



# Aberdeenshire Arable Monitor Farm

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**Draft Meeting Report – 6<sup>nd</sup> Dec 2011**

**[Grain Driers – what are the options?](#)**

**Date of next meeting: Wed 7<sup>th</sup> March 2012**

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The Aberdeenshire Arable Monitor Farm Programme is an HGCA project supported by the Scottish Government SRDP Skills Development Scheme.

## **Meeting Programme:**

The meeting format was unusual in that the Group did not meet on the Monitor Farm, instead there were a series of visits and presentations focusing on grain driers. George and Andrew are facing a major decision on grain drying/storage and asked the Group for guidance.

- Welcome from Chairman
- Visit to Hamish Watson, Balring Fm, Mintlaw
- Visit to Peter Chapman, South Redbog, Strichen
- White Horse Hotel, Strichen – fly cup
- Market prospects – Charlie Birnie, Grainco
- Central store option – Bruce Ferguson, Aberdeen Grain
- Alan Grant, Skillymarno Fm, Strichen
- Group exercise – discussion of each grain drying option

### **1. Welcome**

Peter Chapman, Chairman, welcomed everyone and outlined the meeting programme. There were 69 farmers & others from the Community Group present.

### **2. Hamish Watson, Balring Farm, Mintlaw**

Hamish has 100 suckler cows and grows 700ac of combinable crops. He installed a 100t tray drier with stirrers using a diesel burner in 2007 (previously he had 2 mobile driers). In a further development he invested in a biomass burner this summer (GlenFarrow, 400kw) to reduce his drying costs and potentially earn renewable heat incentives (RHI).

The main focus of the visit was the tray drier and the biomass burner.

#### **Main points from visit:**

- The 100t tray was supplied by Clark & Sutherland and cost approx £60k in total including the shed (£10k fan & burner, £6k floor, £5k walls, £15k shed)
- Four stirrers zig-zag through the grain to allow the hot air to filter up through the heap improving the drying efficiency
- Considering installing another 100t tray so one can be filled while the other is being emptied.
- A tray of grain at 25% mc would require 1,000l of diesel (10,000kw, 1L diesel = 10kw heat)
- Purchased the GlenFarrow 400kw burner this August, cost £30k. See [www.glenfarrow.co.uk](http://www.glenfarrow.co.uk)
- There are several biomass boiler manufacturers. Hamish liked GlenFarrow because they started as plumbers fitting other makes of boiler, so know the pluses and minuses of each and can do the whole fitting and design job.
- The radiator (2,500l water) with the burner is not big enough, was only able to produce heat to 23°C instead of the 40°C required. Successfully dried grain, but took too long.
- As a result plan to fit another radiator – the Manufacturer has agreed to help with the development.

- Therefore needed to run both the diesel burner and biomass burner together during 2011 harvest
- The burner needs to be refilled every 6-hrs with wood (bundle of logs placed in boiler with pallet forks).
- 2.1t wood = 1,000l of diesel
- Purchased 7 artic loads of 2-yr old wood from 'Scottish Woodlands' at a cost £44/t
- Have just applied for approval to be accredited for renewable heat incentives (RHI)
- RHI are a new Govt scheme similar to FiTs , to encourage people to install renewable heat systems.
- The rates for accredited schemes range from 1p to 7.9p /kWh and are guaranteed for 20-years. Hamish's 400kW burner Tier 1 rate is 4.9p /kWh.
- Renewable schemes installed after July 2009 may be eligible
- It was noted that at present it is still unclear if biomass burners used to dry grain will be eligible for RHI

**Table 1: Relative Costs of Biomass**

FUEL	Price per unit	Kwh PER UNIT	Pence /kWh
Wood Chips (30% MC)	£100 /tonne	3,500 kWh/t	2.9p
Wood Pellets	£190 /tonne	4,800 kWh/t	4.0p
Natural gas	4.8p /kWh	1	4.8p
Heating Oil	58p per litre	10 kWh/litre	5.8p
LPG (bulk)	49p per litre	6.6 kWh/litre	7.4p
Electricity	15p /kWh	1	15.0p

### 3. Peter Chapman, South Redbog, Strichen.

Father & son team, farming 930ac of which 715ac combinable crops. This is a low cost example using 2<sup>nd</sup> hand continuous flow drier (Bentall tower) and adapting existing buildings. They have erected a new roof to cover existing buildings which will provide approx. 4,000t grain storage.

#### Main points from visit:

- When South Redbog was purchased it already had a Bentall continuous flow drier which was installed in 1976
- Took opportunity to replace the drier with a 2<sup>nd</sup> hand younger model of the same make for £3k (found through Farmers Weekly ad, in Edinburgh area)
- Have old drier for spares - fan, gearbox, burner, control panel, etc.
- Have intake pit that holds 25t
- Taking out 5% mc, the drier can do 10t/hr, normally 200t per day, all automatic but regularly check in case problem with conveyors.
- Uses 1 litre of diesel to remove 1% mc/t
- Only have to handle the grain once. Elevator system discharges grain into store in same building or across the close to new shed
- Grain stored up to 24 feet deep.
- 1,500t store has 8 pedestal chimneys and uses 4 portable fans

- Use pedestal chimneys to ventilate and cool the grain when in store – cools a bit in drier, but not enough
- Recently reroofed traditional steading following snow damage with a new umbrella roof. Can now hold up to 4,000t in total

#### **4. Market Prospects – Charlie Birnie, Commercial Manager, Grainco**

##### **Market Drivers:**

- World Wheat stock levels recovered (200Mt compared to 114Mt 4 yrs ago), record production. Buyers more relaxed.
- However, low maize stocks which is driving the market.
- Half the US maize crop goes for bioethanol production
- 1<sup>st</sup> real market news with an impact on prices will be how crops have overwintered in eastern Europe and Russia
- Prospects that Australia will have a good harvest
- Still major Fund investments in the market, major worry if collapse in Euro, they would liquidise their position into cash

##### **Malting Barley**

- Varieties; Concerto will be No 1, Optic still important although prone brackling, Oxbridge declining, Belgravia suitable for both high and low N, Propino high N for brewing, export although high level of GN
- Still will be a market for any unsold malting barley – replacing English malting barley which has been v poor this year
- The whisky distilling industry is on full production, record exports, low stocks - the limitation is malting capacity
- Will require over 800,000t malting barley

##### **Oats**

- There is still strong demand from 2 good markets (Cupar and Boyndie)
- Milling oats £170/t, cheaper to grow

##### **OSR**

- Price eased from the £380/t in Sept to £340/t today
- Supplies should be tight.
- Current 2012 harvest price £320/t

##### **Advice**

- Don't base expectations on last year
- If you have crops to sell, look out for spike (+£10--£15/t) then consider selling
- Volatility will still be a feature of the market
- Remember to consider selling crops forward – have over 2 years flexibility
- Protect a margin over input costs, as they have increased and threaten margins

## 5 Central Co-op store option - Bruce Ferguson, Aberdeen Grain

Calculating the benefit of the central co-op store option is complex as it depends on a range of factors (e.g the grower's individual situation, current grain drying & handling infrastructure on the farm, its condition, the scale, labour availability and capital availability.)

### Key points from Bruce's talk

- Aberdeen Grain was formed in 1984 and has recently undertaken major investment which included; 3 x 75tph driers, 2 x 250tph intakes, new office and 29,000t additional storage. Membership currently stands at 180.
- AG's purpose:
  - To deliver a cost effective, efficient, professional integrated grain transport, drying, storage and marketing service
  - To provide customers with consistent quality and superior service
  - To improve the profitability and competitiveness of members by delivering services which add-value to their grain and OSR, reduce costs and improve resource utilisation
  - To protect the asset value of members' storage rights
- Capital Costs - £115/tonne
  - £50 per tonne paid before Harvest 2012
  - Balance paid off at £12 per tonne / annum (6-7 yrs)
  - 100% tax efficient (benefit of between £25/t - £50/t depending on tax rates)
  - Balance Sheet Item – asset should not depreciate in value unlike farm investment
- Annual Cost:
  - Overheads - £7.50 per tonne
  - Transport – net cost into AGS £4 per tonne
  - Drying – charged to members at cost, latest technology so very efficient system.

### **Benefits of Membership include:**

- Lower capital cost (due to economies of scale & grant support)
- Should be higher market prices due to improved marketing, access to premium markets, better storage utilization and collaborative supply chains.
- Prompt uplift from farms (2-3 days) – can be weeks by trade, leading to deterioration
- More efficient drying leading to lower drying costs, no double handling,
- No 'distress' selling at harvest when prices are at their lowest
- Improved cashflow – make 3 payments
- Less risk – ability to meet market specification, store infestations, etc.
- Financial security and Insurance (credit insurance)
- Tax Allowances; investments in a central store are 100% deductible against profit. In contrast capital depreciation in own building is now removed.
- Ease of management
- Future proofing the business.

### **Scenarios when central co-op stores are particularly attractive:**

- Tenant farmers
- Where the existing system can't cope – the central store can take pressure off

- Aging farmer with no successors so unwilling to make major investment
- Any grower with less than 600t combinable crops – penalised because small scale
- Growers of premium crops who currently struggle to consistently produce market specification
- Growers with limited storage who are forced to sell crops at harvest – ‘distressed sellers’
- Any complete new build.

## **6 Alan Grant, Skillymarno Farm, Strichen**

Alan is in the process of making a major investment in his grain drying, handling and storage facilities. He shared his thoughts with the Group on what he is planning and why.

Farm background: 900 acres all arable, enterprises include: full range combinable crops, laying hens, fattening pigs and sprayer contracting business.

The 2011 harvest includes; 800t WB, 400t OSR, 700t SpB, 800T Wh → total 2,700t

Labour comprises 3 (Alan, brother and nephew)

He is building 2 stores 120 x 60 ft (one for grain the other for muck), and installing a continuous flow tower drier (34t/hr) with elevators.

### **Key points from Alan’s talk**

- Has experience of a range of systems over the last 50 years; bins (1960’s), trays (1980’s), then 2 mobile driers (1998 & 2005)
- Drying 2,700t with two mobile driers (10t) requires 270 batches, normally takes 540 hrs or 45 days!!
- The cost of fuel for drying is £2 per 1% mc extracted e.g. 23% mc would cost £18/t to get to 14%.
- Ingo at 20% mc would be approx 10%
- Trays don’t lift the specific wt of cereals unlike mobile driers which can raise specific weight by 8kg/hl
- The new build 60 x 120 feet grain store costs £100k
- The continuous flow drier costs approx £100k plus £90k for all the elevators and fittings
- Undertook considerable research, visited many plants and finally chose a continuous flow system because labour was the main limitation at harvest so needed a fully automatic unmanned system.

## **7 Group Exercise**

### **Criteria for evaluating grain drying, handling & storage systems:**

- The ability to protect and preserve the crop quality
- The ability to maintain and enhance the value of the crop
- The capital cost per tonne – value for money
- Efficiency in terms of operating costs (energy use, labour requirement, maintenance, etc)
- Future proof – flexibility, suitable for next 20-years plus

**With respect to grain driers, the main options are:**

1. Tray driers
2. Mobile driers
3. Continuous flow
4. Buy space in a central co-op store
5. Biomass burners\*

\*For the tray & continuous flow driers, there is the additional option of installing a biomass burner. This creates the potential to attract “renewable heat incentives” (RHI) subsidy.

**Andrew & George’s requirements:**

- Ability to handle up to 2,000t combinable crops
- Multi-crop storage (650t wheat, 700t barley, 600t oats, 160t OSR)
- Need to dry approx 20t/hr = 150t/day
- Simplicity – not just running a farm, have major farm-shop business.

**Current Situation:**

- No drier (had mobile in past)
- Have a basic store at Savoch for 1,000t
- Most grain /OSR has to be moved at harvest. Some feed barley propcorned and over-wintered for sale.

**Group Feedback**

The attendees were split into groups with two groups looking at each option. Pros and Cons were listed and a recommendation made.

**TRAY DRIER**

Pros

- Very simple (few moving parts)
- Cheap to install
- Copes with high moisture content (but slowly)
- Can leave it running unattended for periods
- Provides a storage shed for rest of year. Could even use it to dry other products.
- Good option for the renewable burner
- Many felt it was a safe system for preserving grain germination %

Cons

- Higher handling time/cost – need to fill and empty batches
- Slow drier per tonne handled
- Variation in moisture content across the profile (less so with use of stirrers)
- Doesn’t enhance quality (no screening as happens with mobile)
- Can get taint from fumes if overheat/poor burner maintenance

Discussion of very large tray driers being installed in some large units e.g. down south one unit has 4 x 1100t trays. But pointed out that these only remove 0.5% mc per day, so not suitable for

high mc NE Scotland crops?? Air volume is critical so if big tray, need big fan – easier to get sufficient air volume in a smaller tray.

### **Recommendation?**

These groups said No, but consider if adding renewable burner.

### **MOBILE DRIER**

#### Pros

- By definition it is the most flexible and mobile e.g. can take it to several different storage sheds to avoid double handling grain
- Can rouse it! Does have a moveable value
- Cleans sample so improves bushel weight
- Marginally cheaper to buy than other new options
- Can turn it into a semi-permanent feature if build in elevators, etc
- Can automate and can buy continuous versions
- Accuracy of drying (better than tray)

#### Cons

- High fuel use and running cost per tonne
- More moving parts
- High mc problems
- Dirty!
- Needs constant attention to change batches
- Ties up a tractor and works it hard
- Can maybe get some grain damage via augers
- Capacity unlikely to be anywhere near matching modern combines

### **Recommendation?**

These groups said it depended on your grain quality aims and on the capacity of your combine. Overall they said No given operating cost, labour demand and need for a tractor.

### **CONTINUOUS FLOW DRIER**

#### Pros

- Fully automatic – saves time
- Efficient in electric, fuel and labour
- Can increase quality
- High output – best for big tonnage
- Less handling time and cost if link to elevators, etc.
- Very controllable, unlike tray
- Flexible on change of crops
- Used a small area of shed
- Tend to last a long time if maintained
- Good on maintaining germination %
- Can use as a batch drier if required
- The only real option if want to cope with 20t/hr (except v big tray)

## Cons

- Initial cost if new
- Needs big runs to show its efficiency
- Maintenance cost can be high
- Getting service when need it, especially if harvest breakdown
- Does it need a good operator??
- Need an elevator system if really want to use it to its potential, so even more capital cost if new

## **Recommendation?**

If cheaper than central store option then go for it.

## **CENTRAL STORE**

### Pros

- Simplicity – grain delivered to store and that's it
- Saving in labour and storage cost
- Fast movement
- Low management requirement
- No storage risk eg hot spots etc if store yourself
- Access to marketing expertise
- Access to the most modern infrastructure e.g. efficient driers
- Your asset doesn't depreciate?
- Segregation costs (trying to keep different crops and qualities separate on-farm) eliminated
- Especially attractive if aiming for quality markets (malt, milling) where good marketing expertise and clout of a central store can pay dividends
- Tax benefits
- Access to development grants

### Cons

- Putting your crop in hands of a third party with all the potential risks that incurs e.g. could go bust
- Initial cost of buying storage is not low – if followed lower capital options at home, you could do it cheaper
- Will the asset value of the storage you bought actually stay up?
- Miss out on the buzz (and understanding/knowledge) of marketing your own crop

## **Recommendation?**

Mixed views! Half way house would be worst i.e. some through central store, some with own new facilities, therefore double investment.

Some attendees raised the option of just developing the status quo i.e. market some grain through a commercial central store on a "pay as you go" basis, market premium product through a central store like Aberdeen Grain, feed grain store at home. Maybe just need a better storage shed.

## **BIOMASS BURNER with one of the drier options**

### Pros

- Provides flexible power source (wood, straw, diesel)
- Potential RHI income – not definite for driers in enclosed buildings – watch this space. Know in 4 to 6 wks time?
- It works on the basis of the lower cost of timber as a fuel anyway, so the RHI is the icing on the cake (potentially thick icing)
- Protection against oil price rise
- Use farm fuels (straw, timber from farm woods)
- Best if in RHI early – fixed rate 20 yrs, indexed. Likely to be reduced later??
- 100% plant write off for renewables equipment
- Could be done on an industrial scale by a central store like Aberdeen Grain to get wider benefit?

### Cons

- Uncertainty over what will qualify for the RHI at time of visit
- Labour and machine intensive as need to stoke with timber or straw regularly
- Need fuel storage space – biomass fuels (straw, timber) must be dry or efficiency is greatly reduced. Need timber a year in advance to stack and allow to dry.
- Is the technology fully developed? Need some development time. Likely to see more efficient systems further down the line?
- Need a maintenance contract
- Personal risk/ health and safety concerns of large scale burners
- Specific insurance inspections required if classified as industrial plant – check this out
- Cost of timber likely to increase as more of these facilities installed

### **Recommendation?**

Groups felt the drier decision should stand alone. Once this is made, then look at the biomass boiler option as a bolt-on. Also need to sort out fuel source first.

### **The Poll**

To get a feeling for the overall view of the group we asked members to vote for their preferred option.

<b>Drier Option</b>	<b>No of Votes</b>
Tray	12
Mobile	1
Continuous	28
Central Store	6
Status Quo/ Do Nothing	1

### **Two final comments were made;**

- think about which option might be best suited to a further expansion in acres/ tonnes
- don't forget the status quo and at least compare the investment options against the status quo.

## 8 Other Project Business

### Arable Business Groups

Benchmarking will form a key part of the ABG's with members expected to share production costs, gross margins, yields, prices, etc. to look for improvements.

**Anyone wishing to find out more about the Arable Business Group please contact Jim Booth, Tel 01651 – 843607 or [jim.booth@saos.coop](mailto:jim.booth@saos.coop)**

### Management Committee

Remember this is a farmer led and owned project. A small Management Committee has been established to represent the Community Group. Please give them a call if you have any feedback or suggestions to make the project even better.

NAME	MOBILE NO
Peter Chapman Jnr – Chairman	07711 347735
Bryan Chalmers	07801 296811
Stuart Davidson	07885 232401
Robert Drysdale	07753 929248
Phil Smith	07900 991196
Willie Willox	07778 110937
Andrew Booth (Monitor Farmer)	07970 767071

### Date of next meeting

Wednesday 7<sup>th</sup> March 2012