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## Focus Site Project Review

Alwyn Phillips Pen-y-

Gelli

Ffordd Bethel

Caernarfon

Gwynedd

LL55 1UH

**Prepared by:**

Rhidian Jones

On behalf of

Kite Consulting

Dunston Business Village

Dunston

Staffordshire

ST18 9AB

Date: June 2017

Tel: 07889 182 364

Email: [rjlivestocksystems@btinternet.com](mailto:rjlivestocksystems@btinternet.com)



Cronfa Amaethyddol Ewrop ar  
gyfer Datblygu Gwledig:  
Ewrop yn Buddsoddi mewn Ardaloedd Gwledig  
European Agricultural Fund for  
Rural Development:  
Europe Investing in Rural Areas



Llywodraeth Cymru  
Welsh Government

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## 1.0 Summary

### 1.1 Farm details

Pen-y-Gelli is a lowland farm, 1 km North East of Caernarfon on the B4366. There are 44 hectares (110 acres) owned and 10 hectares (25 acres) rented (16 ha rented prior to 2017). The land lies between 30m and 60m above sea level with a general North facing aspect although the ground is fairly level and does not present any problems for tractor work. Included in the total land area is a “marsh” of around 6 hectares (15 acres).

The farm has two sheep flocks, both bred pure and self-replacing. The flocks have been closed since 1989 and have a high level of Biosecurity.

- Early lambing flock of 200 Poll Dorset ewes, lambing in December/January to produce early finished lambs from mid-April onwards.
- April lambing flock of 200 performance recorded Texel ewes, producing finished lambs off grass and some (about 35 each year) purebred rams for sale to commercial flocks. The Texel flock has been performance recorded on a grass based system since the 1980's and concentrates are only fed pre-lambing.

In addition to the sheep there is a small suckler herd of 20 cows, producing store cattle.

The owner is a progressive sheep farmer having been involved in performance recording for over 30 years, CT scanning ram lambs since 1996 (has CT scanned more rams than any other Texel breeder), and has been breeding sheep from grass based systems for over 25 years. This has come into vogue in recent years with many pedigree breeders now claiming to producing breeding sheep from low concentrate/high forage systems, more suited for commercial flocks managed in a similar system.



*Alwyn Phillips*



*Pen y Gelli*

#### **Business Objectives:**

- Increase flock Output by 25% without increasing overhead costs
- To make more use of own land and reduce the amount of land rented
- To establish a cattle system that is complimentary to a grass based sheep flock

## 1.2 Project key objectives

The business has bred sheep on high forage systems since the 1980's with minimal concentrate supplementation. A key objective of this project is to not only grow more grass but to grow grass of much higher quality so that the genetic potential of the flock can be fully expressed. Currently it is felt that the flock is at a disadvantage against other performance recorded flocks that have higher concentrate inputs. With very high-quality grass available on a year round basis then the gap between growth rates can be closed significantly.

Land is at a premium in this locality with rental values of up to £200/acre (£500/ha) common for the best land. Increasing stocking rate by 20-25% is one objective that is achievable by growing and utilising 20-25% more grass of higher quality. On this farm that would equate to around 100 ewes but even higher numbers may be possible as more of the farm is subdivided and managed in the new grazing system. In 2017 15 acres (6ha) fewer have been rented giving a hypothetical (in the open market) saving of ca £2,250 (@ £150/acre) in addition to higher Gross Margin from more ewes. These are significant positive financial impacts which can be scaled up on larger farms.

## 1.3 Project achievements

The project has been a great success with the extra Gross Margin from 100 ewes being well on the way to fruition with the possibility of even higher sheep numbers to follow in future. As the flock is closed the extra ewes have been retained ewe lambs and some older ewes so full productivity from the extra ewes has not yet been reached.

The payback from the equipment can be achieved in two years which is a remarkable Return on Investment (ROI) compared to other farm investments in machinery, equipment and buildings. A partial budget has shown that the annual return on this investment is an estimated £5,582 using previous GM data as a comparison. This should be comfortably exceeded in practice as the GM per ewe should improve as well but insufficient data is available at present to quantify this.

The other achievement is that it is a positive message to enthuse farmers, young and old of the potential of producing meat from grass, in terms of increasing output, reducing costs and effectively making your farm bigger without having to buy or rent land, for which the benefit is often not fully costed, often leading to a "bidding war" to secure land of questionable quality and yield potential.

## 1.4 Project Details

The project commenced in 2016 with the objective of increasing grass growth and utilisation, leading to an increase in stocking rate of around 25% or, on this farm, an increase from 400 breeding ewes to 500. In addition to the higher amount of utilised DM the average quality of the grass should also increase as the grass will be grazed at a higher

D value (hence higher ME). Taking both these factors into account should see a hypothetical increase in ME/hectare from ca 84,000MJ (8,000 kgDM/ha x 10.5MJ/kgDM) to 115,000 MJ (10,000 kgDM/ha x 11.5MJ/kgDM, an increase in MJ/ha of 31,000 or 37%.

The method used to achieve this aim was to convert the farm from set stocking to a rotational grazing system, using purpose built electric fencing equipment from “Kiwitech”. This equipment and the system “Technograzing” were developed in New Zealand by Harry Weir and is now commercially available in the UK via James Daniels of “Precision Grazing Ltd”

In addition to raising stocking rate and sheep numbers the project also aimed to highlight the practical considerations around subdividing farms, paddock size, type of equipment, water supply etc as well as promoting the benefits of measuring grass and allocating grass to livestock very accurately according to their requirements. For this final point farm software programs were used such as FARMAX, of which James Daniels is one of the few UK consultants conversant with its use.

In 2016 24 hectares were split into 1 ha paddocks using a mixture of permanent and temporary equipment. Equipment has been purchased to enable a further 12 hectares to be subdivided in future. It is envisaged that the whole farm could be subdivided in this way in future and the cattle system may change to allow growing cattle to follow sheep in the rotation, thereby improving grass utilisation even further.



**Initial subdivision- 24 x 1 hectare paddocks. fences to be crossed**



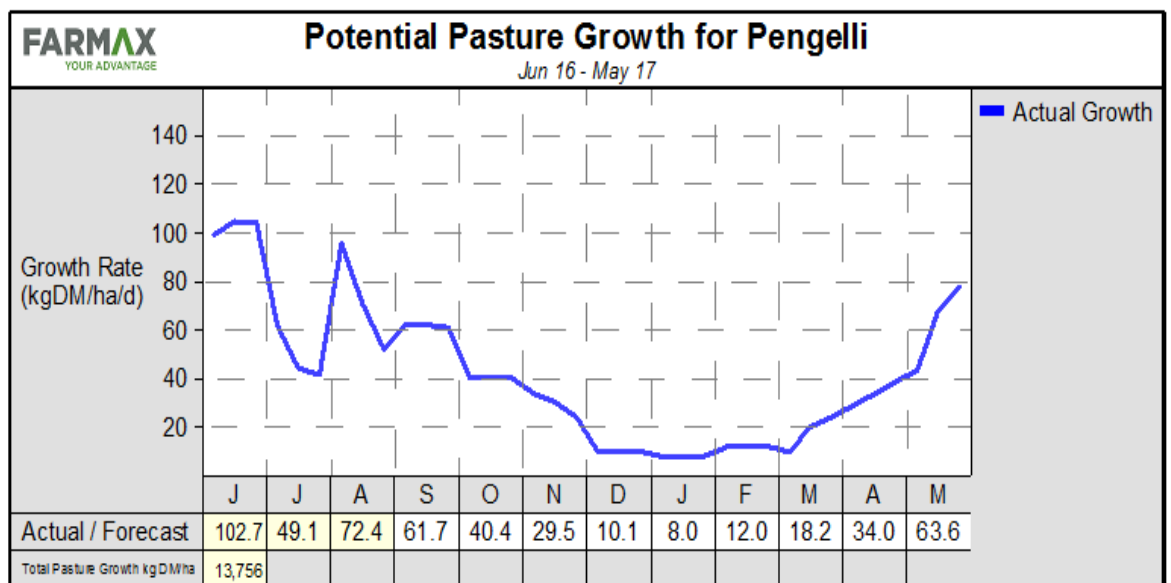
**Spring loaded wire to allow**

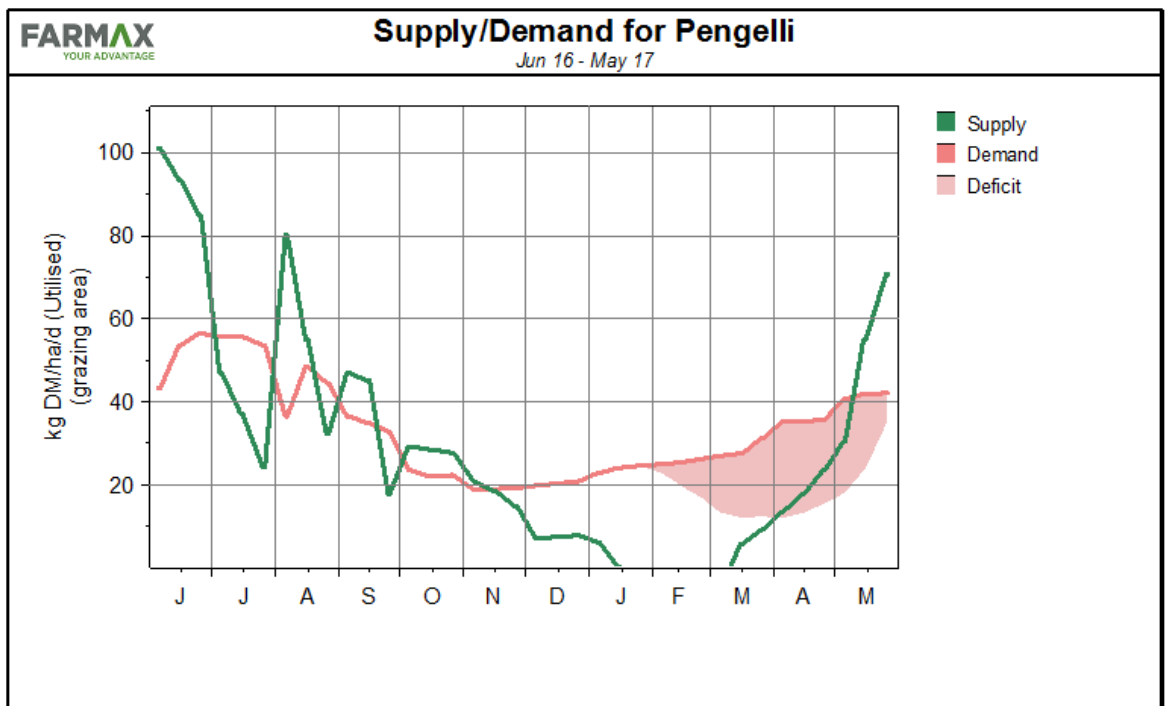
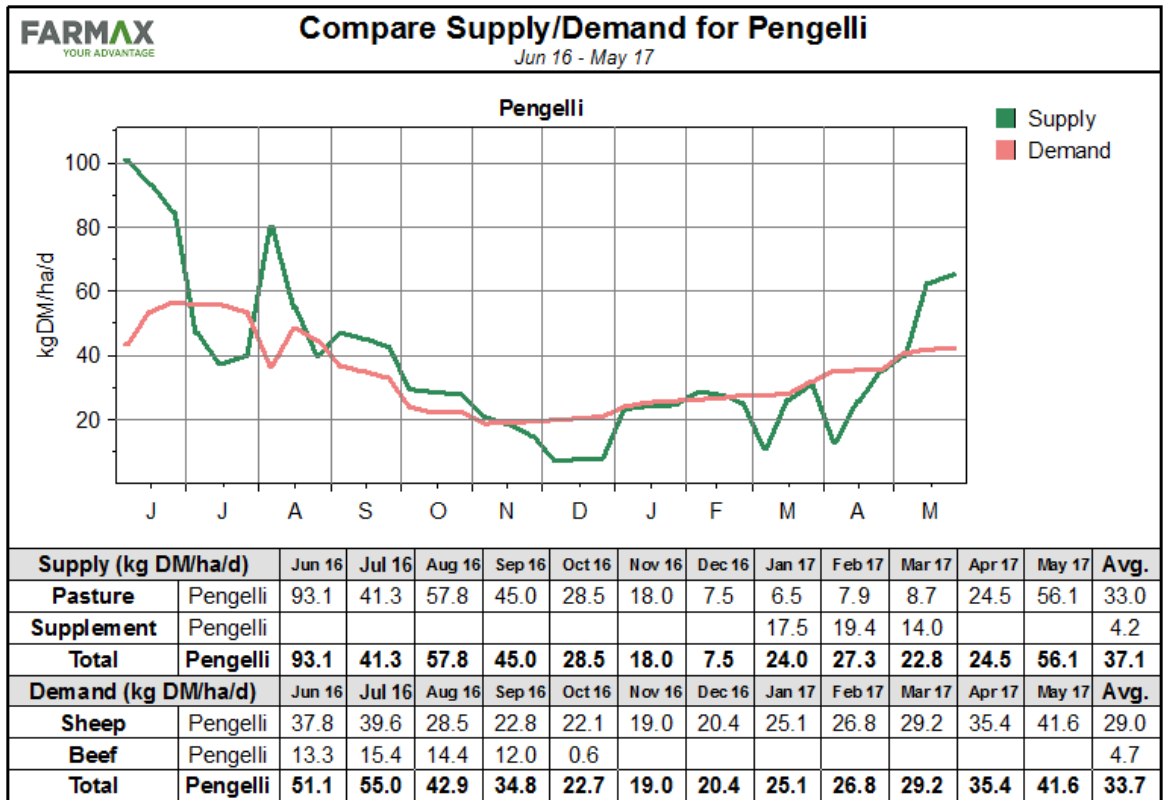
### Set up costs for initial 24 hectares

Item	Cost ex VAT £	Comment
System design	600	Farm analysis, feed budget, design, mapping,
Water system	1,613	25mm MDPE pipe, fittings, hydrants and 4 x 120l drag troughs
Fencing	3,840	3 x wires for sheep, wooden posts, HT steel wire, fibreglass posts, insulators, underground cables, switches and connectors
Mains energiser	650	15J energiser, installation and earthing
Labour	1,500	Installation, testing and commissioning of the system
<b>Total</b>	<b>8,203</b>	<b>Dep cost of £610/yr over 10 yr period + interest of £305/yr @ 5%</b>
Cost/ha (acre)	341.79 (136.72)	

### Other costs

A consultancy fee of £215/month was paid. This included the use of the FARMAX software, interpretation of regular data provided on grass cover and livestock numbers as well as an advisory note each month with action points for Alwyn to follow. These went to some considerable detail on what the grazing/feeding management should be for groups of sheep and the implications of doing so in terms of the grass budget as shown by the FARMAX graphs below.





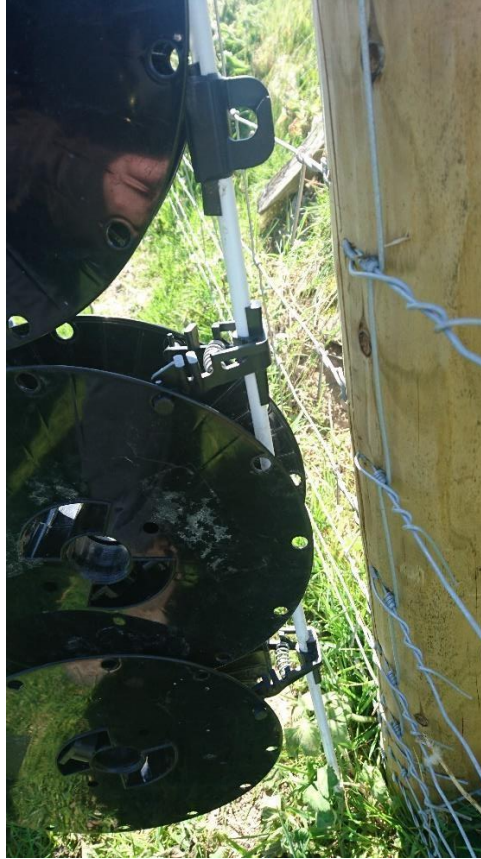
The project continued into 2017 and is still in progress. As of 8<sup>th</sup> May 2017 more equipment had been purchased to subdivide a further 12 hectares to allow more efficient finishing of weaned lambs.



**Kiwitech fencing & watering system**



**Flexible fibreglass posts**



**Innovative reel and bracket assembly**



**Portable water trough**



**Push in water fitting**

## Partial budget

A partial budget calculates the returns, positive or negative arising from making changes to a business. Extra income and costs saved are a positive figure while extra costs and income foregone are on the negative side. Investment in equipment needs to be spread over the expected lifespan of the equipment.

Annual losses (costs)	£	Annual gains (benefits)	£
<b>Income foregone</b>		<b>Extra income</b>	
		Gross Margin from 100 extra ewes @ £48.27/hd	4,827
		5 extra ram lambs sold @£400 (over fat lamb value)	2,000
<b>Extra costs</b>		<b>Costs saved</b>	
Equipment for 24 ha @ £342/ha over 10 years @5%	915	6 ha less rented land	2,250
Consultancy fee of £215/mth <sup>1</sup>	2580		
	<b>3,495</b>		<b>9,077</b>
<b>Annual benefit<sup>2</sup></b>	<b>5,582</b>		

- 1 The consultancy fee has been worth paying during the timescale of the project but once familiar with the system this can be reduced with advice thereafter being received on an ad hoc basis.
- 2 As previously mentioned there were also initial design and installation costs of £2,100

## 1.5 Farmer commentary – Alwyn Phillips

Feeding high quality forage is key to getting top performance from sheep bred for the job. If you put rubbish in you will get rubbish out! Good grassland management can help to maximise the potential of our superior genetics.

My Texel flock has one of the highest muscle EBVs in the breed- the top 1% for muscle depth is 3.49mm and my best rams are 7.15mm. However, I cannot compete with the 20-week weight EBV for growth against rams on continuous creep feed. To improve my lamb growth rate EBVs, I knew I had to improve my grassland management to give them access to grass of the highest quality. This will allow me to sell more breeding rams in addition to the extra income from increasing flock size.

Lowland farms like Pen y Gelli are disadvantaged by having a limited range of environmental payment options from Glastir. This meant that I had to find other ways to make the farm more productive, increasing Output and making the business more resilient for an uncertain future.

## 2 Business Review

### 2.1 Potential impact of the project on the business

This project has shown that investing in infrastructure to allow rotational grazing to take place is very worthwhile with a rapid return on investment and a positive annual financial return. For Alwyn Phillips at Pengelli this has meant-

1. Keeping an additional 100 ewes (at least), an increase of 25% with corresponding increase in flock Gross Margin. This is due to growing/utilising 25% more grass.
2. Potential to reduce concentrate costs as the grass will be higher quality for most of the year thereby reducing concentrate requirements, for example in late pregnancy.
3. Potential to reduce costs of silage making (contractors, fuel etc) as the ability to accurately allocate grass to animal requirements throughout the year will mean less silage will be needed.
4. Potential to sell more breeding rams as currently their (grass based) genetic potential is not expressed fully. When fed higher quality grass their performance and EBVs will improve and make them more attractive to buyers.





### 3 Project Review

#### 3.1 SWOT analysis

<b>STRENGTHS</b>	<ul style="list-style-type: none"> <li>• Sheep have been bred for high forage/low concentrate systems since the 1980's</li> <li>• good individual performance achieved in the past</li> <li>• Alwyn Phillips has the enthusiasm to improve the system, profitability, efficiency and resilience further</li> </ul>
<b>WEAKNESSES</b>	<ul style="list-style-type: none"> <li>• Lack of options for environmental payments</li> <li>• Scale limiting farm profit</li> <li>• Limited options for expansion in the area due to low land availability and cost of rented land</li> <li>• Flock not expressing true genetic potential</li> </ul>
<b>OPPORTUNITIES</b>	<ul style="list-style-type: none"> <li>• Increase grass production and utilisation</li> <li>• Increase stocking rate</li> <li>• Improve GM per ewe through reduced variable costs</li> <li>• Increase GM/hectare by at least £100/ha</li> <li>• Reduce rented land</li> <li>• Sell more breeding rams</li> </ul>
<b>THREATS</b>	<ul style="list-style-type: none"> <li>• Brexit and uncertainty of sheep meat trade beyond 2020</li> <li>• Extreme weather events in high rainfall area</li> <li>• Sheep health issues with higher stocking rate</li> </ul>

### 3.2 Benefits for other Welsh sheep businesses

From a KT perspective this project has proved useful already in terms of farm open days and will continue to do so in future. Many Welsh sheep farm businesses will benefit from the findings of the project. The principles, techniques and equipment are also equally applicable to beef or milk production.

The system can be scaled up for larger farms although the benefits are perhaps more applicable to small to medium sized units, where land is the main limiting factor. Larger farms can still benefit but may have more options for environmental or diversified income streams, and can still produce a suitable farm income without pushing the stocking rate.

From an environmental point of view keeping more stock and producing more kg of meat per hectare will reduce the carbon footprint per kg produced. In addition, with higher quality grazed grass (and more grass availability on a year-round basis) there will be reduced requirement for conserving grass as silage and for supplementary feeding of concentrates. These will both reduce costs and the environmental impact, fuel, haulage etc of the system.

### 3.3 Alignment with sheep sectors strategic goals

This work contributes to the Welsh Red Meat Industry's Strategic Action Plan 2015-2020; specifically, in relation to-

- ***The Strategic Priority “Improve production efficiency (thereby increasing quality supply) whilst maintaining the environments and landscape of Wales”***
- ***Strategic Objective 2- “Increase the contribution of the Welsh red meat sector to Welsh Agricultural Output”- specifically Actions***
- ***“Develop new business-focussed programmes to improve the management, efficiency and profitability of Welsh red meat businesses”***
- ***“Establish mechanisms that will maximise outputs from grass based systems and reduce reliance on bought in (imported) feed”.***

The success of the project has resulted in the business being more profitable due to increased farm output without a significant increase in overheads. The investment has shown a positive annual return and payback will be rapid. The business will have a reduced carbon footprint per kg of lamb produced and will be more resilient to withstand the effects of an uncertain political climate.

## 4 Impact on the industry

### 4.1 Impact on individual business

The partial budget has shown an annual positive return of around £6,000 with higher returns potentially possible. This represents an increase in farm GM of £125/hectare.

## 4.2 Impact on wider industry

There is currently much interest in improving grassland management and implementing rotational grazing systems. This project has shown the potential on this farm and there is no reason why many other sheep farm businesses can also implement a similar system.

## 4.3 Impact on Welsh Government's cross cutting and priority themes

### Climate change

The UK government is legally required to reduce greenhouse gas emissions across agriculture by 80% of the 1990 levels, by 2050 (there is also an interim reduction target of 11% by 2020). Agriculture has to play a key role in achieving these reductions. A Carbon footprint calculation has not been done yet. However, by increasing farm output and reducing concentrate inputs Pengelli will have reduced its impact on the climate.

### Animal Health and Welfare (AHW)

There is a risk of increasing some health issues such as lameness and parasitic gastroenteritis with increasing stocking density, especially on predominantly sheep farms. However, it is generally accepted that rotational grazing systems, properly managed mitigate against many of these problems by always providing high quality (high ME & Crude Protein) feed that will help to increase an animals immunity. In addition moving stock to fresh ground on a regular basis is preferable to set stocking for many ailments including lameness.

### Future Generations

One of the barriers to future generations of farmers entering the Welsh sheep industry is the availability of land as they are unable to buy land and are often competing with established businesses for rented land. Growing and utilising more grass per hectare, increasing stocking density and farm output goes some way towards alleviating this issue. In addition, while not new, rotational grazing has never had a wider choice of equipment, software and grass measuring devices which are all factors to attract capable individuals into the industry.

### The Natural Environment

This system could allow higher production from the best land on a farm while more marginal areas can be used for environmental measures.

### Tackling Poverty

By farms being more profitable, typically the additional monies are then reinvested back into the business. This results in more money being spent in the locality with suppliers to the business, resulting in continuation of job retention in local communities.

## Health & Safety

Rotational grazing means that most stock can be observed, moved etc very easily and quickly. This releases time that can be spent on other aspects on a farm that are often neglected, such as paperwork and Health & Safety issues.

## 5 Project Team

Alwyn Phillips, farmer, Pengelli

Gethin Davies & Emyr Owen, Farming Connect James

Daniels, Precision Grazing Ltd