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Focus Site Project Report and Enterprise Costings

For

Alun Thomas
Upper Pendre
Llangorse
Brecon
LD3 7TT

Prepared by:
Rhidian Jones

for

Kite Consulting
Dunston Business Village
Dunston
Staffordshire
ST18 9AB

Date: September 2017

Tel: 07889 182 364

Email: rjlivestocksystems@btinternet.com





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Appendix 1 Enterprise Gross Margins



1 Executive Summary

- ☐ Upper Pendre is a 180 ha (450 acre) mixed farm with a dairy herd of 180 cows, beef cattle and also grows a significant acreage of cereals, mostly for home use.
- ☐ The enterprise mix of the farm and how the farming systems have evolved means there are many transfers of livestock and crops between enterprises which makes it difficult to determine which enterprises are performing best. In 2017 significant effort was undertaken to provide information that would at least make a start on the task of benchmarking each enterprise.
- ☐ In addition, as part of a Farming Connect project (focus site) the farm has grown winter Rye in 2016-17 to determine its suitability for use in Wales. While the crop has been grown and harvested this project will continue as the grain quality & feed value needs to be determined as well as evaluating livestock performance.
- ☐ Analysis of Gross and Net Margins suggest that the dairy herd is the best use of the land, followed by the growing of wheat.
- ☐ However, as a true mixed farm there are many issues that also come into the equation such as fitting into a rotation, spreading workload, fertility building leys and provision of FYM etc.
- ☐ The winter rye does not look favourable in this report but one year is not enough to provide the definitive answer as to its suitability.
- ☐ While the dairy herd shows the best return, there will be a major investment required in the next 5 years or so to upgrade the milking plant. This will require a detailed investment appraisal and advice from specialist dairy consultants such as Kite Consulting.
- ☐ A suckler beef system is not the best use of land on a heavily stocked farm. However, a system of finishing beef cross dairy bred cattle could still be part of the system.
- Were the decision to be taken to get out of dairy production due to the level of investment required, potential for more future milk price fluctuations and lack of interest from the next generation then the next best option would be to continue with arable cropping, which seems to be very productive and efficient. Increasing the suckler herd on such a good farm would not, in my opinion, be a good option and there may be more money to be made at considerably less risk in rearing dairy heifers. However, I appreciate that this does not give the level of job satisfaction as keeping one's own herd of cows.
- ☐ This report is a good starting point for future record keeping and benchmarking. It is recommended that full use of industry tools such as Farmbench be made in future. It is likely that the suite of systems will soon also encompass dairying as well as arable and livestock.



2 Background

Upper Pendre is situated on the edge of the village of Llangorse near Brecon. It is a mixed dairy, beef and arable farm of 180 hectares (450 acres) of which half is ground suitable for cropping. The land is a mixture of owned and rented land. The farm rises to 700 ft a.s.l. and has 30 inches of rainfall per annum. The soils are mainly red sandstone loams which are generally quite robust but can be prone to compaction and poaching. The grassland and forage on the farm comprise of 92 ha (230 acres) of permanent and rotational grassland.

There is a dairy herd of 175 Friesian cows of which 80 are bred pure to produce replacement dairy heifers with the remainder crossed to beef bulls. Black & White dairy bull calves are reared on a bull beef system while the beef crosses are either used as replacements for a suckler herd of (currently) 38 cows or are finished. The progeny of the suckler herd are also finished on farm. TB restrictions generally preclude selling of store cattle although they could be sold to TB finishing units.

The dairy herd averages 9,000 litres and has a calving index of 411-417 days. It requires around 40 replacement heifers each year. Recently there have been issues with mastitis that has raised the culling rate so Genus RMS service has been used to improve conception rates and produce more dairy heifers. Due to the mixed farming system, the dairy cows are not extreme dairy type and some effort is made to retain more “beefy” qualities. The beef systems are rather complex with several sources of beef cattle requiring different management, exacerbated by the All Year Round calving nature of the dairy herd-

- ☒ Black & White bull calves finished on a bull beef system
- ☒ Dairy cross beef bull calves (and some heifers) finished from 18-24 months
- ☒ Three quarter bred beef cattle from the suckler herd

The arable crops grown are all winter sown and usually comprise 40 ha of wheat, 20ha of barley and 16 ha of triticale. However, difficulty in sourcing quality triticale seed has resulted in the farm growing 6 ha of rye in 2017 as a trial crop. This is of interest to Farming Connect who would like to determine its suitability as a crop for Welsh conditions. The next section outlines the project in more detail. A typical arable rotation would be 2 years (sometimes 3) of temporary grass, followed by 2 wheat crops and one other cereal before being put back into grass again. Most of the grass is sown in the autumn although some 30 hectares of winter stubbles are left for FYM and are reseeded in spring. Some of the home-grown wheat is treated with Maxammon (Urea based additive) to raise protein levels and preserve the crop. It also ensures an alkaline product for the dairy cows to assist with rumen function to offset acidic feeds like grass silage or barley. All home grown straw is used on the farm.

This report will outline the findings of the Rye crop to date, including yield and Gross Margin. It does not include agronomy details which was carried out by another party. As yet the grain has not been analysed for feed quality and it has not been fed to stock so no performance data is available.

The report also gives Gross Margins for the arable crops to compare with the rye and also has enterprise costings for the livestock enterprises in as much detail as is possible with the data provided.



3 Farming Connect Project - Does Rye have a Role in Wales?

Project aims:

- ☐ Evaluate the suitability of rye as a combinable cereal in Welsh growing conditions, how rye fits into a cereal rotation, and its suitability as a cattle feed.
- ☐ The project will focus on the agronomy needs of the trial Rye crop throughout its establishment and growing phases through to harvest, evaluating its suitability to the environment and comparing the required inputs against those required by other cereal crops.
- Rye will be grown during winter 2016/17, with careful recording throughout its growth phases, in the form of photographs and agronomist's records, following the success, or otherwise, of the crop.
- ☐ The grain and straw yields of the crop will be measured and the quality analysed and benchmarked against more traditional cereal crops. This will allow cost of production comparisons to be made and a feed value generated.
- ☐ The crop quality will be analysed as a livestock feed, and compared to alternative cereal feeds to evaluate its suitability as part of a feed ration to both dairy and beef cattle. The performance of livestock fed the Rye will be monitored.
- ☐ The project will evaluate whether Rye could have an on-going role on the host farm, beyond the trial crop, and whether it could create new opportunities for other farmers to reduce their cost of production or add value within their system.

4 Issues to cover in this report

- Several integrated enterprises on a mixed farm that make evaluation of physical and financial results difficult due to internal transfers of livestock and crops and allocation of input costs.
 - Dairy herd of 180 cows
 - Calf and replacement heifer rearing
 - Suckler herd bred from dairy x beef
 - Beef finishing systems
 - Dairy bred- pure dairy bulls and beef crosses
 - Suckler bred beef
 - Grassland, permanent and temporary
 - Arable crops
 - Barley
 - Wheat
 - Rye & triticale
- Next generation returning to farm
- A need to focus on what the business is good at and what makes money
- Major reinvestment in dairy infrastructure is required

Proposal

- Provide Alun Thomas with templates to fill in as much financial detail as possible from the last full year's accounts as well as the current (recently completed?) accounts. Templates for physical inputs and outputs from each enterprise and allocation of fixed costs
- Carry out enterprise benchmarking exercise to Gross Margin level and beyond if possible.



- ☐ Allocate fixed costs as accurately as possible based on the information given
- ☐ Evaluate enterprise efficiency and profitability and comment on whether the enterprise mix can be improved upon with consideration to the objectives of the farmers.
- ☐ Provide a Gross Margin for the Rye crop as it is of interest to Farming Connect

Enterprise Templates Provided

- ☐ Grassland
- ☐ Arable crops
 - Barley
 - Wheat
 - Rye & triticale
- ☐ Dairy cows
- ☐ Calf and heifer rearing (youngstock)
- ☐ Suckler cows
- ☐ Finishing beef from suckler herd and beef cross from dairy herd
- ☐ Finishing beef from dairy bull calves
- ☐ Other income + Overheads

5 Benchmarking

Benchmarking is useful for a number of reasons

- ☐ Instils a discipline to keep records of enterprise performance so that the most profitable enterprise mix can be found. On a farm such as Upper Pendre where most of the land is of good quality this can help to find the most profitable return per hectare.
- ☐ Enterprises can be compared on the farm to previous years and will help with forward budgeting. This is probably the best use of benchmarking when a farm is commencing detailed recording of enterprises.
- ☐ Enterprises can be compared to industry standard data (AHDB, FAS etc) and with budgeting publications like John Nix, SAC Farm Management Handbook or ABC Costings book.
- ☐ Highlights weaknesses that can be improved and strengths that can be built upon.

Taking one year in isolation can be a useful starting point but ideally 2-3 years needs to be looked at so trends can be seen and isolated events can be discounted or averaged over the years. These might include low milk price, disease outbreaks or crop failure due to weather etc.

Arable enterprises are relatively straightforward to determine return per hectare while livestock enterprises can be more difficult as some land may be grazed by several classes of stock and silage/forage may be used among different enterprises. The templates provided asked for an estimate of the forage area, the tonnage of silage as well as the tonnage of grain used by each enterprise. This will provide an initial look at what gives the best return per hectare on this farm.



6 Overhead allocation

The template also asked for an allocation of overhead costs to each enterprise based on the current best estimates of how each enterprise uses labour, power etc. This allows a Net Margin to be calculated, effectively how profitable each enterprise is after overheads but not including subsidy income. Allocating overheads is one of the most difficult exercise involved with any farm accounts or benchmarking and often early attempts are nothing more than a best “guestimate”. However it provides a starting point on which more accurate allocations can be based on in future.

It is important to realise that a farm such as Upper Pendre is a true mixed farm and often it is the combinations of all the enterprises that make the whole farm system work. Saying that (for example) winter wheat is, on paper, the most profitable use of a hectare does not consider the fact that the short-term rotational grass (utilised by livestock) helps build fertility for the wheat crops or that the FYM obtained by bedding livestock on straw from the wheat helps to reduce fertiliser costs. In addition, it may justify having extra labour on the farm that is used to bed and feed livestock, relief milk etc when there is no arable work to be done. Also where there is a beef system on a dairy farm they will benefit from the feeding equipment and extra machinery that is there primarily for the dairy herd. A standalone beef unit may not justify having such overheads available.

Nevertheless, it is a valid and interesting exercise to carry out the profitability of each hectare as a starting point for further discussion and as a crucial part of the decision-making process. All transfers of livestock and crops in this report have been done at the full commercial value that could have been realised had they been sold on the open market.

Overhead allocation at Upper Pendre % of total costs

	Labour	Power/mach	Property/admin	Rent/finance
Dairy herd	55	55	80	45
Arable	20	20	5	40
Beef	25	25	15	15



7 Crop costings

Gross Margin data has been provided for the 2016 and 2017 harvest years while Net margin data is only available for the most recent year. Comparative data has been provided by Richard Meredith, AHDB Cereals & Oilseeds Knowledge Exchange Manager for the West and Wales. Data for the 2016 harvest year only is currently available. In addition, he has provided results of a Triticale trial on the Herefordshire arable monitor farm for the 2015 harvest year.

Winter wheat data/£/ha

	Upper Pendre 2015-16	AHDB 2016 average	Upper Pendre 2016-17
Grain yield t/ha	8.75	8.49	9.5
Output/ha	1327.50	1138.72	1497.50
Variable costs			
Seed	73.77	62.00	82.30
Fertiliser	190.50	210.00	155.00
Sprays & chemicals	292.00	205.00	192.00
Other costs	21.88	15.00	23.75
Total	578.15	492.00	453.05
Gross Margin/ha	749.36	646.72	1044.45
Overheads			
Labour			266.76
Mach dep			65.51
Mach rep			133.38
Fuel & power			58.73
Contractors/hire			32.71
Property/admin			15.72
Rent & Finance			158.89
Total			731.70
Net Margin/ha			312.75

Assumptions (applicable for all crops)

- ☐ Grain has been valued at what the farm could sell it for (or what it would have cost to buy in)
- ☐ Triticale has been valued at wheat price, Rye at barley price (discussion with farmer)
- Straw has been valued at £75/tonne
- Grain drying is £2.50/tonne (usually 2% drying from 16% to 14% is required @£1.25/1%/tonne)
- ☐ Overheads allocated according to earlier breakdown then by % of each crop grown. All cereals are winter sown with similar establishment methods & cultivations.
- See Appendix 1 for full Gross Margins & sensitivity analysis (yield and £/tonne)



Winter barley data/£/ha

	Upper Pendre 2015-16	AHDB 2016 average	Upper Pendre 2016-17
Grain yield t/ha	7.8	6.7	8
Output/ha	1209.60	847.00	1284.25
Variable costs			
Seed	50.31	69.00	81.07
Fertiliser	148.00	146.00	123.00
Sprays & chemicals	130.00	133.00	215.00
Other costs	19.50	12.00	20.00
Total	347.81	360.00	439.07
Gross Margin/ha	861.79	487.00	845.18
Overheads			
Labour			268.29
Mach dep			60.85
Mach rep			134.14
Fuel & power			59.07
Contractors/hire			32.90
Property/admin			15.80
Rent & Finance			159.80
Total			730.85
Net Margin/ha			114.33

Winter triticale data/£/ha

	Upper Pendre 2015-16		Upper Pendre 2016-17
Grain yield t/ha	8.5		7.75
Output/ha	1395.00		1326.25
Variable costs			
Seed	70.74		69.69
Fertiliser	190.50		155.00
Sprays & chemicals	140.00		76.00
Other costs	21.25		19.38
Total	422.49		320.07
Gross Margin/ha	972.51		1006.19
Overheads			
Labour			269.94
Mach dep			61.27
Mach rep			134.97
Fuel & power			59.43
Contractors/hire			33.10
Property/admin			15.91
Rent & Finance			160.78
Total			735.40
Net Margin/ha			270.79



Winter rye data/£/ha

	Upper Pendre 2015-16		Upper Pendre 2016-17
Grain yield t/ha			6.9
Output/ha			1055.40
Variable costs			
Seed			52.29
Fertiliser			123.00
Sprays & chemicals			243.00
Other costs			17.25
Total			435.54
Gross Margin/ha			619.86
Overheads			
Labour			276.29
Mach dep			62.69
Mach rep			138.15
Fuel & power			60.83
Contractors/hire			33.88
Property/admin			16.28
Rent & Finance			164.57
Total			752.69
Net Margin/ha			-132.83

Summary

- ☐ Wheat & triticale are the most profitable crops.
- ☐ All crops have an above average Gross Margins/hectare
- ☐ All crops except rye have a positive Net Margin.
- ☐ In 2017 Rye has not been as successful as triticale due to lower output and higher variable costs.
- ☐ Analysis of the feed value of and livestock performance on the Rye has yet to be determined.



8 Livestock costings

Currently there is only enough data provided to compile a Gross & Net Margin for the dairy herd. Ideally the same should be carried out for the youngstock rearing system and the various beef enterprises. However, it is unlikely that these will surpass the dairy enterprise in terms of financial performance.

Dairy Costings (2016-17) £/cow

	Upper Pendre	Wales FAS 15-16 herds>150 cows	Wales FAS 15-16 All herds	Wales FAS top third herds 15-16
Output	2,158	1,716	1,731	2,242
Variable costs				
Concentrates	669	495	509	607
Vet & medicine	177	64	65	65
Other costs	187	177	176	203
Forage costs	69	177	179	174
Total	1,102	913	929	1,049
Gross Margin/cow	1,056	803	802	1,193
Gross Margin/ha	2,862	1,384 (extrapolated from available data)		
Overheads		Not available	Not available	Not available
Labour	346			
Mach dep	78			
Mach rep	173			
Fuel & power	76			
Contractors/hire	42			
Property/admin	119			
Rent & Finance	84			
Total	918			
Net Margin/cow	138			
Cows per hectare	2.71			
Net margin/ha	375			

Summary

- ☐ High input- high output herd with high inputs of concentrates
- ☐ High V&M costs due to mastitis issues?
- ☐ Achieving top third performance to Gross Margin level
- ☐ High stocking rate as rotational grass is high performing and purchased/home grown feed use is high (reduces the acreage of forage required and raises the stocking rate and GM/ha used)
- ☐ A dairy consultant would be best placed to analyse and fine tune dairy performance



9 Discussion

Performance per hectare (£)- 2016-17

	Dairy	Wheat	Barley	Triticale	Rye
Output	5,848	1497	1284	1326	1055
Variable costs	2,986	453	439	320	435
Gross Margin	2,862	1044	845	1006	620
Overheads	2,488	732	731	735	753
Net Margin	374	312	114	271	-133

- ☐ Dairy produces the best returns per hectare
- ☐ Wheat is the best performing crop
- ☐ Rye does not appear to have been a success in 2017

This much is reasonably obvious from the data collected. However, there are some issues with the dairy herd that require addressing.

- ☐ The dairy plant/parlour etc is reaching the end of its productive lifespan and a decision needs to be made on its long-term replacement. This is a major investment though.
- ☐ In recent years this has manifest itself with higher than usual cases of mastitis which has partly been resolved by replacing clusters and liners etc
- The Thomas's son Tudor is also not as keen on dairying and would like to increase the beef herd. However, the returns from beef will never match that of a high performing dairy herd.
- ☐ This is especially so from a suckler herd. Suckler cows carry a high maintenance requirement and on a farm with an already high stocking rate they are an unaffordable luxury. In short, the best place for suckler cows is on more marginal or less favoured land.
- ☐ However, beef from the dairy herd in the form of beef crosses can still provide an alternative income and be profitable if some of the following ideas can be implemented-
 - Use sexed semen on the dairy herd to minimise the number of black & white bulls and allow more cows, perhaps as many as 130 to be crossed to high index beef bulls.
 - Use easy calving, fast growing beef bulls – eg Charolais, Simmental for intensive finishing
 - Bull calves can be left entire on a barley beef system, finished at 12-13 months of age or castrated but still finished on a diet of high quality silage plus grain at 15-16 months.
 - Heifer calves can be finished on a slightly more extensive system but still under 20 months. There is also the option of selling some of these a suckler cow replacements if they are the right type and breed (eg Sim cross).
 - Don't chase very heavy weights and avoid store periods. Keep the cattle growing at a good rate. If there is a grazing period then don't restrict their growth too much before turnout but DO acclimatise their rumen to a forage diet by reducing the amount of concentrates fed in the month before turnout. Also implement rotational grazing.
 - Don't be afraid of selling store if this is financially advantageous. Finishing is the least efficient part of the beef system. It takes five times as much feed to put on a kg of fat than it does to put on a kg of lean meat
 - This would considerably simplify the beef system which is very complex at present and makes benchmarking very difficult.



Appendix 1- Enterprise Gross Margins

Crop	Winter wheat						
	2015-16				2016-17		
Output	Tonnes	£/tonne	Income		Tonnes	£/tonne	Income
Grain	8.75	120	1050.00		9.5	130	1235.00
Straw	3.7	75	277.50		3.5	75	262.50
Output			1327.50				1497.50
Variable costs							
Seed			73.77				82.30
Fertiliser			190.50				155.00
Sprays			292.00				192.00
Drying		(£1.25/1%/tonne)	21.88				23.75
Total			578.15				453.05
Gross Margin							
			749.36				1044.45
Overheads (share of)/ha							
Labour							266.76
Machinery depreciation							65.51
Machinery repairs							133.38
Fuel/oil etc							58.73
Contractors/hire							32.71
Property							8.96
Admin							6.76
Rent & finance							158.89
Total							731.7
Net Margin/ha							
							312.75
Sensitivity analysis £/ha							
Grain yield		plus/minus 0.5t/ha	60.00				65.00
Price per tonne		plus/minus £10/t	87.50				95.00



Crop	Winter barley						
	2015-16			2016-17			
Output	Tonnes	£/tonne	Income	Tonnes	£/tonne	Income	
Grain	7.8	107	834.60	8	116	928.00	
Straw	5	75	375.00	4.75	75	356.25	
Output			1209.60			1284.25	
Variable costs							
Seed			50.31			81.07	
Fertiliser			148.00			123.00	
Sprays			130.00			215.00	
Drying	(£1.25/1%/tonne)		19.50			20.00	
Total			347.81			439.07	
Gross Margin							
			861.79			845.18	
Overheads (share of)/ha							
Labour						268.29	
Machinery depreciation						60.85	
Machinery repairs						134.14	
Fuel/oil etc						59.07	
Contractors/hire						32.9	
Property						9.01	
Admin						6.79	
Rent & finance						159.8	
Total						730.85	
Net Margin/ha							
						114.33	
Sensitivity analysis £/ha							
Grain yield	plus/minus 0.5t/ha		£/ha			£/ha	
			53.50			58.00	
Price per tonne	plus/minus £10/t		£/ha			£/ha	
			78.00			80.00	



Crop	Winter triticale						
	2015-16				2016-17		
Output	Tonnes	£/tonne	Income		Tonnes	£/tonne	Income
Grain	8.5	120	1020.00		7.75	130	1007.50
Straw	5	75	375.00		4.25	75	318.75
Output			1395.00				1326.25
Variable costs							
Seed			70.74				69.69
Fertiliser			190.50				155.00
Sprays			140.00				76.00
Drying	(£1.25/1%/tonne)		21.25				19.38
Total			422.49				320.07
Gross Margin			972.51				1006.19
Overheads (share of)/ha							
Labour							269.94
Machinery depreciation							61.27
Machinery repairs							134.97
Fuel/oil etc							59.43
Contractors/hire							33.10
Property							9.07
Admin							6.84
Rent & finance							160.78
Total							735.40
Net Margin/ha							270.79
Sensitivity analysis £/ha			£/ha				£/ha
Grain yield	plus/minus 0.5t/ha		60.00				65.00
Price per tonne	plus/minus £10/t		85.00				77.50



Crop	Winter rye					
	2015-16			2016-17		
Output	Tonnes	£/tonne	Income	Tonnes	£/tonne	Income
Grain				6.9	116	800.40
Straw				3.4	75	255.00
Output						1055.40
Variable costs						
Seed						52.29
Fertiliser						123.00
Sprays						243.00
Drying						17.25
Total						435.54
Gross Margin						
						619.86
Overheads (share of)/ha						
Labour						276.29
Machinery depreciation						62.69
Machinery repairs						138.15
Fuel/oil etc						60.83
Contractors/hire						33.88
Property						9.28
Admin						7.00
Rent & finance						164.57
Total						752.69
Net Margin/ha						
						-132.83
Sensitivity analysis £/ha			£/ha	£/ha		
Grain yield	plus/minus 0.5t/ha		0.00			58.00
Price per tonne	plus/minus £10/t		0.00			69.00



Upper Pendre		Dairy Gross Margin			
Number of cows		175			
				2016-17	
Output				£ total	£/cow
Milk sales				366,384.00	
Cull cows				17,020.00	
Calves transferred out				31,650.00	
Less					
Heifers transferred in				37,400.00	
Output				377,654.00	2,158.02
Variable costs					
Purchased feed				81,845.00	
Purchased bedding				9,511.00	
Home grown grain				35,100.00	
Home grown straw				4,125.00	
Vet & Med				31,002.00	
Breeding AI etc				15,678.00	
Miscellaneous				3,474.00	
Forage costs				12,072.00	
Total				192,807.00	1,101.75
Gross Margin				184,847.00	1,056.27
Overheads					
Labour				60,500.00	
Machinery depreciation				13,722.00	
Machinery repairs				30,250.00	
Fuel/oil etc				13,320.00	
Contractors/hire				7,418.00	
Property				11,824.00	
Admin				8,915.00	
Rent & finance				14,741.00	
Total				160,690.00	918.23
Net Margin				24,157.00	138.04
Hectares grass/forage used				64.40	
GM/ha				2,870.30	
Net margin/ha				375.11	