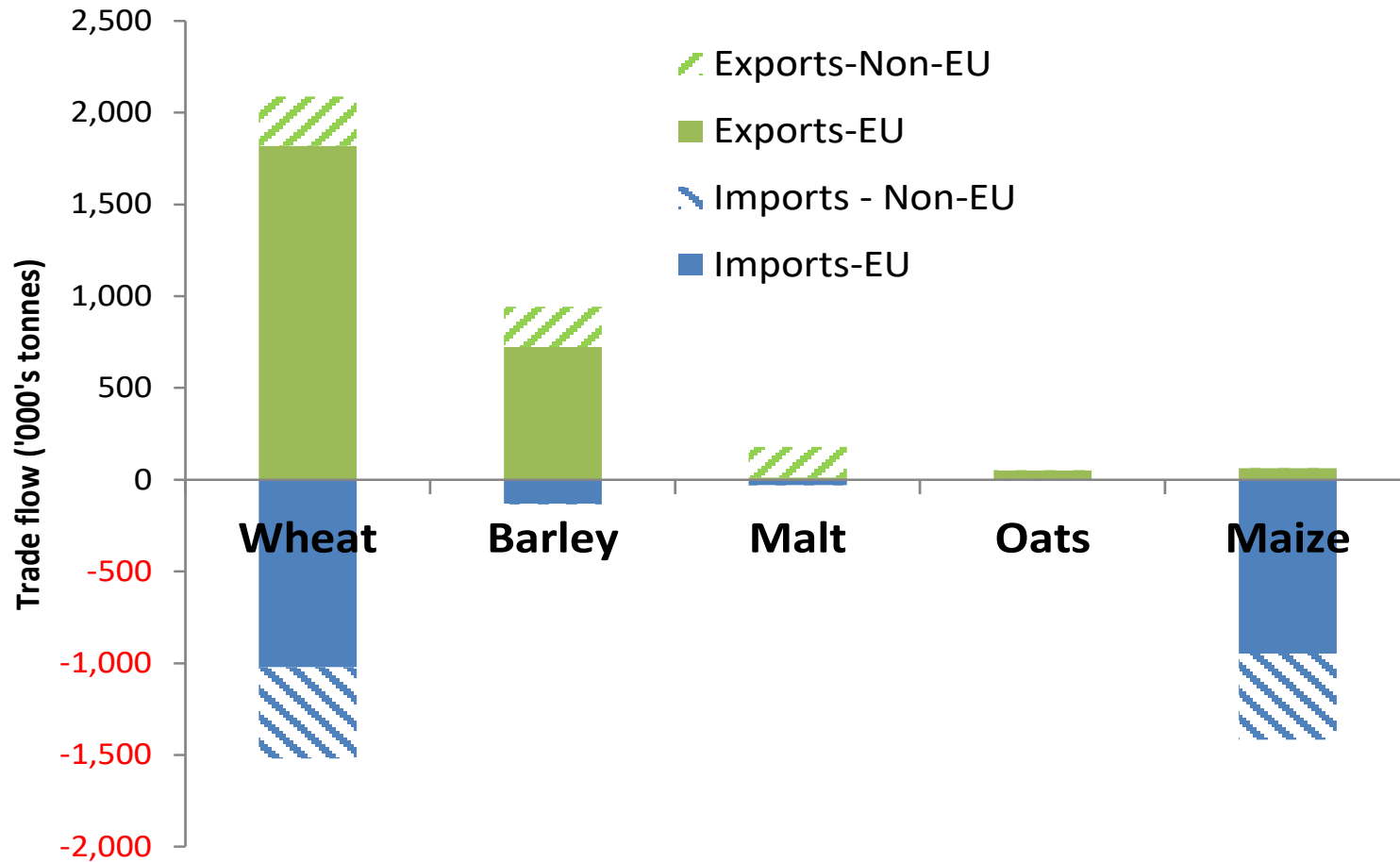
Depending on contract prices / relative yields, may beat winter barley / second wheat



Source: SAC Consulting

Trade with EU critical for agriculture

– e.g. 70-80% of UK grain imports /exports



Source: 5yr average, AHDB. SAC Consulting

Future subsidy post Brexit

- some clarity to 2022, beyond?



- **UK** - 2019 to 2020 – as is (cut to LFASS in Scotland)
- **Scotland**
 - - 2021 to 2023 – continue Direct Payments system, some changes,
 - > Post 2023 + continue with Direct Payments? Would coupled payments be allowed – SUSS, SBCS? Simplification? More Public Good?
- **England**
 - - 2020 to 2027 – England phase out Direct Payments
 - - >Post 2028 - England move to “public money for public goods”

Nobody knows what's going to happen

- can you lower risk / increase resilience?



1. Increase financial resilience

- Move loans from short term to long term
- Delay investment, hold cash

2. Diversify markets and income

- Favour dual use varieties, e.g. swop hard feed wheat for good soft distilling, yield penalty but choice of two markets
- Diversify income – AD crops, off-farm income

3. Minimise Apr – Jun trading exposure

- Forward buy essential spring inputs before March – seed, fert, agchem, fuel where feasible
- Consider risks for holding grain unsold after March

Summary



- 1) **Introduction**
- 2) **Crop production** – cereals and grass dominate
- 3) **Agricultural arisings** – slurries and manure mainly,
- 4) **Livestock feed use** – competition for feedstock, market for high quality protein – pigs and poultry mainly
- 5) **Cost and business issues** – feedstocks face competition with existing livestock and bio-energy use, farmers will respond to price, pressure for farmer to diversify growing