



Canolfan Organig Cymru
Organic Centre Wales



Organic thatching straw: an opportunity for Welsh producers?

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The Better Organic Business Links (BOBL) project, run by Organic Centre Wales, is a four year project designed to support the primary producer in Wales and grow the market for Welsh organic produce in a sustainable way.

The aim is to develop markets for organic produce whilst driving innovation and promoting sustainable behaviours at all levels within the supply chain, to increase consumer demand and thence markets for organic produce, especially in the home market, and to ensure that the primary producers are aware of market demands. The project provides valuable market information to primary producers and the organic sector in general.

Delivery of the project is divided into five main areas of work:

1. Fostering innovation and improving supply chain linkages
2. Consumer information and image development of organic food and farming in Wales
3. Market development
4. Providing market intelligence to improve the industry's level of understanding of market trends and means of influencing consumer behaviour
5. Addressing key structural problems within the sector.

In all elements of the work, the team are focused on building capacity within the organic sector, to ensure that the project leaves a legacy of processors and primary producers with improved business and environmental skills, able to respond to changing market conditions, consumer demands and climate change.

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1 Executive summary

Thatching straw production has declined as modern, fertilised wheat varieties have dominated the market and, being shorter stemmed, are unsuitable for thatching. This, alongside the reduction in available labour and the predominance of combine harvesters, has resulted in thatching straw production being a niche production technique.

Presently, a significant quantity of imported straw and reed is used. The market is very underdeveloped and direct relationships between the producer and the thatchers are the norm. In 2007, the latest data available, the UK demand for thatching straw was estimated at approximately 10,000 tonnes. There is enthusiasm among the thatching community to source Welsh straw. In addition, there are opportunities for organic producers to enter the market as their lower nitrogen conditions are advantageous to producing quality straw.

Many arable producers have the potential to produce thatching straw. However, there are technical differences in production of straw as opposed to grain particularly in the harvest and post-harvest management stages. It requires an attitudinal change; straw has essentially been regarded as a secondary product to grain, although its value as a bedding material and an essential ingredient of FYM is well recognised. Nevertheless, treating the straw as the primary product requires a change in mindset.

There is little general knowledge or experience of growing thatching straw in Wales. However, there are a number of experienced growers in the UK who are generally willing to share their knowledge. The National Thatching Straw Growers Association can provide details of thatching straw growers who can provide support for any new entrants.

Many plants can and have been used for thatching but generally it is only cereal straw and water reed that is used. The only commercially available variety of wheat suitable for thatching is Maris Widgeon. Other heritage varieties are not grown as seed and cannot be sold as such, but they can be given away and this is common in the thatching straw community. Triticale has become increasingly popular as thatchers have gained experience of using it. Spelt produces a good thatching straw it is not widely grown, whilst rye is not popular.

Maris Widgeon is winter drilled with a latest planting date of end January, similar to modern wheat varieties. It is generally slower maturing, but cutting for thatching straw will generally be ahead of grain varieties.

As a rule of thumb straw yields are between 2 and 2.5 t/ Ha. There is also grain harvest, but the size of this depends on the species. The biggest technical challenge for organic straw growers is likely to be weeds. Freedom from weeds is an important quality criteria for thatchers. In general terms weed management strategies are the same as when growing grain crops. In addition, combers can also be used to remove weed from the harvested straw.

Suitable harvesting and processing machinery will be required. This machinery is not readily available and so needs to be considered ahead of starting production. Discussions with the Meirionnydd Vintage Machinery Society indicate that there are suitable machines available in Wales but it is uncertain under what terms these might be available to any new thatching straw growers. Machinery Rings could facilitate the joint ownership of specialist machinery by a group of interested producers.

Labour requirements for thatching straw are significant and many of the operations cannot be mechanised.

There are some thatching straw contractors. Indicative contracting costs are £375 per ha (£150 per acre) for the equipment and 2 men, but additional labour requirements must be supplied by the farmer. At present none are known to operate in Wales. One short term solution may be to transport Welsh grown sheaves to England for threshing and combing.

Gross Margin calculations indicate that thatching straw gross margins are comparable to (indeed slightly higher) than feed wheat gross margins. No price premium was attached to the grain produced from the thatching straw crop. If a quality heritage grain such as Maris Widgeon is grown it may sell at a premium, the enterprise would become more attractive financially.

2 Introduction

The deficit of thatching straw production within Wales is as significant as it is within the rest of the UK with most thatching material being imported from Eastern Europe and Eurasia as reed. With the predominance of livestock production within the Welsh agricultural economy straw is a valuable product and any surplus straw produced on farm has a ready market. However the value of straw for thatching may mean that the straw should be regarded as the primary product from the arable enterprise rather than a by-product and could make it an attractive proposition for Welsh producers.

Thatchers prefer straw grown in lower fertility systems; the stem grows more slowly as this makes it stronger straw and less prone to rotting. This gives organic producers an advantage but there is little if any specific demand for straw to be certified as organic.

This project looks at the technical and economic feasibility of establishing a supply chain for thatching straw in Wales.

3 Objectives

- Consider the structural and practical challenges of producing thatching straw
- Assess the financial returns
- Consider the practical challenges of adapting an existing grain enterprise to produce thatching straw

4 The market for thatching straw

There is enthusiasm among the thatching community to source Welsh straw. Presently, a significant quantity of imported straw and reed is used. The market is very underdeveloped and direct relationships between the producer and the thatchers are the norm. This means that farmers need to be prepared to take responsibility for marketing the crop, preferably prior to planting so that the specific requirements of the thatcher can be taken into account. There are some thatching straw merchants who can help to market thatching straw but as volumes are low, the margins taken by the merchant is high on a per tonne of straw basis. Haulage costs are also significant as the straw is bulky.

This report focusses on Wheat Reed (Combed Wheat, Devon Reed) rather than Longstraw thatch. Longstraw thatch declined in popularity once mechanical threshing and combing became popular during the 19th Century. There is a slight revival in Longstraw thatching however the majority of thatching straw used today is Wheat Reed.

Each thatcher will require approximately 3- 4 tonnes of straw per roof and will need between 20 – 30 tonnes of straw per annum. In 2007, the latest data available, the UK demand was estimated at approximately 10,000 tonnes.

The market for thatching straw is unstructured and so no formal or universal specifications exist as they do for grain or livestock. Some straw is sold as standing crops so the thatcher takes responsibility for harvest and conditioning of the straw. A lot of straw will be assessed by the thatcher prior to purchase and little middle market exists.

The quality of the straw is very important. It should be in excess of 90 cm (3 feet) and the longer the better, although there is no price premium for greater length. Colour is important as home owners prefer the thatch to look bright on completion. Dull straw is an indicator of straw having weathered after harvest. Poorer straw can be used for ridges and porches, for example, which are re-thatched more regularly, but the price will be lower.

Straw hardness, promoted by growing in lower fertility/organic conditions, is important to create a good thatch, but there is no quantitative assessment of hardness. Moisture changes to the harvested straw can affect straw strength and so straw should be stored in dry conditions.

Broken or bent straw due to rough treatment post-harvest, which results in higher wastage for the thatcher, will also reduce its value. Stooks should not be tied too tightly and should be handled carefully to reduce damage.

5 Growing the crop

Many arable producers have the potential to produce thatching straw. However, there are technical differences in production of straw, particularly in the harvest and post-harvest stages. It also requires an attitudinal change; straw has essentially been regarded as a secondary product to grain, although its value as a bedding material and an essential ingredient of FYM is well recognised. Nevertheless, treating the straw as the primary product requires a change in mind-set.

There is little general knowledge or experience of growing thatching straw in Wales. However, there are a number of experienced growers in the UK who are generally willing to share their knowledge. The National Thatching Straw Growers Association can provide details of thatching straw growers who can provide support for new entrants.

5.1 Species and varieties for thatching straw

Many plants can and have been used for thatching but generally it is only cereal straw and water reed that is used. Modern plant breeding has focussed on shortening straw length and this means modern varieties are generally unsuitable for thatching. Most thatching straw is grown using heritage wheat varieties such as N59 and Maris Widgeon. However, the only commercially available variety of wheat is Maris Widgeon and is conventionally produced, so organic farmers will require a derogation from their organic control body.



Figure 1: Thatchers assessing straw quality at 2012 Annual Conference
Credit: Philip Jones



Figure 2: Wheat straw
Credit: Philip Jones

The seed is also expensive (in the region of £700/t), because only small quantities are produced. Other heritage varieties are not grown for seed and therefore cannot be sold as such, but they can be given away and this is common in the thatching straw community. Triticale has become increasingly popular as thatchers have gained experience of using it. Spelt produces a good thatching straw but is not widely grown, but rye is not suitable.

5.2 Yields

As a rule of thumb straw yields are between 2 and 2.5 t/ Ha.

There is also grain harvest, and the size quality of this depends on the species. There is little or no reduction in grain yield for triticale or spelt grown for straw, but grain yield for wheat will be significantly lower (up to 45% lower) compared to modern varieties.

5.3 Sowing and harvesting dates.

Maris Widgeon is winter drilled with a latest planting date of end of January, similar to modern wheat varieties. It is generally slower maturing, but cutting for thatching straw will generally be ahead of grain varieties. The harvested straw is stooked to mature. If stooks are staked at the field edge or moved from the field to ripen, it creates the opportunity to undertake summer cultivation.

5.4 Weeds

The biggest technical challenge for organic growers is likely to be weeds. Freedom from weeds is an important quality criteria for thatchers as they are more likely to absorb and retain water differently from straw and this will encourage rotting. In addition some weeds such as thistles can make the straw unpleasant to handle. The annual survey of Welsh organic producers, carried out by OCW, shows that organic arable producers see weeds (brome, wild radish, docks, couch grass, charlock, thistles and chick weed) as their main technical problem.

In general terms weed management strategies are the same as for grain crops. Straw crops should go in as early as possible in the rotation to avoid the build-up of weeds over previous years. If there is a preceding crop, cut and clear it as early as possible to maximise the opportunities for pre sowing management. Combers can also be used to remove weed from the harvested straw.

5.5 Maintaining fertility

Straw is often retained on farm and used as animal bedding and then spread as farmyard manure (FYM) and so the nutrient is not lost to the farm. If the straw is exported this is not the case. Based upon a straw yield of 2.5 t/ha, approximately 3.8 Kg/ha of Phosphate and 31 Kg/ha of Potash (HGCA Information sheet No 5 Spring 2009) would be exported. This should be included in any nutrient budgets produced for the farm and its replacement considered.



Figure 3: Water reed

Credit: Philip Jones

5.6 Competing priorities

In systems that are predominantly livestock based the straw crop will effectively be competing with the grain requirements of the stock. Ideally (from the perspective of the organic standards and potentially profitability), straw will be produced on land that is not required to grow feed. This section aims to quantify the area of that land in Wales. The information on which this is based comes from two sources: 2011 Certification data from DEFRA¹ and the Welsh Organic Producer Survey 2011². In the interim, more data has become available, but as the organic sector in Wales has been very static we judged that the new information does not significantly alter the conclusions.

Key statistics for the arable sector in Wales are presented in Table 1.

	Area (ha)	Yield (t/Ha)	Total production (t)	Price (£/t)	Sold (%)	Volume sold (t)	Area available for straw (ha)
Wheat	519	4.4	2284	247	43	982	223
Barley	1186	4.4	5218	218	12	626	142
Oats	884	4.1	3624	244	31	1124	274
Total	2589		11126.4			2732	640

Table 1: Key statistics for organic arable crops in Wales

Figures are calculated as follows:

- 1) Total area for each crop was taken from the DEFRA Certification Data
- 2) The average yields were calculated using data from the OCW survey
- 3) Total production was calculated by multiplying 1) and 2)
- 4) Average prices were taken from the OCW survey
- 5) The percentages sold were derived from the OCW survey
- 6) The volumes sold were calculated by multiplying 5) and 3)
- 7) The area that this represents is calculated by dividing 6) by 2).

This analysis suggests that there are 640ha of organic arable land that could be used to grow thatching straw without impacting on existing livestock enterprises. Where farms do not have spare land available, the thatching straw will reduce the quantity of straw available to the farm as animal bedding or feed, and an alternative source of straw will be required. Generally straw is available as bedding as this can be inorganic straw under organic certification rules. However if the straw needing to be replaced is used as feed this would need to be replaced with organic straw which may be more difficult to source.

¹ Based on information collected by Organic Control bodies in 2011 Aberystwyth University disaggregated this data to 'Wales' level and summarised it in [this report](#), which will be used in our analysis

² An [annual survey](#) carried out every autumn by Organic Centre Wales.

6 Harvesting and storage

6.1 Harvesting and processing

As noted previously, thatching straw is cut slightly underripe and then dried. This improves the strength of the straw. In order to maintain the integrity of the straw it cannot pass through a conventional combine harvester and so specialist equipment is required. The traditional approach was to cut (Figure 4) and bind (Figure 5) the straw and then stook it (Figure 6) to ripen, after which was threshed. This relies upon equipment which is relatively scarce and is labour intensive and so an alternative approach has been devised.

This involves removing the ear from the standing crop by use of a stripper header on the combine which allows the grain to be threshed using a standard combine. The standing straw can then be cut and bound and ripened before storage. Rather than a traditional binder, a swather can be used. If the crop is clean the straw may not require combing to remove weeds and broken straw but in an organic situation without the use of herbicides this is less likely. Some thatchers argue that this approach produces an inferior quality straw as the straw is more mature at cutting which results in a weaker straw.

The more traditional approach which allows for combing is perhaps more applicable. This method requires the straw to be cut and stooked before threshing.

6.2 Machinery

Both the binder and threshing drum are relatively rare pieces of agricultural equipment and no current manufacture could be found. There are rice harvesters available which might be applicable but they are walk behind machines intended for small scale production systems. Discussions with the Meirionnydd Vintage Machinery Society indicate that there are binders available in Wales but it is uncertain under what terms these might be available to any new thatching straw growers. They have also indicated that they have held successful thatching straw demonstrations and for an enterprising farmer this might be a novel way of bringing in the additional labour required to stook and thresh thatching straw with payment made in beer and beef rather than hard cash!



Figure 4: Cutting
Credit: Rushall Farm



Figure 5: Binding
Credit: Rushall Farm



Figure 6: Stooking
Credit: Rushall Farm

There are some modern machines available, such as reaper-binder pictured in Figure 7 (for details visit <http://www.bcs-ferrari.in/reaperbinder.html>). This machine cuts and binds in a single operation, and can be adapted for other crops. It is suitable for small scale operations and has a work rate of about 0.5 ha/ hour.



Figure 7: Reaper- binder
Credit: BCS

Machinery Rings can be very useful vehicles for the joint ownership of specialist machinery and could be used by a group of cereal producers wishing to produce thatching straw. However this might only work if all producers were in a fairly small geographic area. A further concern might be the vintage and delicate nature of the machinery. If the machinery requires specialist knowledge for maintenance and operation it may not be suitable for operation by a machinery ring with no individual taking responsibility for the machinery.

6.3 Labour

Regardless of whether the standing crop was processed by a stripper header combine followed by a binder or cut with the binder directly, all of the growers of thatch and roofers are agreed that labour requirements increase significantly when growing for straw.

The binder will require a tractor driver and binder operator and additional labour to pick up and stook the sheaves.

The labour requirement for stooking varies. In the experience of Stephen Letch, Secretary of the National Thatching Straw Growers Association it needs about 5 man hours/acre (see box 1 for details).

Normally, it is possible for 4 experienced stookers to stack a 5 acre field in 6 hours, then 2 to 3 people to create pressed bales of sheaves to be transported. Allen Main, Secretary of the Meirionydd Vintage Machinery Club commented that when harvesting a 6 acre field of oats, 12 people were present to stook the sheaves. However, when machinery from a Vintage Club is put to work, it is usually done for the purpose of a show or demonstration using personnel that are enthusiasts and volunteers. They tend to use more personnel/acre compared to commercial operations.

The threshing and combing operation will also require between 6 and 8 staff to operate the system effectively. The threshing drum separates the grain from the straw whilst the comber removes both damaged stalks and weeds within the straw. Threshing can occur later in the year but leaving the grain on the plant will attract more vermin which will potentially damage the straw.

'We waited until the binder had gone round the field five times before starting to stook. Two or three of us would then take on the five rows, picking up sheaves in pairs and setting them together to form the stook. We set five pairs per stook. If we made them longer they would be less able to dry out and if we made them shorter they may fall down easier. Each "gable end" of each stook was set to the midday sun, that is due South to aid drying. When finished every stook in the field was sitting at the same angle.'

Stephen Letch, Secretary of the National Thatching Straw Growers Association

There are some thatching straw contractors but these are few and far between. None are known to operate in Wales but it may be possible to transport Welsh grown sheaves to England for threshing and combing. Indicative costs are contracting cost of £375 per ha (£150 per acre) for the equipment and 2 men but additional labour requirements must be supplied.

Once harvested the straw needs to be well stored to prevent deterioration. It needs to be kept dry and as it is bulky significantly more storage than baled straw is required. Stem strength and length are important quality parameters and so the straw does not want to be handled more than is necessary and so a dedicated storage area is preferable in order to maintain straw quality which will be spoiled by repeated handling.

7 Case study: Rushall Farm

In 2008 Rushall Farm in Wiltshire embarked on an exciting project to build a new dwelling on the estate. They had two primary aims: to produce most of the materials for the house on the estate and to make it as energy efficient as possible. For these reasons the production of straw was important both for the house walls and the thatched roof.

Rushall Farms regularly grow spelt wheat (var Frankenkorn) for sale into the milling market and so determined that 8 ha of the crop would be cut to provide thatching straw. As a one off project the farm did not invest in specialist machinery but used contractors and were charged £370 per ha for the cutting binding and threshing of the grain.

The crop was cut in late July, stooked and left to ripen for about 10 days and then moved off the field to a barn for threshing. The operation was undertaken by contractors with farm labour being used alongside the contractors. Contractors cut and bound the sheaves which were stooked by farm staff and then collected and hauled by farm staff who also helped with the threshing operation. The farm has 3 full-time employees alongside the owner. No comprehensive records were kept but it is estimated that the



labour requirement was 25 man days for the 2.8 ha or 8 days per ha in addition to the contractors. However it was also commented that because it was a “one off” and at a time prior to the main harvest this could probably have been reduced as staff were not worked very hard.

The thatching straw production was seen as an interesting and enjoyable diversion for a specific purpose but even with local contractors available it is not an enterprise they are considering introducing to their farming system.

The large acreage farmed means that harvest is a busy time and this was a distraction to the main harvest and so did not fit the farming system. Rushall considered that the amount of time the contractors spent working with the thatching machinery the contracting

charge was too cheap and that it was partly done for the enjoyment of the work than purely as a business. They also commented that two members of their farm staff were old enough to remember pre-combine harvesting and so had some understanding of the process. A younger less receptive workforce might be less enthusiastic as it is hard physical work compared to modern cereal harvest.

The land from which the thatch was taken was brought back into the normal rotation and there was no impact upon the wider farming system once the crop thatching straw was harvested.

8 Assessing financial returns and opportunity costs

8.1 Gross Margin analysis

The financial viability of thatching straw production will largely be determined by the yield penalty experienced moving away from more productive wheat varieties. The financial model shown in Table 2 indicates that the yield reduction of the varieties of wheat grown for thatching is a significant determinant of the financial viability of growing straw.

With modern wheat varieties yielding 2 tonnes of grain per hectare more than thatching straw varieties and current strong wheat prices, the value of the thatching straw is insufficient to incentivise thatching straw production. Should thatching straw values change or wheat prices weaken the financial incentives will change.

Analysis of the figures shows that the value of the straw for a non-thatching wheat enterprise has been valued at £70 per tonne and the thatching straw enterprise “buys in” replacement straw at a cost of £70 per tonne. In reality few farms cost straw transfer between their arable and livestock enterprises. If a farming system was surplus of straw for the livestock enterprises on the farm this requirement would be an accounting convention rather than a cash position for the business. This straw adjustment makes a significant difference to the Gross Margins of both enterprises.

It should be noted that no price premium has been attached to the grain produced from the thatching straw crop. If a quality heritage grain such as Maris Widgeon is grown it may sell at a premium. The financial model assumes wheat is sold as feed at £250 per tonne as an average value. Current spot values are higher than this and the higher the wheat price the less incentive there is to grow thatching straw.

8.2 Sensitivity analysis of thatching straw production

The yield sensitivity analysis (Table 3) indicates that at £250 per tonne for organic wheat a 0.25 t / Ha yield variation makes a variation of £62.50 to the Gross Margin whilst an improvement in wheat value has a greater impact upon the non-thatching straw production because of the greater yield expected.

<u>Organic Thatching Straw</u>						<u>Organic Feed Wheat</u>					
Output						Output					
Straw	2.5	t / Ha @	700		1750	4.5	t / Ha @	70		315	
Grain	2.5	t / Ha @	250		625	4.5	t / Ha @	250		1125	
					2375					1440	
Costs						Costs					
Seed*	220	kg/ha @	0.7	/ Kg	154	220	kg/ha @	0.6	/Kg	132	
Fertiliser					44					44	
Other					30					30	
Straw Replacement	2.25	t/ha @	70		158						
Contractors					380						
Casual Labour	18	hours @	10.1		181						
					947					206	
Gross Margin										1234	

Table 2: Comparison of Thatching straw Gross Margin and Feed wheat Gross Margin

		+/-	+/-
Grain Yield	0.25t/ha	62.5	62.5
Wheat Value	£25/t	50	113

Table 3: Sensitivity analysis for thatching straw gross margins

9 Conclusions

Thatching straw production has declined as modern, fertilised wheat varieties have dominated the market and being shorter stemmed unsuitable for thatching. This, alongside the reduction in available labour and the predominance of combine harvesters, has resulted in thatching straw production being a niche production technique.

There are opportunities for organic producers to enter the market as their lower nitrogen situation is advantageous when producing thatching straw. Thatching straw requires good attention to detail in production to reduce weed growth and other quality problems in the thatching straw.

Suitable harvesting and processing machinery will be required. This machinery is not readily available and so needs to be considered ahead of starting production. Discussions with the Meirionnydd Vintage Machinery Society indicate that there are suitable machines in Wales but it is uncertain under what terms these might be available to any new thatching straw growers. Machinery Rings could facilitate the joint ownership of specialist machinery by a group of interested producers. A significant amount of additional labour will be required for the harvest period

Whilst there is a ready market for thatching straw it may be necessary to store the straw until it is required. Little thatching is done through the winter months and so it is possible that the straw will not be used until the spring or summer following harvest and so good storage will be required to ensure that quality does not deteriorate.

Thatching straw production needs to be viewed as the main output of the cereal enterprise with the grain as the by-product. This will take some adjustment from the usual way cereal production is considered. If the straw is considered a by-product it is likely that poor quality thatching straw will be produced making the enterprise less successful.