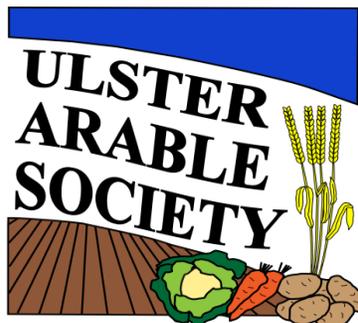


Review and Strategic Priorities for Development of the Arable Sector in Northern Ireland.



January 2014

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Review and Strategic Priorities for the Development of the Arable Sector of the Agriculture Industry in Northern Ireland.

Executive Summary

Ulster Arable Society.

The Ulster Arable Society (UAS) is a membership organisation which brings together people from throughout the arable production, processing and supply industries with a common interest in –

- furthering the competitiveness of the sector;
- fostering knowledge transfer; and
- facilitating the professional development of those working in the sector.

The UAS therefore represents the arable sector which is an important contributor to agricultural output in Northern Ireland in its own right but also underpins the sustainable intensification of the livestock sector through the production of feed inputs and the effective use of excess nutrients from those enterprises. The sector currently utilises in the region of 50,100 hectares to deliver £70 to £80 million of output while supporting the wider Northern Ireland economy and employment through providing input to the animal and food processing industries.

In 2012 the Society identified the need to carry out a comprehensive review of the arable sector in Northern Ireland and through this to-

- identify the changing market requirements;
- illustrate the challenges and opportunities faced in meeting these changing market demands; and
- establish what action those working in and supporting the sector need to take to meet the challenges and capitalise on market opportunities.

The Development Strategy is being published shortly after the Agrifood Strategy Board launched its Strategic Plan for the Agrifood Sector industry “ Going for Growth” and

during final negotiations about reform of the Common Agriculture Policy; both of which will have considerable, implications for the arable sector in Northern Ireland. Many of the issues contained in this review restate and support representations made by UAS members during the formulation of these key policy instruments.

The full “Review and Report for the Development of the Arable Sector in Northern Ireland” is available to download from the websites of the UAS www.ulsterarablesociety.org or the Managing Agent for the Supply Chain Programme, Countryside Agri-Rural Partnership www.countrysiderural.co.uk.

2. Our Vision for a successful Arable Sector in Northern Ireland.

The industry is confident that through responsible management, expansion can be achieved through sustainable intensification which ensures that the growth is both sustainable and environmentally sensitive. In particular it sees the growth of the sector as a parallel to and not a competitor to the growth in livestock production envisaged in the “AFSB Going For Growth Strategy” published in May 2013.

It is the Societies view that a competitive and sustainable arable sector in Northern Ireland will have –

- I. A good understanding of market requirements, based on soundly researched information, ensuring a strong customer focus.
- II. Streamlined and efficient supply chains with the various elements working together effectively for their mutual benefit..
- III. Good communication and effective working relationships with its customers, including the livestock sectors and food processors.
- IV. A flexible and skilled workforce, facilitated by effective training capacity, across all areas of activity – business and financial management as well as technical competence, occupational and food safety. An important contributor to this is a positive public perception of the industry which is a key driver in encouraging investment and attracting young people to enter the industry.

- V. Access to up-to-date technical and research information of relevance to Northern Ireland industry; facilitated by effective local knowledge and technology transfer capacity, to increase capability and innovation in the industry.
- VI. A strong and co-ordinated voice to effectively promote and represent the interests of the sector to consumers and customers, as well as Government.
- VII. Access to funding support to stimulate and support strategic investment based on servicing identified market opportunities.

The delivery of this vision requires the action identified within the individual sector reviews (Section 8) and the Action Plan (Section 11) of the Report.

3. Opportunities for Growth.

The Agrifood Strategy Board strategic Action Plan “Going for Growth” published in May 2013 concentrates on the opportunities within the livestock and horticulture sectors, and makes little reference to the wider arable sector. The UAS however has demonstrated through this comprehensive and rigorous review that the arable sector is of critical importance in delivering the future sustainable development of the whole NI Agrifood Industry.

The following is a summary of the major development opportunities identified within the Report. Specific examples of growth opportunities are provided within each of the Individual Crop Reviews, and actions to deliver this growth are contained in the Action Plan in Section 11 of the Report.

Livestock Feed.

The UAS believes that the livestock sector can best be sustainably developed through the parallel and interlinked development of the arable sector. This belief is based on three key principles –

- 1. Integrated production systems are the most economically and environmentally sustainable*

The vast majority of cereal production in Northern Ireland is used on the farm of production or close to the point of production. Sustained growth of the livestock sector will depend on an equivalent growth in the local arable production.

Arable production sustains intensive livestock production through effective utilisation of excess nutrient from livestock enterprises. This includes both liquid (slurry) and solid fractions and will be increasingly important as livestock numbers increase. Effective utilisation of nutrients is a key component of delivering sustainable intensification and of achieving growth while ensuring that environmental requirements are met.

It makes no economic or environmental sense to import all grain and fertiliser and then export the surplus nutrients – some of which are globally finite. The future must be built on systems which can recycle this nutrient locally in a way which is both safe and environmentally beneficial. Local arable production will be a key component of such systems.

2. Local production meets the requirement for rigorous quality assurance.

Recent food standard scandals have raised public concerns about the ingredients contained in their food. Local production with tailored quality assurance increases consumer confidence and compliments the Food Fortress feed materials scheme recently introduced for imported ingredients.

3. Volatility in both food supply security and price are expected to continue.

As the global demand for feed increases, reserves are tightening and extreme weather events in both producing and importing countries regularly affect world supplies. It is anticipated that price volatility will continue affecting both output values and input costs. All elements of the supply chain must work better together to minimise the impact of such volatility on businesses in the sector and secure supplies to our customers. While local supply cannot eliminate feed security concerns, the availability of local supplies can help buffer short term supply difficulties and contain transport costs.

Protein

With over 300,000 tonnes of soya cake and meal imported into Northern Ireland each year, these feed ingredients are critically important as protein sources for the livestock sector.

Locally produced pulses (peas, beans, lupins) could substitute for imported protein sources in ruminant rations – both on farm and at feed mills. Production system development is required to improve performance and reliability on farm and generate the volumes required by the local feed mills.

Oilseeds and Oil.

Over 200,000 tonnes of oilseed cakes and meals are imported each year yet oilseed rape can be grown successfully in NI and high yields achieved.

Recent developments in plant breeding and feed formulation now mean that rape seed can be used in considerable quantities in broiler rations, without the need for any specialist equipment. These needs can be met by a much increased area of locally grown oilseed rape. In addition, an oilseed extraction facility on the Island of Ireland would enable the extensive use of rape oil in food processing to be met from local production.

Oats.

Ireland has a long tradition and a climate well suited to oat production. The recognition of the health benefits of oats ensures that there is a rapidly growing market at home and abroad for high quality oats for both human food and horse rations. An estimated 15,000 tonnes of oat grain is imported each year and local growers have shown that they can meet the quality standards demanded by millers. There is a considerable opportunity for local production to both substitute for imported oats and to meet the increasing international demand for oat based food products.

Ware Potatoes.

Although consumption has been declining slowly, potatoes still remain a significant crop (over 150,000 tonnes produced each year) and an important element of the Northern Ireland national diet.

The high volumes of washed prepacked potatoes place a strong emphasis on skin finish.

The trend to processed product and convenience pre-prepared ingredients is being met by innovative local companies but sustained innovation is required in this area.

Seed Potatoes.

The worldwide demand for seed potatoes which meet environmental and market conditions in local markets, remains very substantial, although the competition is strong and the growth is now very largely in developing countries.

A substantial opportunity exists to i) satisfy the worldwide demand for high grade low generation multiplication material and ii) to provide increased volumes of commercial seed in local markets within the British Isles.

Future development will depend on new varieties and disciplined integrated supply chain arrangements.

Energy Crops.

With over 90% of Northern Ireland's energy needs being imported and based on fossil fuels, the opportunities for local renewable energy sources are immense. Energy cropping has a useful contribution to make but requires sustained commitment from Government to provide confidence and competitive commercial margins.

4. Growth Potential

When all these opportunities are combined, an increase in economic output by 2020 from the arable sector of 27% (or £21m) was identified in figures submitted by the Arable Crops, Fruit, Vegetable Subgroup to the Agrifood Strategy Board and are fully endorsed by the Ulster Arable Society.

Sector	Current (2012) Sector value, £million	Prospective (2020) and Sector value, £million*	Means of Growth / Comments
Barley	29	31.5	Increase average yield by 0.5t/ha through new varieties and agronomy
Wheat	19.7	28	Increase average yield by 0.5 t/ha through new varieties and improved agronomy. Overall area increase with more OSR and oats as break crops. Change from forage maize to whole-crop wheat.
Oats	2.9	3.7	Increase area by 50% and increase yield by 0.5t/ha Supported by greening requirements for break crops and increasing demand for Oats within animal feed and breakfast cereal/health food markets. Export potential.
Oilseed Rape	0.8	2	Increase area to that of the peak in the early 90's and increase yield to 4.5t/ha Supported by greening requirements, need for break crops and increasing demand for rape-meal in animal feed / rape-oil in food processing.
Protein Crops	< 0.5	1	Replacement of imported protein with local protein crop production for use in the livestock sector. Requires focused R&D to overcome challenges and risks associated with current varieties and production methods. Long term research effort will be required.
Energy Crops	1	5	Biomass can make a significant contribution to the NI Executive target of 10% of renewable heat by 2020 and PFG target of 25% reduction in GHG emissions (relative to 1990 levels) by 2025 and 80% by 2050. If biomass is not home grown it will be imported. Also has considerable employment potential in the associated service sector. Total will include biomass from forest waste as well as energy crops. Stimulated by the DETI RHI and DARD Biomass Challenge funds but planting support also required in view of long lead-in times.
Potatoes Ware	20	21.5	Reduced waste. Import substitution (Chipping). Growing for specialist markets such as salad potatoes / added value products

Potatoes Seed	5	7.5	10,000t of seed potatoes exported to UK mainland and used locally; subject to availability of new locally controlled varieties
Total	78.9	100.2	27% increase

*Prospective sector value at current prices.

The figures take no account of the additional employment which will inevitably result from the associated increase in capacity within the processing and service sectors.

5. Conditions for Growth.

The Arable Sector is motivated to deliver this growth but to do so needs sustained support from others to provide the environment for industry investment in the necessary resources and technology. The details are contained in Section 11 of the Report but can be summarised as –

Policy

- A carefully tailored capital investment package, linked to strategic development priorities for the sector should be introduced to encourage investment in new on-farm technology, including, precision farming, on-farm storage and first-stage processing.
- The Society would support increased funding for projects with a strong supply chain partnership approach.
- Changes to land tenure arrangements and associated taxation implications must encourage efficient long term land use and facilitate the entry of young people into the industry.
- Fair and equal treatment in any revamp of the Single Farm Payment within the CAP reform package. The sector receives limited other support and should not be expected to carry the environmental obligations and financial penalties for the entire industry.
- The industry already funds research in cereal production through the HGCA and has developed good links with this organisation; however a means needs to be

found whereby other sectors can initiate and access research relevant to local needs.

- Strong representation is required at EU level to retain essential fungicides such as triazoles and help slow the development of resistance to crop diseases of critical significance to continued crop production in Northern Ireland. In the Societies view, policy makers do not yet appreciate the severity of the impact which the proposed changes will have on farmers throughout Europe.
- Disease protection must be delivered through effective local Plant Health enforcement supported by relevant scientific expertise.
- Policy decisions must reflect the situation in Northern Ireland and have a sound scientific, factual basis.

Research.

- Access to scientific research programmes on production technology linked to local industry needs is vitally important.
- DARD funded research in cereal crops should supplement that of HGCA where local requirements are not adequately covered by research in other regions.
- Close liaison between AFBI, DARD, HGCA, UFU, UAS and CAFRE is essential and the recently introduced annual liaison meetings should become a permanent feature .
- Co-operation between research workers in AFBI, Teagasc and other regions/countries will deliver cost effective solutions to local problems. For crops such as pulses and potatoes, active steps need to be taken to develop a more structured collaborative multi-regional approach to addressing common industry needs.
- A well resourced and scientifically credible Plant Pathology unit within AFBI is essential to provide industry with rapid disease identification and control guidance as well as supporting Government Agencies in ensuring effective screening of imported plant material.

Education Courses

- Tailored education and training courses are required linked closely to a) the sector development strategy and b) industry needs, rather than being driven by the demands of the validating bodies. The Challenge programmes provide a good basis for this delivery.
- Education provision should be co-ordinated and delivered on an all island basis to maximize use of scarce resources.
- Education should be based on regular industry consultation with strong arable sector representation on CAFRE Advisory Boards and other education bodies.

Business Development through Industry Training, Benchmarking and Knowledge / Technology Transfer

- Access to research results from Home Grown Cereals Authority / Potato Council or elsewhere with interpretation by CAFRE to encourage local adoption is essential. Servicing this critical need depends on the CAFRE team working on crop production and business development being well staffed and resourced.
- Farm scale research and demonstrations, Focus and Monitor Farms linked to arable production are very beneficial.
- Maximise the exchange of information and sharing of expertise with Teagasc and other sources of technical information will maximise use of scarce resources.
- Working in association with organisations such as UAS provides important knowledge transfer routes to commercial growers.

6. Conclusions

The UAS is confident that through responsible management, expansion of the arable sector in Northern Ireland is possible and that this can be achieved through sustainable intensification in a way which ensures that the growth is both sustainable and environmentally sensitive. In particular it sees the growth of the sector as a parallel to and not a competitor to the growth in livestock production envisaged in the “AFSB Going For Growth Strategy” published in May 2013. The Action Plan contained in

Section 11 of this Report identifies the action required to deliver the 29% growth which industry believes could be achieved by 2020.

Review and Strategic Priorities for the Development of the Arable Sector of the Agriculture Industry in Northern Ireland.

1. Background.

The Ulster Arable Society (UAS) is a membership organisation which brings together people from throughout the arable production, processing and supply industries with a common interest in –

- furthering the competitiveness of the sector;
- fostering knowledge transfer; and
- facilitating the professional development of those working in the sector.

The Society is conscious that, with its position as the lead organisation for the Arable Sector in Northern Ireland it must become more active in –

- the identification of market opportunities;
- encouraging members and others in the sector to work effectively together to exploit these opportunities within Northern Ireland; and
- influencing the policy makers in the NI, UK and EU administrations in supporting the industry overcome barriers and deliver a sustainable future for the sector.

In 2012 the Society identified the need to carry out a comprehensive review of the arable sector in Northern Ireland to identify the changing market requirements; indicate the challenges and opportunities faced in meeting the market demands and establishing what action those working in and supporting the sector, need to take to meet the challenges and capitalise on market opportunities. A successful application for assistance with this study was subsequently made to the Supply Chain Development Programme funded through Axis 1 of the Northern Ireland Rural Development Programme 2007 – 13.

This Review and Strategic Priorities for the Arable Sector will compliment that already completed for the Horticulture industry by the Horticulture Forum. The scope will therefore extend to all arable crops – excluding horticulture (already covered in the horticulture review), with major elements focusing on combinable crops and potatoes.

The Society believes that, once completed, this Strategy will enable it to effectively communicate the opportunities to all elements of the arable supply chains and stimulate collective action to exploit these opportunities. The strategy will also provide a soundly researched and structured basis for UAS to contribute effectively to discussions and consultations on critical areas of NI Executive, UK and EU policy which impact directly on its ability to maximise its contribution to society and the Northern Ireland economy.

The Strategy is being published shortly after the Agrifood Strategy Board launched its Strategic Plan for the Agrifood Sector industry “ Going for Growth” and during final negotiations about reform of the Common Agriculture Policy; both of which will have considerable, implications for the arable sector in Northern Ireland. Many of the issues contained in this review restate and support representations made by UAS members during the formulation of these key policy instruments.

2. Method Used to Develop the Strategy.

The study represents the views of the Society members who were actively engaged in its preparation. The UAS Committee (Appendix 1) is ideally placed to take the lead in this strategic review since its members are drawn from the major enterprises in the sector and from along the entire supply chain.

Members have a wide spectrum of interest areas including horticulture, potato and combinable crop production, banking, food processing and packing as well as businesses within the agricultural supply sector. Many hold senior positions within industry organisations. This breadth of experience within the Society and its excellent contacts with the wider interests in the sector provides confidence that the Strategy is

built on a strong foundation and is a true reflection of the opportunities and challenges within the sector.

3. Overview of the Arable Sector in Northern Ireland.

The Northern Ireland Arable Sector in this context includes all combinable crops and potatoes but excludes field vegetable production.

3.1 Size of the Sector

a) Production Areas

While the arable area in Northern Ireland has declined over the last 150 years (*Figure 1*) and is now much reduced in size (51,400 ha or 5.2 % of the 991,400 ha farmed area of Northern Ireland – Table 1), it underpins many of the livestock enterprises which are the core of the agri-food industry in Northern Ireland. It also provides raw material for the food processing enterprises such as potato packing / processing and oats for human consumption, which provide valuable income and employment.

In a region with a large and growing intensives sector arable production is vitally important in effectively utilising livestock manures, while contributing to the delivery of sustainable production within the region.

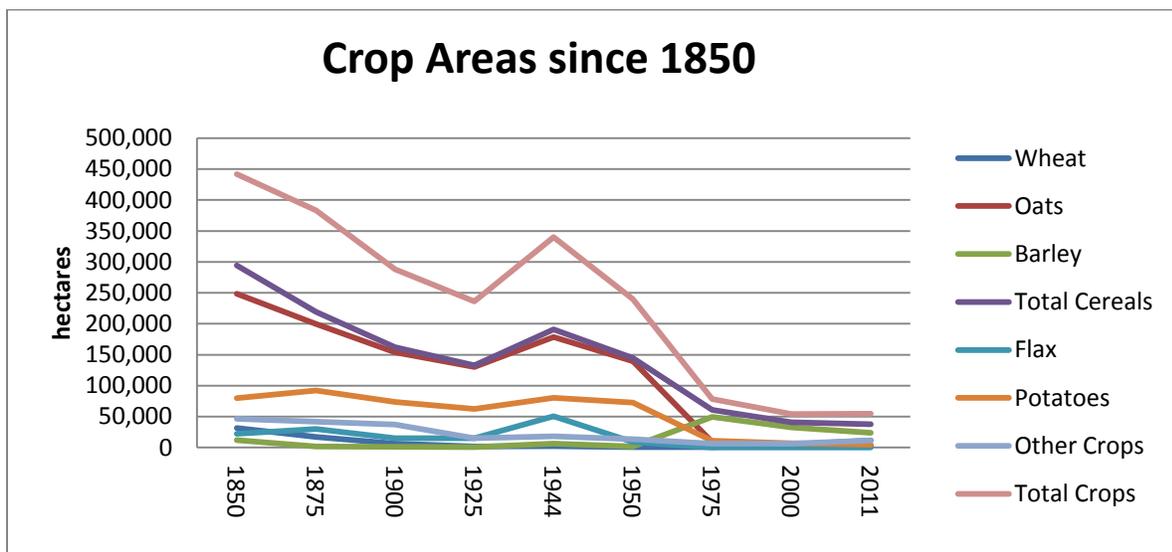


Figure 1.

Source. DARD

Table 1. Areas (thousand of hectares) of Agricultural Crops Grown in Northern Ireland June 2007 – 2012

Statistical Review of NI Agriculture 2012

Year / Crop (1000 ha)	2007	2008	2009	2010	2011	2012 (provisional)
Oats	2.0	2.4	2.1	2.3	2.1	1.9
Wheat	9.2	12.1	10.1	10.9	11.6	9.4
Winter Barley	4.7	6.1	5.1	6.8	6.8	5.3
Spring Barley	18.1	19.5	21.6	17.6	17.2	20.2
Mixed Corn	0.2	0.2	0.3	0.2	0.2	0.3
Potatoes	4.8	5.1	5.1	4.9	4.8	4.2
Arable crop silage	3.3	3.2	3.5	3.9	3.3	3.7
Oil Seed Rape	0.4	0.4	0.6	0.4	0.6	0.8
Other field crops	6.0	6.6	6.9	6.1	5.4	4.4
Total Agricultural Crops	48.2	55.4	54.8	52.6	51.4	50.1

Table 1 indicates the dominance of Spring Barley and the growing importance of wheat (largely winter wheat) in the cereal sector. The area of oats has remained fairly steady in recent years after a dramatic fall during the last century as the number of horses and associated demand for horsefeed declined (*Figure 2*) and varieties of other cereals suitable for local conditions improved.

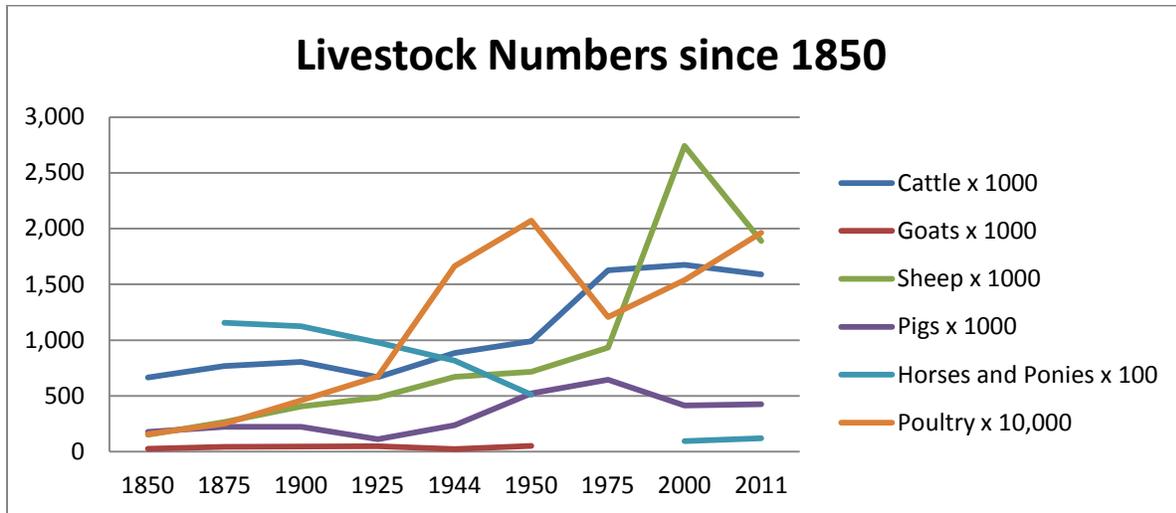


Figure 2.

Source. DARD

The cereal area contains a small number of cereal crops grown for certified seed production – typically between 60 and 80 hectares per year.

The “other field crop” area includes a small amount of oilseed rape which has remained steady at around 500 hectares in recent years. Most is used in animal feed but some is used to produce specialist vegetable oils for industrial and culinary use.

The potato area and number of growers has undergone a steady decline in recent years (Figure 3) with the number of growers falling by almost 50% (49.7%) since 1999, but yield increases have ensured that production has only fallen by 20.1%.

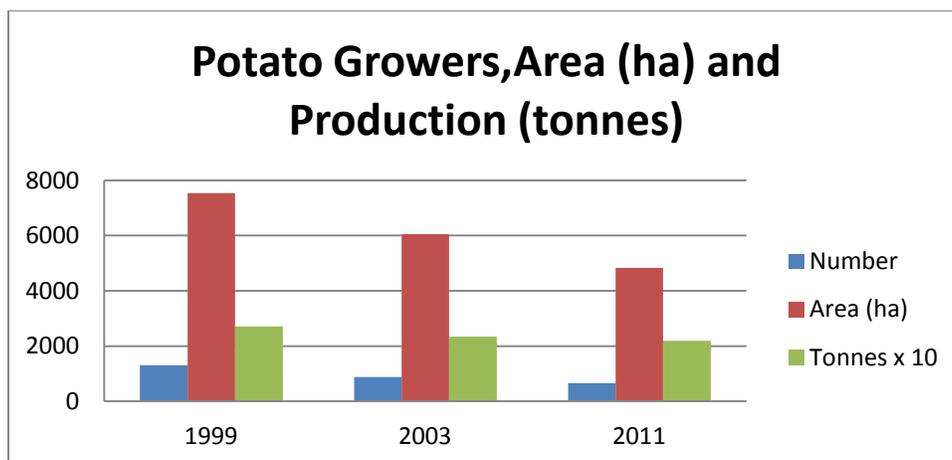


Figure 3.

DARD Statistical Review of NI Agriculture

b) Production Quantities and Value

The quantity of the major crops produced in Northern Ireland are shown in Table 2 and their farmgate values are provided in Table 3.

Table 2. Quantity of Output from the main Agricultural Crops Grown in Northern Ireland June 2007 – 2012.

Statistical Review of NI Agriculture 2012

Year / Crop (Tonnes saleable x 1000)	2007	2008	2009	2010	2011	2012 (provisional)
Oats	10.5	10.9	11.1	13.5	12.6	9.0
Wheat	67.9	95.8	73.2	89.1	89.9	56.2
Barley	119.3	131.2	139.7	139.1	137.9	127.2
Oilseed Rape	1.2	1.5	2.1	1.5	2.3	2.7
Potatoes						
Ware	139.2	126.3	137.1	139.6	151.9	124.5
Seed	20.3	22.7	21	19.6	19.7	15.6
Stockfeed	24.2	22.8	25	24	24.7	22.1

The variability of potato yields is very apparent with a large increase in yield in 2011 being obtained from an area broadly similar to that grown in the previous year.

Low outputs in 2012 are largely due to the impact of adverse weather in Autumn 2011 and throughout 2012.

Table 3. Value of Crop Outputs in Northern Ireland 2007 – 2012.

Statistical Review of NI Agriculture 2012

Year / Crop (million £)	2007	2008	2009	2010	2011	2012 (provisional)
Oats	1.5	1.6	1.3	1.9	2.2	1.7
Wheat	10.1	13.7	8.9	13.7	17.2	11.8
Barley	17	19	15.4	18.8	24.7	25.1
Other crops	11.8	11.2	14.2	14.1	12.5	13.5
Potatoes	21.7	20.5	21.4	22.8	25.6	16.5
Total Field Crops	62	66	61.3	71.4	82.1	68.6

The total of £82.1 output per year places arable crops fifth in the list of the most important enterprise in NI agriculture when measured in output value terms ([Table 4](#), [Figure 4](#)).

Table 4. Enterprise Output Values Northern Ireland Agriculture 2011.

Statistical Review of NI Agriculture 2011 and 2012

Enterprise	Output Value 2011. £ million	Output Value 2012 (provisional £ million)
Milk	543.7	511
Finished cattle and calves	351.8	408.8
Poultry	241.8	240.8
Finished Pigs	106	116.9
Field Crops (all agriculture)	82.1	68.6
Eggs	56.6	65
Finished Sheep and Lambs	53.5	58.9
Horticulture products	60.5	59.2
Minor Products	13.4	13.3
Total	1509.4	1542.5

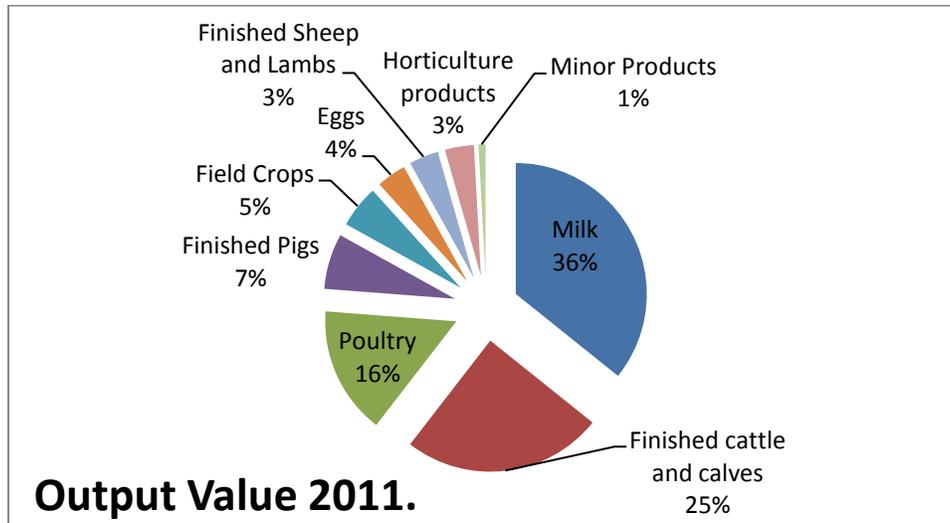


Figure 4.

Statistical Review of NI Agriculture 2011

2011 information has been used to compile this Figure on the basis that the 2012 information is provisional and the weather during the year was exceptionally poor for all enterprises, reducing their relevance to a long term review of this type.

3.2. Arable Farm Structure.

Cereals are grown on 2,684 farms which represents 11% of the total farms in Northern Ireland, although almost 80% (79.9%) of the area is concentrated on 1011 farms growing 10 hectares or more. (Table 5). The 143 farms which grew 50 hectares or more accounted for one third of the cereal area grown (Figure 5).

Table 5. Distribution of total cereals by area of crop

Statistical Review of NI Agriculture 2012

Area per farm (ha)	Number of farms	Area of cereals	Farms %	Area of cereals %
under 1	43	27	1.6	0.1
1- 4.9	982	2,842	36.6	7.7
5 – 9.9	647	4,578	24.1	12.4
10 – 19.9	530	7,279	19.7	19.6
20 – 29.9	195	4,660	7.3	12.6
30 – 39.9	81	2,763	3.0	7.5
40 – 49.9	62	2,694	2.3	7.3
50 and over	143	12,223	5.3	33
Total (2011)	2684 (2,845)	37,066 (37,932)	100	100

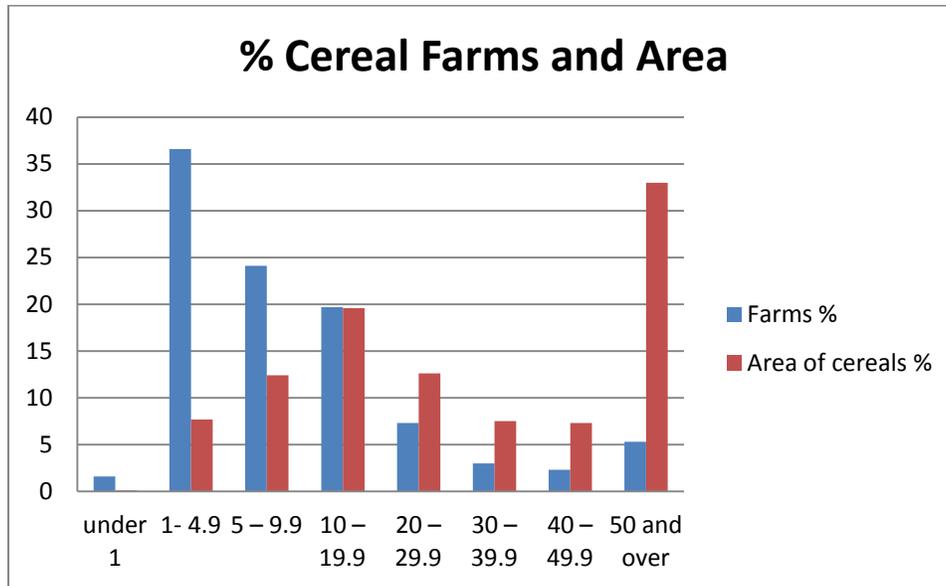


Figure 5.

Statistical Review of NI Agriculture 2012

The number of farms growing potatoes continues to decline with 576 farms producing the crop in 2012. This represents 2.4% of the total farms in Northern Ireland with almost 74% (73.9 %) of the area concentrated on 100 farms growing 10 hectares or more. (Table 6). Twenty nine percent of the potato area is to be found on only 13 farms (Figure 6), illustrating a very high degree of specialisation in potato production.

Table 6. Distribution of Potatoes by Area of Crop 2012

Statistical Review of NI Agriculture 2012.

Area per farm (ha)	Number of farms	Area of potatoes	Farms %	Area of potatoes %
under 1	181	77	31.4	1.9
1- 4.9	234	586	40.6	14.1
5 - 9.9	61	428	10.6	10.3
10 - 19.9	44	577	7.6	13.9
20 - 29.9	23	552	4.0	13.3
30 - 39.9	14	462	2.4	11.1
40 - 49.9	6	258	1.0	6.2
50 and over	13	1,210	2.3	29.1
Total (2011)	576 (656)	4150 (4,830)	100	100

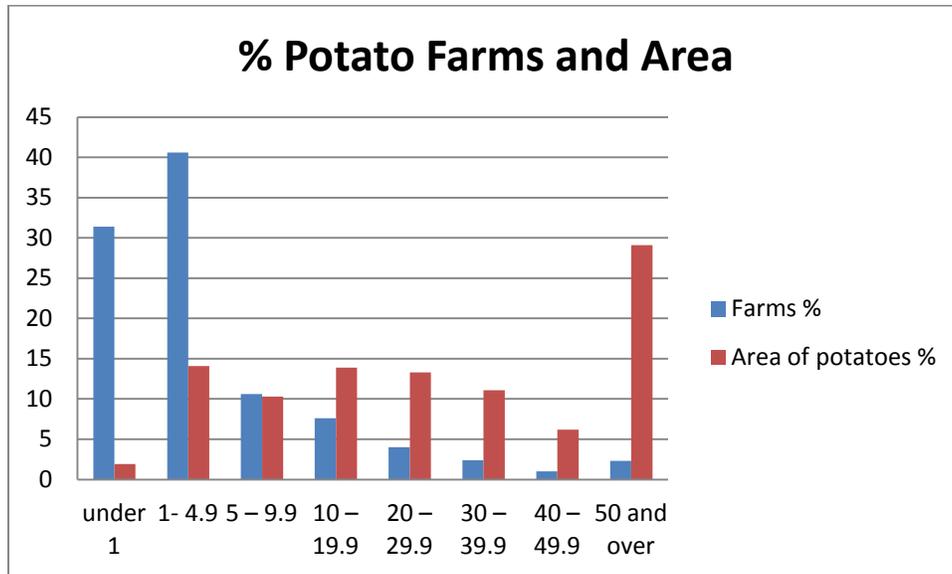


Figure 6.

Statistical Review of NI Agriculture 2012

Published figures show that around 30% of the area farmed in Northern Ireland is rented (*Figure 7*), and the vast majority of this will be in short term conacre arrangements. There are no published figures for the area of land rented for cereal and potato production but the need to have disease free soils for potatoes; the specialist nature of modern potato production and the attraction within a cropping rotation means that the percentage grown on rented land will be relatively high.

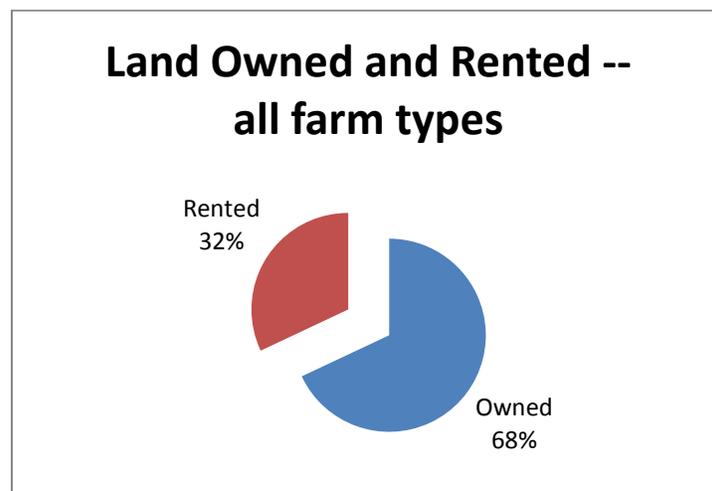


Figure 7.

Statistical Review of NI Agriculture 2011

4. Current Market Position of Arable Production in NI

4.1 Cereal and Combinable Crops.

Being a predominantly livestock area, Northern Ireland has a high demand for cereals for incorporation into feeding stuffs. It therefore is a grain deficit area and imports large quantities of cereals and associated products from Ireland and around the world.

The use of grain and other ingredients in animal feed and sold to farmers as straights is summarised in Table 7. It will be noted that wheat is the most important grain for compound feeds although far more barley is grown for on farm use in ruminant rations

Table 7. Use of cereals and other ingredients in Animal Feed 2012 (DARD 2013)

	Use in Compound Feed. Tonnes x 1000	Sales Direct to Users. Tonnes x 1000	Total Use in Animal Feed. Tonnes x 1000
Wheat	535.9	16.7	542.6
Barley	118.9	19.9	138.8
Whole and Flaked Maize	345.3	33.5	378.8
Maize Gluten Feed	67	10	77
By-Products of Malting, Brewing and Distilling	92	12.8	104.8
Other Grains & Cereal By-Products	117.9	1.5	119.4
Rape Seed Cake and Meal	125.4	-	125.4
Soya Cake and Meal	335.1	57.4	392.5
Whole Oilseeds & Other Oilseed Cakes and Meals	99.8	8.5	108.3
Fish Meal	0.4	0	0.4
Meat and Bone Meal	0.2	0	0.2
Milk Products/By-Products & Other Animal By-Products (excluding fats)	3.9	0.1	4
Roots and Tubers	2.9	0	2.9
Citrus and Other Fruit Pulp	35.5	3.6	39.1
Molasses and Sugar	62.6	6.5	69.1
Oils and Fats	25.5	1.5	27

Dried forages & Dried Sugar Beet Pulp	29.2	3.9	33.1
Minerals, Vitamins etc	69.2	0.9	70.1
Other materials	119.5	3.5	123

It is estimated that of the 227,800 tonnes of wheat and barley produced in Northern Ireland in 2011, in excess of 50,000 tonnes was sold to the feed trade, leaving in the region of 180,000 tonnes, mostly barley, used on the farm of production or sold to other farmers.

With just over 680,000 tonnes of wheat and barley sold to farms through merchants, either as straights or in compound feeds (Table 7) , the total use in the region is of the order of 860,000 tonnes – a self sufficiency ratio of around 26% (Figure 8). This compares to the self sufficiency ratio of between 74% and 91% in the Republic of Ireland (TEAGASC Tillage Sector Development Plan) . The EU has been self sufficient in cereals since the 1980’s and although, with changes to market support arrangements, this has since declined, to date it has remained over 100%.

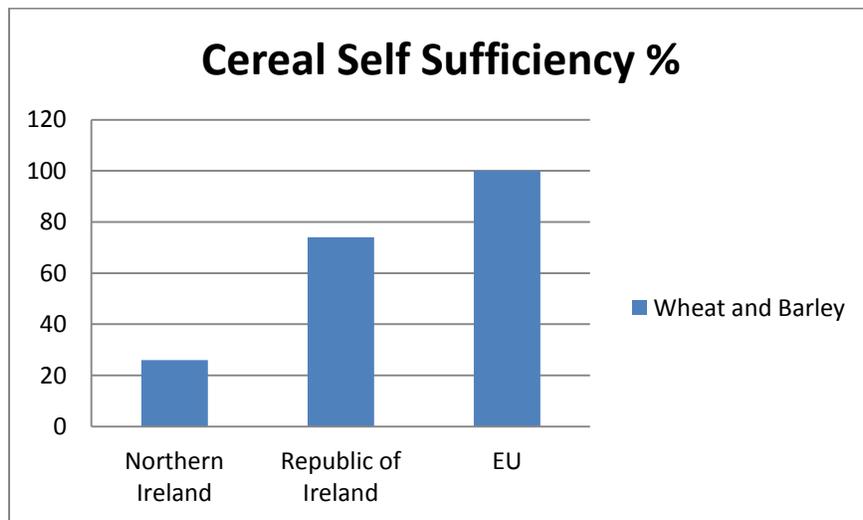


Figure 8 Sources; DARD and Teagasc Tillage Sector Development Plan 2012

With only a small area of oilseed rape grown in Northern Ireland the self sufficiency rate for oilseeds in animal feed alone is only around 2 %. A considerable volume of rape oil is also used in the food processing sector. There is a small quantity of oats traded for food processing or incorporation in specialist horse feeds.

Cattle and Poultry feeds now dominate feed compound production and sale in Northern Ireland (*Figure 9*). Poultry feed in particular demands high quality wheat to achieve the required animal performance.

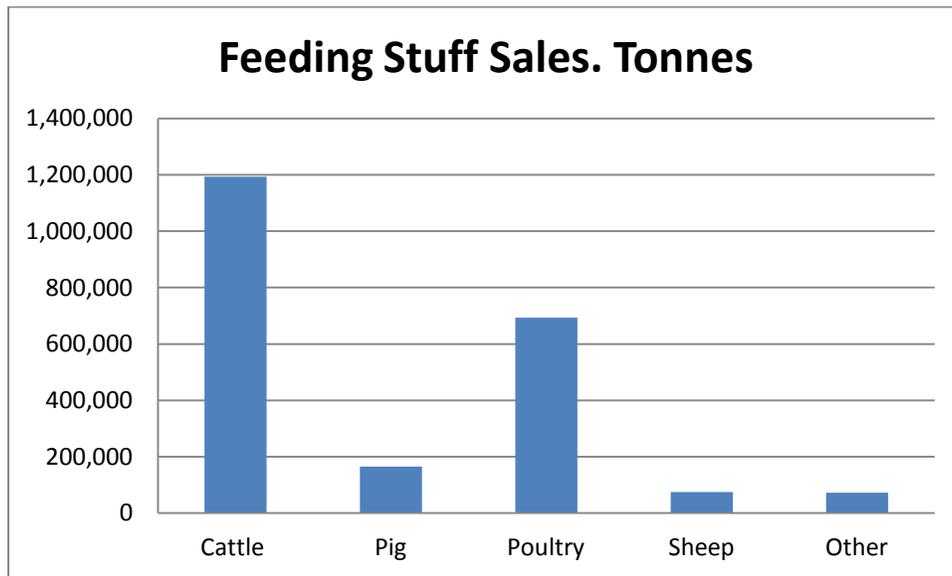


Figure 9.

Source; DARD 2012

4.2 Ware Potatoes.

There is very limited information on the end use of ware potatoes in Northern Ireland. This is difficult to establish with any degree of accuracy because of the integration of supply chains in Northern Ireland and the Republic of Ireland; imports / exports and the commercial sensitivity of such information.

The NI Stakeholder (Ultimo) Report of 2005 suggested that the breakdown at that time was of the order of –

Outlet	% of total NI Production
Packing – retail	26
Processing	11.5
Peeling / Food Service	13.2
Farm shops / greengrocers etc.	49.3

Table 8. Sales of Ware Potatoes as estimated in 2005. NI potato Stakeholders

The Teagasc Tillage Sector Development Plan published in 2012 segmented the Irish market six categories.

Category	Quantity (tonne)	Domestic Supply (%)	Comment
Ware (Table) Potatoes	170,000	90 – 100%	Grocery and wholesale
Peeling	60 – 80,000	15 – 85 %	Retail and Food Service outlets (catering)
Chips	30,000	5 – 10%	Imports from October
Processing / Crisps	32,000	80 %	Crisping
Salad Potatoes	30,000	10 %	Increasing in SE Ireland
Frozen Products	82,000	0	100% imported

Table 9. Ware Potato Market in Ireland. Teagasc Tillage Sector Development Plan 2012

No market analysis figures are available for this important sector in Northern Ireland, so this Report attempts to compile a table similar to that in the Teagasc Development Plan based on the limited information available. This included the population statistics for Northern Ireland compiled by NISRA and consumption figures obtained from British Potato Council (PC) and others. We stress that these figures can only be approximate but felt it was important to provide some estimate of the overall market for potatoes and potato products in Northern Ireland.

Consumption figures are based on a NI Population at March 2011 of 1.811 million people of all ages. Discounting children below 10 years suggest an adult population of 1.7 million. The PC consumption figures for 2011 suggest a per capita consumption of Fresh Potato of 39.7 kg / person / year and for processed potato products of 51.9 kg / person / year, giving a total of 91.7 kg / year. The total consumption figures generally quoted for Ireland are quite a bit higher than GB at 120 kg / year / head.(IPM.ie) and we believe that the consumption of traditional boiled potatoes will still be relatively high in Northern Ireland.

On that basis we assumed the figures for NI to be an equal split between processed and fresh and a total consumption of 110 kg/person /year or for the local population a consumption of – 93,500 tonnes of fresh potatoes. There will be the same consumption, in raw equivalent terms of processed product, most of which will be imported. Using a variant of the categories used by Teagasc and making the assumptions explained above, brings the following *approximate* market breakdown for Northern Ireland to –

Category	Quantity (tonne ex-farm equivalent)	Estimated Domestic Supply (%)	Comment
Washed Ware (Table) Potatoes	60 – 70,000	80 – 100%	Grocery and retail
Ware (Table) Potatoes	15,000- 25,000	100%	Sales ex-farm and farm shops
Peeling (whole)	20 – 30,000	80 – 100 %	Retail and Food Service outlets (catering)
Fresh Chips to catering and chip shops	10, – 15,000	20 - 60%	Food Service outlets (catering and chip shops)
Potatoes to chip shops	10 – 20,000	20 – 60 %	Unprocessed potato peeled and chipped on site
Salad Potatoes	4 – 6,000	25 %	Limited area suitable in NI
Processing / Crisps	25 – 30,000	50 - 60 % of local production	Crisping and added value processing.
Frozen Products	50,000 – 75,000	0	100% imported

Table 10. Estimated Distribution of Ware Potato Market in NI 2012.

The fresh potato trade is dominated by washed prepacks sold through the large supermarkets and this is mostly supplied by three specialist packers. This is supplemented by a number of smaller packers supplying into local shops, symbol chains and service stations. Figures from GB suggest that the supermarket prepack trade accounts for about 80% of all fresh potato sales. While this may be true for urban areas of Northern Ireland we believe that the level in Northern Ireland is quite a bit lower, at between 60% and 70%.

The vast majority of prepacked potatoes are now washed prior to packing, which demands a high standard of skin finish which can only be achieved through excellent husbandry and store management. There is still however a significant but declining market for unwashed large bag sales direct from farm; through formal and informal farm shops and through greengrocers or convenience stores

The export of ware potatoes to the GB wholesale markets has now ceased and the export of ware to other markets is largely opportunistic, depending on availability and market demand. This export trade is however very important in years of oversupply such as 2010, when it helps stabilise and relieve pressures in an oversupplied market.

Supply chains aligned to the major packers are generally organised through some form of loose contract arrangement and supported by specialist agronomists to help growers meet the high quality standards and skin finish demanded by this market.

Smaller packers are frequently packing a high proportion of their own product which helps deliver the required quality.

With much of the potato area grown on rented land a very limited area is covered by effective irrigation. Farm storage facilities are also of variable quality.

4.3 Seed Potatoes.

Northern Ireland has a very suitable climate for seed potato production being relatively cool and windy. This helps contain the number of aphids, which are the vector for serious viral diseases of potatoes and allows quality to be sustained during multiplication.

In addition, strong advisory support, rigorous statutory controls and the remoteness from the major potato production areas of Europe, have over the years helped keep Northern Ireland free of many serious diseases and pests important to seed potatoes. Northern Ireland is a recognised High Grade Seed Potato Production Area within the European Union and only seed potatoes of EU Basic Seed quality are grown and classified.

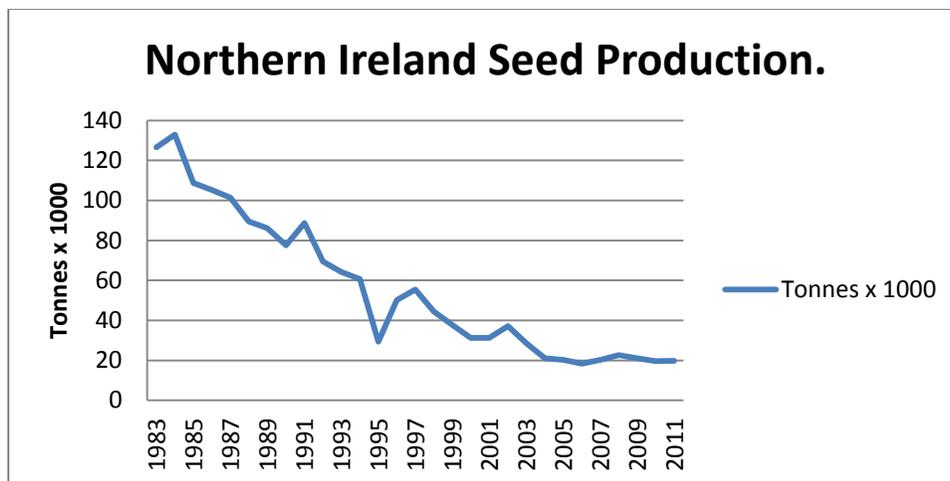


Figure 10

However over the years the area of seed grown and seed exported has declined rapidly (*Figure 10*). This has taken place for a variety of reasons; including -

- The very small volume of seed now going to GB. This has declined from almost 80,000 tonnes in the 1950s through approx 40,000 tonnes during the 1960s to only 356 tonnes in 2011 (Table 11) . This market is being supplied by local multiplication and seed from Scotland or Netherlands.

- The decline in sales to “export” countries from over 50,000 tonnes in 1984 to 5,131 tonnes in 2011. This has been accompanied by a shift from centralised Government purchasing in export countries to purchase by local commercial companies which increases the trading risk. There has also been a much stronger marketing effort by countries in Europe closer to the Mediterranean market, traditionally served by NI.
- Export sales from NI were based largely of “free” varieties (e.g. Desiree) while for some time, improved new varieties have been offered by our competitors. Complications with the commercialisation of varieties bred at the Department’s Loughgall breeding Station, delayed the introduction of new local varieties. This has now been resolved and promising new varieties are starting to be marketed.
- Export sales still depend on the same countries in the Mediterranean basin (Table 12). No significant new markets have been successfully penetrated in the last 20 and perhaps 50 years; despite world production of potatoes increasing and market opportunities opening up in the developing world.
- World seed markets are dominated by Netherlands, Scotland, Canada and France, who can deliver large quantities of high quality seed from new as well as traditional free varieties.
- Northern Ireland’s reputation as a source of seed deteriorated in the 1970’s and 1980’s due to quality problems, largely associated with poor storage and outdated practices. This led to a number of highly publicised soft rot problems. Although the causes of the problem have been overcome to a significant extent as growers have increasingly specialised, unfortunately the reputation still exists and impacts on sales – especially when seed is plentiful. A Hot Box test developed by AFBI is now available to the industry to test seed potential rots prior to export.

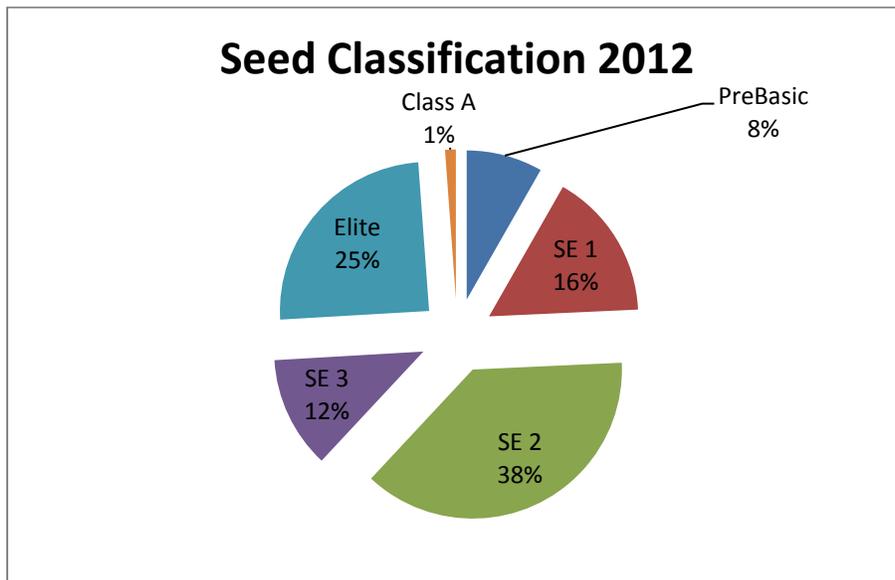


Figure 11. Seed Certification in Northern Ireland – DARD.

During 2012 an area of 593 ha was certified by the Department of Agriculture and Rural Development Inspectors, of which over 60% was at Super Elite 2 standard or higher. Of the 55 varieties classified only 14 had areas of over 10 ha and of these 9 were old “free” varieties, leaving only 6 modern protected varieties with some unique marketing properties.

Table 11. Seed Potato Exports by Region

Destination	Tonnes (June 2011 / June 2012)
Total Certified	8,847
Home	1,427
Exported to Rol	1,933
Exported to GB	356
Exported to Other Countries	5,131

For the 2012 crop, notification of imports into Northern Ireland were submitted to DARD for 1,900 tonnes; of which about 80% came from Scotland.

Table 12 Destination of Seed Potatoes Exported from NI in 2011.

The principal destinations in 2011 outside GB were –

Country	Quantity (tonnes)
Morocco	2,439
Canary Islands	1,369
Portugal	441
Malta	25
Spain	66
Channel Islands	23
Pakistan	52
Egypt	474
Iraq	150
Israel	27
Romania	➤ 10

By way of comparison Table 13 provides details of the exports to GB and outside the UK between 1950 and 1984.

Year	Sold to GB	Exported outside UK	Total
1950	78,000	40,000	118,000
1955	35,000	60,000	95,000
1960	40,000	49,000	89,000
1970	39,000	41,668	80,912
1975	10,884	39,358	50,242
1980	16,022	73,718	89,740
1984	12,360	51,507	63,867

Table 13. exports to GB and outside the UK between 1950 and 1984.

4.4 Food Processing.

The review of the Size and Performance of the Northern Ireland Food and Drinks Processing Sector for 2011 published by DARD, identifies the businesses by sector. Potatoes, including manufacture, processing and packing, are included as part of the wider Fruit and Vegetable Sector. The figures summarised below show the sector to be a significant generator of both economic activity and employment.

Number of Businesses - Fruit and Vegetable Sector	Gross Turnover 2011	FTE Employees 2011
51	£238.5 m	2,016

Table 14. Economic Activity and Employment within the Fruit and Vegetable Sector.

There will also be a considerable level of employment and economic benefit to the economy delivered by businesses supplying and servicing the needs of the arable sector. In a report provided for the Minister of Agriculture's FH2020 High level Implementation Group Miller et al. found that 17 jobs were associated with every million euro of domestic output at farm level. The equivalent number for potato production was nine jobs per million euro farm output.

5. Market Overview.

5.1 Grain

This report is being prepared at a time of increased concern about the world's ability to feed the accelerating growth in population. The current population of 7 billion, of which an estimated one billion still do not have daily access to safe food and suffer from chronic malnutrition, is predicted to rise to 9 billion by 2050 and at the same time

increasing prosperity will shift more consumption to meat and dairy products.. All this represents a huge challenge to the agri-food industry both in the developed and developing world, and while estimates of the magnitude of increase are complex and subject to wide variation, even the most optimistic scenarios require increases in food production of at least 50% by 2050 (Science and the Sustainable Intensification of Global Agriculture – Royal Society 2009).

This increased demand for food will have to be achieved from less land per head available, especially in the developing world -- one source suggests (Bruinsma 2009) that even today there is only about 0.25 hectare of arable land available per person in the world and in the developing world this is below 0.2 ha compared to 5 and more ha in the large grain producing countries of USA, Canada, Australia.

Water is fundamental to the global food security challenge with a projected 40% gap between demand and supply anticipated by 2030, and the situation is made worse by the fact that areas with arable land available are, in many cases, not those with a good supply of water.

The increase in middle class affluence and urban living (70% by 2050) in the developing world will mean an increased demand for livestock products, with an associated loss of efficiency as more grain, water and fertiliser is required to produce meat. For example it takes 2 to 4 kilograms of grain and about 3,900 litres of clean water to produce one kilogram of chicken and 7 to 10 kilograms of grain and 15,500 litres of clean water to produce one kilogram of beef.(FAO) .

The net effect of this increased demand for food has already seen a rapid increase in consumption and demand for grains such as maize and wheat, resulting in a reduction in the end-of-season stock to lower than desirable levels (*Figure 12*).

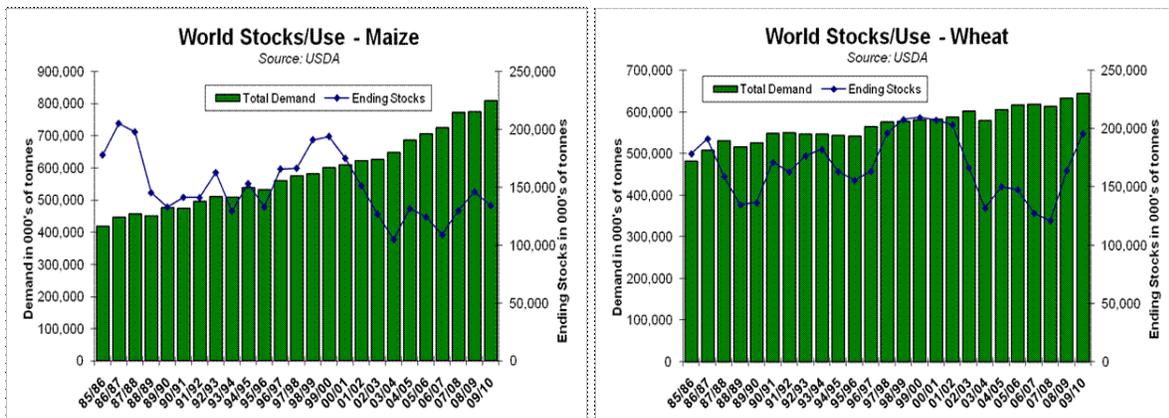


Figure 12. World Stocks and Use for Maize and Wheat. Source HGCA.

Global grain consumption has exceeded production in 8 of the last 13 years and the reserve storage is now at about 68 days – just 6 days more than the low which preceded the 2007/8 grain crisis, when food riots erupted and several countries restricted exports (*Figures 13 and 14*). Latest figures from the 2013 harvest suggest stocks rising but at the same time USDA estimates that consumption for 3012/13 has risen substantially. The differential between the price of wheat and maize has reduced substantially from in the region of £100/t to about £40/t. Obviously this affects differential demand where grains can be substituted.

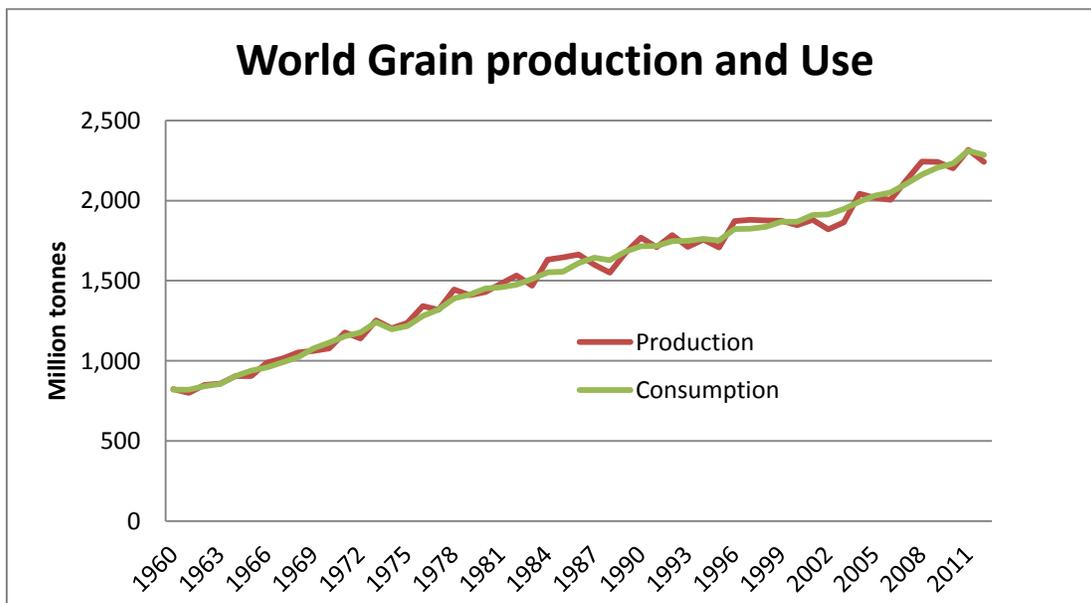


Figure 13. World Grain production and Use. Source Earth Policy Institute / USDA

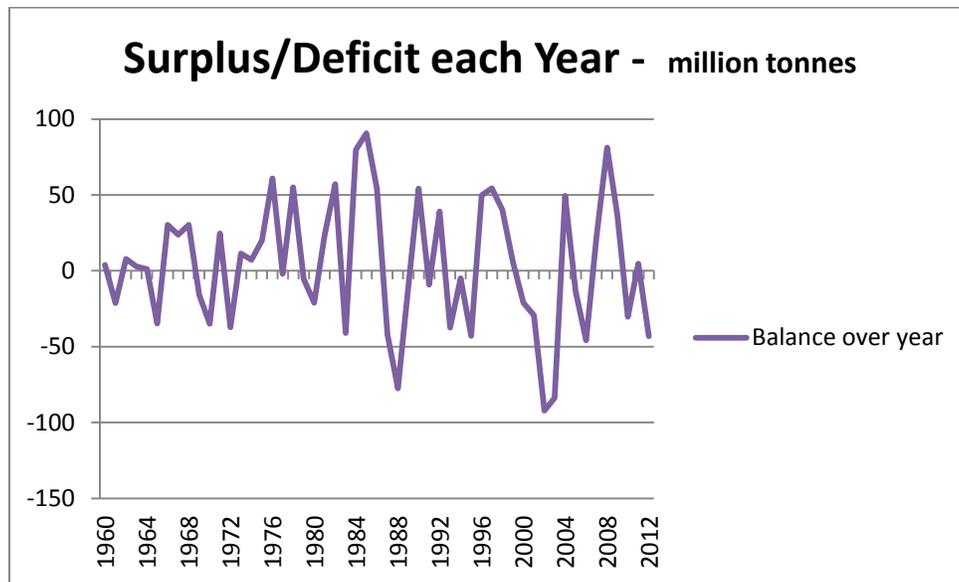


Figure 14. Year on Year Surplus / Deficit.

Source Earth Policy Institute / USDA

Associated with the increase in meat consumption is a need for vegetable protein such as soya bean and for oilseeds. Demand has increased rapidly but greater worldwide production has now reduced the deficit. This increased demand for protein for animal feeds has required more land to be diverted to soya production as there has been only a limited increase in yield per hectare.

The pressure on scarce arable area is exacerbated by the diversion of land to the production of fuel for energy in the form of biodiesel and ethanol. Ethanol markets are dominated by the US, Brazil and to a lesser extent the EU. Biodiesel markets are dominated by the EU followed by the US, Argentina and Brazil. Maize and Sugar cane are the main feedstocks for ethanol production while soybean and rapeseed are used for biodiesel production

There is an extremely complex interaction between the cost of petroleum products, Government incentives / mandates to include biofuels in the fuel mix and the value of crop products suitable for biofuel production. There is also an interaction between the different crops as growers react to the biofuel / food demand affecting crop values. For

example maize and soyabeans compete for the same land so if maize prices rise then land use shifts from soya to maize production.

The OECD-FAO Agricultural Outlook 2013- 2022 projects that global ethanol production will increase 67% in that 10 year period to reach 168 billion litres with biodiesel rising faster from a lower base to reach 41 billion litres. At these levels biofuel production will consume 28% of the world sugar cane production, 15% of the vegetable oil and 12% of coarse grains.

An added complication is that the advent of hydraulic fracturing (Fracking) and horizontal drilling in shale rocks has transformed the oil markets in the US, with shale oil outputs now projected to make the US the world's biggest supplier of oil in 2013.

In the past, the demand for feedstock grain for biofuel production has undoubtedly increased the cost of grain on world markets (Discussion paper 967 Federal Reserve Board). It remains to be seen whether the international political resolve to sustain reductions in greenhouse gas production through the use of biofuels will be sustained in as the oil market adjusts to the new situation.

All this, makes it extremely difficult to predict how grain prices will be affected in the future, although with the demand for both food and energy bound to rise, the trend will, in our view, be for increased increasing demand and prices in the long term.

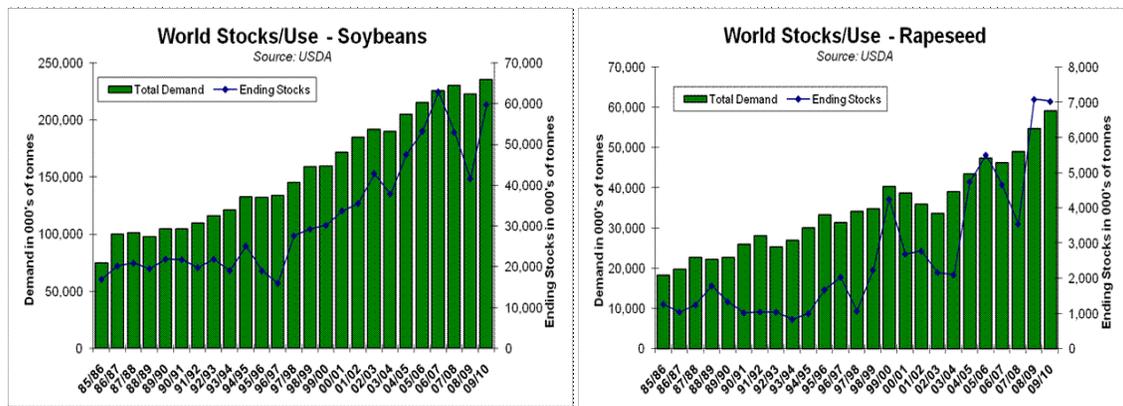


Figure 15. World Stocks and Use for Soybeans and Rapeseed Source HGCA.

As indicated above both Soya and Rapeseed are likely to be in increased demand worldwide for the production of biodiesel as well as food. (Figure 15).

With stocks low, speculative trading and increasingly disruptive weather patterns, grain prices have not only risen but volatility has increased. This volatility is expected to continue for the foreseeable future.

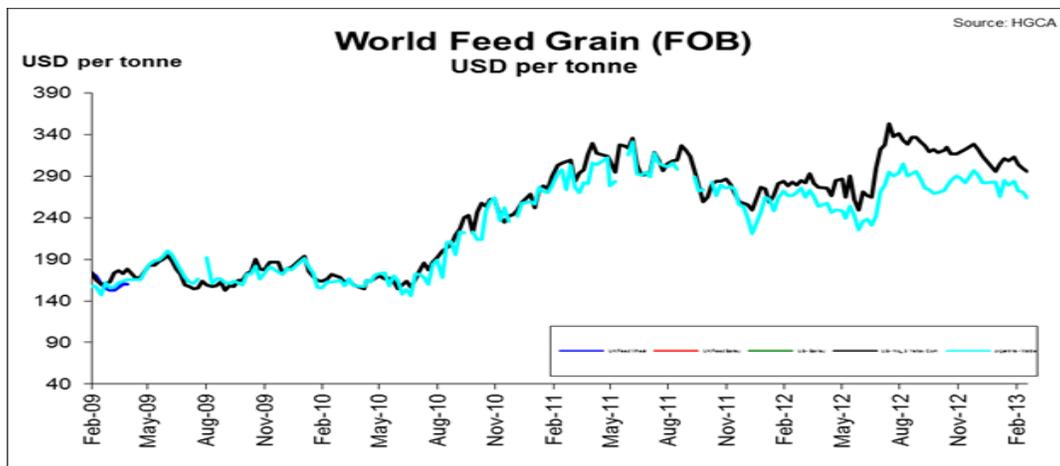


Figure 16. World Grain Price Volatility. Source. HGCA

As European farmers push their crops to maximise yields it has become apparent that the rate of yield increase being achieved through the application of new and improved techniques seems to have reached a plateau.

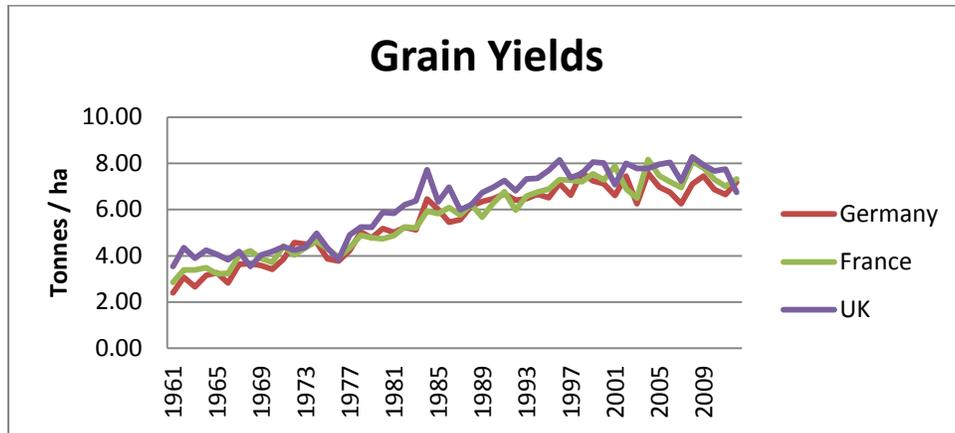


Figure 17. Grain Yields France, Germany United Kingdom

Source Earth Policy Institute.

This trend will continue and be exacerbated by the likely loss, through the implementation of the Sustainable Use Directive and other measures, of the pesticides required to control fungal and other diseases. The industry is extremely concerned about the impact of this change which stands to have a major impact on grain yields in Europe. The industry is also being constrained in facing this challenge by being prevented from using technologies such as Genetic Modification to overcome barriers to increased crop yields.

Cereal trading is a truly global operation with the EU 27 being a significant player for all the major grains. (Figure 18).

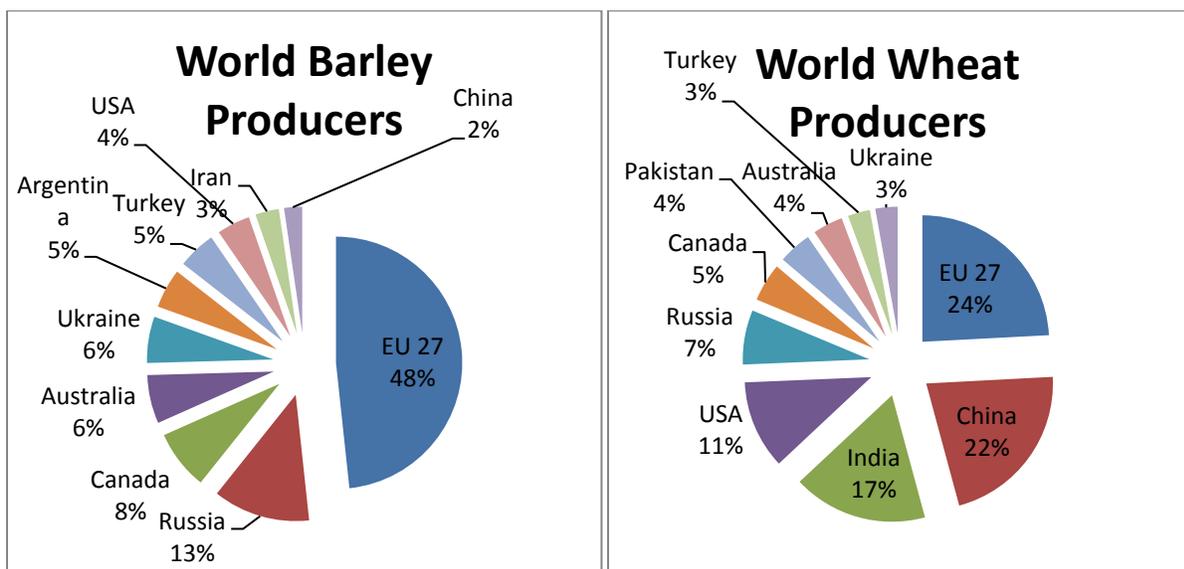


Figure 18. World Barley and Wheat Producing Countries Source: USDA

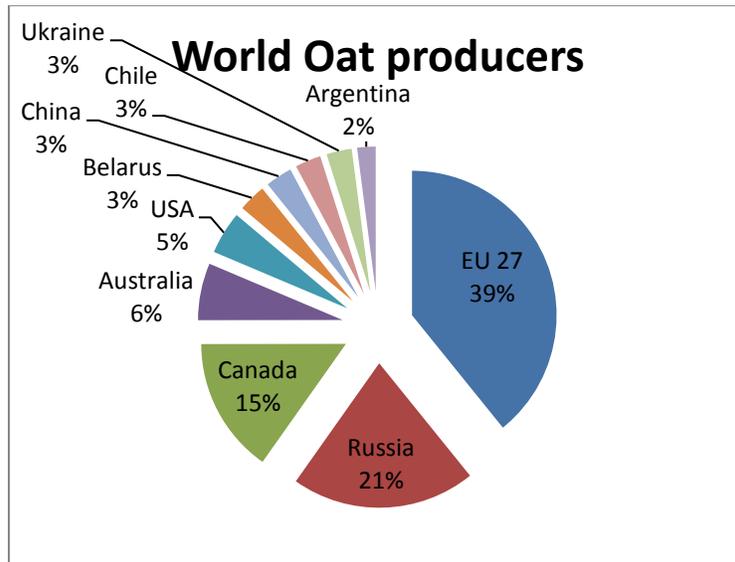


Figure 19. World Oat producing Countries. Source: USDA

Poland, Spain, Germany, Finland and Sweden are the major producers of oats within the EU 27 which is the largest world producer (Figure 19).

Within the UK oat production is increasing and supplying a growing demand, with some 480,000 tonne being used in the food industry. Around 196,000 tonnes is used in animal feed and seed production, giving a total demand of some 676,000 tonnes, the vast majority of which is grown locally.(Figure 20)

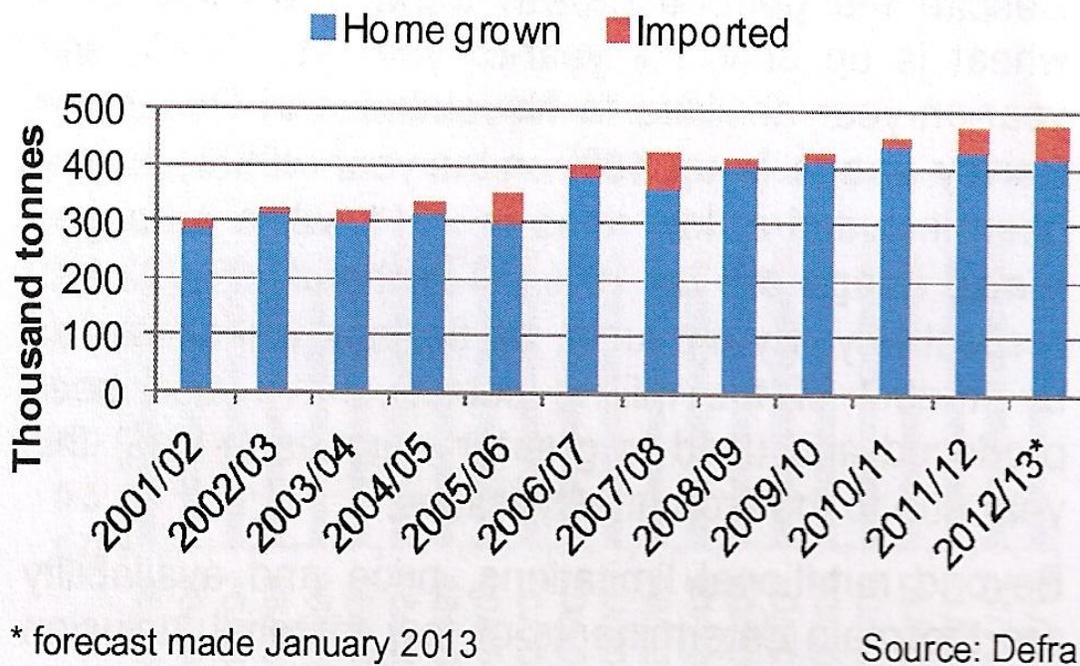


Figure 20. UK Oat Millers Total Season Usage.

In Northern Ireland the one local processor is working closely with local growers to increase the proportion sourced locally, although the majority of oats processed is still imported from the UK and Scandinavia.

5.2 Ware Potatoes.

In the case of ware or table potatoes, trade is largely restricted to Northern Europe. This is because of their high moisture content and susceptibility to deterioration unless transported in controlled atmosphere conditions. There are however some regular marketings to the Mediterranean and the Canaries, with occasional sales to other countries (e.g Russia).

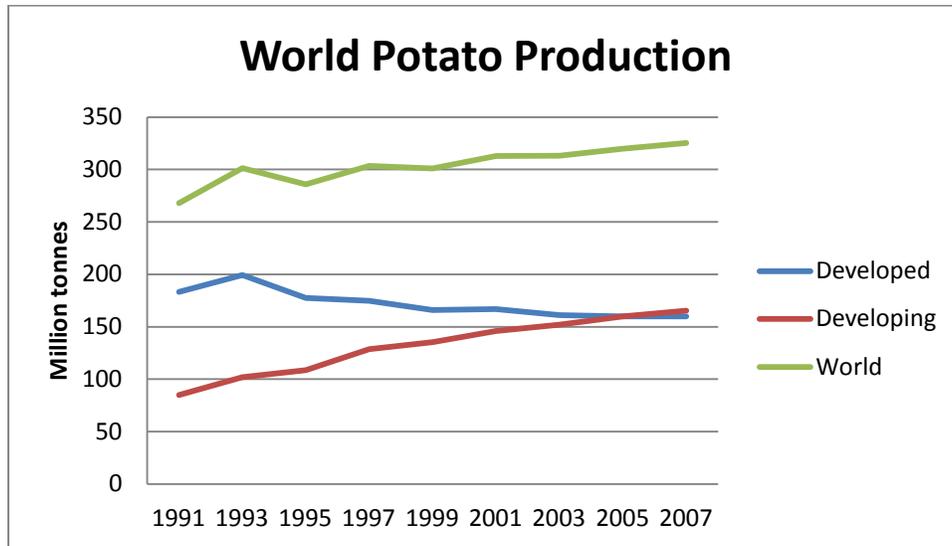


Figure 21. World Potato Production

Source. International Year of Potato

World potato production is steadily increasing but the growth is occurring in Asia, Africa and Latin America with a slow decline in production in Northern Europe and North America. (Figure 21).

While significant producers in local terms, Northern Ireland and indeed Ireland are minor producers in the world with around a third of all potato production taking place in India and China (Table 15)

Table 15 World Potato Production – source PC

	Country	Production (million tonnes)
1	China	73,281.890
2	India	34,391,000
3	Russian Federation	31,134,000
4	Ukraine	19,666,100
5	USA	19,569,100
6	Germany	11,617,500
7	Poland	9,702,800
8	France	7,226,310
9	Netherlands	7,181,000

10	Belarus	7,124,980
11	Great Britain	6,192,000
12	Bangladesh	5,268,000
13	Canada	4,581,000
14	Turkey	4,397,710
15	Iran	4,107,630
16	Romania	4,003,980
17	Egypt	4,000,000
18	Peru	3,716,700
19	Brazil	3,443,710
20	Belgium	3,296,080
	Island of Ireland	550,000

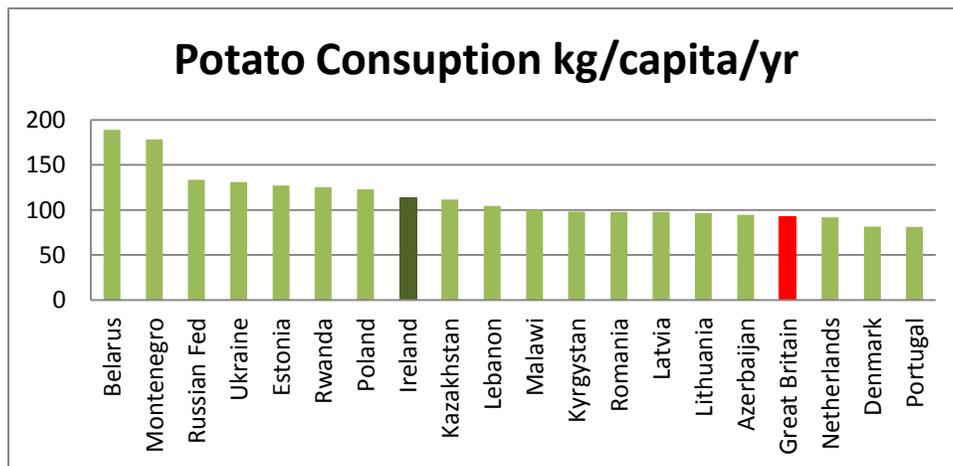


Figure 22. World Potato Consumption kg / capita / year. Source: British Potato Council

Potato consumption in Ireland is still relatively high (*Figure 22*) but well below the 4 – 6 kilos per day reported to be the daily diet of a man prior to the potato famine in the 19th century.

There has been a small but steady decline in potato consumption per head in the UK and Ireland over many years. This has been accompanied by a shift from consumption of freshly prepared potato to frozen and convenience products.

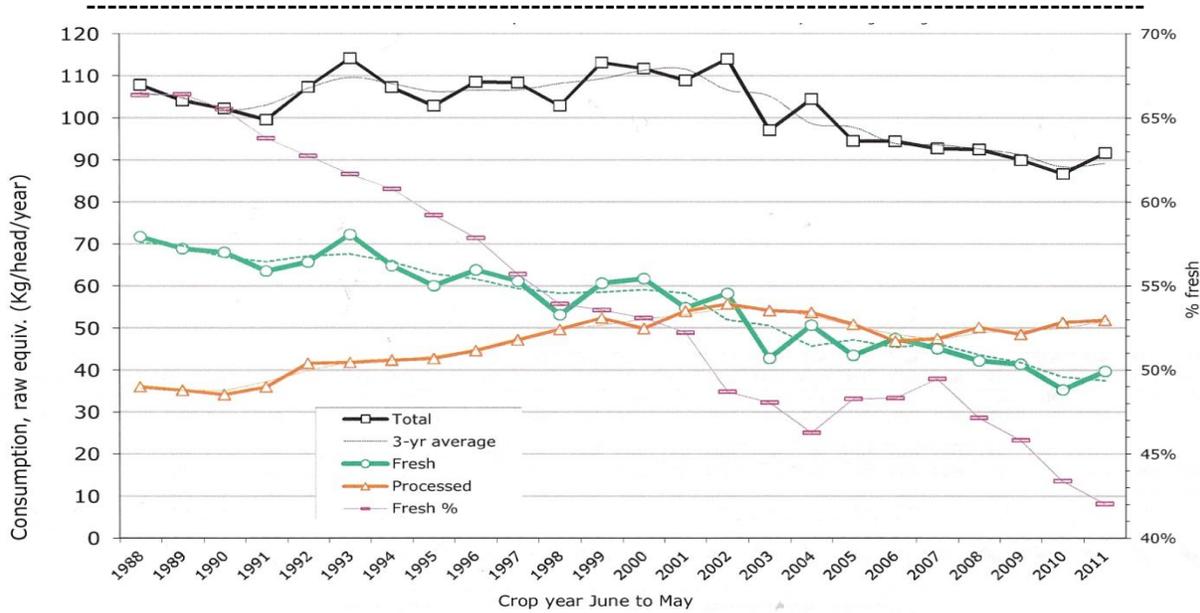


Figure 23. Consumption of Potato and Potato Products in UK Source PC

This graph (*Figure 23*) from the report of “Consumption and Processing in GB – annual Trends 1988 – 2012, prepared by the (British) Potato Council, illustrates that since the turn of the century, consumption of processed potato has exceeded that of fresh potato.

Potatoes and potato products now compete with rice, past and noodles in the market for carbohydrates where consumers increasingly place the emphasis on convenience and formal meal occasions have become less important. Similar trends have been recorded in Ireland (*Figure 24*).

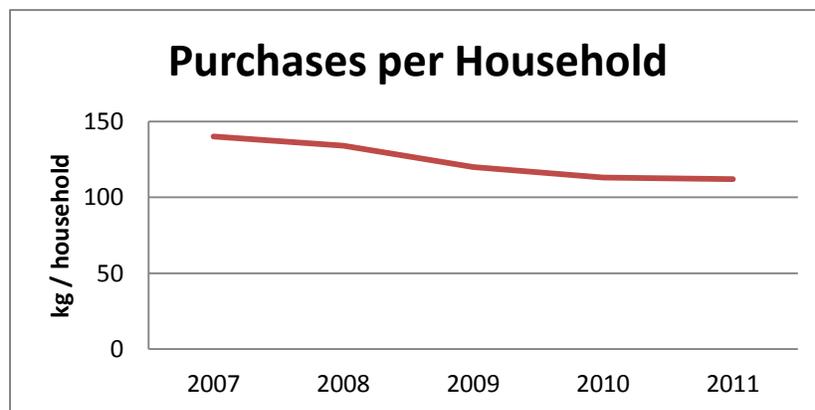


Figure 24. Potato Purchases per Household in Ireland Source Kantar Worldpanel 2011

However potatoes are still by far the most important carbohydrate purchase for Irish consumers (Figure 25).

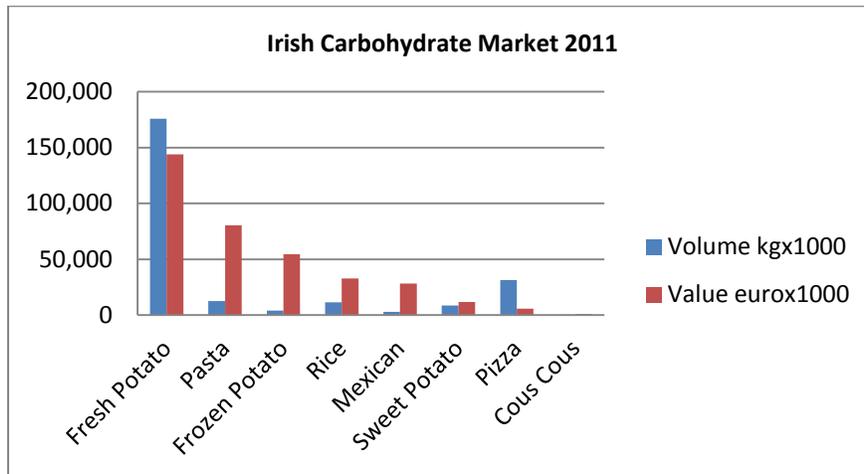


Figure 25. Irish Carbohydrate Market Source Kantar Worldpanel 2011

This trend to reduced consumption per head can only increase as younger consumers purchase fewer potatoes (Figure 26).

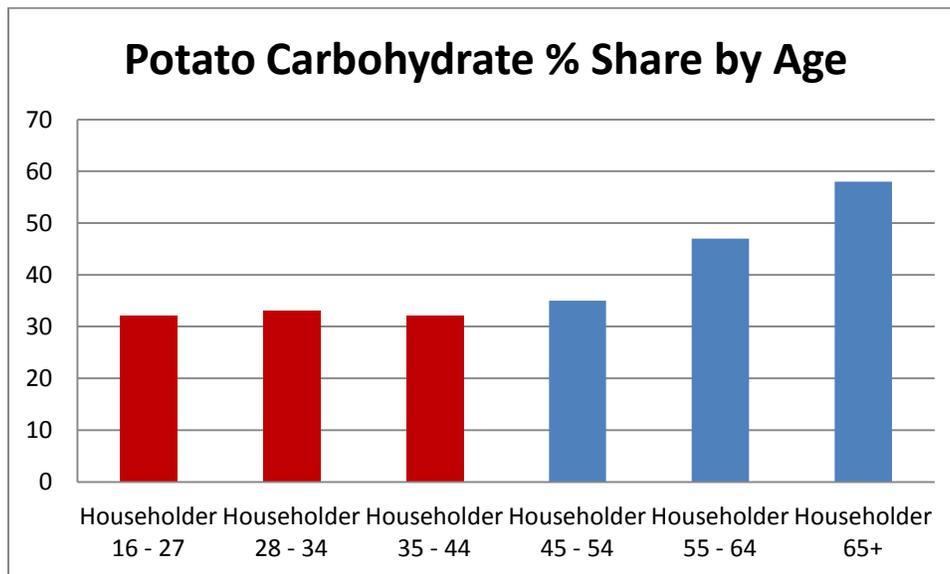


Figure 26. Potato Share of Carbohydrate Market in Ireland. Source Kantar Worldpanel 2011

As households get smaller and an increasing number of households are single occupancy, smaller quantities are purchased at each shopping visit with demand for smaller pack sizes increasing (Figure 27).

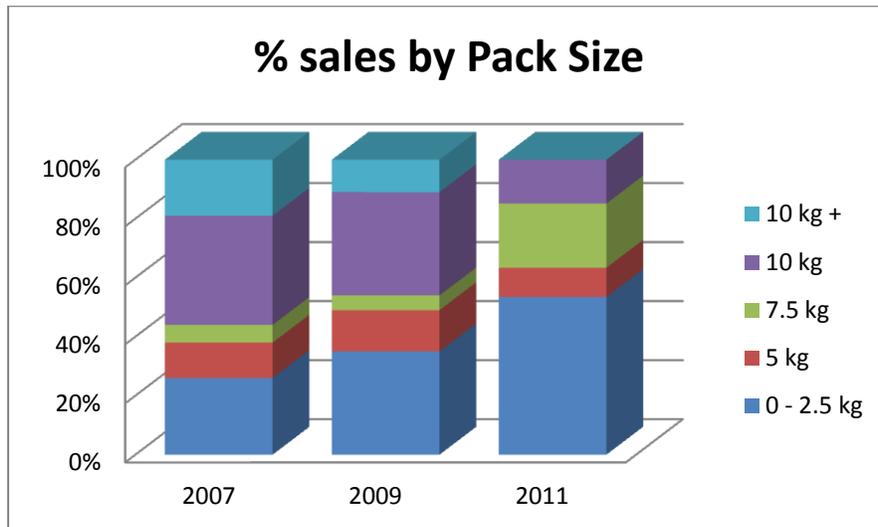


Figure 27. Potato Pack Size Sales in Ireland. Source Kantar Worldpanel 2011

Potato processing in Northern Ireland is now based on one significant crisp manufacturer, a large number of “peelers” servicing the food service sector, and at least one very successful processor of instant product and ready meals.

While “peelers” can help use potatoes with skin finish which is not up to the standard for washed pre-packs, at times of oversupply the processing capacity is insufficient to absorb large quantities of potatoes.

As potato consumption is very little affected by changes in price (inelastic demand/supply) and shipping long distances is not normally a viable option, farm gate prices are very sensitive to oversupply, which leads to large price reductions in years with high yields in Northern Europe.

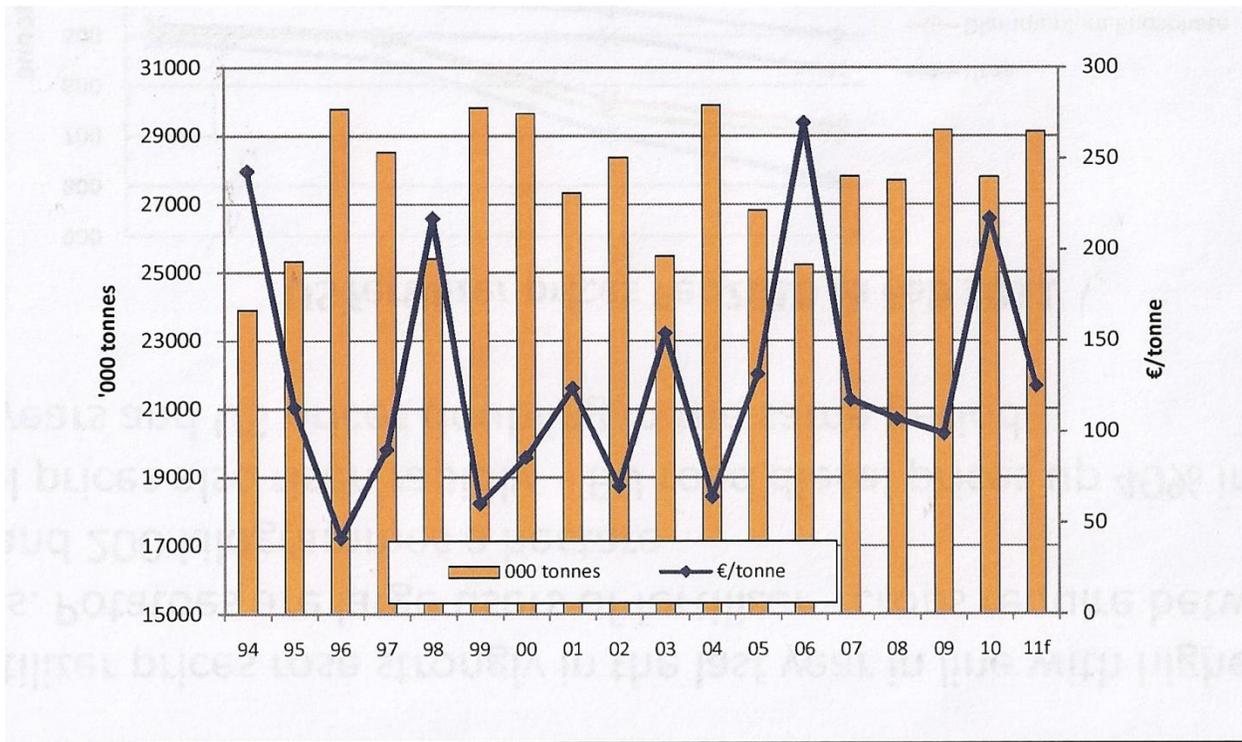


Figure 27. EU 5 Ware and Seed Potato Harvest and Average Price.

Source Guy Faulkner World Potato Markets

5.3 Seed Potatoes.

As has been discussed earlier, the growing worldwide demand for seed potatoes will come from developing countries. Because of distance, any trade will be in small quantities of high grade seed tubers or minitubers. Where new protected varieties are concerned the challenge will be to capitalise on the opportunity they present, while ensuring that the large financial investment in breeding is protected.

The large Great Britain market, with plantings of 127,450 hectare in 2011 presents a realistic if challenging market opportunity for Northern Ireland, in addition to supplying a greater proportion of the Irish market. Seed potato production in the Republic of Ireland has declined to very low levels with exports of under 200 tonnes in 2010.

In all markets the key to market penetration is strong quality control and varieties which meet the needs of growers better or equal to that available from existing suppliers.

Potato breeding is beginning to deliver results which gives optimism for the future. To protect the huge investment involved, disciplined and carefully controlled supply chains will be essential. Growers will also need to be supported with high quality agronomy to meet the market standards required.

6. Cross Industry Issues

Section 8 of this report considers the opportunities, challenges and support needs for individual arable crops grown in Northern Ireland. There are however some themes which are common to all enterprises in the sector and these are summarised in this Section.

6.1 External Influences

(i) CAP Reform

The Strategy is being developed at time when the discussions on the reform of the Common Agricultural Policy are still in progress. It is unclear exactly what will emerge from the Commission and be applied at regional level, but as proposed the reform stands to have a very considerable and disproportionate impact on arable production in Northern Ireland.

Of particular concern are the suggestions commonly known as the greening proposals which have the capacity to –

- I. severely curtail the availability of arable land for rental / leasing; and
- II. reduce the arable area farmed through the mandatory requirement to establish Ecological Focus Areas (EFAs); and
- III. interfere with good husbandry practice and established programmes of environmental enhancement through insisting on inappropriate crop diversification.

A recent study by AFBI using the FAPRI modelling system has predicted that the current EFA proposals for 7% of arable land to be dedicated to EFAs will lead to price increases of 3.8% for wheat and 3.95% for barley, with knock on effects on customers in the livestock industries. There would also be a reduction of about 4.3% in the arable land in production.

The Ulster Arable Society has made representations to the NI Members of the European Parliament, reflecting the concern of the Sector about the proposed changes.

(ii) Pesticide Availability.

The implementation of the Sustainable Use Directive and the Water Framework Directive, with the emphasis on hazard avoidance, has already caused a number of important pesticides used in both cereal and potato production to be withdrawn. Under the proposed legislation [Regulation (EC) No 1107(2009)] other sectors can argue to override a substance being refused approval because of a potential hazard, on the basis of the socio-economic impact. This option is not available to plant protection products which could lead to the loss of chemicals such as common fungicides which are critical to viable crop production systems.

The imposition of this extremely onerous requirement will have very significant implications for the arable sector at a time when the need is for every effort to be made to sustain or increase yields to underpin the local livestock sector and feed the world's growing population. One impact assessment suggests that loss of the "endocrine disruptors" which include the triazole fungicides could reduce wheat yields by 10-20%. This very real threat emphasises the need to ensure that policy makers are aware of the practical implications of such changes and for timely and targeted R & D to try to identify alternative measures to control / reduce the impact of weeds and disease on the efficiency and profitability of local crop production.

(iii) Climate Change.

The UK Climate Projections (UKCP09) have been followed up with risk assessments which consider the impact on particular areas of the UK, including Northern Ireland.

The UK Climate Projections for 2050, assuming a medium level of emissions, indicate –

- An increase in mean winter temperature of 1.7 deg (range 0.6 to 3.0 deg C)
- An increase in mean summer temperature of 2.2 deg (range 0.9 to 3.9 deg C)
- An increase in mean winter precipitation of 9% (range 2% decrease to 20% increase)
- A decrease in mean summer precipitation of 13% (range 25% decrease to 5% increase).

Based on this the NI risk assessments suggest that there could be –

- Increased grass yields due to higher temperatures but still with sufficient moisture to sustain growth.
- Increased wheat yields, as wheat can withstand drought stress well. Projected increases are 20% to 65% by the 2020's and 30% to 80% by the 2050's.
- Potatoes are more sensitive to soil moisture content which could decrease yield but this is balanced by a very positive increase with higher CO₂ levels. The predictions are for similar or slightly reduced yields.
- Plant disease and weather interactions are complex but milder winters and warmer wetter summers are likely to increase disease pressures. The relevance of this is more significant when considered along with the possible loss of effective pesticides to control such diseases – see(ii) above.

Obviously the level of accuracy of such predictions is very limited and the impact is hard to detect in the short term. The greatest impact for Northern Ireland agriculture will likely come from other areas where water is already limiting. For example Wageningen University predicts that for potatoes there will be –

- Increased production in Northern Europe (Scandinavia);

- Stable production in Western Europe (UK, France, Germany, Belgium and Netherlands);
- Decreased production in Eastern Europe (Czech Republic, Poland, Hungary etc.)
- Disappearance of Mediterranean production.

This will present both challenges and opportunities for NI farming, but the dominant issue is likely to be the management of water – drainage to control increased rainfall and conservation to reduce costs and facilitate irrigation in times of drought.

The changing climate will expose the industry to different and evolving plant diseases and emphasises the importance of DARD and the authorities in Republic of Ireland developing and vigorously implementing an effective All-island Plant Health Policy.

Associated with the climate change concerns within society are the National and International pressures and legislation to control the release of greenhouse gases (GHG). The NI Executive's has in its 2011 Programme for Government set a target of 35% reduction in Greenhouse gases between 1990 and 2025. As agriculture is responsible for around 26% of this (NI Environmental statistics Report 2012) there will be sustained pressure to reduce GHG emissions and increase the carbon intensity (industry output per unit of carbon emitted) of agricultural production.

Gas emissions are rated in terms of their Global Warming Potential (GWP) relative to the GWP of Carbon Dioxide. Methane has a GWP 23 times that of CO₂ while Nitrous Oxide) N₂O has a value 300 times greater than CO₂.

For arable crops the most significant GHG emissions come from N₂O from manures, fertilisers and soils, followed by carbon emissions from engines and the application of chemicals. The DARD sponsored Agriculture and Horticulture Greenhouse Gas Stakeholder Group recognised that the agri-food industry can have a positive impact on GHG through the ability of growing plants and trees to absorb carbon dioxide

(sequestration). However the Stakeholder Group identified the following 5 main areas for positive action which will reduce carbon intensity of agricultural operations –

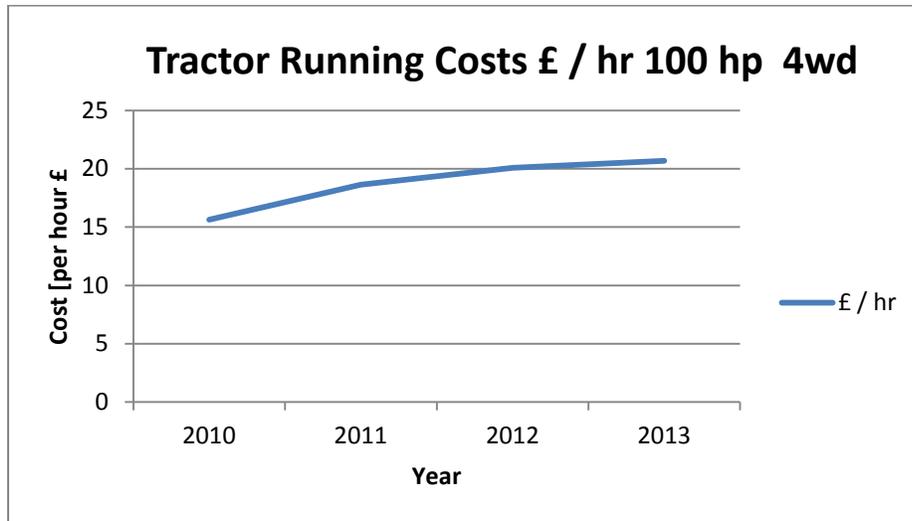
- Precise Nutrient Management Planning
- Careful Timing and Application of Slurry
- Suitable Variety Selection
- Improved on-farm energy efficiency, including the use of min-till seeding where appropriate
- Creation of new and management of existing woodlands.

These actions are also linked closely to reducing input costs, so efficient farming will not only reduce input costs but also reduce carbon intensity of the production achieved and cut overall greenhouse gas emissions. The arable sector is already actively engaged in implementing these principles through efficient utilisation of livestock manures, precision farming and reduced cultivations.

With so much grain used on farm the use of locally produced and stored moist grain results in large energy and therefore GHG savings. This is achieved through avoiding the use of fossil fuels for drying and eliminating the need to transport grain long distances.

(iv) Rising Input Costs.

Input costs have risen dramatically in recent years and with the close linkage of machinery and fertiliser costs with world oil prices, this trend show no signs of decreasing (*Figures 28 and 29*).



Source DARD Farm Business Data 2010 - 2013.

Figure 28 Tractor Running Costs.

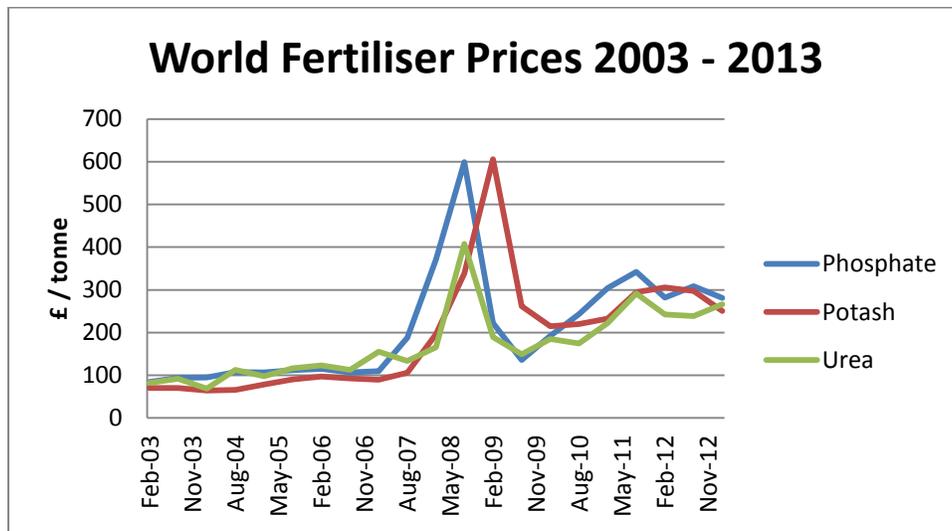


Figure 29. World Fertiliser Prices 2003 to 2013

Source www.indexmundi

(v) Land Quality

The current cropped area in Northern Ireland is about 55,000 ha compared to the peak area of 450,000 ha in the 1850's and 340,000 ha in the 1940's. However with the

changing weather patterns and higher yield potential of modern cropping systems it is no longer viable to grow high value arable crops on anything but good quality land. The investment in crops such as potatoes is extremely high and loss of a crop due to a wet harvest can have a devastating impact on the business. The DARD Farm Business Data Book 2012 suggests that the Enterprise Marginal Capital Requirement for maincrop potatoes is £1,645. That represents a very big risk to a potato business of any significant size.

Grade	Soil Profiles	Soil Depth (cm)	Annual Rainfall (mm)	Growing Season Days	Altitude m (asl)	Slope Degrees	Description	Comments
1	Brown Earths on Sand, Gravel or Sandy Till	>60	<850	250-300	<100	<7	Excellent quality	Not extensive in Northern Ireland. Has minor or no physical limitations that would affect agricultural use or productivity. Suitable for wide range of agricultural and horticultural crops. Yield is usually high and less variable.
2	Brown Earth and some Surface Water Gley on Sand or Sandy Till	45 – 60	<1050	250-280	<150	<7	Very good quality	Not very common in Northern Ireland. Slight physical limitations on use or productivity. Suitable for wide range of agricultural and horticultural crops. Yield is slightly lower than grade 1.
3a	Surface Water Gley, Shallow Brown Earth and Brown Podzolic	30 – 45	<1150	250-280	<200	<7	Good quality	Common in Northern Ireland. Sandy textures and better drainage of class 3. This land type can consistently produce high to moderate yield for narrow range of arable crops.
3b	Surface water Gley, Lake Clay, Alluvium and Organic Alluvium.	20 – 30	<1400	250-280	<200	7-11	Moderate quality	Common in Northern Ireland. Clayey textures and worse drainage of class 3. Capable of producing high yield of narrow crop range, principally cereals and grass. Therefore commonly used as grazing land.
4	Most Rankers, Podzols, Peat Podzol, Humic Gleys, Peat and Organic Alluvium	15 – 20	<1100-1500 or <800 lowland	230-250	<300	11-18	Poor quality	Common in Northern Ireland. Very limited in use either by poor drainage, extreme climate or both in situations of drought in shallow soils. Mostly suitable for grass.
5	Urban and Disturbed soils. Blanket Peat, Humic and Rock Rankers	<15	800-2000	<230	0-1000	>7	Very poor quality	Common in Northern Ireland. Almost of no arable agricultural potential. Found in lowland swamps, coastal marshes or humic rankers on mountaintops. Mainly suitable as permanent pasture or rough grazing.

Table 16 – Land Classification for Northern Ireland

Source; AFBI / NI Geological Survey

Land in Northern Ireland is classified according to soil type, depth, altitude etc to indicate its production potential (Table 16) (Source AFBI / British Geological Survey)

It has been estimated (Ultimo 2005) that there are in the region of 70 - 100,000 hectares of Grade 2 land in Northern Ireland, which are very suitable for a wide range of crops. Grade 3 land is good to moderate arable land and it is thought that there is upwards of 500,000 hectares of such land available.

Even if cropping is restricted to Class 2 land there is therefore sufficient to double the existing crop area.

(vi) Soil Nutrients.

The optimum availability of most plant nutrients in soil occurs over a small range of soil pH values. Unfortunately the range for each nutrient is not the same but there is sufficient overlap in the ranges to decide the best possible compromise for each cropping system and soil type. Guidance is provided in the Fertiliser Manual published by DEFRA which should be referred to for each specific soil and crop situation.

However as a general rule for mineral soils the recommended values for pH are in the region of 6.0 pH for grass with occasional wheat and oat crop, or 6.2 for grass with occasional barley.

Typically, the maximum yield of arable crops or of grass is reached at Index 2 for phosphorus and Index 2- for potassium. The principle for phosphate and potash management is to maintain the soil at the appropriate target indices.

Results of approximately 7000 soil analyses per year in Northern Ireland between 2008 and 2013 provided by CAFRE (Figures 31, 32 and 33) illustrate the large range of values found and demonstrate how important it is to undertake regular soil analysis to achieve optimum arable crop production. The generally low levels of pH in soils in Northern Ireland is of particular concern for successful arable cropping in the region.

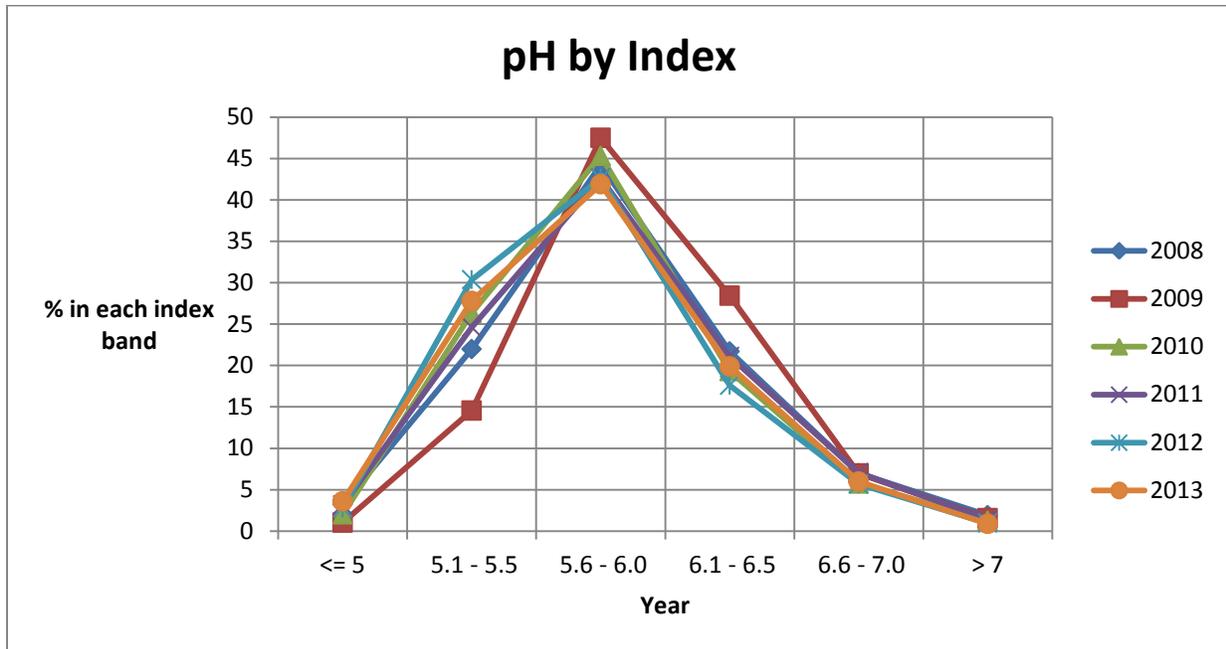


Figure 30 Ph values of some soil analyses in Northern Ireland. (CAFRE)

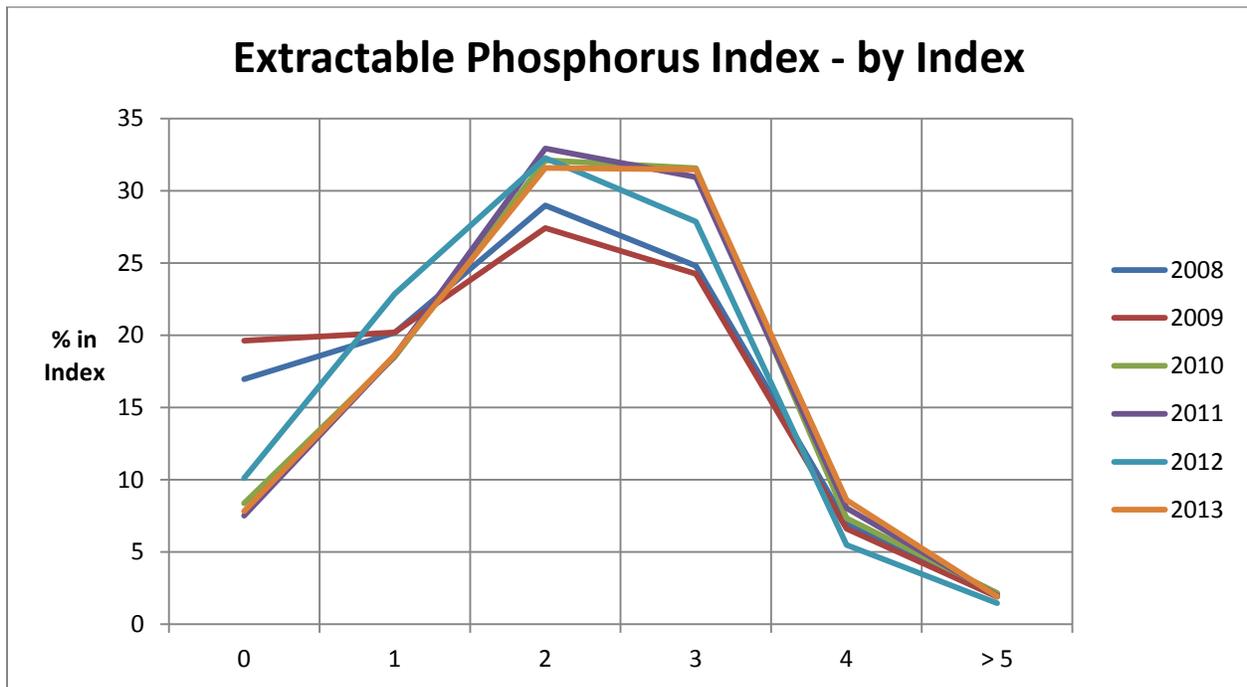


Figure 31 Phosphate Indices of some soil analyses in Northern Ireland.(CAFRE)

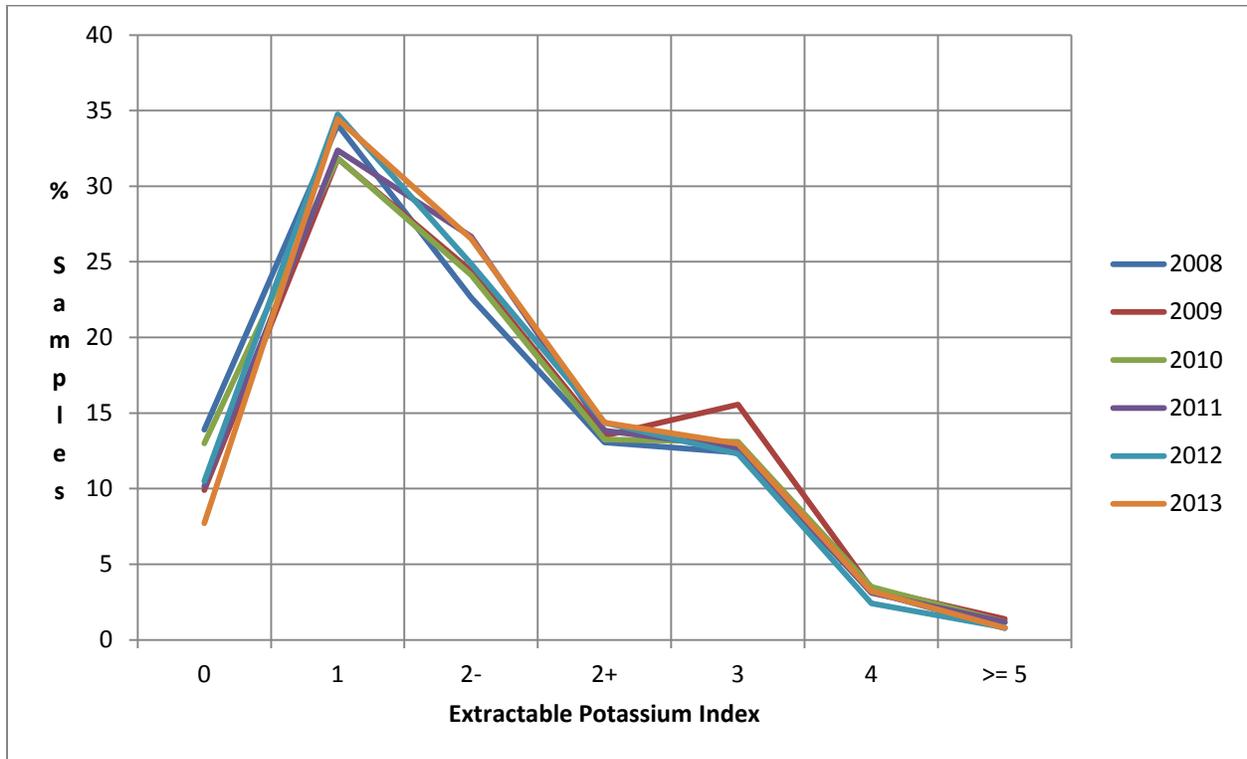


Figure 32 Potassium Indices of some soil analyses in Northern Ireland.(CAFRE)

Since maintaining the optimum pH level in the topsoil in all parts of the field is important to achieve optimum yields and the efficient use of any fertilizer applied, keeping the correct soil pH is of particular importance.

6.2 Sources of support to deliver success.

The industry has demonstrated its commitment to achieving sustainable development through its own efforts and with the minimum of external assistance. However, the support required to enable this development is identified in Section 8 on a crop by crop basis, under the headings of Policy, Education and Training Courses, Research and Industry Training, Benchmarking and Knowledge / Technology Transfer. This support is currently provided through a number of different organisations and Government Departments.

Policy. Within the Northern Ireland Executive, responsibility for production agriculture rests with the Department of Agriculture and Rural Development (DARD) and it is active

in areas such as Plant Health and education/training. Processing is supported through the Department of Enterprise, Trade and Investment.

Research.

Any industry depends for its sustained viability on investment in research and product development. There continues to be a worrying loss of crops research in Europe with a recent report published by the European Crop Protection Agency showing that Europe's share of total worldwide R & D expenditure on new product development in life science (including GMs) is just 7.7% compared to 33% in the 1980s. This worrying loss of capacity in arable research is reflected in the situation in Northern Ireland.

The Agrifood and Biosciences Institute (AFBI) delivers research programmes on Renewable Energy and Energy Crops at Hillsborough and Loughgall; and on cereals and cereal varieties at Crossnacreevy. AFBI also carries out work on potato varieties at Crossnacreevy and has a potato breeding programme with commercial partners at Loughgall. Research on potato disease control is undertaken at AFBI Newforge Lane but currently no research is undertaken on potato husbandry or storage.

This research is funded largely through DARD and is prioritised according to procedures established within the Evidence and Innovation Strategy published in 2009. Overall the AFBI resourcing of arable crops research has declined substantially since the 1990's without any alternative mechanisms being substituted. This is seen as a significant loss in capacity, capability and support to the local arable businesses and is a major concern to the sector.

Research within the processing sector is supported through the Department of Enterprise, Trade and Investment.

The Home Grown Cereals Authority (HGCA) is funded by a statutory levy paid by the industry in Great Britain and Northern Ireland through the Agriculture and Horticulture Development Board (AHDB). HGCA funds research and communicates the results to

growers throughout the UK . Regular liaison meetings are held between AFBI / CAFRE, DARD/ UAS and the HGCA.

The Horticulture Development Company (HDC) and the British Potato Council (PC) are funded in a similar way but neither their levy collection, nor knowledge transfer remit, extend to Northern Ireland. Following an HDC Board visit to CAFRE's Greenmount Campus during April 2011, horticulture growers in Northern Ireland can currently access HDC results through the payment of a voluntary levy and CAFRE Horticulture Development Advisers have access to HDC results through HDC membership. No such arrangement has been negotiated for potato producers.

Teagasc has a significant arable research facility and capacity based at Oak Park, Co.Carlow, with much of the research undertaken having relevance, if not always direct application to arable farms in Northern Ireland. The UAS members access this research indirectly at Open Days and through publications. This information exchange is facilitated through formal arrangements between UAS and their sister organisation in Ireland – the Irish Tillage and Land use Society.

Education and Training. The College of Agriculture and Rural Enterprise (CAFRE) is funded through DARD and is the main provider of formal education and training courses for the agriculture and food industry. LANTRA is the Sector Skills Council for the agriculture industry.

Business Development through Industry Training, Benchmarking and Knowledge / Technology Transfer. CAFRE Crop Development Advisors deliver programmes with those in the industry, targeted at improving business competitiveness through the adoption of good business practice and the effective use of appropriate technology. Regular meetings ensure a close working relationship between the industry and CAFRE staff.

7. Our Vision for a successful Arable Sector in Northern Ireland.

The industry is confident that through responsible management, expansion can be achieved through sustainable intensification which ensures that the growth is both sustainable and environmentally sensitive. In particular it sees the growth of the sector as a parallel to and not a competitor to the growth in livestock production envisaged in the “AFSB Going For Growth Strategy” published in May 2013.

The Ulster Arable Societies vision for the future is that a competitive and sustainable arable sector in Northern Ireland will have –

- I. A good understanding of market requirements, based on soundly researched information, ensuring a strong customer focus.
- II. Streamlined and efficient supply chains with the various elements working together effectively for their mutual benefit.
- III. Good communication and effective working relationships with its customer, including the livestock sectors and food processors.
- IV. A flexible and skilled workforce, facilitated by effective training capacity, across all areas of activity – business and financial management as well as technical competence, occupational and food safety. An important contributor to this is a positive public perception of the industry which is a key driver in encouraging investment and attracting young people to enter the industry.
- V. Access to up-to-date technical and research information of relevance to the Northern Ireland industry; facilitated by effective local knowledge and technology transfer capacity, to increase capability and innovation in the industry.
- VI. A strong and co-ordinated voice to effectively promote and represent the interests of the sector to consumers and customers, as well as Government.
- VII. Access to funding support to stimulate and support strategic investment based on servicing identified market opportunities.

The delivery of this vision requires the action identified within the individual sector reviews (Section 8) and the Action Plan (Section 11) of this report.

8. Individual Crop Reviews.

8.1 Methodology.

The analysis has been compiled by the Ulster Arable Society in close consultation with both CAFRE and AFBI staff. It therefore reflects the combined knowledge and experience of those directly involved in the scientific, technical, practical and business aspects of the arable sector.

Because of the common threads within the development requirements for many of the individual crops, these are considered in two parts. Part 1 (Generic Development Action) identifies development action common to a number of crops and Part 2 (Crop Specific Development Action) identified the action required for the specific crop.

8.2. Barley



8.2.1. Economic Significance

- Barley is by far the most important cereal grown in Northern Ireland with 24,000 hectares producing 137,900 tonnes.

-
- The area rose rapidly in the 1960s to over 50,000 hectares but has been steadily reducing since then.
 - Virtually all the barley produced is stored and used on farm or traded farm to farm, generally as harvested and undried.
 - The majority of the area is sown as Spring Barley (17,200 ha in 2011) compared to 6,800 hectares of winter barley.
 - The producer price of Barley rose 32% during 2011 to deliver an economic value of £25 million for barley produced in Northern Ireland.
 - 119,000 tonnes of barley was used in Compound feeds during 2012 and 20,000 tonnes sold by feed compounders to farmers as straight grains.

Indicative Income and Production Costs (2012).

Typical Barley Production and Income Costs £	Spring	Winter
Grain yield (tonnes/ha)	5	7
Price per tonne £	170	170
Grain output £	850	1,190
Straw yield (tonnes)	3.5	5
Price per tonne £	75	75
Straw output £	263	375
Income £	1113	1,565
Seed (187 kg) £	86	86
Fertiliser £	205	255
Sprays £	72	125
Sundries £	25	25
Total Variable Costs £	388	491
Gross Margin £/ha	725	1074

Source: DARD Farm Business Data Book 2012

1. Land rental (conacre) is not included and is a significant cost for many.
2. These figures are the Typical values – yield differences generate GM per hectare ranges of £517 to £1055 for Spring and £792 to £1,282 for Winter Barley.
3. To obtain a true figure for net margin the overhead cost per hectare must be deducted from these Gross Margin figures. The DARD Farm Business Data (2013) suggest an average overhead cost for a cereal farm of £492 per ha, leaving net margins of £233 / ha and £582 respectively. CAFRE Benchmark data for cereal farms in Northern Ireland however finds much higher overhead costs with an average of £713 per ha. It is the Societies view that the Benchmark figure of £713 per ha is much more realistic but at this level, all but the very best spring barley crops are lucky to break even. However, even at this higher value, good growers still achieve a useful margin

8.2.2. Strengths

- Good grower communication – both within the industry and with others.
- Local variety testing by AFBI ensure that growers have the information required to enable them to select the varieties best suited to growing conditions and disease pressures in Northern Ireland.
- Strong skill base and specialist knowledge amongst the top tier of cereal growers.
- Well served by tailored training (Cereal Challenge) and Benchmark services provided by CAFRE.
- High yield potential – amongst the best in the world due to long growing season.
- Strong and growing demand as net importer of grain – net imports of approximately 1 million tonnes of all grain per year.
- Barley is simpler to grow under NI conditions and has lower production costs than wheat.
- Flexible storage and processing options (sealed storage / drying / aeration / preservatives / crimping and whole-crop)
- Water availability not likely to be a limiting factor if climate change predictions prove correct.
- Well suited to use in ruminant and monogastric animal rations.

- Less susceptible to diseases such as take-all and eyespot than wheat
- Spring barley tends to be more tolerant of adverse harvest weather than wheat.
- Lower fertiliser and chemical input than wheat so has lower carbon footprint.
- Industry funded information and research available through HGCA.
- Quality assurance scheme in operation.

8.2.3. Opportunities.

- Strong local market which is likely to increase as livestock numbers increase and can substitute for large quantities of imported cereal.
- Potential for increased yield amongst large number of small producers growing spring barley as a secondary enterprise.
- Use of animal manures and/or digestate decreases production costs and substitutes for imports while reducing nutrient pressures on livestock farms.
- Yield potential of new varieties is increasing.
- Increasing the proportion of winter barley production would increase yield and the earlier harvest provides the opportunity to plant more winter oilseed rape.
- Local supply chain can be fully traceable, with low carbon intensity and good supply security.
- Increased farm to farm sales of moist barley will reduce supply chain expenses, energy costs and GHG emissions, where suitable storage exists.
- Farm to farm sales may need to be assisted through improved communication and networking. Could be included with simple information exchange to facilitate whole crop and farm forage sales, as well as organic manure transfers.
- Grower co-operation, contract farming to achieve economies of scale.
- Increased protein content could help reduce expensive protein imports. This will require a long term breeding programme but in the short term will be assisted by improved knowledge of the impact of late nitrogen applications on nitrogen content and a means of reflecting this in market price.

Current Sector Value	Prospective Sector value 2020*	Means of Growth / Comments
£29 m	£31.5	Increase average yield by 0.5 t/ha through new varieties and improved agronomy

Source: Industry submission to Agrifood Strategy Board Consultation 2013.

8.2.4. Challenges.

- The more common Spring crop has lower potential yield than winter crops.
- Large difference between worst and best performing growers - £517 to £1,282 GM per hectare.
- Large proportion of growers with barley as minor crop – 40% grow under 5 ha.
- Production (variable and fixed) costs are high and continue to rise (land, fertiliser, fuel, sprays, machinery).
- Volatility in both world prices for grain and in inputs such as fuel and fertilisers.
- Essential fungicides are threatened by EU legislation. This would lead to a massive reduction in yields and loss of quality. Impact assessments have suggested that yields could be reduced by 10-20% as a result of poor control of Septoria should endocrine disruptors be “lost”.
- Resistance is developing for some fungicides and herbicides.
- EU CAP reform will lead to reduction in area available to the larger growers, resulting in reduced supply and higher grain prices.
- Limited local cereal research at a time when increased input is required to overcome the loss of important pesticides and break through the yield ceiling.
- High drying cost in NI conditions.
- International feed and malting grain price volatility.
- Difficult to get winter cereals planted in time if season is poor.
- Lack of efficiency due to small fields, scattered area and short term (conacre) land rental.

- Difficult to consistently meet the high standards required for intensive livestock rations.
- Increased competition for rental land by livestock and energy cropping (AD plants).
- Competition from imported GM feed grains.
- Develop information systems which facilitate use of organic manures and farmer to farmer sales of moist grain, whole-crop forage etc. for ruminant feed.
- Quality Assurance procedures should be reviewed and may need to be updated to meet customer requirements in line with the Fortress Feed materials scheme recently introduced for imported ingredients.

8.2.5. Development Priorities.

The arable sector is committed to support the growth agenda “Going for Growth as promoted by the Agrifood Strategy Board (May 2012) and to achieving its full potential through sustained intensification and the efficient use of resources. However, to achieve this it will require support from DARD, DETI and other Departments and Agencies. The key actions which need to be taken by the industry to achieve this sustainable development and the support required from others are summarised below.

Part 1. Generic Development Action.

a) Industry

Growers need to –

- Improve business performance through engaging with CAFRE to determine own businesses physical and financial performance and benchmark with others.
- Support research through determining and articulating needs to funders and research providers such as DARD / AFBI / HGCA (Ideally this should be done through representative organisations such as the UFU and UAS).
- Participate in on-farm trials, education, industry training and business development programmes.
- Establish web based broker system to facilitate farm to farm sales.

Merchants / Compounders need to –

- Clearly articulate quality and quantity needs; and
- Work with researchers, advisors and growers to meet those needs

b) Government

Policy

- The proposals within the Agrifood Strategy Board's Strategy "Going for Growth", must be implemented by the NI Executive through providing focused financial support for investment by the commercial businesses operating in the sector. This support needs to be sustained and carefully targeted to ensure maximum benefit and value for money.
- Changes to land tenure arrangements and associated taxation implications should be introduced to encourage efficient long term land use and facilitate the entry of young people into the industry.
- The sector should receive fair and equal treatment in any revamp of the Single Farm Payment within the CAP reform package. The sector receives limited other support and should not continue to be disadvantaged due to past decisions on historic entitlements.
- The industry already funds research in cereal production through the HGCA and has developed good links with this organisation; however a means needs to be found whereby this industry funding can be used as the industries contribution to local research.
- Strong representation to retain essential fungicides such as triazoles and help slow the development of resistance to crop diseases of critical significance to continued barley production in Northern Ireland. The Society is of the view that policy makers need to be made fully aware of the serious consequences of the losses of such important pesticides for the future viability of arable production.
- A carefully tailored capital investment package, linked to strategic development priorities for the sector should be introduced to encourage investment in new on-farm technology, including, precision farming, on-farm storage and first-stage processing.

- Disease protection through effective local Plant Health enforcement supported by relevant scientific expertise.
- Policy decisions must reflect the situation in Northern Ireland and have a sound scientific, factual basis.

Research.

- Access to scientific research programmes on production technology linked to local industry needs is vitally important.
- DARD funded research in cereal crops should supplement that of HGCA where local requirements are not adequately covered by research in other regions.
- Close liaison between AFBI, DARD, HGCA, UFU, UAS and CAFRE is essential and the recently introduced annual liaison meetings should become a permanent feature .
- Co-operation between research workers in AFBI, Teagasc and other regions/countries will deliver cost effective solutions to local problems. For smaller sectors such as cereals and potatoes, active steps need to be taken to develop a more structured collaborative multi-regional approach to addressing common industry needs.
- A well resourced and scientifically credible Plant Pathology unit within AFBI is essential to provide industry with rapid disease identification and control guidance as well as supporting Government Agencies in ensuring effective screening of imported plant material.

Education Courses

- Tailored education and training courses such as the Challenge Programmes linked closely to a) the sector development strategy and b) industry needs, rather than being driven by the demands of the validating bodies.
- Education provision should be co-ordinated and delivered on an all island basis to maximize use of scarce resources.
- Education should be based on regular industry consultation and strong arable sector representation on CAFRE Advisory Boards and other education bodies.

Business Development through Industry Training, Benchmarking and Knowledge / Technology Transfer

- Access to research results from HGCA or elsewhere with interpretation by CAFRE to encourage local adoption is essential. Servicing this critical need depends on the CAFRE team working on crop production and business development being well staffed and resourced.
- Farm scale demonstrations, Focus Farms and Monitor Farms linked to arable production are very beneficial.
- Maximise the exchange of information and sharing of expertise with Teagasc and other sources of technical information.
- Working in association with organisations such as UAS provides important knowledge transfer routes to commercial growers.

Part 2. Crop-specific Development.

- To support the important work of HGCA, growers need to honour in full any obligations to pay HGCA levy, including on farm to farm sales.
- CAFRE / AFBI should develop a protocol for valuing moist grain and forages when sold farm to farm and introduce a facility such as web-page which facilitates contact between sellers and buyers.

8.3. Wheat.



8.3.1. Economic Significance

- Wheat is the second most common arable crop in NI amounting to some 11,600 hectares; as compared to 24,000 ha of barley and 4,800 hectares of potatoes.
- It is the highest yielding cereal crop with the 11,600 hectares producing 89,700 tonnes of grain; an average yield of 7.77 t/ha. It therefore accounts for 37% of the grain produced in NI.
- The value of the wheat produced on farms in 2011 was £17.2 m.
- Winter Wheat is higher yielding with earlier harvesting than spring wheat and so wheat is largely autumn sown. The annual area grown is very dependent on a timely harvest of the previous crop and reasonable autumn weather to allow planting.
- Virtually all the wheat grown in NI is used for animal feed production and a high proportion is sold off farm to feed compounders, who used 535,900 tonnes for

 this purpose in 2011. A further 20,500 tonnes was sold to farms unprocessed. There is therefore a huge deficit of wheat for animal feed each year – which is substituted by imports from RoI and international markets.

- Wheat has always been grown in NI with over 30,000 hectares grown in the 19 th century. The area then declined in line with the overall reduction in the cereal area to under 500 ha in 1980 before rising with the arrival of new varieties to the current levels.
- The slightly higher feed value and attraction for pig and poultry rations means wheat has a slightly higher value per tonne than barley.
- Demand for wheat is likely to increase if, as expected, the AFSB recommends an increase in the poultry sector in NI.

Indicative Income and Production Costs.

Typical Winter Wheat Production and Income Costs	per ha
Grain yield (tonnes / ha)	8
Price per tonne £	180
Grain output £	1,440
Straw yield (tonnes)	5
Price per tonne £	65
Straw output £	325
Income	1,580
Seed (187 kg) £	92
Fertiliser £	285
Sprays £	167
Sundries £	25
Total Variable Costs £	569
Gross Margin / ha £	1,196

Source: DARD Farm Business Data Book 2013

1. Land rental is not included and is a significant cost for many.
2. These figures are the Typical values – yield differences generate GM ranges of £984 to £1,499.
3. To obtain a true figure for net margin the overhead cost per hectare must be deducted from these Gross Margin figures. The DARD Farm Business Data (2013) suggest an average overhead cost for a cereal farm of £492 per ha, leaving average net margins of £720 . CAFRE Benchmark data for cereal farms in Northern Ireland however finds much higher overhead costs with an average of £713 per ha. Even at this higher value, which the Society considers is more realistic, good growers still achieve a useful margin

8.3.2. Strengths

- Good grower communication – both within the industry and with others.
- Local variety testing by AFBI ensure that growers have the information required to enable them to select the varieties best suited to growing conditions and disease pressures in Northern Ireland.
- Strong skill base and specialist knowledge amongst the top tier of cereal growers.
- Well served by tailored training (Cereal Challenge) and Benchmark services provided by CAFRE.
- High yield potential – amongst the best in the world due to long growing season.
- Strong and growing demand as net importer of grain – net imports of approximately 1 million tonnes of all grain per year.
- Water availability not likely to be a limiting factor if climate change predictions prove correct.
- Well suited to use in ruminant and monogastric animal rations.
- Fertiliser and chemical input, and carbon footprint per tonne is low if achieve yield potential.
- Industry funded information and research available through HGCA.
- Well developed and disciplined quality assurance scheme in operation.

- World grain so continuing progress can be expected in breeding new varieties.
- Produces straw with useful sale value
- Can be grown on heavier soils.
- Flexible storage and processing options (sealed storage / drying / aeration / preservatives / crimping and whole-crop)
- Low carbon footprint and full traceability compared to imported grain.

8.3.3. Opportunities

- Demand likely to increase if the AFSSB recommend increase in ruminant and poultry meat production in NI is delivered; coupled with similar recommendations within RoI FH2020 strategy.
- Even for growth of dairy / beef sectors wheat will still be required for high grade supplementary rations.
- Ready market on doorstep and can substitute for large quantities currently imported.
- Potential increased yield amongst large number of small producers growing spring barley
- Use of animal manures decreases production costs while reducing nutrient pressures on livestock farms. High P and K requirements make Winter Wheat particularly suitable for using broiler litter as an organic manure.
- Local supply chain can be fully traceable, with low carbon intensity and good supply security.
- Increased farm to farm sales will reduce energy cost and emissions where suitable storage exists. May need to be assisted through improved communication and networking.
- Grower co-operation, contract farming to achieve economies of scale.
- Increased protein content could help reduce expensive protein imports
- Potential for some milling wheat production if suitable varieties become available and bread products suitable for the attainable quality can be developed.
- Early maturing varieties will increase the attraction under Ni conditions.

- Farm to farm sales with low energy storage such as crimping, whole-crop, sealed storage will reduce livestock feed costs.
- Scope to increase yield based on i) extensive worldwide research and ii) raising standards to those of the best.
- Variety development will introduce higher disease resistance as well as greater yield potential.
- Whole crop wheat is much less susceptible to adverse weather than forage maize, and provides more flexible end use options.
- Small premium for grain which meets the standard for milling wheat, but high risk for most growers in NI conditions

Current Sector Value	Prospective Sector value 2020*	Means of Growth / Comments
£19.7 m	£28	Increase average yield by 0.5 t/ha through new varieties and improved agronomy. Overall area increase with more OSR and Oats as break crops. Change from forage maize to whole-crop wheat.

Source: Industry submission to Agrifood Strategy Board Consultation 2013.

8.3.4. Challenges

- The need to produce a more consistent high quality product as required by the intensive livestock sector. This is linked to the need for a laboratory test to determine the feed value prior to its inclusion in intensive rations.
- Vulnerable to increasing input costs (fertiliser, fuel, machinery, land, chemicals) which continue to rise.
- World grain price volatility irrespective of input costs.
- Resistance developing to fungicides, herbicides and insecticides.

- High disease pressures (septoria / ear blight).
- Probable loss of triazole fungicides due to EU legislation will lead to massive reductions in yield and loss of quality..
- Planted area very dependent on autumn weather.
- Variety development will focus on major producing regions and may not reflect needs for the Irish climate.
- Uncertain future of GM constraints and the likely effect of any change.
- Low efficiency in machine utilisation and high transport costs due to fragmentation and dispersed production.
- Lack of efficiency due to small fields, scattered area and short term (conacre) land rental.
- Land tenure (conacre) works against winter crop production – updated system required.
- EU CAP reform will lead to reduction in area available for to the larger growers resulting in reduced supply and higher grain prices.
- Yield limited by lack of understanding of soil effects and less well understood or unknown factors i.e yield stagnation.
- Very limited local research capacity – needs new multi-regional approach.
- Demand increase may be limited by improved grassland management or increased availability of by-products from increased bio-energy production or distilling.
- Limited break crop options.
- Climate and late season diseases can adversely affect yield and drying costs.
- Quality Assurance procedures should be reviewed and may need to be updated to meet customer requirements in line with the Food Fortress Feed Materials Scheme recently introduced for imported ingredients.

8.3.5. Development Priorities.

The arable sector is committed to contribute to the growth agenda “Going for Growth as promoted by the Agrifood Strategy Board (May 2012) and to achieving its full potential through sustained intensification and the efficient use of resources. However to achieve

this it will require support from DARD, DETI and other Departments and Agencies. The key actions which need to be taken by the industry to achieve this sustainable development and the support required for others are summarised below.

Part 1. Generic Development Action.

See Section 8.2.5. Part 1 above.

Part 2. Part 2. Crop-specific Development.

- To support the important work of HGCA, growers need to be encouraged to honour in full any obligations to pay HGCA levy, including those on farm to farm sales.
- CAFRE / AFBI should develop protocol for valuing moist grain when sold farm to farm and introduce a facility such as a web-page which facilitates contact between sellers and buyers.
- AFBI / CAFRE and producers should work with local flour mills to, in the longer term, identify varieties and management practices to achieve the grain quality needed for the production of milling wheat in Northern Ireland
- Development of laboratory testing methods which better predict animal performance of wheat.

8.4 Oats.



8.4.1. Economic Significance

- A traditional cereal crop in Northern Ireland which once dominated the arable area, with 250,000 hectares sown each year. Used for both livestock and human food.
- Current area is static at about 2,100 hectares, yielding 12,600 tonnes in 2011 which is used mainly for animal feed (mostly horses) and milling for human consumption.
- The market is split between premium grade for human food and horsefeed, with lower quality oats used for ruminant rations.
- Economic viability depends on producing high yields which meet the standards required by the quality market.

-
- Demand increasing for locally produced oats, with strong traceability and quality assurance, to supply the human food chain. A high proportion of the oats processed locally is imported.
 - Sustained interest in organic and conservation grade oats for human consumption.
 - Horse feed export markets are being successfully developed in Rol.

Typical Oat Production and Income Costs	Spring	Winter
Grain yield (tonnes / ha)	5	6.5
Price per tonne £	180	180
Grain output £	900	1,170
Straw yield (tonnes)	3.6	4.3
Price per tonne £	65	65
Straw output £	234	280
Income	1,134	1,450
Seed (187 kg) £	97	101
Fertiliser £	165	200
Sprays £	62	117
Sundries £	25	25
Total Variable Costs £	349	443
Gross Margin £ / ha	785	1007

Source: DARD Farm Business Data Book 2013

1. Land rental (conacre) is not included and is a significant cost for many.
2. These figures are the Typical values – yield differences generate GM ranges of £550 to £1,004 for Spring and £698 to £1,322 for Winter Oats.
3. To obtain a true figure for net margin the overhead cost per hectare must be deducted from these Gross Margin figures. The DARD Farm Business Data (2013) suggest an average overhead cost for a cereal farm of £492 per ha, leaving net margins

of £293 / ha and £515 respectively. CAFRE Benchmark data for cereal farms in Northern Ireland however finds much higher overhead costs with an average of £713 per ha. Even at this higher value, which the Society considers is more realistic, good growers still achieve a useful margin.

8.4.2. Strengths

- Increasingly recognised as a healthy food grain for humans in addition to its role as a high grade feed for horses.
- Low cost cereal crop with expanding markets at home and abroad for human and animal consumption.
- Considerable scope for import substitution due to need for traceability and processor confidence.
- Successful local processor now working with growers to increase communication and trust within the supply chain, while actively seeking growers to increase amount of oats sourced locally.
- Local processing generates employment and added economic benefit to the region.
- Local variety testing by AFBI ensure that growers have the information required to enable them to select the varieties best suited to growing conditions and disease pressures in Northern Ireland.
- Well suited to the local climate with manageable levels of disease threat / pressures.
- High yield potential and provides straw with multiple uses.
- Good break crop for wheat.
- Good pool of expertise both on farm and within AFBI, built up over many years.

8.4.3. Opportunities

- Considerable importation from Republic of Ireland and could be substituted by local grain.
- Increasing home and export demand for traditional products such as porridge oats and for newer snack foods due to the recognised nutritional benefits.
- Demand for oats used in horse feed and interest in its use for ruminant rations.

- Potential within naked oat varieties still to be explored and exploited.
- Supports home processing business with export record and potential for further development.
- Greening proposals will force increased crop rotation and inclusion of oats as a break crop for wheat.
- Lowest carbon footprint of all cereals.
- Strong market association with Ireland which can be exploited in export markets.
- Co-operative action between growers, researchers and millers can increase yields at both farm and factory level, thus improving profitability along the supply chain.

Current Sector Value	Prospective Sector value 2020*	Means of Growth / Comments
2.9	3.7	Increase area by 50% and increase yield by 0.5t/ha. Supported by greening requirements for break crops and increasing demand for Oats within animal feed and breakfast cereal/health food markets. Export potential.

Source: Industry submission to Agrifood Strategy Board Consultation 2013.

8.4.4. Challenges

- Economically attractive production depends on good yields of high quality oats which requires varieties suited to NI conditions.
- Quality is variable and poor quality is discounted heavily.
- Most varieties susceptible to foliar diseases such as mildew and rust. Soil borne diseases have decreased the area suited to winter oats in some areas.
- Spring varieties susceptible to winter kill and frost heave in cold winters
- Climate can adversely affect grain quality at harvest, especially grain colour and specific weight.
- Price is supply sensitive.

- Costs are higher due to small fields, scattered area and short term (conacre) land rental.
- Prone to lodging
- Land tenure (conacre) works against winter crop production – updated system required.
- Production (variable and fixed) costs continue to rise (land, fertiliser, fuel, sprays, machinery).
- Loss of triazole fungicides would restrict ability to control foliar diseases.
- Farm yields have plateaued and need production protocols which deliver both high yield and premium quality.
- Relatively small international value of the crop may restrict investment in new varieties, including those suitable for Irish conditions.
- Increased interest and legislative controls on mycotoxin levels will require vigilance.
- The spread of Wild Oats and Oat Mosaic Virus may pose a threat to expansion.
- High standard of on farm drying, storage and cleaning are essential to achieve premium quality standards.
- Investment required to meet the Quality Assurance standards necessary for human food ingredients.
- Need a better understanding of quality measures required for milling and of the production factors which influence these quality indicators.
- Need to promote NI oats and oat products in export markets and health / nutritional benefits of oats as a human food.
- Develop new/novel convenience food products based on oat grain.

8.4.5. Development Priorities.

The arable sector is committed to contribute to the growth agenda “Going for Growth as promoted by the Agrifood Strategy Board (May 2012) and to achieving its full potential through sustained intensification and the efficient use of resources. However to achieve this it will require support from DARD, DETI and other Departments and Agencies. The

key actions which need to be taken by the industry to achieve this sustainable development and the support required for others are summarised below

Part 1. Generic Development Action.

See Section 8.2.5. Part 1 above.

Part 2. Part 2. Crop-specific Development.

- Growers, AFBI and CAFRE should continue to support the work of the Oat Quality Group established under the Supply Chain Development Programme in working closely with millers and each other to improve physical and economic performance along the supply chain.
- Any new financial support package , should encourage investment in new on-farm technology, including, high standard on-farm storage and drying, and seed cleaning equipment to meet the quality standards required for human food.
- Increased market development will depend on investment in research, product development, modern facilities and promotion by industry. This must be generously supported to develop the potential of this traditional local food.

8.5 Oil Seed Rape



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8.5.1. Economic Significance

- Oil Seed Rape (OSR) production in Northern Ireland is currently around 600 ha. Over the last 25 years this has fluctuated from less than 100 ha to over 1200 ha according to the market price and EU support system in place at the time.
- Similar variations are evident in the RoI with current area around 8,000 ha but with large fluctuations e.g 12,000 ha grown in 2012.
- Average yields in NI at 3.3 t/ha are only marginally below those in UK.
- OSR contains 40 – 47 % oil although only about 42% can be readily extracted using the normal industrial crushing and solvent extraction process; giving a yield of around 1.4 tonne (1,300 litres) oil per ha.
- Much of the OSR produced in Northern Ireland is now incorporated directly into broiler rations without the need for any oil extraction capability. Any expansion of broiler production will open up equivalent opportunities for increase OSR production.

- Large quantities (many thousands of litres) of rape oil are imported each year for use in food production
- Rape Oil is extracted by a process of crushing, and while small scale plants are available, increased efficiency of extraction and economies of scale can be achieved with larger industrial scale equipment using crushing and solvent extraction.
- When the oil is removed the resulting rape meal is a high value animal feed due to its high fat and protein content (typically 33.5 % protein c/w Soyameal at 48% and Maize silage at 7 – 8 %). Rapemeal therefore has the potential to provide a valuable and traceable local source of protein and substitute for the large quantities of imported protein. Typically 1 tonne of rape seed will yield about 530 kg rape meal.
- OSR oil can be used for both human or animal consumption and for conversion to diesel fuel. 1 tonne OSR oil will produce the equivalent weight of diesel fuel or 1,186 litres.
- Large fluctuations in area of OSR grown are possible because the crop is combinable and requires minimal specialist equipment.
- A few small scale local crushing plants produce high value specialist oils for cooking and food preparation.

Typical OSR Production and Income	Spring	Winter
Costs		
Grain yield (tonnes / ha)	2.4	3.3
Price per tonne £	370	370
Seed output £	888	1,221
Income	£888	1,221
Seed (8 kg Spring 4 kg Winter) £	68	72
Fertiliser £	105	245
Sprays inc. desiccant £	85	125
Sundries £	15	15
Total Variable Costs £	273	457
Gross Margin £ / ha	615	764

Source: DARD Farm Business Data Book 2013

1. Land rental (conacre) is not included and is a significant cost for many.
2. These figures are the Typical values – yield differences generate GM ranges of £393 to £810 for Spring and £505 to £1,023 for Winter OSR.
3. To obtain a true figure for net margin the overhead cost per hectare must be deducted from these Gross Margin figures. The DARD Farm Business Data (2013) suggest an average overhead cost for a cereal farm of £492 per ha, leaving net margins of £123 / ha and £272 respectively. CAFRE Benchmark data for cereal farms in Northern Ireland however finds much higher overhead costs with an average of £713 per ha. Even at this higher value, which the Society considers is more realistic, good growers achieve a useful margin, with yields of 5 t/ha being regularly achieved.

8.5.2. Strengths

- Yields equivalent to GB and RoI can be achieved.
- Strong local demand for both oil and protein – 125 k tonnes rape seed cake and meal (all imported) already used in cattle, pig and poultry meat rations in Northern Ireland.
- As a combinable crop it uses essentially the same machinery as cereal production which spreads overhead costs.
- Very good break crop for wheat as reduces “take-all” in the following crop. Area likely to increase as more wheat is grown and benefits of rotation are appreciated.
- Can be grown for industrial and food grade markets as well as animal feed. Large volumes of rape oil used in the local food industry.
- Potential use as fuel substitute where Government / EU policy supports this application.

8.5.3. Opportunities

- High yield potential in most seasons -- well above the average of 3.3 t/ha. Likes mild winters with long days and cool temperatures to fill seeds. Further development of yield potential will require investment in local research.
- Demand for rape oil and protein cake will increase if all livestock numbers increase as predicted.
- Most of the locally grown oilseed is currently incorporated directly into animal feeding stuffs (broiler rations) so demand will increase with predicted rise in broiler production.
- The full potential for the crop will only be achieved through construction of a modern extraction plant on the island of Ireland to produce rape oil for the food industry and rape meal for livestock production
- Substitution for imported protein improves carbon intensification as well as traceability / quality assurance in the supply chain. Very attractive break crop which will benefit local wheat production.
- Potential quality market for high grade food oil.

- Low area in Northern Ireland means low disease pressures and cross contamination for product grown for speciality market.
- Biodiesel potential with suitable encouragement and support.

8.5.4. Challenges

- Yield volatility and risk of failure / low yields in years such as 2013.
- All vegetable oils compete in the same market so subject to Soya markets and worldwide seasonal variation.
- Disease pressures and resistance to control chemicals may increase as area increases.
- Probable loss of pesticides (slug control and herbicides) due to the implementation of the Water Framework Directive (2000/60/EC) will have serious impact on yields and quality.
- Rotation requirement (ideally 1 year in 5) to prevent disease build up (club root).
- Lack of local research facility to drive yield potential.
- Increasing input cost such as fuel, fertiliser, chemicals and land will reduce profitability.
- Apparent lack of commitment to biofuel and climate change measures by Governments. Changes of policy on biofuel and world oil prices can affect seed prices.
- Farmers can shift easily in and out of OSR according to its relative profitability.
- Crop needs to be profitable in its own right – will not develop to potential if only grown as a low profitability break crop. Large areas in the past were achieved only through enhanced area aid payment for OSR.
- Local area cannot increase without commitment from livestock sector and compounders to support locally sourced product.
- Quality Assurance procedures should be reviewed and may need to be updated to meet customer requirements in line with the Food Fortress Feed materials scheme recently introduced for imported ingredients.

Current Sector Value	Prospective Sector value 2020*	Means of Growth / Comments
£0.8m	£2m	Increase area to that of the peak in the early 1990's and increase yield to 4.5t/ha. Supported by greening requirements, need for break crops and increasing demand for rape-meal in animal feed / rape-oil in food processing.

Source: Industry submission to Agrifood Strategy Board Consultation 2013.

8.5.5 Development Priorities

The arable sector is committed to contribute to the growth agenda “Going for Growth as promoted by the Agrifood Strategy Board (May 2012) and to achieving its full potential through sustained intensification and the efficient use of resources. However to achieve this it will require support from DARD, DETI and other Departments and Agencies. The key actions which need to be taken by the industry to achieve this sustainable development and the support required for others are summarised below-

Part 1. Generic Development Action.

See Section 8.2.5. Part 1 above.

Part 2. Part 2. Crop-specific Development.

- Any tailored financial support package , should encourage investment in new on-farm technology, including, high standard on-farm storage and drying, and seed cleaning equipment to meet the quality standards required for human food.
- Access to scientific research programmes on OSR production technology under NI conditions and linked to local industry needs is vitally important.
- The feasibility of investment in OSR processing on the Island of Ireland should be kept under review.

8.6 Protein Crops



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8.6.1. Economic Significance

- The vast majority (over 70%) of the protein demand in animal feed is met by imported soyabean and oilseed products (626,000 tonne in 2012) , leaving the livestock industry very vulnerable to volatile world markets for protein.
- The most likely options for home-grown protein feeds is the legume family (beans, peas and lupins), commonly known as “pulses” although the difficulties faced in growing and successfully harvesting these crops in Northern Ireland are considerable.
- As well as supplying scarce protein these legume crops “fix” nitrogen thus minimising the need for additional nitrogen fertiliser.

- Although primarily thought of as protein crops, pulses such as beans, have an energy content in the form of starch which is as good or better than cereals such as wheat and barley.
- Pulses have been grown in Ireland for centuries but are still high risk crops, relative to cereals. Field beans (fabia beans) offer the best opportunity to increase home-grown feed protein production. Incorporation within whole crop silage mixtures may be a useful option for providing protein in ruminant feed.
- Pulses can be included in the diets of all the major classes of farm animals, although inclusion rates are limited in monogastric diets due to the presence of some anti-nutritional factors.
- The small scale of local production means that volumes are not available to justify regular use by major compounders. Other proteins, which are easier to use are available in large quantities on a regular basis.
- Areas grown in Northern Ireland are very small and are not recorded separately in the DARD Statistical Review, but are thought to be under 100 hectares. It is believed that around 3,500 ha are grown in RoI producing some 18,700 tonnes – mostly beans. Between 110,000 and 170,000 hectares of field beans are grown each year in GB.

8.6.2. Strengths

- EU dependence on high cost imported soya for the protein content of animal feeds, ensures that there is a strong market demand for reliable alternative sources with known provenance.
- Yields at 4 – 6 tonne per hectare are slightly below that of Spring Barley but to achieve the target yield of 5-6 t/ha early sowing (November to February) is essential.

- Can be harvested, dried and stored using the same equipment as cereals, but very dependant on favourable harvest weather.
- Ability to fix nitrogen decreases the nitrogen requirement of subsequent crops.
- Spring Beans is a useful break crop in an arable rotation.

- A “native” protein source with low carbon intensity and high confidence in provenance and purity.
- Less influenced by fertiliser prices than other arable crops.
- Provide a non-GM protein source for specific market sectors.
- Can be stored for on-farm use without drying - using preservatives

8.6.3. Opportunities

- Strong local demand for protein suitable for inclusion in ruminant and pig rations. A total of 390,000 tonnes of soya alone was used in Northern Ireland during 2012.
- World demand for protein (Soya) likely to continue to increase which will sustain prices and fuel market volatility.
- Local sourcing provides assurance on integrity, GM integrity and low carbon footprint.
- Growth targets for the livestock contained within the Agrifood Strategy Board “Going for Growth” Strategy will ensure increased demand in the future.
- Niche market opportunity for non-GM protein sources as Soya market moves inexorably to GM based products...
- Incorporation of pulses into whole crop silage crops offers an opportunity to produce local protein rich feed for ruminants, without the weather related high harvest risk of protein grains.
- Market and volume development may require an Island of Ireland approach.
- Provides useful break crop for husbandry reasons and diversity in line with CAP and environmental requirements.

- Reduces demand for nitrogen fertiliser in subsequent crops – the cost of which will inevitably continue to rise with world oil prices as will pressures to reduce use for environmental / GHG reasons.

Current Sector Value	Prospective Sector value 2020*	Means of Growth / Comments
< £0.5 m	£1m	Replacement of imported protein with local protein crop production for use in the livestock sector. Requires focused R&D to overcome challenges and risks associated with current varieties and production methods. Long term research effort will be required.

Source: Industry submission to Agrifood Strategy Board Consultation 2013.

8.6.4. Challenges

- Local use will only increase if can build a confident supply chain capable of delivering the required volumes on a reliable basis. Development of this market will require significant research input coupled with long term commitment and dialogue from all parties i.e. research funders, producers and processors
- Scale is needed for industry and market development, but hindered by price volatility and lack of mature and orderly market.
- Feed industry not well organised or enthusiastic to handle small quantities of local product and pricing information is limited. Price linked more to grain commodity prices rather than protein prices.

- No local research and development to support commercial development at farm level and optimise use in livestock rations.
- Perceived risk of complete or partial crop loss due to lodging and poor weather at harvest will limit grower interest until improved techniques / varieties are identified and demonstrated.
- The balance of reward to risk needs to shift considerably to encourage increased production. Crop margins do not compare well with other crop options – both major crops and break crops
- Little variety development worldwide and varieties still lack reliable performance under Irish conditions.
- Reasons for variable performance year on year need to be better understood.
- Require high standards of management with limited tools available for weed and disease control.
- Beans can be difficult to dry but chemical preservation is possible.
- Production costs can be high and 3-5 year rotation is essential.
- Quality Assurance procedures should be reviewed and may need to be updated to meet customer requirements in line with the Food Fortress feed materials scheme recently introduced for imported ingredients.

8.6.5. Development Priorities.

The arable sector is committed to contribute to the growth agenda “Going for Growth as promoted by the Agrifood Strategy Board (May 2012) and to achieving its full potential through sustained intensification and the efficient use of resources. However, to achieve this it will require support from DARD, DETI and other Departments and Agencies. The key actions which need to be taken by the industry to achieve this sustainable development and the support required for others are summarised below-

Part 1. Generic Development Action.

See Section 8.2.5. Part 1 above.

Part 2. Part 2. Crop-specific Development.

- Potential will only be achieved through sustained research to identify varieties and production techniques which overcome existing challenges and reduce the risks involved in protein crop production under Northern Ireland conditions. Could best be progressed as a collaborative effort between industry, and research institutions through a multiregional approach.
- Growers need to enter into a sustained dialogue with Feed Manufacturers and NIGTA to identify their requirements for protein feeds and work together to meet the demand. Group partnership arrangements between the growers and the feed trade should be encouraged and supported.
- Any tailored financial support package , should encourage investment in new on-farm technology, including, high standard on-farm storage and drying, and cleaning equipment to meet the quality standards required by feed manufacturers.
- CAFRE needs to maximise the exchange of information and sharing of expertise with the Processors and Growers Research Organisation (PGRO), Teagasc and other sources of technical information. Teagasc has a body of expertise on field bean production which could form the basis of a multiregional approach to develop pulse production in Northern Ireland.

8.7 Energy Crops.



All forestry and agricultural crops convert the sun's radiant energy to chemical energy which can be stored in the crop and then released through chemical reactions of various sorts including microbial digestion and combustion. All crops can therefore be classed as energy converters. However for the purpose of this review, consideration of energy crops is being restricted to those crops grown for their biomass energy value alone. Crops such as rape and cereals which can be used for energy as well as food are therefore not considered within this section.

The analysis therefore concentrates on the biomass energy crops currently grown in Northern Ireland --- essentially Short Rotation Coppice Willow (SRC Willow) and to a much lesser extent, Miscanthus or Elephant Grass.

Energy crops have the potential to contribute to both Greenhouse Gas (GHG) emission reduction, provide some stability in energy costs and a degree of supply security in volatile global markets. They do however compete with land used for food production and this pressure on land use presents challenges for both policy makers and growers, which will increase in the years ahead.

Northern Ireland imports over 90% of its energy needs and most of this is in the form of fossil fuels. Biomass crops are essentially carbon neutral with emissions during combustion being equivalent to those used for growth. Carbon budgets calculated for the generation of electricity from biomass, gas and coal show carbon dioxide (GHG) emissions of 60g, 400g, and 1,000 g per kWh respectively.

8.7.1. Economic Significance

- Current estimates put the area of SRC Willow grown in Northern Ireland at c. 1000 ha. There is only a very small area of Miscanthus grown here but up to approximately 3500 ha has been grown as an energy crop in Rol.
- Both crops are “planted” as vegetative clones or rhizomes and are then harvested over a number of years for their energy content. Yields build up over time and so there is a delay of 3 to 4 years before significant economic returns are delivered.
- In addition to its use as an energy crop SRC Willow has a proven ability to extract nutrient and non-nutrient elements from polluting waste – a process known as bioremediation. This provides an additional income stream and can make the difference between a financially attractive crop and one with marginal economic return.
- Both SRC Willow and Miscanthus have been shown to have similar yields of 10 to 15 tonnes of dry matter (DM) per hectare and similar calorific values, although Miscanthus has a higher ash content which needs to be catered in the boiler

when used as a fuel. One hectare of SRC willow produces the equivalent biomass energy content as 4,500 litres of home heating oil each year.

- Both crops can be considered as essentially carbon neutral and so when substituted for fossil fuels have the potential to make a very considerable contribution to the EU and UK statutory requirements to reduce greenhouse gas (GHG) emissions by 34% (compared to 1990 levels) by 2020 and 80 % by 2050 [UK Climate Change Act 2008]. These commitments are reflected in targets set within the NI Executives Programme for Government and drive the various renewable energy incentive schemes operated by the UK Government and the NI Executive.
- These energy crops pose a significant dilemma for Governments in balancing the wish to build economic development on the production and export of food to meet the growth in world population, while stimulating renewable energy to deliver the reductions in GHG emissions needed to minimise the predicted adverse effects of climate change.
- Any economic evaluation needs to take account of the job creation in secondary processing for food or conversion to renewables. Analysis in RoI (IrBEA 2012) predicted 3,600 new full time jobs in the renewables sector by 2020 and in the UK it has been estimated that 35,000 to 50,000 jobs could be created in the same period within the bioenergy sector (NNFCC 2012).

Typical Costs for SCR Willow in Northern Ireland. Source Biomass Energy NI / CAFRE 2012.

Establishment Costs: Typically £2500 per ha. (less SRC Willow Planting Grant of £1,000 when available. This equates to an establishment overhead cost per tonne of wood chip of £6-7 per tonne of biomass produced over a 20 year period.

Production Costs. Typically £60-£65 per tonne of wood chip at 20% MC, including this establishment overhead..

Current market price of wood chip at 20% MC is estimated at £120 / tonne delivered locally.

8.7.2. Strengths

- High energy prices are expected to continue and sustain the market for renewable energy in the longer term.
- Supported by national schemes (eg ROCs for electricity and / RHI for heat) driven by need to meet global Greenhouse Gas reduction targets.
- Provides security of supply in a volatile global market for energy.
- Well suited to low technology and incremental applications as source of heat – DETI target of 10% renewable heat by 2020.
- Good yield potential on a variety of soils in our climatic conditions (10+ tonne DM/ha/year).
- World leading local research base (AFBI / Teagasc) for SRC Willow, supported by strong CAFRE KTT and industry training team.
- Overall wood fuel market is being driven by commercial organisations with professional marketing of wood pellets and associated equipment.
- Biomass production is a potential user of various streams of organic waste which can attract a significant gate fee.
- Large saving in GHG emissions compared to fossil fuels, and can behave as sequestration reservoir.
- Positive environmental impact compared to intensive agriculture.
- Embryonic supply chain emerging through organisations such as Biomass Energy NI – a producers organisation promoting the use of biomass fuel.
- Compliments biomass energy from forestry and industry co-products.

8.7.3. Opportunities

- Incentives driven by the need to reduce GHG emissions will drive demand which, if not met by local production, will be imported, negating the benefits of supply security.

- Introduction of Renewable Heat Incentives with long term support arrangements will stimulate demand and increase confidence. Demand climbing steadily and already showing signs of exceeding local supply capacity.
- Supply chains and Energy Supply Company (ESCO) arrangements need to develop to generate confidence and convenience for users.
- Production on more marginal land will increase if harvest technology and post-harvest treatments can be improved.
- Pressure to meet renewable energy targets will intensify as milestones approach (e.g.2050) further stimulating demand.
- Experience of bioremediation will generate confidence amongst users and supervisory authorities.
- Potential to reduce energy use and costs on farms through effective use of biomass heat energy (Grain Drying / Horticulture / Mushrooms)
- May need differential support linked to a land use strategy to effectively capitalise on the growth potential of both food and energy production.
-

Current Sector Value	Prospective Sector value 2020*	Means of Growth / Comments
1 m	£5m	Biomass can make a significant contribution to the NI Executive target of 10% of renewable heat by 2020 and PFG target of 25% reduction in GHG emissions (relative to 1990 levels) by 2025 and 80% by 2050. If not home grown will be imported. Also has considerable employment potential in the associated service sector. Total will include biomass from forest waste as well as energy crops. Stimulated by the DETI RHI and

		DARD Biomass Challenge funds but planting support also required in view of long lead in times (as for orchards).
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Source: Industry submission to Agrifood Strategy Board Consultation 2013.

8.7.4. Challenges

- Poor cash flow in early years -- a generous Planting support grant is essential to help overcome cash drain before significant income streams develop.
- Damage caused by DETI delay in introducing incentives on demand side – e.g RHI scheme, long after the production was incentivised by DARD. This led to slow development of markets and mature supply chain arrangements.
- High (if volatile) agricultural crop prices makes it difficult to justify the risk of investment in energy crop establishment.
- Grower concern about long term commitment, reinstatement costs and impact on land quality.
- Confidence required in achieving long term market demand and in the sustained prices needed to justify investment.
- High capital and running costs of both harvesting and drying facilities.
- Lack of viable systems to harvest energy crops on lower quality and steep land.
- Lack of commitment to link GHG amelioration to any investment support for industrial processing / manufacturing in other industries – including food processing.
- Piecemeal supply chain development requires producers active engagement in the marketing process.
- Biomass heating frequently linked with district heating systems in Scandinavia etc. but these have not proved attractive or successful in NI.
- Simplistic approach to the Food v Fuel debate tends to undervalue the opportunities and benefits of energy crop production.

8.7.5. Development Priorities

The arable sector is committed to contribute to the EU, UK and Executive policies and targets to increase the proportion of energy coming from renewable sources and to reduce the emission of Greenhouse Gases.. However to achieve this it will require support from DARD, DETI and other Departments and Agencies. The key actions which need to be taken by the industry to achieve this sustainable development and the support required for others are summarised below

Part 1. Generic Development Action.

See Section 8.2.5. Part 1 above.

Part 2. Part 2. Crop-specific Development.

Biomass producers need to -

- Support research through determining and articulating needs to DARD (Ideally this should be done through representative organisations such as Biomass Energy Northern Ireland (BENI).
- Work through BENI and other organisations to promote biomass fuel, represent the interest of the sector and generate confidence amongst growers and potential users.
- Develop organised supply chains which produce to meet pre-determined market needs and reduce speculative production.

Equipment suppliers and Users need to –

- work with growers to build integrated supply chains to satisfy user quality and quantity requirements.

Government Policy

- DARD have been proactive with investment in research, training and KTT actions, as well as schemes such as the SRC Willow Planting Grant, while DETI has eventually introduced a Renewable Heat Incentive scheme to try to stimulate

local use of renewable heat. These support measures must continue and be enhanced to ensure GHG and Renewable Energy targets are met, and job creation opportunities materialise.

- A carefully tailored financial support package, linked to strategic development priorities for the sector should be introduced to encourage investment in new on-farm technology, including irrigation (for bioremediation) , on-farm storage and drying.
- Planting Grants needs to be continued and structured to encourage planting on appropriate land.

Research.

- AFBI Loughgall and Hillsborough have developed a worldwide lead on work in the area of energy crops and this should be maintained.
- The close working relationship and sharing of knowledge with colleagues in Teagasc should be developed through a coordinated multiregional approach.
- One priority area must be delivery of production and harvesting systems which allow the SRC Willow crop to be produced on lower quality land which is of marginal use for food production. Currently this is curtailed for mechanisation rather than production reasons.

8. 8 Forage Maize.



8.8.1 Economic Significance

The area of Forage Maize grown in Northern Ireland rose rapidly from 2000 to 2008 with the arrival of varieties more tolerant to northerly climates and development of plastic mulch techniques to protect plants in the early stages of growth (Figure 31).

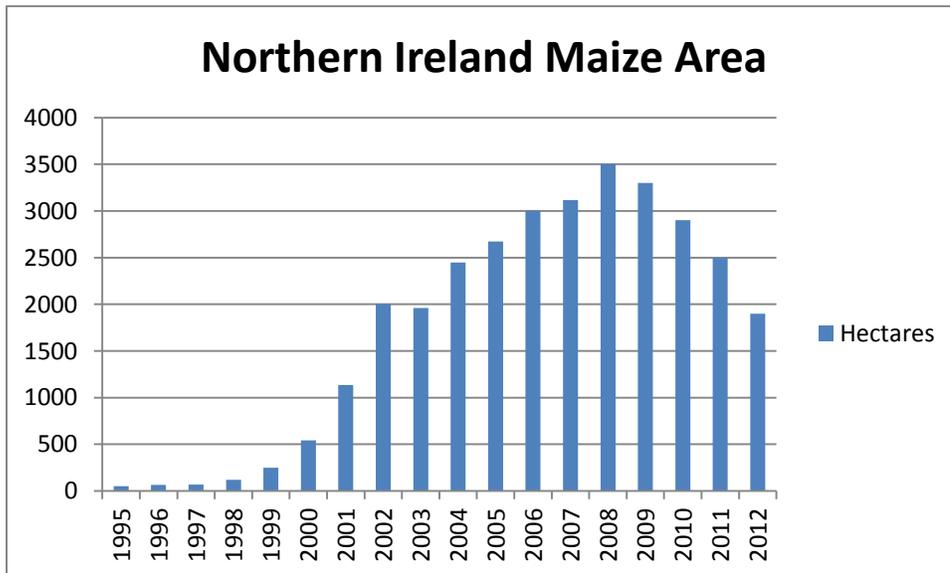


Figure 31. Forage Maize in Northern Ireland

Source DARD

Reduced yields resulting from adverse weather in recent years have led to a steady reduction in area since 2008 / 2009.

Forage Maize is grown for whole crop silage as in suitable conditions it can produce a high value high energy silage.

Most of the Forage Maize in NI is grown under plastic mulches to extend the growing season, increase yields and improve the reliability of crop performance.

8.8.2 Strengths

- Can produce high yields of high quality feed, which when fed in combination with grass silage gives enhanced animal performance, notably for milk production.
- Attractive crop because it is harvested using existing grass harvesting equipment at a time when the grass harvest has been completed.
- High yield from a single harvest and reasonable crop density reduces transport cost compared to grass.
- Can be grown by specialist cereal farmers and sold to dairy farmers ex-field.
- Easy to ensile and produces little or no effluent.

8.8.3. Opportunities

- The Forage Maize area can be expected to rise in line with the targeted increase in the dairy and beef herds – subject to improved weather resistance.
- Attractive alternative to multiple grass harvests on remote land.
- Potential to be grown as break crop on specialist cereal farms either on contract or for sale ex-field.
- Makes good use of livestock manures.
- Effective bio-energy crop which can be grown as an effective feedstock for anaerobic digestion.

8.8.4. Challenges

- Very sensitive to adverse weather which can lead to low yields and high cost per tonne harvested.
- Late harvesting can lead to soil structure damage in wet seasons and limits options for the planting the succeeding crop.
- Great variability in performance between years.
- Production costs are high and rising (fertiliser, fuel, spays, machinery)
- Growing under plastic mulch reduces seasonal variability but does not guarantee success as still working at the northerly limits of crop viability.
- Needs to be grown in rotation to avoid loss of soil structure and pollution.
- Weed control less reliable and more expensive following loss of atrazine. Particularly difficult when using plastic mulch.
- Where minimum tillage or direct drilling is used, the presence of maize in an arable rotation may increase the risk of fusarium head blight on cereals and mycotoxin production.
- Prone to secondary fermentation (heating) during feed out leading to quality and quantity losses.
- Unless the seasonal variation can be overcome through new varieties the expansion will be limited.
- Breeding of new varieties is focused on warmer climates which dominate the world production, so can expect little emphasis on breeding varieties for more temperate climates.
- May be affected by CAP proposals on crop rotation.

8.8.5. Development Priorities

The arable sector is committed to contribute to the growth agenda “Going for Growth as promoted by the Agrifood Strategy Board (May 2012) and to achieving its full potential through sustained intensification and the efficient use of resources. However, to achieve this it will require support from DARD, DETI and other Departments and

Agencies. The key actions which need to be taken by the industry to achieve this sustainable development and the support required for others are summarised below -

Part 1. Generic Development Action.

See Section 8.2.5. Part 1 above.

Part 2. Part 2. Crop-specific Development

- Research and development work with associated KTT activity, is required by AFBI / CAFRE on issues critical to increased forage maize production. This includes the identification of varieties and production techniques which will improve reliability of crop performance under NI conditions. As for many of the issues facing the arable sector in Northern Ireland this can best be approached on a multiregional approach, working with partner organisations in RoI, GB and elsewhere.

8.9 Ware Potatoes.



8.9.1. Economic Significance

Although the current potato area (4,150 hectares) is now only a fraction of the 80-100,000 hectares of previous centuries, in the region of 140,000 tonnes of ware potatoes are still produced each year.

Potatoes are now grown on about 580 farms although in recent years this production has become concentrated on fewer farms with almost 75% of the area now planted on 100 farms and over a quarter of the area is found on only 13 farms.

The crop contributes over £20 million to the value of the industry output each year – although this is subject to considerable variation from year to year, being estimated at only £16.5 m in 2012 (*Statistical Review of NI Agriculture 2012*).

Potatoes are significant contributors to the £238.5 million turnover and 2,016 jobs generated in the fruit and vegetable processing sector.

With consumption moving to more processed and pre-prepared products, NI depends on one major potato crisp manufacturer and a single high profile added value

 convenience food processor. There are however many other commercial operations supplying the food service sector with products such as peeled and prepared potatoes and the retail sector with oven ready salad potatoes with added herbs etc.

The supply of prepack potatoes to the large supermarkets is concentrated in two major packers, but again there are numerous smaller businesses supplying local shops and selling direct to consumers. A significant but unquantified trade remains for ex-farm and farm shop sales in 10 to 25 kilo packs.

There is a significant cross-border ware potato market although strong market loyalty to local producers means that packers tend to source product within RoI or NI to supply the local market.

Export of ware potatoes to wholesale markets in GB and RoI has now virtually ceased but there is still some opportunistic export to areas such as the Canaries and Russia where market and supply situations make this attractive.

Typical Production costs and Income	Maincrop Potatoes	First Early Potatoes
Output		
Ware	40 t/ha = £5,200	19 t/ha= £5,130
Chats	2t/ha = £20	1t/ha = £10
Total Output	£5,220	£5,140
Inputs		
Seed	£600	£875
Fertiliser	£400	£410
Sprays	£225	£65
Sacks / Boxes etc	£420	£152
Total Inputs	£1,645	£1,502
Gross Margin	£3,575	£3,638

Source; DARD Farm Business Data 2012. Indicative only as will vary with farm, weather, variety etc

NOTES:

1. Land rental (conacre) is not included and is a significant cost for many.
2. These figures are the Typical values – yield differences generate GM ranges of £2,738 to £4,172 for maincrop and £2,328 to £4,424 for First Earlies.
3. To obtain a true figure for net margin the overhead cost per hectare must be deducted from these Gross Margin figures. The DARD Farm Business Data (2013) suggest an average overhead cost for mixed cropping farms of £814 per ha. CAFRE Benchmark data for cropping farms in Northern Ireland however finds much higher overhead costs, which seriously reduce net margins.
4. Variability in yields and crop areas year on year are a major issue for ware potato profitability. Figure 27 shows the dramatic impact of even slight changes in potato yields in the 5 major European potato producing countries, on the price per tonne.

8.9.2 Strengths

- Local market still strong and loyal to home production.
- Relatively high consumption per head
- Strong demand for traditional varieties
- Substantial investment in capacity by prepackers to meet supermarket standards and volumes
- Focused specialist growers.
- Agronomy support for those in integrated supply chains is provided by packers.
- High health status with associated lower cost – e.g PCN low.
- Growing food service trade to utilise crops with poorer skin finish.
- Some sophisticated local processing with strong market emphasis.
- Development support for simpler low capital added value products.
- Adequate high quality land dispersed throughout the region.
- Water not likely to be limiting factor even if climate change predictions are correct.
- Import substitution contained by transport cost of bulky perishable product

8.9.3. Opportunities

- PGI status for Comber Earlies provides growth potential.
- Substitution of an estimate 20,000 tonnes Maris Piper imported for use by the chip shop trade with new varieties of local potatoes grown and stored to a protocol which consistently provides the required frying quality.
- Product innovation to meet demand for simple low capital / volume convenience products.
- Increase local supply to the vibrant processing sector
- Maximise yields of marketable potatoes through optimising production methods and variety choice.
- Grocery Code Adjudicator can ensure fair rewards along the supply chain and reduction in high proportion of potatoes sold on reduced margin promotions.
- Exploit current move to more local sourcing to deliver consumer confidence.
- Generic promotion to dispel misinformation and emphasise the healthy eating benefits of potatoes.
- Promotion to school children and younger people of the health and convenience benefits of potatoes.
- Move away from “traditional” cooking to new exciting celebrity driven menu items through sustained co-ordinated promotion.
- Raise the average to the standard of the best growers
- Develop small scale local markets / farm shop sales through raised professionalism and improved presentation.
- Contain costs through economies of scale and sharing equipment / stores
- Increased production of salad potatoes – although it is recognised that suitable land is limited.

Current Sector Value	Prospective Sector value 2020*	Means of Growth / Comments
£20 m	£21.5	Reduced waste. Import substitution (Chipping). Growing for specialist markets such as salad potatoes / added value products.

iv) Challenges

- Competition from producers in RoI who have had very valuable Government funded investment support for stores and grading equipment over many years. Investment in Northern Ireland has by comparison been trivial
- Competition from rice and pasta for the carbohydrate market is threatening demand.
- Traditional image (meat and two vegetable) and lower consumption of potatoes by younger people.
- Sustained pressure on margins by the major retailers. Low margins and high investment compared to other crops.
- Meeting the standards of the processors – who can import large quantities in bulk.
- Need to increase yield of saleable product.
- Variable yields year on year due to weather with limited opportunity to market any overproduction at anything but stockfeed value, increases price volatility.
- Large capital investment in machinery and stores needs increased scale or agreements to share resources
- High financial risk due to high production costs, increasingly extreme weather patterns and variable market prices.
- Dependence of rented land dramatically increases growing and transport costs while making forward planning difficult.
- Dependence on rented land also prevents investment in irrigation to ensure that high quality skin finish can be sustained in dry years.
- Loss of essential blight and other sprays could put all local production in jeopardy.
- Diseases such as Brown and Ring Rot have the potential to increase costs for the industry in general and ruin individual growers.
- Rising fertiliser, fuel and machinery costs put margins under sustained pressure.
- Lack of security through contracts or continuity of markets for many growers.
- The tradition of opportunistic production and marketing by individual growers sustains and accentuates price fluctuates.

- Lack of suitable early maturing varieties means harvesting tends to be late in the season.

v) Development Priorities

The arable sector is committed to contribute to the growth agenda “Going for Growth as promoted by the Agrifood Strategy Board (May 2012) and to achieving its full potential through sustained intensification and the efficient use of resources. However to achieve this it will require support from DARD, DETI and other Departments and Agencies. The key actions which need to be taken by the industry to achieve this sustainable development and the support required for others are summarised below –

Part 1. Generic Development Action.

See Section 8.2.5. Part 1 above.

Part 2. Part 2. Crop-specific Development

Growers need to be encouraged and supported in -

- working towards organised and integrated supply chains which produce to meet pre-determined market needs and reduce speculative production.
- sharing experience and agronomy expertise within supply chains.
- Join with CAFRE to gain access to the research and promotion work of the (British) Potato Council.
- Increasing saleable yields

Merchants / Packers need to –

- Work with growers to build integrated supply chains with access to quality agronomy support
- Invest in breeding to develop new varieties suited to NI conditions.
- Build relationships and supply arrangements with local seed producers.
- Come together with growers and each other to promote consumption of local potatoes and potato products, especially to schoolchildren and young people.

DARD should -

- Support the industry gaining access to (British) Potato Council (PC) research and promotion activities. Industry led actions to achieve better integration with PC initiatives should be supported.
- Retaining essential pesticides such as fungicides for blight control, is of critical significance to continued potato production in Northern Ireland and must be championed.
- Introduce a tailored financial support package to encourage investment in new on-farm technology, including irrigation, on-farm storage and first-stage processing. This can be modelled on the successful programme operating in Rol for many years.
- Currently, apart from the variety testing at Crossnacreevy, there is very little research on potatoes outside that on breeding at AFBI Loughgall and the plant pathology / disease control work at Newforge. DARD funded research should supplement that of PC and Teagasc where local requirements are not adequately covered by other research.
- A strong and rigorously enforced All-Island Plant Health Policy is of critical importance to protecting the local potato sector from diseases already threatening both ware and seed production.
- A well resourced and scientifically credible Plant Pathology unit within AFBI is essential to provide the potato sector industry with rapid disease identification and control guidance as well as supporting Government Agencies in ensuring effective screening of imported plant material.

8.10 Seed Potatoes.



8.10.1. Economic Significance

A total of 55 varieties of seed potatoes were certified in Northern Ireland during 2012, with a combined area of almost 600 hectares (593.19 ha).

The Register of Pre-basic and Basic Seed Potato Crops 2012 shows that the largest areas were still old varieties free of any control or royalty payments, with the largest areas being Desiree (102 ha) and Kerrs Pink (76 ha). A number of newer controlled varieties are however now featuring in the list with significant areas of Cara, Paramount and Rooster now being grown in Northern Ireland

The ex-farm value of the potato seed sales in the 5 years 2008 - 2012 (DARD Statistical review 2012) is estimated at £3.3 m and the average producer price was £172.1 per tonne. The equivalent figures for ware potatoes were £17.9m and £132.5 respectively.

 Of the 8,847 tonnes certified between June 2011 and June 2012, an estimated 1,427 tonnes was for home use, with 1,933 tonnes exported to Rol; 356 tonnes to GB and 5,131 tonnes to other countries.

By way of contrast, in 1950 118,000 tonnes of seed was produced in Northern Ireland of which 78,000 tonnes were sent to GB and 40,000 tonnes to other markets.

Also in contrast to the situation in NI, Scottish seed potato exports have continued to increase – rising steadily from 45,046 tonnes in 2000/2001 to 76,615 tonnes in 2010 / 2011.

Seed imported into NI notified to DARD for the 2012 crop amounted to 1,900 tonnes – more than the quantity of home produced certified seed sold here (1,427 tonne). It is estimated that 80% of these imports came from Scotland.

The major breeder of new varieties in Northern Ireland is now Potato Partners NI Ltd who are the commercial partner with AFBI / DARD in the programme of work at AFBI Loughgall. There are number of other breeders also investing in breeding programmes some of whom purchase technical support from AFBI.

Typical Production costs and Income	Seed Potatoes
Output	
Seed	21 t/ha = 3,780
Ware	8 t/ha = £1,040
Chats	2t/ha = £20
Total Output	£4,840
Inputs	
Seed	£800
Fertiliser	£400
Sprays	£240

Inspection Fees	£147
Total Inputs	£1,587
Gross Margin	£3,253

Source; DARD Farm Business Data 2012. Indicative only as will vary with farm, weather, variety etc.

NOTES:

1. Land rental (conacre) is not included and is a significant cost for seedproducers.
2. These figures are the Typical values – yield differences generate GM ranges of £1,627 to £4,224 for seed potato production.
3. To obtain a true figure for net margin the overhead cost per hectare must be deducted from these Gross Margin figures. The DARD Farm Business Data (2013) suggest an average overhead cost for mixed cropping farms of £814 per ha. CAFRE Benchmark data for cropping farms in Northern Ireland however finds much higher overhead costs, which seriously reduce net margins.
4. Variability in yields and crop areas year on year are a major issue for seed potato profitability, as is the demand for new improved varieties.

8.10.2. Strengths

- Climate and isolation create conditions ideally suited to producing high quality product.
- Absence or low occurrence of soil borne diseases.
- High health status – virus, PCN, freedom from Brown Rot / Ring Rot.
- Dedicated experienced growers provide the foundation for capability development within the sector.
- Smaller growers provide isolation, time and care.
- Respected independent certification scheme
- Local potato breeding programme with international partners.
- Pool of suitable land to allow long rotations.
- Close proximity to large markets in Rol and GB.
- Well developed export markets in Mediterranean Basin

-
- Less climate change and disease pressures than in competing countries
 - CAFRE support (industry training, business development, benchmarking, knowledge and Technology Transfer).
 - AFBI scientific expertise and support service.

8.10.3 Opportunities

- Growing world markets for potato varieties / high grade seed.
- Disease build up in competing countries.
- High health status for local seed.
- Large markets available in GB and Rol.
- Import substitution for seed from Scotland etc.
- New varieties starting to reach the market through PPNI / Loughgall partnership.
- Integrated supply chains are essential to secure Protection of Plant Breeding Rights and quality assurance. Growers and Merchants must work closely together to reduce volatility, share risk and generally meet customer requirements.

Current Sector Value	Prospective Sector value 2020*	Means of Growth / Comments
5	7.6	Increase seed exported to UK mainland and for local use; subject to new locally controlled varieties.

7.10.4. Challenges

- Need to encourage and support younger growers and merchants / supply coordinators.
- investment support for stores and grading equipment is required based on Rol model

- Integrated supply chains and mature relationships between seed and ware producers in GB make it very difficult to break into the supermarket production chains.
- Loss of critical chemicals for disease control will have severe impact on quality and yields.
- Unregulated ware production threatens health of seed crops.
- CAP reform – threatens to reduce availability of suitable land.
- Disease threat from imported potatoes.
- New local varieties slow to reach market.
- Increasing input and energy costs.
- Capital investment required to deliver consistent quality e.g stores.
- Poor quality image in some markets based on historic experience and the short term opportunism of a few.
- Need to deliver consistent return to sustain investment.
- Extreme weather events increase financial risk.
- Lack of co-ordinated marketing / continued speculative production.
- Small scale and limited reach of marketing organisations.
- Lack of levy to support research and market promotion.
- Distance, cost and financial risks of shipping to overseas markets.
- Financial risk of investment in breeding and market development.
- Limited market intelligence or support for export market development.
- Competition between individual growers and merchants – lack of constructive cooperation.
- May be falling below critical market volumes for some markets.
- Price volatility

8.10.5. Development Priorities

The arable sector is committed to contribute to the growth agenda “Going for Growth as promoted by the Agrifood Strategy Board (May 2012) and to achieving its full potential through sustained intensification and the efficient use of resources. However to achieve

this it will require support from DARD, DETI and other Departments and Agencies. The key actions which need to be taken by the industry to achieve this sustainable development and the support required for others are summarised below –

Part 1. Generic Development Action.

See Section 8.2.5. Part 1 above.

Part 2. Part 2. Crop-specific Development

Growers need to –

- Work towards organised supply chains with open internal communication, which produce to meet pre-determined market needs and reduce speculative production.
- Give delivery of sustained quality the highest priority to recover and develop long term quality image.
- Accept discipline of coordinated production and work with owners of PBR to protect new varieties, pay the royalties due and eliminate supply chain leakage to spurious production.
- Share experience and agronomy expertise with others – competition is not other growers in NI but international organisations.

Merchants / Exporters need to –

- Work with growers to build integrated supply chains with access to quality agronomy support and monitoring of crops throughout their growth.
- Develop and invest in supply partnerships with growers.
- Focus market attention to improve credibility and confidence in the quality of NI Seed, starting in Ireland (North and South) and in GB.
- Develop international partnerships with access to new developing markets.
- Come together with growers and CAFRE to gain access to the research and promotion work of the PC.

Government

- Freedom from disease is critical to the future of the seed potato industry in NI. Recent import controls are welcome but the seed industry is still at risk from lack of control of plantings of non certified seed close to high grade seed crops. Planting controls for uncertified seed need to be introduced.
- Disease protection through vigorous local Plant Health enforcement supported by relevant scientific expertise must be delivered on an all island basis.
- The industry does not currently have access to PC research and promotion activities. Industry led actions to achieve better integration with PC initiatives should be actively supported.
- A carefully tailored financial support package, linked to strategic development priorities for the sector should be introduced to encourage investment in new on-farm technology, including grading and quality packaging. This can be modelled on the successful programme operating in RoI for many years.

Research.

- Currently AFBI undertakes very little research on potatoes outside the breeding and plant pathology / disease control areas – and even this is under threat. Research linked to disease control during production, harvesting and storage are important to secure the high health status of product sold under the NI name.
- New varieties are critical to long term industry viability – strategic research and the AFBI research team at Loughgall must continue to be supported and funded to underpin investment by local breeders.
- DARD funded research should supplement that of PC and Teagasc where local requirements are not adequately covered by other research. A multiregional approach can share expenditure on issues of common importance.
- A well resourced and scientifically credible Plant Pathology unit within AFBI is essential to provide industry with rapid disease identification and control guidance as well as supporting Government Agencies in ensuring effective screening of imported plant material.

9. Environmental Considerations of Arable Production in Northern Ireland.

Any review of the potential development of any sector of agriculture must be undertaken in the context of the environmental as well as the commercial implications of such development.

This section therefore attempts to summarise the environmental issues relating to the arable sector in Northern Ireland and its potential future development.

Strengths.

- The dispersed nature of arable production in Northern Ireland contributes much to the unique scenic attraction of the landscape and contrasts markedly with large areas of arable monocultures found in other EU regions.
- Many arable farms are actively engaged in Agri-environment Schemes which allow a mix within the one farm of arable production with environmental enhancement on the land less suitable for arable production.
- Arable Farmers have shown strong leadership in environmental issues and the responsible use of pesticides through the Voluntary Initiative.
- The high yield potential of crop production ensures that efficient use of nutrients can be achieved - in line with the principles of sustainable intensification (delivering more output from any inputs).
- Closeness to livestock production allows arable farms to effectively and efficiently recycle nutrients from the intensive livestock sector.
- Arable production contributes to the diverse patterns of farm production thus contributing to local biodiversity and counterbalances a grass based monoculture.
- Where practiced, a good crop rotation enables sustainable arable production systems which enhances soil structure and disease control and minimises the need for crop protection chemicals and inorganic fertiliser.

- Sector has taken the lead in delivering voluntary actions with an environmental focus; e.g. voluntary sprayer testing.
- Local arable production reduces transport costs and transport energy use (carbon footprint).
- Local crop production provides an element of short term feed security through a buffer stock of local feed.
- Potential for increased import substitution of feed ingredients while efficiently using nutrients from intensive livestock production.
- Use of cereals for livestock feed on farm of production or purchased from local grower reduces costs and energy requirements – for drying and transport.
- Crop rotation with long grass breaks provides good soil structure, high organic matter levels with strong water and nutrient retention, and minimal soil erosion. This is a marked contrast to many of the arable cropping practices in the arable regions of the world where soil erosion is a major problem.
- Production achieved without irrigation and water availability unlikely to be reduced, even as a result of climate change.
- Dispersed potato production and long rotation through growth on rented land reduces disease build up and associated increased use of pesticides.
- Strong local R&D base for energy crop production.
- Greenhouse Gas Reduction Strategy for the sector already developed and being actioned. (Greenhouse Gas Reduction Strategy and Action Plan – DARD 2011)

Opportunities.

- Proposed growth of the livestock sector (AFSB Going for Growth Strategy 2013) will both increase demand for feed and the opportunities for efficient nutrient uptake by the arable sector.
- Replacing feed imports for the livestock sector by local produce will both reduce transport costs and carbon emissions while ensuring consumer confidence through supply chain assurance.

- Develop reliable sources of locally produced protein and oil crops to substitute for product imported long distances.
- Develop reliable pulse crop production systems to displace import, maximise natural nitrogen fixation and reduce use of fossil fuel based fertilisers.
- Reduce GHG emissions and improve carbon efficiency through maximising output, improved on-farm efficiency, reducing cultivations / soils inversion, and adoption of precision farming methods.
- Further development and adoption of precision farming techniques will enable improved matching of nutrient supply and pesticide application to crop requirements e.g. optimising fertiliser and pesticide timings and rates; accurate determination of organic manure nutrient content; soil analysis and nutrient management tools.
Optimising variety selection through use of local variety trials to optimise selection of crop varieties for higher yields, better disease resistance and nutrient use efficiency.
- Benchmark enterprises with others to identify areas for improvement in input use.
- Maximising efficiency of water use.
- Improved soil structure management through reduced compaction.
- Maximising efficiency of pesticide use through accurate application of the correct chemicals using the best technology and good working practices.
- . Almost total reliance of electricity generation and heat supply on imported fossil fuels provides opportunity for significant energy crop supply industry based on locally grown energy crops.
- SRC Willow energy cropping produces a carbon neutral fuel and has the potential for use for sustainable bioremediation. It will have a positive effect on wildlife where it replaces intensive agricultural production and improved grassland.

Challenges.

- Much of the perception of the arable sector and associated policy interventions are based on a very different systems of monoculture agronomy adopted in other regions and widely publicised in the popular media.
- The requirement to introduce Environmental Focus Areas (EFAs) emerging from the latest CAP reform package has the potential to impact severely on arable production in Northern Ireland for minimal environmental benefit. Application of this requirement must reflect the nature of the farming and positive environmental features of the region e.g. hedgerows, meadowland and woodland.
- The sector needs to continue to work hard to overcome the erroneous perception that it is a threat to biodiversity and human health through the widespread use of agrochemicals and fertilisers. Improved communication with the environmental organisations will be an important element of this work.
- Simplistic reasoning leads to arable production being chosen as an easy target for loss of diversity which will often have multifactorial causes.
- Nutrient leaching from crops as well as grass due to unpredictable and extreme weather events.
- Water quality issues in catchment studies may result in increased regulation of cropping activities, with insufficient evidence of relevance in the local situation.
- Increased regulation and withdrawal of pesticides which will impact on efficiency and viability of crop production. Any proposal must have a sound scientific, factual basis and take due cognisance of the overall impact on the environment and commercial realities.
- The potential for soil loss and pollution increase with more winter cropping and harvesting when soil is vulnerable to damage.
- Ensuring that the growth of energy cropping is suitably stimulated and supported by The Northern Ireland Executive to ensure that the potential and benefits can be realised in a way which balances the need for both increased food and renewable energy, with responsible environmental management.

- The opportunity for the sector to grow in parallel with the livestock sector is critically important to the sustainable development of the entire Agrifood industry in Northern Ireland. However this is at risk through constraints imposed within the Nitrates Action Programme as currently constituted. In particular –
 - The permission to field store broiler litter is under threat and may well be lost. Alternative handling and storage systems, which are safe for both farm livestock and the environment, must be found to enable this efficient and sustainable source of nutrient to continue to be used.
 - Current constraints imposed may well, in time, lead to a reduction of Phosphate content of soils. This is especially true for farmers who use high rates of organic manures. The availability of phosphate in livestock manures is set at 100% by the Northern Ireland Nitrates Action Plan (NAP). The DEFRA Fertiliser Manual (RB209) gives the availability of P in livestock manures at 60% so this means that farmers in Northern Ireland are over estimating the amount of P they are applying. This difference in nutrient availability is designed to reduce the amount of Phosphate applied but it means that in time the fertility of soil with respect to Phosphate will decline. In certain soils and under high performance management regimes this may already be constraining crop yields.
 - There is a similar issue for Nitrogen but the difference is much less with the typical actual availability for poultry litter being from 10 – 50% compared to the set value in NAP of 30%. For cattle slurry the difference is 5 – 50% compared to the set value in NAP of 40%.

There is an urgent need for research funded through the DARD Evidence and Innovation Strategy to ensure that policy decisions such as these are based on scientific evidence and do not unnecessarily constrain productivity and

profitability, contrary to the declared need for growth through sustainable intensification.

Overview.

The arable sector in Northern Ireland has already demonstrated its environmental responsibility and sensitivity through active participation in Agri-environment Schemes; through leadership in voluntary action on the responsible use of pesticides; and through enthusiastic engagement by the Ulster Arable Society and its members with the research, education and knowledge transfer activities of CAFRE and AFBI. For these reasons we are confident that any expansion of the area under arable crops in Northern will be environmentally positive.

10. Conclusions

The industry is confident that through responsible management, expansion of the arable sector in Northern Ireland is possible and that this can be achieved through sustainable intensification in a way which ensures that the growth is both sustainable and environmentally sensitive. In particular it sees the growth of the sector as a parallel to and not a competitor to the growth in livestock production envisaged in the “AFSB Going For Growth Strategy” published in May 2013. The Action Plan contained in Section 11 of this Report identifies the action required to deliver the 29% growth which industry believes could be achieved by 2020.

11. Action Plan for the Future Development of the Arable Sector in Northern Ireland.

(O) = Ongoing. Timescales used are linked to those of the Agrifood Strategy Board. (S) = within 12 months. (M) = 1-2 years. (L) = beyond 2 years

Action Number	Outcome Required	Mechanism to achieve the Outcome	Lead Responsibility	Timeframe.
1.	Growers improve overall business / enterprise performance	i) Benchmarking Tool reviewed with industry and adjusted to meet industry needs for convenience but with meaningful outputs.	CAFRE	O
2.		ii) Industry adoption rate increased.	UAS and Industry with CAFRE lead.	M
3.	Industry research needs are met	i) Industry identifies and effectively communicates its research needs to DARD. Process is scheduled to ensure needs are identified, and clarified with researchers in time for effective communication with DARD during annual EIS consultation. Sustained engagement with this process will depend on these representations providing results and meaningful dialogue with DARD	UAS with UFU.	S
4		ii) Industry maintains strong linkages to HGCA to ensure they are aware of local needs.	UAS / UFU	O

		Achieved through NI representation on HGCA committees and annual HGCA / DARD / AFBI / UFU / UAS / CAFRE review meeting		
5		Industry needs not met through HGCA are effectively communicated to DARD in the annual research consultation with Stakeholders (Item 3). Feedback from DARD needs to be improved on the results of any representation and progress towards delivery of the required programme of work.	UAS / UFU	S
6		iii) Other sectors not covered by HGCA consider how best their needs can be met. E.g. potatoes and linkages to PC	UAS / UFU / CAFRE	M
7		iv) Where common needs exist in NI and RoI joint Teagasc/ AFBI research should be funded / undertaken on a regional basis . This should be formalised through a structure such as a Multiregional Crops Research Alliance whose interest extends to all field crops including vegetables. Joint funding of work at centres of excellence should be developed.	DARD / AFBI	S

8		v) HGCA and HDC Levy payments are fully honoured by growers	HGCA / UAS / Industry	M
9		vi) Industry participates and supports research through on farm trials	UAS / Industry	O
10	Merchants / Compounders communicate grain quality and quantity requirements	i) Discussions between NIGTA and UAS to establish what is required and feasible.	UAS / NIGTA	S
8		ii) Procedures established to implement what is agreed	UAS / NIGTA	M
9	Local crop production has access to fungicides or alternatives needed to diseases of arable crops	i) Sustained case is made to ensure existing fungicides are reviewed on the basis of scientific evidence of risks presented by their use.	UFU / UAS / DARD	O
10		ii) AFBI undertake timely work to develop alternative production methods, should the approvals be lost	AFBI	S

11		iii) AFBI continue renew work to identify local disease strains and optimise control methods e.g. potato blight	DARD	S
12	Land tenure arrangements are available which encourage long term business / environmental planning, and entry of young people to the industry.	i) DARD commission research to quantify the effects of the existing “conacre” system, identify alternatives and make recommendations.	DARD to include in Research Call 2014	S
13		ii) Cross Departmental discussions lead to introduction of new land tenure arrangements which will satisfy both business development and inheritance security. This should be compatible with ongoing work at DEFRA	Industry / AFSB / DARD	L
14	Investment support is available to stimulate investment in new technology.	i) Representation ensures that the Farm Business Improvement Scheme proposed by the AFSB extends to the arable sector. Any scheme should provide for significant investments linked to quality, efficiency or	UAS / UFU	S

		supply chain enhancement as evidenced by a simple but documented business case		
15	The high plant health status of Northern Ireland is robustly protected.	i) An Island of Ireland plant health policy is developed and implemented without delay	DARD	S
16		ii) The Island of Ireland policy is vigorously implemented through a well resourced Inspectorate	DARD / DAFM	S
17		iii) Enforcement authorities and industry are supported by relevant and readily available scientific expertise	DARD / DAFM	S
18	Education, business development and training courses meet industry needs	i) CAFRE formally consult with industry on a regular basis to identify needs and methods.	CAFRE / UAS / UFU	O
19		ii) Where needs cannot be met locally then alternative arrangements ensure that needs can be met	CAFRE / DARD	S
20		iii) Industry supports and participates in programmes.		O
21	Knowledge and	i) A well resourced CAFRE Technology Team	CAFRE	O

	Technology Transfer (KTT) ensures early adoption of appropriate technology and business practices	interprets research work undertaken at AFBI / TEAGASC / elsewhere and undertakes additional development work as necessary to validate the results under local conditions.		
22		ii) To ensure that work undertaken at i) is closely linked to industry need, priorities are based on annual liaison meeting with industry.	CAFRE	S
23		iii) KTT is achieved through a well resourced team of Development Advisers working with other organisations and individual growers.	CAFRE	O
24		iv) KTT is supported through effective use of on-farm research, demonstrations, workshops and Focus / Monitor Farms.	CAFRE / industry	S
25	Farm to farm sales of feed grain are maximised.	i) Protocols are developed to provide confidence and feed value conversions for sale of locally produced grain / whole crop.	CAFRE / UAS / UFU	S
26		ii) A mechanism is developed to help seller and buyers exchange information and facilitate sales.	CAFRE / UFU / UAS / Supply Chain Prog.	M
27	Higher proportion of	i) Work continues to encourage improved	Manufacturer /	M

	locally grown oats is used by manufacturers	communication between millers, growers, AFBI and CAFRE to identify critical quality requirements and improve profitability through increasing yields of the quality required.	growers with Supply Chain support	
28	Local oilseed production potential is maximised	i) An investigation should be carried out to determine the feasibility and economic viability of processing Oilseed Rape for animal feed / food grade oil production on the Island of Ireland	DARD / DETI / DAFM	L
29	Local protein production potential is maximised	i) Work should be commissioned to develop reliable protein crops production systems , such as Field Beans.	CAFRE / TEAGASC	M
30		ii) KTT activity should encourage local protein crop production based on the outcome of i) above.		M
31	Energy Crop production potential is maximised	i) Long lead in times, investment demands and modest returns mean that these crops will require financial support if the potential contribution to Renewable Energy and GHG targets are to be met. e.g. Planting Grants, RHI	DARD / DETI	S

		etc		
32		ii) Differential support should be considered linked to land quality to minimise competition with food production on high quality land.	DARD	M
33		iii) The bioremediation potential should be exploited in appropriate situations.	DARD / DoE / industry	S
34	Ware potato production potential is maximised.	i) Industry requires access to research and technology support on production issues equivalent to that provided to the major livestock sectors. Arrangements need to be made to ensure that this is available locally.e.g. through Teagasc or PC	DARD / CAFRE / UAS	S
35		ii) Industry needs to come together to promote potatoes to consumers in NI.	Packers / Producers / Food NI or any organisation emerging from the AFSB report.	L
36		iii) New varieties suited to NI conditions and market demand are available.	Breeders / AFBI / DARD	L
37	Seed potato production	i) Industry requires access to research and	DARD / CAFRE /	S

	potential is maximised	technology support on production issues equivalent to that provided to the major livestock sectors. Arrangements need to be made to ensure that this is available locally .e.g. through Teagasc or PC	UAS	
38		ii) Investment in breeding new varieties must continue and be supported by both government and local growers.	Industry / DARD / DETI	S
39		iii) New integrated supply arrangements are required to develop new variety potential while protecting breeder investment and ensuring high standards of agronomy.	Breeders / Merchants / Growers	L
40		iv) Marketing increases proportion of locally grown seed use for ware production in NI.	Packers / Merchants	S
41	Organic Manures are effectively used in NI arable production	i) Results of DARD funded research is available to growers and Nutrient Action Plan is adjusted in line with research findings.e.g. Phosphate utilisation.	AFBI / CAFRE	L
42		ii) Any new facility commissioned to process poultry waste is such that this nutrient resource is still available to the arable sector in NI.	DARD / DETI / Investors	L

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Copies of this “Review and Report for the Development of the Arable Sector in Northern Ireland” are available to download from the websites of the UAS www.ulsterarablesociety.org or the Managing Agent for the Supply Chain Programme, Countryside Agri-Rural Partnership www.countrysiderural.co.uk

Appendix 1.

Ulster Arable Society Committee Members 2013.

Robert Moore	Chairman
James Mathers	Vice Chairman
David George	Treasurer
Robin Bolton	Secretary
Gary Adams	
John Best	
Allan Chambers	
Lindsay Easson	
Richard Kane	
Fred Murphy	
Robin McKee	
George Starrett	
David Shilliday	
Ethel White	