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Mixed farming – Histories and Futures

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MIXED FARMING – HISTORIES AND FUTURES

D5.2 Historical Agriculture Data Report

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List of Acronyms

ARCW	The Archives and Records Council Wales
GIS	Geographical Information Systems
LSE	London School of Economics
NLW	The National Library of Wales
TNA	The National Archives
UKDA	UK Data Archive

1 Introduction

Mixed Farming - Histories and Futures is a collaborative pilot project focused on the UNESCO Dyfi Biosphere. Its overall aim was to ‘encourage movement towards sustainable mixed agriculture’ and a more resilient local food production economy.

The primary tangible output of the Project is a *Gateway*, which brings together information to demonstrate that mixed sustainable agriculture is possible in Mid-Wales through provision of interrogatable historical land-use maps, predictive crop maps and risk-based opportunity maps. In addition, both existing and former arable crop producers are identified by location and crop. Oral histories with older farmers in the area supplied the information for the latter.

This report focuses on deliverable D5.2 – Mid-Wales Historical Agriculture Data. It will introduce the historical angle of the Project and the core historic datasets used - the tithe maps and associated apportionment schedules - along with the steps undertaken to make them accessible and usable in the Gateway. It will then discuss additional historical datasets used in the project and those identified as having value for possible future integration, along with the issues associated with their use and reuse.

2 Historic Data and the *Mixed Farming Project*

The *Mixed Farming Project* was predicated on identifying and leveraging data from historical and archival sources to demonstrate that, in the past, the agricultural economy in the Dyfi Biosphere area of Mid-Wales was characterised by a mixture of both arable and livestock raising activities. The information sources discussed in this report were identified through desk-based research - literature search, interrogation of online finding-aids and catalogues from appropriate library and archives collecting organisations, and examination of online digitised resources. Relevant information was assessed for its usability in the project including: its accessibility, how comparable the data was to other datasets selected, how much data processing would be required for the information’s re-use and the intellectual property rights surrounding their integration into the project.

The breadth and depth of this research was adversely affected by COVID-19 restrictions that saw libraries and archives closed over spring and summer 2020. Plans for visits to these to consult identified archival material, not available in a digital format, to assess their value and feasibility for re-use as a data source, had to be curtailed.

3 The Tithe Surveys

The core historic datasets used in the *Mixed Farming Project* are the *Tithe Maps* and their accompanying *Apportionment Schedules* created in the 1830-1840s. Digitised *Tithe Maps* were used to create the primary historical layer for the Gateway while the *Apportionment Schedules* provide information on land-use classes for large areas of the Biosphere. A simplified 8-point classification scheme was adopted to record land-use as: arable, pasture, meadow, woodland, settlement, water, common and upland.

3.1 Introduction to the Tithe Surveys

Tithes were tax payments, of a tenth of the annual yields from farming land and labour, were made in kind to fund the parish church and support associated clergy. The Tithe Commutation Act 1836 established the Tithe Commission to undertake the process of replacing payments in kind with cash payments or a ‘tithe rent-charge’. Tithe Districts were established across England and Wales; and the land surveyed during the 1830s and 1840s to enable the calculation of the tithe payments due from both the district as a whole and individual properties.¹ The *Tithe Maps* and associated *Apportionment Schedules* resulting from these surveys give a unique snapshot of the landscape at the time, and it is worth noting that *Tithe Maps* for the Dyfi Biosphere area were completed before the start of the construction of the Cambrian Railway Line, which caused an economic upheaval by changing supply lines for the area.²

The *Tithe Maps* captured farm names and field boundaries for a parish, while the *Apportionment Schedules* captured the acreages of individual fields, and the names of both the owners and occupiers of each land parcel. More crucially for *Mixed Farming* many of the *Apportionment Schedules* also captured the names of fields and their state of cultivation, enabling the land-use at the time to be identified. Field numbers noted on the maps link each land parcel to the data in the *Apportionment Schedules* so that they must be used in parallel (**Error! Reference source not found.** and **Error! Reference source not found.**). The ‘state of cultivation’ was captured using a simple classification scheme, recording land-use as arable, pasture, meadow, wood, water, sheepwalk (rough grazing), gardens or yards with occasional use of other terms such as e.g. gravel, waste and plantation.



¹ The National Archives, “How to Look for Records of Tithes,” accessed October 30, 2020, <https://www.nationalarchives.gov.uk/help-with-your-research/research-guides/tithes/>; National Library of Wales, “Tithe Maps of Wales,” n.d., <https://www.library.wales/collections/learn-more/maps/tithe-maps-of-wales>.

² C.P. Gasquoine, *The Story of the Cambrian* (Oswestry: Woodall, Minshall, Thomas & Co. Ltd, 1922), <https://www.gutenberg.org/files/20074/20074-h/20074-h.htm>.

Figure 1: Tithe Map Showing Bryn Caemeiler Farm in Llanwrin Parish, Montgomeryshire³

LANDOWNERS.	OCCUPIERS.	Numbers referring to the Plan.	NAME AND DESCRIPTION or LANDS AND PREMISES.	STATE or CULTIVATION.	QUANTITIES in STATUTE MEASURE.		Amount of Rent-Charge apportioned upon the several Lands, and to whom payable.						REMARKS.	
					A.	R.	PAYABLE TO VICAR.			PAYABLE TO <i>the Vicar</i>				
<i>(decuss) Sir John Barent (continued)</i>	<i>Williams John (continued)</i>		<i>Bryn cae medde (continued)</i>	<i>Brought forward</i>	<i>17</i>	<i>1</i>								
		<i>921</i>	<i>Caer pwrfa</i>	<i>Arable</i>	<i>2</i>	<i>0</i>								
			<i>Wood</i>	<i>Wood</i>			<i>20</i>							
		<i>930</i>	<i>Caer main</i>	<i>Arable</i>	<i>2</i>	<i>0</i>								
		<i>935</i>	<i>Bank</i>	<i>pasture</i>	<i>3</i>	<i>2</i>								
		<i>929</i>	<i>Stochwdd bach</i>	<i>pasture</i>	<i>1</i>	<i>0</i>								
			<i>Wood</i>	<i>Wood</i>			<i>34</i>							
	<i>923</i>	<i>Caer bach</i>	<i>Arable</i>	<i>1</i>	<i>2</i>									
	<i>918</i>	<i>Chapwalk</i>	<i>pasture</i>	<i>48</i>	<i>2</i>									
					<i>76</i>	<i>2</i>	<i>25</i>							
														<i>A.A.4.</i>

Figure 2: Apportionment Schedule for part of Bryn Caemeiler Farm in Llanwrin Parish, Montgomeryshire⁴

3.2 Tithe Surveys and the Dyfi Biosphere

The Dyfi Biosphere is covered by part of 3 historic counties and all or part of 15 historic parishes – with a Tithe Map for each of these parishes. All the maps produced, except for Machynlleth Parish, are what is known as 2nd class maps, those based on existing surveys, possibly provided by landed estate owners in the parish. For Machynlleth Parish a mixture of existing surveys and new surveying was used. The maps were drafted by 8 different surveyors at 3 different scales. All the *Apportionment Schedules* accompanying the maps include individual field names for each (or most) numbered fields in the ‘name and description’ column. However, only 8 of the maps included land-use data in the ‘state of cultivation’ column, with this information missing for Cemaes and Machynlleth Parishes in Montgomeryshire and all the relevant parishes in Merioneth. Full information can be seen in Table 1.

³ Richard Yates, “Map of the Enclosed Lands in the Parish of Llanwrin in the County of Montgomery,” 1839, <http://hdl.handle.net/10107/4548863>.

⁴ Yates.

County	Parish	Surveyor	Scale	State of Cultivation Recorded	Field Names Given
Cardiganshire	Llanbadarn Fawr	Anthony and Thomas Reed, Stockton on Tees	1:6336 8 chains to the inch	✓	✓
	Llanfinhangel Genau'r Glyn	Richard Morgan, Talybont	1:4752 6 chains to the inch	✓	✓
	Llangyfelwyn	Richard Morgan, Talybont	1:4752 6 chains to the inch	✓	✓
	Llanwrin	Richard Yates, Whittington Mount	1:7128 9 chains to the inch	✓	✓ Enclosed lands only
Merioneth	Llanymawddy	Thomas Payne, Dolgellau	1:6336 8 chains to the inch	✗	✓
	Mallwyd	Thomas Payne, Dolgellau	1:6336 8 chains to the inch	✗	✓
	Pennal	Richard Morgan Talybont	1:6336 8 chains to the inch	✗	✓ Unenclosed lands all labelled sheepwalk
	Talyllyn	Peter Edwards, Llanefydd	1:6336 8 chains to the inch	✗	✓
	Tywyn (part)	Thomas Huws, Llangyniew	1:6336 8 chains to the inch	✗	✓ Enclosed lands only
Montgomeryshire	Carno (part)	William Parry, Llanidloes	1:4752 6 chains to the inch	✓	✓
	Cemaes	William Parry, Llanidloes	1:6336 8 chains to the inch	✗	✓
	Darowen	Thomas Jones, Cemmaes	1:6336 8 chains to the inch	✓	✓ Enclosed lands only
	Llanbrynmair	William Parry, Llanidloes	1:7128 9 chains to the inch	✓	✓
	Machynlleth	Richard Morgan, Talybont	1:6336 8 chains to the inch	✗	✓
	Penegoes	Richard Yates, Whittington Mount	1:7128 9 chains to the inch	✓	✓

Table 1: Details of Tithe Maps and Apportionment Schedules in the Dyfi Biosphere⁵.

⁵ Robert Davies, *The Tithe Maps of Wales: A Guide to the Tithe Maps and Apportionments of Wales in the National Library of Wales* (The National Library of Wales, 1999).

3.3 The Cynefin Project

The National Library of Wales (NLW) digitised both the *Tithe Maps* and the accompanying *Apportionment Schedules*, for the whole of Wales, between 2014 and 2017 for the Archives and Records Council Wales' (ARCW) project *Cynefin: Mapping Wales' Sense of Place*. The maps were georeferenced to modern Ordnance Survey mapping and point data – data that identifies a place in space - for a central point in every field on the maps was created. Structured data was created from the *Apportionment Schedules* by capturing the handwritten text, through crowdsourcing techniques. These were linked to the relevant field on the maps through the unique identifiers for each land parcel created by the Tithe Commission. This enables the data and the maps to be cross-searched through the discovery interface on the *Places of Wales* website.⁶

3.4 Data Limitations of the Tithe Surveys

Digitised *Tithe Maps* and the dataset for the digital *Apportionment Schedules*, covering the area of the Dyfi Biosphere, were made available to *Mixed Farming* through its partnership with NLW. These were used to create the historic layer *Land-Use (1840s)* on the *Land-Use Comparison* page of the *Gateway*.

Reusing information for a different purpose from which it was originally created is not without difficulties. Several issues were encountered with both the content of the original sources, and the method in which the digital derivatives were created, that required additional research and mitigating action.

3.4.1 Field Boundaries

Creating reliable polygon data - data that outlines boundaries - for the fields on the digitised *Tithe Maps* was financially prohibitive within the funding for the *Cynefin Project*. This created a major limitation to their usefulness to the Project as, without polygon data it is not possible to present the land-use information in a choropleth map, with each field colour-coded according to its classification. The required new dataset of field level polygons for the 1840s was created by using modern digital field boundaries as a digitisation template, as these were found to be substantially similar to the 1840s boundaries. 5 volunteers were recruited and trained to correct areas where there were substantial deviations using QGIS software e.g. splitting modern fields back into their original land parcels when these had been amalgamated into larger fields or realigning boundaries where these had changed substantially. This process was not without problems both from the original surveying, which was of a lower quality than modern maps, and the varying skills of the digitisation volunteers. Combined these led to errors in e.g. geo-positioning and attribute capture.

3.4.2 Land-use Data

Mixed Farming developed a simple classification scheme of 8 land-uses from the information recorded in the 'state of cultivation' column in the *Apportionment Schedules*. This required some of the recorded land-uses to be re-assigned to the more simplified classifications e.g. 'garden' and 'yard' were amalgamated into the new classification 'settlement'. GIS techniques were then used to code the new land-use classifications as attributes of field level-data, so that the information can be displayed online on modern maps.

⁶ National Library of Wales, "Places of Wales," accessed November 3, 2020, <https://places.library.wales/>.

However, because 7 out of 15 of the original *Apportionment Schedules* did not record information in the ‘state of cultivation’ column, the first version of the *Gateway* showed large areas of the Biosphere with no land-use information for the 1840s. Closer examination of the *Apportionments* with no explicit ‘state of cultivation’ recorded showed that land-use could often be pragmatically inferred from the field names given. For instance, many land parcels were named ‘sheepwalk’ so that rough grazing could be inferred, or the use of ‘common’ as a field name identified common land. Figure 3 shows fields in Machynlleth Parish identified as slope (llechwedd), heath (rhos), fields (cae), woodland and ‘sheepwalk’.

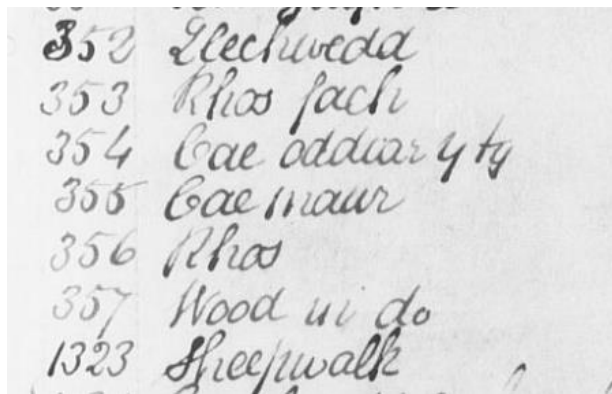


Figure 3: Land classifications embedded in field names⁷

Names can also identify the crops being grown in individual fields. Figure 4 shows fields in Machynlleth Parish owned by Charles Thurston and occupied by Micah and Hugh Jones that are labelled hay meadow ((g)we(i)rglodd) and wheat (gwenith).

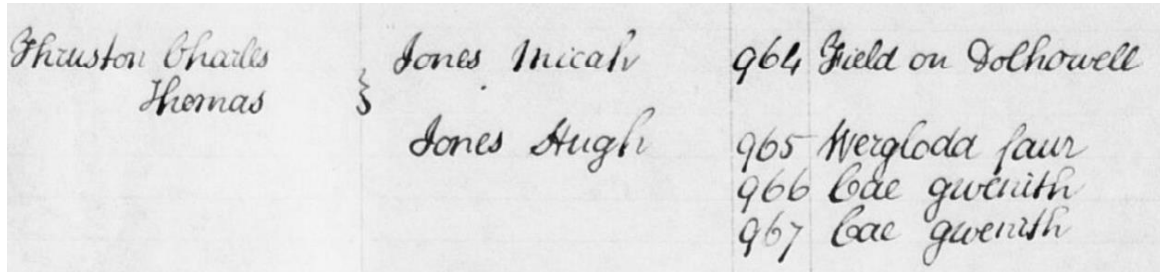


Figure 4: Hay and wheat fields in Machynlleth Parish⁸

A bilingual list of these implicit land-use and crop identifiers was created as part of a collaboration with the Woodland Trust. These identifiers were then classified into the 8 land-uses used by *Mixed Farming* and an algorithm used to compare ‘field-name’ against ‘state of cultivation’ in apportionments where both sets of data had been collected. Further training of the algorithm enabled it to be used to infer land-use from the field names for many areas where this was not explicitly included in the tithe apportionments. This information was captured in a separate data-layer for GIS delivery. An example of the data used to train the algorithm can be seen in Appendix 1.

The results of this exercise were not completely reliable, especially around more marginal, or unimproved land-uses such as heath, moorland or semi-wooded areas, and

⁷ Richard Morgan, “Map of the Parish of Machynlleth in the County of Montgomery,” 1844, <http://hdl.handle.net/10107/4562007>.

⁸ Morgan.

did not produce complete coverage of the missing data. However, further refinement of the methodology is beyond the scope of the Project. Issues included:

- Field names reflecting recollection of a former use rather than the actual use in the 1840s
- Mismatches between modern and historic vocabulary e.g. plantation in the 1840s appears to have meant an area that was planted with any crop – rather than the term being reserved for trees.⁹

3.4.3 Crowdsourcing Issues

Another issue with reuse of the *Cynefin* data was errors or omissions in the digital apportionments because of the crowdsourced nature of their compilation. Some areas of the Biosphere lacked digital apportionment data completely because their transcription had not been completed by the crowdsourcing activity when the funding ended. Errors of transcription are also a problem, and despite efforts to clean the data by the *Cynefin Project*, these persist in areas. Additionally, the lack of data consistency caused by the literal transcription of names – acceptable in the hand-written *Apportionments* – made it difficult to search and sort data accordingly e.g. a major landowner in Machynlleth Parish was Sir Watkin Williams Wynn (Baronet). His name has been recorded and then transcribed variously as:

- Wynn Sir Watkin Williams Baronet (117 land parcels)
- Wynn Sir Watkins Williams Baronet (44 land parcels)
- Wynn Sir Watkin Williams Wynn Baronet (29 land parcels)

Field name data digitised by the *Cynefin Project* have been cleaned by the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) and this was offered to the Project. However, for *Mixed Farming* the data inconsistencies in how the names of ‘landowners’ and ‘occupiers’ were recorded is also critical. These inconsistencies made it difficult to identify estate landholdings, made up of many farms, crucial for identifying estate records to complement the tithe data. Cleaning the data was beyond the scope of *Mixed Farming* but various data manipulation techniques were used to help identify archival material as a small pilot (section 6.5).

3.4.4 Other Tithe Survey Source Records and Data

It was not possible to view files relating to the execution of the Tithe Commission’s surveys and maps which are held at TNA (ref. nos. TNA IR 18, IR 90, IR 30, and IR 94). Although heavily weeded in the early 20th Century, these records can contain additional information surrounding the enumeration of land-use and crops, including the yield of individual crops and livestock numbers.¹⁰ In particular the Assistant Commissioner’s Reports record information on the soil, farm productivity and the actual crops grown. A synthesis of information in these files was made and mapped to GIS by R.J.P Kain of Exeter University between 1978 and 1981 as the *Atlas of Agriculture in England and Wales c1840*. This data is available in GIS MapInfo format from the UK Data Archive (UKDA) (ref. no. UKDA 1659) with limited licensing for reuse.¹¹

⁹ Brian Palmer, “Welsh Place Names Report” (unpublished resource, 2020).

¹⁰ National Library of Wales, “Tithe Maps of Wales,” n.d.

¹¹ R.J.P. Kain, “Atlas of Agriculture in England and Wales, c.1840,” 1981, <https://doi.org/http://doi.org/10.5255/UKDA-SN-1659-1>.

4 Other Historical Sources used in the Gateway

4.1 1930 Land Utilisation Maps

The first *Land Utilisation Survey of Britain* was undertaken in the 1930s by L. Dudley Stamp of the London School of Economics. It used volunteer surveyors, mostly schoolchildren and their teachers, to record field level land-use data on 6-inch (1:10,560) Ordnance Survey maps. Recording used a simple classification, similar to that used by the *Tithe Maps*: meadow and grass, arable land, hill pasture, woodlands, gardens, and unproductive land. The resulting dataset was published using 1-inch (1:63,360) Ordnance Survey sheets as a base map. Publication was complicated by several funding issues, and maps for Wales were eventually published in the 1940s with Government support granted because of the role they could play in post-war planning.^{12 13 14} A composite of the maps at the smaller scale of 10 miles to the inch (1:633,600) was also published in the 1940s.

The granularity of the data collected by the first *Land Utilisation Survey*, almost a century after the tithe map data was collected, made this an ideal comparator to enable visualisation of the differences over the 90-year period between the 2 surveys.

This data was readily available for reuse by *Mixed Farming*. The Environment Agency funded raster digitisation and georeferencing of the 1-inch derivative sheets by the Great Britain Historical GIS Project at the University of Portsmouth in the early 2000s.¹⁵ These digital derivatives are now made freely available for download and reuse (with appropriate attribution) on their Vision of Britain website.¹⁶ This made it relatively straightforward for the digitised Land Utilisation Survey maps to be integrated into the *Gateway*.

The limitation of this data is its generalisation from the field level data collected at 6-inch scale for publication at 1-inch scale. A plan to digitise the original 6-inch survey maps was put forward by the Historical GIS Project in 2007, but this was never realised.¹⁷ The original 6-inch survey maps showing field level data are available for Cardiganshire and Merionethshire in the London School of Economics (LSE) Library. They do not hold the maps for Montgomeryshire – though it is possible these are held by the copyright holder, Alice Coleman, who maintains a personal archive of later Land Utilisation Surveys at her home in London. Extracting field level data for integration into the *Gateway* would be a major manual task or a funded partnership with LSE Library.

¹² L. Dudley Stamp, “The Land Utilization Survey of Britain,” *The Geographical Journal* 78, no. 1 (1931): 40–47, <http://www.jstor.org/stable/1784994>.

¹³ L. Dudley Stamp, *The Land of Britain: Its Use and Misuse* (London: Longman, 1946).

¹⁴ National Library of Scotland, “Land Utilisation Survey, Scotland, 1931-1935,” Maps, accessed December 12, 2021, <https://maps.nls.uk/series/land-utilisation-survey/info.html>.

¹⁵ Nick Burton, “Digitising the Inter-War Land Use Survey of Great Britain,” *Historical GIS News*, no. Summer (2004),

<https://web.archive.org/web/20050324130459/https://www.port.ac.uk/research/gbhgis/mediareources/newsletters/filetodownload%2C23102%2Cen.pdf>.

¹⁶ Vision of Britain: <https://www.visionofbritain.org.uk/>.

¹⁷ Humphrey Southall, Nigel Brown, and Monks Wood, “Digitising the Inter-War Land Use Survey of Great Britain: Scanning and Geo-Referencing Project,” 2004, https://researchportal.port.ac.uk/portal/files/201580/LUSGB_Scan_and_Georef_Report.pdf.

4.2 Estate Maps and Records

Landed estates create maps and records for their ongoing management and these can be an important source of data concerning historic farming practices. Estate maps and records are often held by archives and are available for public consultation.

An investigation was undertaken into the use of landed estate maps and records for additional information on farming history in the Biosphere, and particularly to fill in further gaps in land-use coverage. Due to time restrictions it was agreed to concentrate on maps in the first instance.

The map curator at the NLW was able to point the Project to their collection of digitised estate maps. Those which were relevant to the Dyfi Biosphere were identified and these were examined for data relating to agricultural farm use. Many were found to have information about land-use classified similarly to the classification adopted by *Mixed Farming*, particularly those related to the Gogerddan Estate which held scattered farms across Biosphere parishes in Ceredigion and Powys. This information was extracted into attribute tables on a new data layer as part of the collaboration with the Woodland Trust. A list of maps digitised by NLW with relevant data can be found in Appendix 2.

After identifying some estates to investigate other relevant maps, in hard copy, were identified through catalogue interrogation, but COVID restrictions meant it was impossible to visit the archival organisations where the information was held to extract information. The maps, and some associated records, identified during the search are listed in Appendix 3. There is further information about a small pilot project surrounding the identification of estate records and maps and issues surrounding their use in section 6 below.

4.3 County Level Information

4.3.1 Agricultural Statistics: Acreage and Livestock Returns

The Board of Agriculture collected national data about agricultural production from 1866-1988. The summary reports of these censuses were published as *Agricultural Statistics: Acreage and Livestock Returns*. Aberystwyth University's subscription to *Parliamentary Papers Online* enabled access to these summary statistical reports from 1894-1930. These summaries include county level data on acreages used for agriculture, woodland, and grazing, as well as acreages given over to growing individual crops. This evidenced a wide range of crops being produced in the pre-1972 historic counties represented in the Dyfi Biosphere including grain, peas and beans, root crops, a variety of fruit and grassland managed for hay production. Livestock numbers were also reported – one notable aspect being the number of horses for agricultural use.

Data for selected years was extracted from these reports manually and tabulated into a spreadsheet by a volunteer. Appendix 4 shows data for 1910, 1920 and 1930 for the historic county of Merioneth.

One feature of the early *Agricultural Statistics: Acreage and Livestock Returns* was data at Petty Sessional Division level. These historic administrative boundaries, abolished in 2005, represented the area over which a magistrate's court had jurisdiction. This data detailed the acreages of land given to grain crops, root crops and 'other' crops as well as the total acreages of arable land and permanent grassland. This enables a better understanding of the situation at a more local level, although the exact boundaries of the area represented could not be established. Appendix 5 shows the data for 1913 for counties Cardigan and Merioneth Counties extracted into a spreadsheet by volunteers.

The 2 data sets highlighted above were used to illustrate engagement and educational activities undertaken by the project. It was beyond the scope of the project to source all the summary *Acreage and Livestock Returns*, extract the data and create attribute tables, to show change over time, or to include county and petty session division GIS layers in the *Gateway*.

The *Agricultural Statistics: Acreage and Livestock Returns* main limitation is that the aggregated county level data is not granular enough to understand the situation within the Biosphere boundaries. The original summary information from the agricultural censuses is retained in The National Archives (TNA) (ref. no. TNA MAF 68). These would need to be inspected in person to determine their usefulness for mapping field or farm level data regarding land-use.

4.4 Parish Level Information

4.4.1 1801 Home Office Parish Acreage Returns

The 1801 Home Office Parish Acreage Returns were the result of a survey undertaken during the Napoleonic Wars due to worries about national food security.¹⁸ The original returns are held in TNA and are organised per diocese (ref. no. TNA HO 67), however, the data has been extracted and synthesised from these records and published.¹⁹ A spreadsheet of the data for Parishes included in the Dyfi Biosphere was created and the information used to illustrate engagement and educational activities. This can be seen in Appendix 6.

As with the county level data above, this data was used to illustrate engagement and educational activities undertaken by the project.

5 Other Data Identified

A large amount of other data was identified that could be further explored. Many are not available digitally so will require physical inspection to identify the suitability of the data they contain for achieving the stated aims of *Mixed Farming*. These include:

5.1 Land Surveys

1284: Edward I's Survey

After the conquest of north Wales in 1284 Edward I undertook a survey of his new territories to identify the rents, dues, and services of tenants and to identify the land that had been held by Llywelyn ap Gruffudd.²⁰²¹ Records relating to this survey are held in TNA (ref. no. TNA SC 11)²². Their use would require considerable expertise in the identification and interpretation of historical records and palaeography skills.

¹⁸ W E Minchinton, "Agricultural Returns and the Government during the Napoleonic Wars," *Agricultural History Review* 1, no. 1 (1953): 29–43, <https://bahs.org.uk/AGHR/ARTICLES/01n1a5.pdf>.

¹⁹ D Williams, "The Acreage Returns for 1801 for Wales," *Bulletin of the Board of Celtic Studies* 14 (n.d.).

²⁰ Gwynedd Archaeological Trust, "Historic Landscape Characterisation - Ardudwy Historical Themes," accessed December 13, 2020, <http://www.heneb.co.uk/hlc/ardudwythemes.html#agri>.

²¹ Colin Thomas, "Thirteenth-Century Farm Economies in North Wales" 16, no. 1 (1968), <http://docplayer.net/storage/89/97870260/1610824309/opLk4LS2wcc1AeqDBX-Urw/97870260.pdf>.

²² Frederic Seebohm, *The Tribal System in Wales: Being Part of an Inquiry into the Structure and Methods of Tribal Society*, 1895, <https://archive.org/details/tribalsysteminwa00seebuoft/page/n117/mode/2up>.

1790s Agricultural Census

An agricultural census was undertaken during George III's reign with returns being made between 1790 and 1800. This was undertaken on a parish basis with the local clergy reporting on the agricultural situation. There were no forms to standardise entries – so the data that can be extracted from these is varied. The original returns are held by (TNA) (ref. no. TNA HO 42). This series of archives is digitised and freely available online. However, it contains all home office domestic correspondence for George III and has not been arranged for ready searching. This, along with the need for palaeographic skills to read the original handwriting, makes these records difficult to access and use.

1873: Return of the Owners of Land in England and Wales

This survey lists holdings over one acre and an estimated yearly rental on the landholdings. Organised by county and landowner.²³ A copy of the return for Cardiganshire is held at Ceredigion Archives (ref. no. ADX/25). The data for landholdings above 3,000 acres in Britain and Ireland was published as *The Great Landowners of Great Britain and Ireland* between 1876 and 1883.²⁴ This was further refined to the data for landholdings above 3,000 acres in Wales in 1966.²⁵ This data represents an inventory and does not attempt to identify exact location of the land or how it was valued, making it of limited value for the aims of *Mixed Farming*.

1910-1915: Land Use, Value and Ownership: Valuation Office Survey

Land Use, Value and Ownership: Valuation Office Survey records held at TNA (ref. no. TNA IR 131/1-11) include plans, field books, valuation books and survey forms, recording information about the value, use extent and ownership of land. Copies of the ledgers are in Ceredigion Archives and the working copies of the maps are held by NLW. Collected through a form-based survey, the information mostly relates to the property values rather than production, making these records of limited interest to the aims of *Mixed Farming*.

1940-1941 Farm Survey

This survey classified farms for productivity into 3 categories but only the county level summary report of the survey survives. This is held at TNA (Summary report MAF 38/213).

1941-1943: National Farm Survey of England and Wales

The records of the National Farm Survey of England and Wales are held at TNA (ref. nos: Surveys MAF 32 and MAF 73, Summary Report MAF 38/216, Statistical Summary MAF 38/473, Statistical Analyses MAF 38/852-863, Planning Minutes MAF 80). This farm level survey was undertaken by War Agricultural Executive Committees ('War Ags')

²³ Royal Statistical Society, "The Domesday Book of 1873 Source : Journal of the Statistical Society of London , Vol . 39 , No . 2 (Jun . , 1876) , Pp . 393- Published by : Wiley for the Royal Statistical Society Stable URL : <https://www.jstor.org/stable/2339123>" 39, no. 2 (1876): 393–410.

²⁴ John Bateman, *The Great Landowners of Great Britain and Ireland*, 4th ed. (Leicester: Leicester University Press, 1971).

²⁵ Brian James, "The 'Great Landowners' of Wales in 1873," *National Library of Wales Journal* 14, no. 3 (1966): 301–20.

under the auspices of the Ministry of Agriculture and Fisheries to identify uncultivated land that could be made productive and to inform post-war planning. The data includes information on land holdings, how they are used and details of the fabric of a farm, its equipment, and personnel, as well as maps showing the boundaries. Farm codes used to identify the individual farms and the parish each farm is located in are the same as those for the *Acreage and Livestock Returns* meaning relevant data can be readily identified and integrated.^{26 27 28 29 30}

1960 Land Utilisation Survey of Britain

The crowdsourcing technique of the 1930s *Land Utilisation Survey* was reprised in the 1960s by Alice Coleman of King's College London, with financial and moral support from Dudley Stamp. This created a much more detailed classification of land-use with 64 categories used. Only 15% of the 1:25,000 scale field maps were published, and the programme was suspended in 1977. A map of the whole of England and Wales was also published at 1:400,000 scale in 1992, which summarised the survey results into 6 land-use classifications. The unpublished material is held as a private archive by Alice Coleman and digitisation of these would require her, or her successors, cooperation.³¹

Only 1 map, partially within the Dyfi Biosphere boundary was published – sheet SN57-58 Aberystwyth. NLW holds 2 published maps and some unpublished field survey data from the 1960 survey, but it is unclear from their catalogue what area of Wales these relate to.

1996 Land Use UK Survey

The Geographical Association used the lessons of the 1930 and 1960 *Land Utilisation Surveys* to undertake a third survey using schoolchildren as surveyors. Led by Rex Walford of the University of Cambridge it collected and stratified samples of 1000 1km square units of land.^{32 33} No published mapping was created from this survey and the data sets are probably in the archive of the Geographical Association in Sheffield. The information has not been digitised.³⁴

²⁶ Hannah Chiswell, "The Value of the 1941-1943 National Farm Survey as a Method for Engagement with Farmers in Contemporary Research," 2016, <http://hdl.handle.net/10871/21566>.

²⁷ Oliver Finnegan and Catherine Glover, eds., "British Farm Surveys 1941-1943 The National Farm Survey of England and Wales and the Agricultural Survey in Scotland - Reports and Statistical Analysis - Introduction," *The List and Index Society* 354 (2014), <http://www.listandindexsociety.org.uk/BritishFarmSurveys.pdf>.

²⁸ Brian Short, *The National Farm Survey, 1941-3: State Surveillance and the Countryside in England and Wales in the Second World War* (Wallingford: CABI Pub., 1999).

²⁹ Ministry of Agriculture and Fisheries, "National Farm Survey of England and Wales (1941-1943): A Summary Report," 1946.

³⁰ B Short and C Watkins, "The National Farm Survey of England and Wales 1941-3," *Area* 26, no. 3 (1994): 288-93, <https://www.jstor.org/stable/pdf/20003459.pdf?refreqid=excelsior%3Af4dcd450c970be82c4cd45fc37738365>.

³¹ Southall, Brown, and Wood, "Digitising the Inter-War Land Use Survey of Great Britain: Scanning and Geo-Referencing Project."

³² Rex Walford, "The 1996 Geographical Association Land Use-UK Survey: A 'Geographical Commitment,'" *International Research in Geographical and Environmental Education* 8, no. 3 (1999): 291-94, <https://doi.org/10.1080/10382049908667621>.

³³ Rex Walford, *Land-Use UK: A Survey for the 21st Century* (Geographic Association, 1997).

³⁴ Southall, Brown, and Wood, "Digitising the Inter-War Land Use Survey of Great Britain: Scanning and Geo-Referencing Project."

1990-2019 Centre for Ecology and Hydrology (CEH) - Land Cover and Land Cover Plus Crops

CEH derives land cover datasets from satellite imagery collected by Landsat Satellites. Each product uses different classes and subclasses to classify land-use at landscape scale, and comes with a warning relating to possible classification error.³⁵ These datasets are available digitally as georeferenced raster and vector GIS files (GEOTiff and Esri Shape files respectively) with different technical specifications for each dataset as technologies and methodologies changed over time. Although the data was available to the project through Aberystwyth University's subscription to EDINA Digimap, they require a licence for integration into other services or products. The landscape scale of the classifications did not complement the field level classification scale used by *Mixed Farming*. Additionally, the level of work required to make these datasets compatible with the technical architecture and the licencing implications made their use impractical.

5.2 Aerial Photography

Aerial photography can be used to identify land-use at the exact time that the flight run was taken. Identifying the location of aerial photographic collections and systematic analysis of these, many of which are not digitised, would be a time consuming and expensive research activity.

Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW)

The RCAHMW has a large collection of aerial photographs relating to Wales taken between 1919 and the present day. The collections include the following, which might include useful coverage of the Dyfi Biosphere, although the catalogues of these have not been fully interrogated:

- 1919-2006 - Aerofilms Low-level – obliques. Some of these are available digitised in the online service Britain from Above.³⁶
- 1940-1993 - RAF Medmenham Collection - obliques and verticals taken from different heights. Many of these have been digitised and flight traces are being digitised.
- 1986-present - RCAHMW - low-level obliques

Cambridge University – Collection of Aerial Photographs (CUCAP)

This collection of nearly 500,000 aerial photographs covers areas from across the UK. 1,500 of these have been digitised and made available online as a pilot project. Georeferencing of the remainder has been undertaken so that coverage can be identified.³⁷ There is good coverage for the Dyfi Biosphere area, with photographs a mixture of vertical and oblique with sporadic dates from the 1950s to 2000s (Figure 5).

³⁵ Edina Data Centre, "CEH Products Available Overview Land Cover Map 1990 Data Introduction," 2007, https://digimap.edina.ac.uk/webhelp/environment/data_information/environment_roam_lcm_data_information.pdf.

³⁶ Britain from Above: <https://britainfromabove.org.uk>

³⁷ Cambridge Air Photos: <https://www.cambridgeairphotos.com>

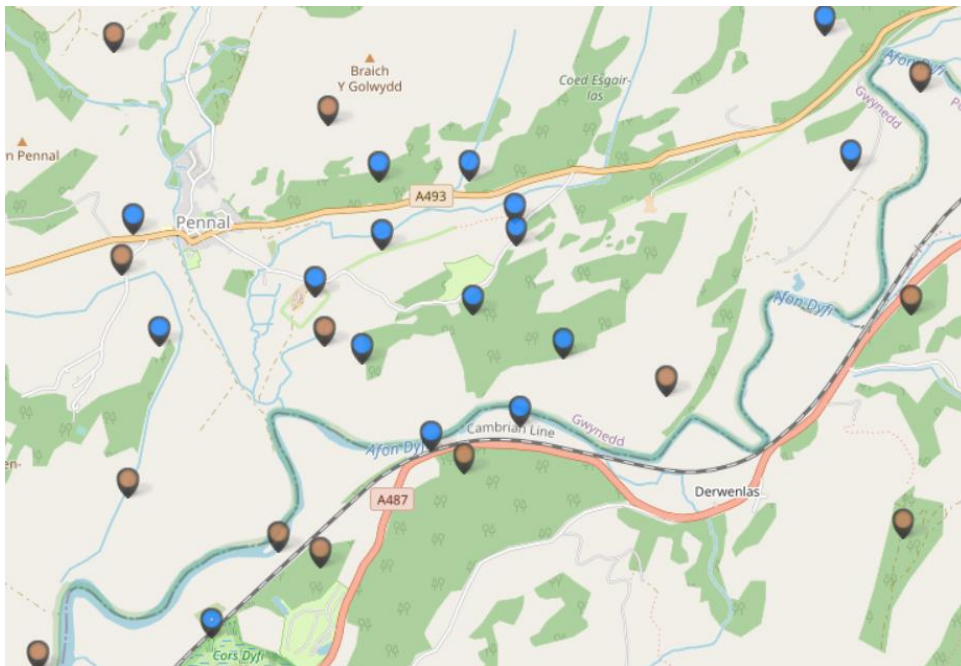


Figure 5: Coverage of CUCAP photographs around Pennal

5.3 Tithe Returns

Archival collections, particularly parish or estate records, often hold documents relating to tithes and tithe payments. Such records have not been identified for the Dyfi Biosphere, but if found through archive catalogue interrogation could give additional valuable information about farming outputs from the 17th Century to the final commutation of tithes.

5.4 Sales Catalogues

Landed estates started to decline after the agricultural depression of the 1870s and continued throughout the 2 World Wars. Catalogues from the sale of these assets can provide valuable information about the land holdings and their contemporary use. These can be found in archival collections with NLW holding a wide range.

5.5 Common land Surveys and Enquiries

A number of surveys and enquiries have been undertaken around common land and its designation. Their archives are held at TNA and although the catalogues have not been interrogated, may contain relevant material for research.³⁸ These include:

- 1800-1956: Enclosure, Commons and Copyhold Acts (ref. no. TNA MAF 25)
- 1846-1915: Rights of common claims (ref. no. TNA MAF 24)
- 1873-1874: Common lands census – published as *House of Commons Sessional Papers 1874 lii 383*
- 1956: Common land requisitioned for war (ref. no. TNA MAF 143/49) – schedule of common land requisitioned in England and Wales

³⁸ The National Archives (UK), “Land Ownership, Use and Rights: Common Lands,” accessed December 13, 2020, <https://www.nationalarchives.gov.uk/help-with-your-research/research-guides/common-lands/>.

- 1958: Royal Commission of Common Land (ref. no. TNA COU 1/933) – report and correspondence from the enquiry.

5.6 Newspapers

Old newspapers can be a good source of information on local history and, if digitised, can be quickly interrogated online with the development of an appropriate methodology. The NLW's service *Welsh Newspapers Online* offers digitised newspapers from across Wales from 1800-1910. Examples of information which can be found in these include details of crop and livestock sales, classes and prize-winners in agricultural shows and details of their arrangement, ploughing competitions etc. All of these can help to build a picture of the farming activities in the Biosphere at the time of their publication, and the agricultural concerns of local people. Figure 6, showing prize winners in the Grain and Roots classes at the 10th Annual Machynlleth Show in 1897 identifying that, at the time, wheat, barley, white oats and black tartarian oats were grown in the area, and also identifies the farms which excelled in this. Similarly, tenant farmers in the area were growing turnips, swedes and mangel wurzel.

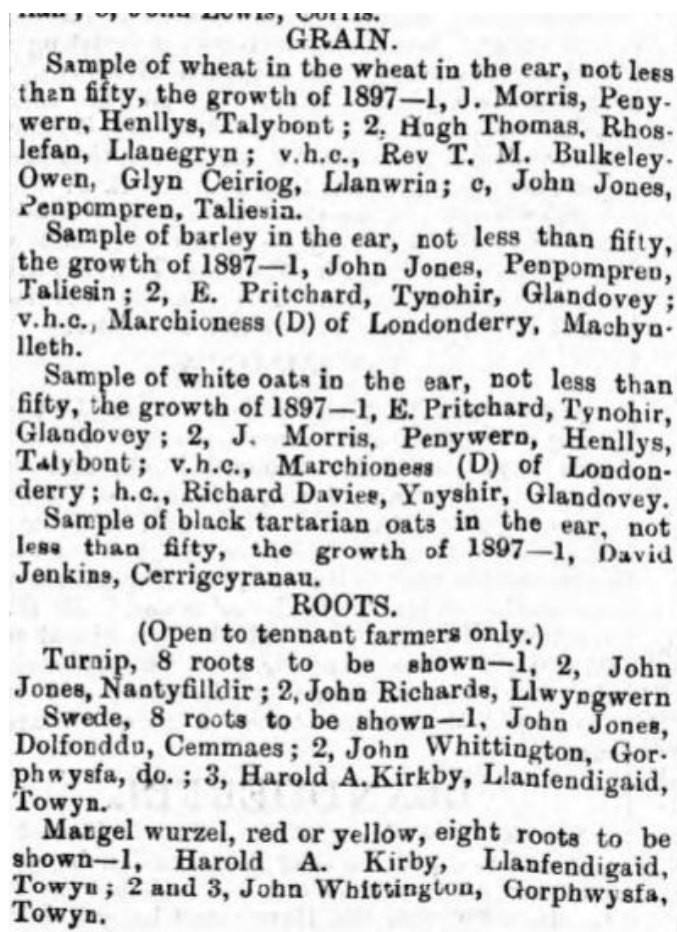


Figure 6: Details of winners in the Grain and Roots classes at the 10th Annual Machynlleth Show in August 1897 ³⁹

³⁹ The Cambrian News and Merionethshire Standard, "Machynlleth Show," *The Cambrian News and Merionethshire Standard*, August, <https://newspapers.library.wales/view/3315691/3315699>.

5.7 Agricultural Development Records

The Ministry of Agriculture, Fisheries and Food in Wales and their predecessors the Welsh Department Regional Office had responsibility for agricultural matters in Wales. Their records are held at TNA (ref. no. TNA MAF 112) and deal with matters relating to land-use and land tenure. Of particular interest could be the files MAF 112/209 relating to the reconstitution of County War Agricultural Committees ('War Ags') and MAF112/219 detailing requisitions of farms.⁴⁰

6 Recommendations for Future Work

6.1 Field Boundaries

Field boundary polygons were created by *Mixed Farming* using modern digital field boundaries as a digitisation template and volunteer labour. Scaling this methodology up nationally would be a major undertaking.

Since undertaking this work a hackathon at NLW developed code to enable vectorisation of the field boundaries on the digitised *Tithe Maps* through the contour detection function in IIF technologies.⁴¹ The code does not give perfect results, but crowdsourced correction of errors has been suggested by its creator. This code is freely available for re-use on GitHub as *map_contours*⁴² and could be explored as an alternative methodology for a wider project.

6.2 Field Level Data

There are several ways in which field level data in the *Gateway* could be enhanced. Investigation of the Tithe Commission's surveys and maps could yield more detailed data. In particular the usability and technical requirements for reuse of the data set created by R.J.P Kain could be investigated (Section 3.4.4). Developing methods and undertaking the work to extract field-level data from former land-use surveys could also be beneficial for the aims of *Mixed Farming*. In particular the archival material relating to the 1930 *Land Utilisation Survey of Britain* (Section 4.1) and the 1941-1943 *National Farm Survey of England and Wales* (Section 5.1) are publicly accessible, and would be worth further exploration, to give a more detailed picture of land-use change since the industrial revolution. Information from *sales catalogues* (Section 5.4) could also be assessed and if applicable extracted as field level data. The inaccessibility of the original data from the 1960 *Land Utilisation Survey of Britain* makes its reuse less viable (Section 5.1). The viability of digitising the *Land Utilisation Surveys* has already been explored and building on this could be a possible course of action for a Wales wide or UK wide study. For small areas of interest data could be extracted manually.

6.3 Farm Level Data

Capturing farm level data would require boundaries of farms to be identified and digitised. Individual farms can be identified from the *Apportionment Schedules* and their boundaries could be digitised. This would enable farm level data from the *Acreage and*

⁴⁰ Richard Moore-Colyer, *Farming in Wales 1936-2011* (Aberystwyth: Y Lolfa Cyf., 2011).

⁴¹ International Image Interoperability Framework (IIF): <https://iif.io/>

⁴² Glenrobson / map_contours on GitHub: https://github.com/glenrobson/map_contours/

Livestock Returns and the 1941-1943 *National Farm Survey of England and Wales* to be integrated into the datasets, although undoubtedly variations in boundaries developed over the 100 years between these surveys. Information gained from newspapers and aerial photographs could be linked to individual farms to give a rich picture of farming activity over time.

6.4 Data for Other Divisional Units

Capturing and mapping data collected at the level of divisional units such as historic county, historic parish, petty session divisions etc. would require the identification of definitive digital data delimiting these and securing any necessary licences to use them.

6.5 Detailed Information - Estate Maps and Records

Digitised estate maps were used in *Mixed Farming* to capture additional land-use data as described in Section 4.2 above. However, archival collections are also likely to contain significant detailed information for further studies regarding former land-use, crops grown, the yields produced etc.

Studying these archives would merit a project, to build a more detailed picture of the situation over time throughout the Biosphere and beyond.

Identifying what records to consult, and where they are held, is not straightforward. It would involve a time consuming 4-step process, the results of which would not produce complete coverage. Pilot investigations to inform possible further studies discovered that:

1. Identifying the landowners. This requires land ownership data from the *Tithe Apportionments* to be cleaned so that a list of landowners can be created, and coverage of an individual landowners' holdings mapped. One limitation of data cleaning is the similarity of Welsh names and the reuse of first names within families, making unequivocal identification of individuals difficult.
2. Identifying the estates. Landowners at this time were generally authority figures in society, with the right to vote only extended to men who owned or rented property land of a certain value. Many were MPs, Knights of the Realm, County Lieutenants or similar. Desk research regarding individual landowners can enable the identification of the names of the estates to focus on. This would require considerable research – the pilot covering 5 parishes – Llanwrin, Machynlleth, Mallwyd, Pennal and Talyllyn identified 122 landowners. Of the 26 landowners in Machynlleth Parish names of estates were only easily identified for 8.
3. Identifying where records are held. Archival records, even for an area as discrete as the Dyfi Biosphere, can be held in repositories across the UK because landowners often held multiple estates in different parts of the country. Records may also be held abroad due to an earlier international market in archives (now legally restricted). Additionally, designated as private records – estate records may also be held by private individuals. Records for discrete smaller estates may be incorporated into a wider record keeping system for the full landholding. To identify relevant collections rigorous interrogation of Welsh archives catalogues and national and international union archival catalogues such as the *Archives Hub*⁴³ or *Discovery*⁴⁴ at TNA would be needed. In addition, private individuals may need to be identified and approached.

⁴³ Archives Hub: <https://archiveshub.jisc.ac.uk/>

4. Interrogating individual archival repository's catalogues. The quality and detail of archival cataloguing can vary considerably, so that identification of relevant material can be time-consuming. Archives are unique materials, only a small portion of which have been digitised. This means that interrogation of records requires in-person visits to where they are held. One final point to note is that there is no legal requirement to maintain private estate records and the quantity and content of those that survive can vary considerably.

A list of archival material relevant to farming in the Dyfi Biosphere identified during the pilot can be seen in Appendix 3.

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⁴⁴ Discovery: <https://discovery.nationalarchives.gov.uk/>

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Appendices

Appendix 1: Example Data Sets from Land-Use Algorithm Training

Data showing a positive correlation between field name and land-use

Field id	Field Name	Detected Keywords	Keywords in English	Land Uses (documented)	Inferred LU Classes	Confidence	Final LU Classification	Correct guess?
229	Cae oddiar ysgubor	Ysgubor	Barn	Arable	Arable	2	arable	TRUE
231	Barn and yard, Cae pant gwyn	Barn and yard	Barn and yard	Arable, Arable	Arable	3	arable	TRUE
232	Cae clover	Clover	Clover	Arable	Arable	3	arable	TRUE
267	Cae clover	Clover	Clover	Arable	Arable	3	arable	TRUE
269	Cae ysgubor	Ysgubor	Barn	Arable	Arable	2	arable	TRUE
297	Cae tan ysgubor	Ysgubor	Barn	Arable	Arable	2	arable	TRUE
307	Cae tan ysgubor	Ysgubor	Barn	Arable	Arable	2	arable	TRUE
318	Cae ysgubor	Ysgubor	Barn	Arable	Arable	2	arable	TRUE
373	Cae Clover bach	Clover	Clover	Arable	Arable	3	arable	TRUE
374	Cae Clover uchaf	Clover	Clover	Arable	Arable	3	arable	TRUE
400	Cae pen yr rutra, Cae Ysgubor	Ysgubor	Barn	Pasture, Arable	Arable	2	arable	TRUE
406	Cae Ysgubor	Ysgubor	Barn	Arable	Arable	2	arable	TRUE
421	Cae Ysgubor	Ysgubor	Barn	Arable	Arable	2	arable	TRUE
579	Werglodd refel	Werglodd	Hay field, meadow	Meadow	Meadow	2	meadow	TRUE
590	werglodd fawr	Werglodd	Hay field, meadow	Meadow	Meadow	2	meadow	TRUE
590	Weirglodd ganol	weirglodd	Hay field, meadow	Meadow	Meadow	2	meadow	TRUE
596	Weirglodd Issa	weirglodd	Hay field, meadow	Meadow	Meadow	2	meadow	TRUE
599	Dol gron	Dol	Meadow	Meadow	Meadow	2	meadow	TRUE
600	Dol garn	Dol	Meadow	Meadow	Meadow	2	meadow	TRUE
605	Werglodd wen	Werglodd	Hay field, meadow	Meadow	Meadow	2	meadow	TRUE

Data showing a negative correlation between field name and land-use

Field id	Field Name	Detected Keywords	Keywords in English	Land Uses (documented)	Inferred LU Classes	Confidence	Final LU Classification	Correct guess?
141	Cae Gwastad, Cae Canol Ucha	Gwastad	Plain, flat	Arable, Pasture	Pasture	2	arable	FALSE
149	Rhos felin	Rhos	Heath	Meadow	Pasture	2	meadow	FALSE
150	Rhos felin	Rhos	Heath	Meadow	Pasture	2	meadow	FALSE
151	Bank brynhwylach	Bank	Bank	Arable	Pasture		arable	FALSE
152	Rhos garreg wen	Rhos	Heath	Arable	Pasture	2	arable	FALSE
160	Gwndwn bach	Gwndwn	Grassland, Lea	Arable	Pasture	2	arable	FALSE
162	Rhos y Perfedd	Rhos	Heath	Meadow	Pasture	2	meadow	FALSE
166	Cae brwyn	Brwyn	Rushes, marsh	Arable	Pasture	2	arable	FALSE
175	Rhos fach	Rhos	Heath	Meadow	Pasture	2	meadow	FALSE
175	Rhos fach	Rhos	Heath	Meadow	Pasture	2	meadow	FALSE
177	Cae Brwyn Tynfanal	Brwyn	Rushes, marsh	Hay	Pasture	2	meadow	FALSE
178	Cae Gors	Gors	Bog, Fen, Marsh	Hay	Pasture	2	meadow	FALSE
187	Rhos gefen issa	Rhos	Heath	Arable	Pasture	2	arable	FALSE
625	Rhos	Rhos	Heath	Arable	Pasture	2	arable	FALSE
626	Rhos	Rhos	Heath	Arable	Pasture	2	arable	FALSE
628	Ffridd nessa yma	Ffridd	Upland sheep walk	Arable	Pasture	2	arable	FALSE
629	Rhos	Rhos	Heath	Wood	Pasture	2	woodland	FALSE
641	Gwndwn gwyn	Gwndwn	Grassland, Lea	Arable	Pasture	2	arable	FALSE
649	Bank yr odyn hen	Bank	Bank	Arable	Pasture		arable	FALSE
653	Moel olwg	Moel	Bare	Wood	Pasture		woodland	FALSE
673	Rhôs y ffridd	Ffridd	Upland sheep walk	Arable	Pasture	2	arable	FALSE
679	Cae bank	Bank	Bank	Arable	Pasture		arable	FALSE
679	Ffridd	Ffridd	Upland sheep walk	Arable	Pasture	2	arable	FALSE
680	Cae bank issa	Bank	Bank	Arable	Pasture		arable	FALSE
687	Gwndwn Mawr	Gwndwn	Grassland, Lea	Meadow	Pasture	2	meadow	FALSE

Appendix 2: Digital Estate Maps in National Library of Wales Showing Land-use Information Relevant to Mixed Farming

Maps of Gogerddan Estate

- 1788 - *Maps of the Gogerddan Estate in the several counties of Cardigan and Montgomery the property of Mrs. Margt. Pryse Vol.2'*

<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/maps-of-the-gogerthan-estate-in-the-several-counties-of-cardigan-and-montgomery#?c=&m=&s=&cv=&xywh=-1538%2C0%2C7418%2C6299>

This is a book of maps with pages relating to every farm held with maps and tables recording land-use for every field on the maps. The relevant farms for the Dyfi Biosphere are:

- Bwlch y Garreg, Esgair Hir etc.
 - Bwlch y Styllen
 - Cae Rhedin & Allt Ddu
 - Camddwr Mawr
 - Ceffn Syllion & Cynffyrch
 - Garreg and Cae Mainan, and Tyhohir and Doly Garnedd
 - Glanmerin
 - Hafod Wnnog
 - Hencwm Annedd
 - Huddgen
 - Llechweddmor
 - Lodge Park
 - Waun Bwll & Llyaft y Garthen
 - Wenffrwd
- 1778 - *Court Grange Estate in the county of Cardigan belonging to the Rt. Honble. the Earl Lisburne*

<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/court-grange-estate-in-the-county-of-cardigan#?c=&m=&s=&cv=&xywh=-1450%2C22%2C6938%2C5892>

This book of maps includes tables with land-use for every field on the maps. Maps of interest are:

- Llawrycwm and Sarn-ddu
 - Part of Pen y cefen
 - Pen y Bryn and Llety Evan Hen
- 1764 - *An accurate map of the Demeasns of Cynnill-mawr & Argoed-Vach in the parish of Llanvihangel-generglynne Cardiganshire part of the estate of Mr John Hughes, Atty at Law*

<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/an-accurate-map-of-the-demeasns-of-cynnill-mawr-and-argued-vach-in-the->

[parish-of-llanvihangel-generglynne-cardiganshire#?c=&m=&s=&cv=&xywh=-401%2C-1168%2C18084%2C14777](https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/plan-of-the-outlines-of-lodge-park-hen-hafod-trwyn-y-buarth-and-bodfagen#?c=&m=&s=&cv=&xywh=-401%2C-1168%2C18084%2C14777)

Field names and land-use noted on map although land-use data for this area is already available on the tithe maps.

- 1788 *Plan of the outlines of Lodge Park, Hen hafod, Trwyn y Buarth and Bodfagen with the intended canal from Trwyn y Buarth to the River Dovey*
<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/plan-of-the-outlines-of-lodge-park-hen-hafod-trwyn-y-buarth-and-bodfagen#?c=&m=&s=&cv=&xywh=-217%2C0%2C7176%2C5863>

Limited use as a new source of data but shows extent of the salt marsh at Cors Fochno and property boundaries.

- 1784 - *Map of Bwlch-y-styllen in the parish of [Llanbadarn Fawr], Cardiganshire being part of the Gogerthan Estate, the property of Mrs. Marg't. Pryse*
<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/map-of-blwch-y-styllen-in-the-parish-of-llanbadarn-fawr-cardiganshire#?c=&m=&s=&cv=&xywh=-258%2C-329%2C11644%2C9515>

Limited use as a source of new data. It includes a location map for Bwlch y Stellen Farm with meadow indicated round the houses – see *Maps of the Gogerddan Estate in the several counties of Cardigan and Montgomery the property of Mrs. Margt. Pryse Vol.2'* for more detailed map of the farm.

- 1788 - *A survey of Nantcollen, Glan-y-Mor and Tan-y-Voel farms in the parish of Llanbadarn vawr in the county of Cardigan the property of Mrs Pryse*
<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/a-survey-of-nantcollen-glan-y-mor-and-tan-y-voel-farms-in-the-parish-of-llanbadarn-vawr-in-the-county-of-cardigan#?c=&m=&s=&cv=&xywh=2671%2C4311%2C4111%2C2449>

Field names and land-uses noted although this data is also in the tithe maps.

- 1788 - *A survey of Bron-y-Gof farm and some adjoining lands, part of Ucha-yn-y-Vainer township in the parish of Llanbadarn in the county of Cardigan the property of Mrs Pryse*
<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/a-survey-of-bron-y-gof-farm-and-some-adjoining-lands-part-of-ucha-yn-y-vainer-township-in-the-parish-of-llanbadarn-in-the-county-of-cardigan#?c=&m=&s=&cv=&xywh=-565%2C-3234%2C10228%2C8358>

Additional data to the tithe maps. Pasture and agricultural land shown.

- 1790 - *Map of Cors Fochno and the several islands situate thereinwith part of the navigable River Dovey in the county of Cardigan*

<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/map-of-cors-fochno-and-the-several-islands-situate-thereinwith-part-of-the-navigable-river-dovey-in-the-county-of-cardigan#c=&m=&s=&cv=&xywh=-738%2C6333%2C12437%2C7408>

Land-use noted, data that is missing from tithe surveys.

- 1800 - *A map of the Borough of Aberystwith with several farms, messuages & lands in the parish of Llanbadarnfawr and county of Cardigan*

<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/a-map-of-the-borough-of-aberystwith-with-several-farms-messuages-and-lands-in-the-parish-of-llanbadarnfawr-and-county-of-cardigan#c=&m=&s=&cv=&xywh=-5414%2C-3951%2C17686%2C20177>

Limited new relevant data – some information on land-use given but index missing. Inference from field colouring may be possible.

- 1723 - *A map of several lands and tenements situate and lying in or near the parish of Machynlleth in the county of Montgomeryshire being part of the possessions of Charles Yonge of Shrewsbury, Gent.*

<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/a-map-of-several-lands-and-tenements-situate-and-lying-in-or-near-the-parish-of-machynlleth-in-the-county-of-montgomery#c=&m=&s=&cv=&xywh=4834%2C8071%2C5471%2C4796&r=90>

New relevant data around Machynlleth town and surrounds - shows pasture, arable and hay-fields land-use in surrounding fields.

- 1769 - *A map of part of Rhoskellan Estate in the parish of Llanbadarnfawr, Cardiganshire, belonging to*

<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/a-map-of-part-of-rhoskellan-estate#c=&m=&s=&cv=&xywh=-424%2C-108%2C9495%2C4793>

Shows land-use and field names although this information is already in the tithe surveys.

- 1744 - *A plan of the Mannor of Perveth commonly called Cwmmwd y Perveth being one of the Crown's mannors in the County of Cardigan South Wales. Describing all the wastes and commons and freeholders lands, and the courses and veins of all the mines and silver done by order of Thos. Walker Esqr., Surveyor General of His Majesty's land revenues*

<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/a-plan-of-the-mannor-of-perveth-commonly-called-cwmmwd-y-perveth#c=&m=&s=&cv=&xywh=7746%2C2750%2C4705%2C5368>

Limited relevant data and only some parts of the map in the Dyfi Biosphere. No land-use shown – main purpose is to locate mines. This area is covered by the *Maps of Mary Pryse* – listed above.

- 1790 - [*Gogerddan Estate, Northern Cardiganshire*]
<https://www.library.wales/discover/digital-gallery/maps-1/estate-maps/gogerddan-estate/gogerddan-estate-northern-cardiganshire#?c=&m=&s=&cv=&xywh=2450%2C606%2C3650%2C4164>

Limited relevant data – overall map of estate that can help with orientation for the other maps listed. No land-use or field name data but township/farm/plas information.

Crosswood Estate Maps

All the Crosswood Estate Maps are outside of the Dyfi Biosphere except:

- 1778 - *Troed Rhiw Seiri and Cwm y glo*
<https://viewer.library.wales/4834291#?c=&m=&s=&cv=&manifest=https%3A%2F%2Fdamsssl.llgc.org.uk%2Fiiif%2F2.0%2F4834291%2Fmanifest.json&xywh=548%2C500%2C6443%2C5232>

Land ownership shown but no land-use.

Appendix 3: Estate Maps and Records Identified of Interest to Mixed Farming

British Library Maps

Series of Ordnance Survey Drawings from 1834 at the British Library that show woodland, roughland and farms:

- OSD 337/4 - Machynlleth 1834 <http://explore.bl.uk/BLVU1:LSCOP-WEBSITE:MBogi82227>
- OSD 339/14 - Towyn 1834 <http://explore.bl.uk/BLVU1:LSCOP-WEBSITE:MBogi82392>
- OSD 336/14 – Plynlimmon 1833-1834 <http://explore.bl.uk/BLVU1:LSCOP-WEBSITE:MBogi82391>
- OSD 338/4 - Aberdovey 1834
http://www.bl.uk/onlinegallery/onlineex/ordsurvdraw/a/002osd000000004u00306000.html?_ga=2.155856696.2061682076.1598291029-454278275.1598291029
- OSD 314/13 - Aberystwyth 1820
http://www.bl.uk/onlinegallery/onlineex/ordsurvdraw/a/002osd000000013u00275000.html?_ga=2.155856696.2061682076.1598291029-454278275.1598291029
- OSD 324/4 – Aberystwyth 1823
http://www.bl.uk/onlinegallery/onlineex/ordsurvdraw/a/002osd000000004u00289000.html?_ga=2.155856696.2061682076.1598291029-454278275.1598291029
- OSD 319 pt1/13 Cader Idris 1816
http://www.bl.uk/onlinegallery/onlineex/ordsurvdraw/c/002osd000000013u00283000.html?_ga=2.219358874.2061682076.1598291029-454278275.1598291029

Dolgadfan Estate – Llanbrynmair – NLW

- **GB 0210 HIGHMEAD.** 1548-c.1916 - Highmead Estate Records Davies-Evans family, of Highmead, Cardiganshire and Penylan, Carmarthenshire. Not catalogued https://discover.library.wales/permalink/f/1norb00/44NLW_ATM_760733
- **GB 0210 BONFAN.** 1741-1920 - Bontdolgadfan (Williams family) Papers - Papers of the Williams family of Bontdolgadfan, including deeds for property in Bontdolgadfan, records of the Llanbrynmair Agricultural School Library, records of the overseers of the poor for Llanbrynmair <https://archives.library.wales/index.php/bontdolgadfan-williams-family-papers-2>

Dolgadfan Estate – Llanbrynmair _ Carmarthenshire Archive Service

- **GB 211 DAVIESEVANS.** 1654-1908 – Davies Evans Family of Highmead Family and estate papers of the Davies-Evans family of Highmead including rentals, mainly of the Dolgadfan estate, Montgomeryshire, 1760-1907, deeds, 1654-1897, accounts, 1824-1908, legal papers, 1805-1905, correspondence, 1813-1907, maps, plans and photographs, [19 century]; wills, all relating to the Highmead estate in Carmarthenshire, Cardiganshire and Pembrokeshire, 1786-1903; and genealogical papers, 1819-1886. <https://archiveshub.jisc.ac.uk/search/archives/00de09ed-e7dd-390c-bd42-a28129318446?terms=%22Davies-Evans%20family%20of%20Highmead%22>

Esgair and Pantperthog Estate – NLW

Richard Matthews

- **GB 0210 ESGAIR.** 1519-1822 - Records of the Esgair and Pantperthog estates, Merionethshire, and of the Ruck family, comprising deeds and documents relating to lands in Merioneth, Cardiganshire, and Kent, 1509-1939, letters and papers relating to the Plas Gwyn estate, Anglesey, 1659-1822, and Welsh manuscripts of more than one Oliver Morris of Esgair Lleferin, Merioneth, 17 cent.-18 cent.
<https://archives.library.wales/index.php/esgair-and-pantperthog-estate-records>

Gogerddan Estate – NLW

(NB – digitised maps listed in Appendix 2)

- **Gogerddan 204.** 1891 - Manor of Generglyn; Map B Roads and Allotments [cartographic material]. Map with insets of Cors Fochno with fields, rivers and roads. Area bounded by Tretaliesin in east, Ynys Fergi in west, River Dyfi to the north. Incroachments described as 'old' to the south of map. Farms and owners noted. Fields of the Manor coloured and numbered. Map copied from Inclosure Award of 1847.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21794958480002419
- **GB 0210 GOGERDDAN.** 1796-1922 - Gogerddan Estate Records: Gogerddan agricultural production records and official papers Fisheries and other organisations, 1796-1922. They consist of miscellaneous Gogerddan farm accounts, 1813-1919; regular series of farmer's weekly account books, 1814-1921, and dairy accounts, 1881-1919; cultivation and livestock husbandry papers, 1796-1920; stud books and horse-breeding papers, 1875-1922; and official agricultural returns, valuations and printed tracts, 1835-1918. 26 vols, 3 bundles, 2 folders, 7 envelopes, 1 loose item

Llugwy Estate - Meirionnydd Record Office

Jonathan Anwyl – Pennal Parish

- **GB 220 Z/DO.** 1633-1943 - The Anwyl Papers. Family papers including wills, marriage settlements and correspondence; and estate papers, 1809-1949, including accounts and some deeds. <https://archiveshub.jisc.ac.uk/search/archives/cee28b4c-1ded-3694-b2df-2915359f904a>

Llwyngwern Estate

Edward Rowlands – Llanwrin Parish

- **LIGC De MAP Accession: Plas Machynlleth 21.** 1855 - Plan of Llwyngwern & Glandulas Estates in the Parish of Llanwrin in the County of Montgomery [cartographic material] : The Property of Fra.s Johnson Ford, Esquire / By T.S. Nicholls, A.D. 1855. Plan showing old & new turnpike roads Dolgellau to Machynlleth, River Dulas, woodland, farms, adjoining owners etc. Elementary relief hachuring.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21750238900002419

Londonderry Estate – NLW

Sir John Edwards, Baronet – Machynlleth Parish

- **GB 0210 PLAETH.** 1601-1923 Plas Machynlleth Estate Records (formerly Plas Machynlleth MSS and Documents and Londonderry Collection)
<https://archives.library.wales/index.php/plas-machynlleth-estate-records-formerly-plas-machynlleth-mss-and-documents-and-londonderry-collection>
- **LIGC De MAP Accession: Ms. Maps Vol. 93.** 1766-1900 - Maps of the estates of Col. John Edwards - A portfolio of ms. maps of the estates amassed by Col. John Edwards in the early nineteenth century in the parishes of Darowen, Cemmaes, Llanidloes, Llanwrin, Machynlleth, Penegoes, Pennal. This portfolio has been disbound. Some of the maps individually treated and catalogued. Includes various letters, newspaper extracts and references.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21864118890002419
- **GB 0210 EVANSMACH/398.** 1879-1897 - Henry Evans (Solicitor), Machynlleth, Records. Plas Machynlleth (Montgomeryshire) estate account book
- **LIGC De MAP Accession: Plas Machynlleth 22.** 1910 - [Plas Machynlleth Estate, in Merioneth and Montgomeryshire] [cartographic material] : [Pasted-up sheets of the six-inch second edition O.S. maps]. Map extracts showing disposal of parcels of estate lands. parcels in different colours, some marked 'now sold', others given group numbers.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21750215110002419
- **LIGC De MAP Accession: Mont. 018 – 018F.** 1930 - The Plâs Machynlleth Estate / John D. Wood and Co. Conditions of sale published separately.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21837680940002419
- **LIGC De MAP Accession: Mont. 036-036B.** 1952 - The remaining properties of the Plâs Machynlleth Estate / George Trollope and Sons.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21840962920002419

Londonderry Estate – Durham County Record office

- **GB 032 D/Lo Acc 1750(D).** 1930 - Londonderry Estate - Box 20/8 - Valuations of Plas Machynlleth estate

Nanteos Estate

- **LIGC De MAP Accession: Nanteos 298.** 1825 A map of estates in the parish of Llanbrinmair in the county of Montgomery, belonging to Captain Comoy [?] [cartographic material] https://discover.library.wales/prime-explore/fulldisplay?docid=44NLW_ALMA21766565800002419&context=L&vid=44WHELP_NLW_NUI&lang=en_US&search_scope=LSCOP_INLIBRARY&adaptor=Local%20Search%20Engine&tab=tab4&query=any,contains,pennant%20estate%20llanbrynmair&offset=0

Ormsby-Gore's Estate

William Ormsby Gore Esq.

- **LIGC De MAP Accession: Ms. Maps Vol. 31.** 1855 - A survey of estates in the parishes of Cemmes, Darowen and Machynlleth in the county of Montgomery [cartographic material]: belonging to William Ormsby Gore Esquire M.P. / by George Owen, Oswestry. Maps show adjoining properties. Terrier details acreages and field names.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21872666800002419

Pennant Estate – Llanbrynmair – NLW

Sir John Conroy, Baronet of Llanbrynmair. Also see Wynnstay Estate

- **LIGC De MAP Vaughan Owen 27.** 1940s Ty-Hir and Pennant estate [cartographic material] Coloured field plan on copy of OS 6" map showing lands between Dylife and Llanbrynmair identifying freehold and sporting rights lands and sporting rights lands only. Scale [1:10,560]. 6 inches = 1 mile.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21781675550002419
- **LIGC De MAP NANTEOS 298.** 1825 - A map of estates in the parish of Llanbrynmair in the county of Montgomery, belonging to Captain Comoy [?] [cartographic material] / surveyed by Thos. Lewis; mapped in 1825 by John Hughes of Aberystwyth. Plan shows field numbers, adjoining properties, adjoining landowners and part of Afon Twymyn.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21766565800002419

Talgarth Estate (Pennal Towers) - Meirionnydd Record Office

Charles Thomas Thurston – Pennal Parish

- **GB 220 Z/D/AD.** 1684-1927 - Thruston Family Papers, Pennal - 1684-1927 – 5 boxes. Deeds of the Pennal Tower estate in Merioneth and Montgomeryshire, 1684-1908, letters, 1842-1927, and letters and reports relating to the prospects of the Gellyllog and Cwmbreichiau slate and slab quarries, Merioneth, 1869-1893.

Talgarth Estate (Pennal Towers) – NLW

Charles Thomas Thurston – Pennal Parish

- **LIGC De MAP Accession: MAP 11134.** 1800 - Pwllbidyr or Penybryn in the parish of Pennal in the county of Merioneth belonging to Miss Edwards [cartographic material]. Ink field plan with field names and acreages. Total 56A. OR. 35P. North to bottom of plan. Shows the lands where Pennal Tower was built.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21865393680002419
- **GB 210 PENNALTOWER - NA269.** 1826 - File - Terrier of the estate of Vincent Corbet, esq., in p's Towyn and Aberdovey, co. Mer., giving names of premises and ...,
https://discover.library.wales/permalink/f/1norb00/44NLW_ATM_579452

- 1863 - Plan of a portion of freehold estates and family residence [cartographic material]. Particulars and conditions of sale of a very valuable freehold estate, near Machynlleth.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21751474820002419
- **GB 210 PENNALTOWER.** 1501-1842 - Pennal Tower estate records of the Price family of Esgairweddan, Pennal, Merioneth, and the Edwards and Thruston families of Talgarth Hall and Pennal Tower, Pennal, Merioneth, including title deeds, 1501-1918, of the Esgairweddan, Talgarth Hall and Pennal Tower estates, mainly in Merioneth and Montgomeryshire, rentals of the Esgairweddan estate, 1604-1727, and Talgarth Hall, 1760-1855; financial papers, [c. 1558]-1918; estate correspondence, 1787-1925; family correspondence, 1727-1917; and the papers of Captain Edward Scott (c. 1752-1842) of Bodtalog, near Tywyn.
<https://archives.library.wales/downloads/pennal-tower-estate-records.pdf>

Wynnstay Estate – NLW

Sir Watkin Williams Wynne, Baronet – Cemmaes Parish, Llanwrin Parish, Machynlleth Parish, Mallwyd Parish

(NB – Mathafarn estate merged into Wynnstay in 1762)

- **LIGC De MAP Accession: Wynnstay (1952) 1.** 1763 - Wynnstay Ms. Maps Vol. 1 - Survey and valuation of the several estates of Sir Watkin Williams Wynn Bart. : lying in the parishes of Llanwryn, Machynlleth, Darowen, Penegoes, Cemmaes and Llanbrynmair within the hundred of Cyfeiliog and county of Montgomery; also in the parish of Mallwyd in the county of Merioneth. Reference pages give property name, tenant's name, field name, utilisation and areas in customary measurements. 14,092 acres. Adjoining landowners named on maps.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21743446120002419
- **LIGC De MAP Accession: Peniarth Deposit Vol. 3.** 1800 Maps of estates in the several parishes of Machynlleth, Darowen, Cemes, and Llanowrin, Montgomeryshire [cartographic material] : and the parish of Penal, Merionethshire, belonging to William Wynne Es'r / map'd by Edw'd Jones Jun'r. Schedules give fieldnames, land-use, acreages and rents.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21823073970002419
- **1901 - LIGC De MAP Accession: Wynnstay 42.** c. 1901 - Cyfeiliog [cartographic material]: 2, Ceinws to Cemmaes: Composite map of OS 6-inch Montgomeryshire 2nd ed. sheets XVIII NE (pt) & SE (pt) and XIX NW, NE, SW, SE, folded in cover. Coloured to show property boundaries and with ms. additions in pencil. Originally produced as sheet 2 of a 9-sheet composite map showing Wynnstay holdings, the other sheets did not come to the NLW Map Collection with this sheet.
https://discover.library.wales/permalink/f/1norb00/44NLW_ALMA21808617800002419
- **GB 0210 Wynnstay/L559.** 1675 - File - Acquittance from Mary Griffiths of Glynne Twymyn, co. Mont., to William Williams, Glascoed, of 40s.
https://discover.library.wales/permalink/f/1norb00/44NLW_ATM_290478
- **GB 0210 Wynnstay/L589, 590, 591.** 1793 Abstract of the title to the manor of Cyfeiliog and other estates late of John Pugh, esq., deceased, in the ...
https://discover.library.wales/permalink/f/1norb00/44NLW_ATM_290984

- **GB 0210 Wynnstay/L174.** 1775 - Cases and queries concerning certain manorial rights and customs in Arwystli and Cyfeiliog, with L. Kenyon's opinions thereon. Matters dealt ...
https://discover.library.wales/permalink/f/1norb00/44NLW_ATM_290987
- **GB 0210 Wynnstay/L177.** 1787 - Opinion of John Madocks re the throwing open of encroachments by Montgomeryshire freeholders. Various questions regarding rights of common.
https://discover.library.wales/permalink/f/1norb00/44NLW_ATM_290988
- **GB 0210 Wynnstay/L179-L180.** 1676-1732 - Case and opinions concerning the right of Cyfeiliog freeholders to enclose exclusive sheepwalks without the lord's consent, & similar matters.
https://discover.library.wales/permalink/f/1norb00/44NLW_ATM_290989
- **GB 0210 Wynnstay/L1267-1269.** 1676-1732 - Machynlleth Town Rentals, Surveys and Manorial Miscellanea,
- **NLW MSS 10256D.** 1725-1726 - A rental of the estate of Watkin Williams Wynn in the counties of Denbigh, Montgomery, Merioneth, and Caernarvon, 1725, in the collection of John Davies, with accounts of disbursements, 1725-1726.
<https://archifau.llyfrgell.cymru/index.php/rental-1730>
- **Brogyntyn MS I.20.** 1744-1764 Brogyntyn MS I.20 - A volume containing accounts, 1744-1758, relating to the administration of the estate of Roger Mostyn (c. 1678-1744), Aberhirieth [Aberhiriarth], Cemais, Montgomeryshire
<https://archives.library.wales/index.php/roger-mostyn-aberhirieth-estate-administration>

Ynysymaengwyn Estate - Meirionnydd Record Office

Athelstan Corbet – Pennal Parish, Talyllyn Parish, Tywyn Parish

- **GB 220 Z/DAB.** 1756-1889 - The Ynysymaengwyn Estate Papers, 1756, 1836-1889. Deeds relating to the Ynysymaengwyn estate in Merionethshire and Montgomeryshire, 1855-1889; estate papers, 1756, 1861-1882, including maps and plans, sale catalogues, correspondence; and family papers, 1836-1880. Book of sale 1878 describes the sale in detail.

Ynysymaengwyn Estate – NLW

Athelstan Corbet – Pennal Parish, Talyllyn Parish, Tywyn Parish

(NB - Caethle Estate incorporated sometime between 1755 and 1875)

- **GB 0210 Peniarth.** 1468-1878 - Ynysymaengwyn estate 1468-1878 and NA269 Terrier of the estate of Vincent Corbet, esq., in p's Towyn and Aberdovey, co. Mer., giving names of premises and tenants and acreages.
https://discover.library.wales/permalink/f/1norb00/44NLW_ATM_372331

Appendix 4: Example of County Level Summary Statistics from the Acreage and Livestock Returns

Merioneth	14/03/1900	04/06/1910	04/06/1920
Total Acreage		418,475	418,475
Acreage under crops and grass	152,944	150,966	145,579
Arable land		28,912	32,643
Permanent grass	110,559	122,053	112,936
Grazing (mountain and heath) for hay		n/a	34,261
Grazing (mountain and heath) not for hay		n/a	78,675
Total Grazing (mountain and heath)		192,740	196,004
Coppice		n/a	n/a
Plantation		n/a	n/a
Plantation and woodland		15,912	n/a
Other Woodland		n/a	n/a
Total woodland			
Wheat	836	520	308
Autumn Sown Wheat		n/a	202
Spring sown wheat		n/a	4,433
Barley (Bere)	3,997	3,710	9,937
Oats	9,074	8	389
Mixed Corn		913	0
Rye	42	10	1
Beans	2	3	4
Peas	12	2	1,471
Potatoes	1,849	1,467	1,383
Turnips and Swedes	1,499	1,496	182
Mangold	203	222	12
Cabbage	19	9	0
Kohlrabi	0	0	544
Rape	19	2	15
Vetches or Tares	17	11	1
Lucerne	1	3	0
strawberries		4½	0
raspberries		0	0
currents and gooseberries		2½	6
Other small fruit		7	13
Total Small fruit		13¾	19
Apples		10¾	12
Pears		1	1
Cherries		¼	0
Plums		1¼	9
Other + mixed orchards		15¼	9
Total Fruit		28¼	31
Clover, Sainfoin, grasses under rotation for hay	9,868		9,428
Clover, Sainfoin, grasses under rotation not for hay	8,830		4,224
Clover, Sainfoin, grasses under rotation	18,698	12,494	13,652

Merioneth	14/03/1900	04/06/1910	04/06/1920
Other crops		27	84
Carrots		10	13
Onions		0	3
Buckwheat		7	1
Brussel sprouts		n/a	0
Cauliflower or broccoli		n/a	0
sugar beet		0	0
mustard for seed		n/a	0
mustard for fodder		n/a	6
flax for fibre	0	0	0
linseed		n/a	1
celery		0	0
rhubarb		1	0
Bare fallow	98	n/a	105
Horses (agricultural use)	3,378	3,646	3,146
Stallions for service	n/a		39
Unbroken horses > 1year	1,226	971	822
Unbroken horses < 1year	615	616	483
Other horses	n/a		727
Total Horses	5,219	5,032	5,217
Cows /Heifers in milk	14,276	11,106	10,327
Cow in Calf (no milk)	n/a	2,268	955
Heifers in calf	n/a	n/a	1,270
Bulls for service	n/a	n/a	533
Cattle 2 years +	5,089	4,532	4,713
Cattle 1-2 years	9,631	9,104	10,051
Cattle < 1 year	10,522	10,374	8,697
Total Cattle	39,518	37,374	36,546
Breeding ewes	153,649	169,526	161,978
Rams/ram lambs for service	n/a		5,896
Other sheep 1 year +	159,701	145,281	109,820
Other sheep < 1year	120,377	131,460	136,317
Total Sheep	433,727	446,267	414,011
Sows for breeding	1,265	1,025	765
Boars for service	6,872	n/a	42
Other pigs		5,162	5,182
Total pigs	8,137	6,187	5,989

Appendix 5: Agricultural Statistics at Petty Sessional Division Level from the Acreage and Livestock Returns (4 June 1913)

						total acreage under crops and grass						
Cardigan	corn crops	roots and potatoes	other crops	total arable land	permanent grass		horses	cows and heifers	other cattle	Total cattle	sheep	pigs
Llandyssul	3,503	751	2,076	6,330	10,370	16,700	1,080	1,516	2,877	4,393	3,944	2,017
Lower Ilar and Aberayron	10,732	2,219	7,430	20,381	31,931	52,812	3,490	4,225	7,041	11,266	18,351	3,827
Lower Troedyraur	4,761	828	2,955	8,544	16,346	24,890	1,694	2,259	4,227	6,486	5,014	2,379
Penarth	7,116	1,997	5,985	15,098	32,256	47,354	3,672	4,417	8,048	12,465	89,954	2,554
Penrhiwpal	5,789	1,201	3,344	10,334	16,596	26,930	2,110	2,906	4,513	7,419	5,740	3,331
Upper and lower Geneurglyn and Upper Ilar	10,494	3,065	8,501	22,060	40,183	62,243	4,397	5,772	11,353	17,125	108,206	3,232
Upper Moyddin	5,005	1,090	3,010	9,105	19,675	28,780	1,711	2,584	4,094	6,678	13,188	2,037

						total acreage under crops and grass						
Merioneth	corn crops	roots and potatoes	other crops	total arable land	permanent grass		horses	cows and heifers	other cattle	Total	sheep	pigs
Ardudwy-is-arto	501	191	731	1,423	7,482	8,905	297	883	1,532	2,415	21,322	428
Arduwdywuch Arto	1,785	532	1,028	3,345	35,219	38,564	1,037	2,940	4,398	7,338	81,257	1,136
Edeyrnion	3,826	866	3,148	7,840	12,477	20,317	948	1,717	3,749	5,466	40,799	1,493
Estimaner	1,856	630	1,440	3,926	19,943	23,869	996	1,938	4,744	6,682	101,946	1,094
Penllyn	3,830	621	2,352	6,803	28,609	35,412	1,117	2,940	6,192	9,132	90,511	1,201
Talybont	1,537	329	779	2,645	19,930	22,575	622	1,830	3,119	4,949	96,037	673

Appendix 6: Parish Level Data from the Home Office Parish Acreage Returns

Parish	Wheat	Rye	Barley	Oats	Potatoes	Peas	Beans	Turnips or Rape	General remarks	
Carno	70	150	30	350	60	10	0	10	Note 2	[In the Diocese of Bangor.] Seldom much wheat sown; very little barley in general; principle grain cultivated in this parish is oats; very few peas in general; land not strong enough for beans; very little turnips in general
Cemmes	28	96	42	390	48	3	0	2	Note 3	The above is an exact account
Darowen	36	170	67	567	60	2	0	20	Note 4	It is humbly requested that it be observed that the number of acres herein contained are according to the customary plough acres in the country, which is 120 perches, 4.5 yards in the perch instead of 160 perches, 5.5 yards a perch. There are no large quantity of beans sown in this parish.
Eglwys Fach	26	12	38	135	19	4.5	0	2.5	Note 6	Chapelry in the parish of Llanfihangel Geneu'r Glyn
Llanbadarn Fawr	482	182	1,100	1,629	189	173	5	42	No note	
Llanbrynmair	65	97	41	531	58	3.5	1	3.5	No note	
Llancynfelyn	34.5	11	87	153	26.75	21	0	2.5	No note	
Llanvihangel Geneu'r Glyn (Borth)	252	117	605	916	115	101	5	18	No note	
Llanwrin	90	60	80	350	20	2	0	10	No note	
Machynlleth	102.5	66.75	103	373	55	2.5	0	0	Note 19	Statute acres
Mallwyd	No data									
Penegoes	20	65	38.5	266	14	1	0	1		
Pennal	30	60	70	212	28	5	0	0		
Talyllyn	14	15	36	219	20	2	0	2		
Towen	No data									