HORIZON

Market Intelligence

14 June 2017

AHDB

AGRICULTURE & HORTICULTURE DEVELOPMENT BOARD

Post-Brexit prospects for UK grains

Contents

FOREWORD

Some twelve months on from the EU referendum result, I have realised that the big policy issues created by Brexit are out of my hands. My job is to know my business, to farm as well as I can, while trying to figure out what consumers want and what our food chain demands. As far as possible, that means understanding the future scenarios for my sector and understanding what they mean from my business. This report does not hold back from the potential realities that I need to factor in to my business planning and my decision making. It's challenging in parts but I know that it also helps me "get fit quick" and ensures my farming is ready for the brave new world of post-EU agriculture.

This report underlines the significance of trade discussions with the EU. Without an effective trade deal, it becomes more challenging to export surplus grain into the EU, which currently takes the lion's share of trade. The staunch competition we'd face in new markets with bulk grain shipments is daunting. It means identifying, understanding and targeting the niche opportunities when it comes to exports. Moreover, it highlights the potential competition I could face here in the domestic market too.

> *"This report does not hold back from the potential realities that I need to factor in to my business planning and my decision making. It's challenging in parts but I know that it also helps me "get fit quick" and ensures my farming is ready for the brave new world of post-EU agriculture"*

You will draw your own conclusions from this report, but at the outset, I wanted to share my take-home messages.

- Competitiveness counts. Understanding my business, benchmarking my costs and systematically seeking to improve performance are my best form of protection.
- The supply chain needs to quickly develop a more collaborative approach and move on from a short-term view. That helps us to supply consistent quality to processors, it helps us to be fleet-footed when export opportunities arise and helps us be increasingly responsive to customer demands.
- Consistency is going to be key to maintaining markets. Proximity of supply must not be undermined by variations in quality. A consistent raw material ensures a consistent end product and we must not give reasons for our supply chain to select, for example, imported wheat over domestic supply.
- Get to grips with the niche opportunities. Scale is never going to be in our favour, so think differently. That might mean specific target markets, overcoming some technical barriers or adding value. But what's apparent is that the trade dynamics for bulk grain will shift.

The bottom line is that Brexit will mean change. This report highlights how shifting trade dynamics could impact on my business and the changes it will trigger. More significantly, it leaves me thinking about what it means for my own farm business. I hope that it triggers similar questions for you.

Paul Temple
AHDB Cereals & Oilseeds Board Chairman

INTRODUCTION

In the autumn of 2017 UK arable farmers will be planting winter crops for harvest the following year. Based on the existing Brexit timeline, a proportion of the crops harvested in 2018 will be marketed in a post-Brexit world.

In this latest Horizon report, we look at what the future may hold for UK wheat and barley production. The knee-jerk opportunity is to flag potential new export markets should our opportunities for trade into the EU become limited. However, the critical issue for UK wheat and barley production is its competitiveness on the UK market. While high-quality milling and malting products will most probably continue to be exported, the trade in feed-quality grains is very dependent on beneficial exchange rates and market access.

While we do not yet know what will take the place of the CAP post-2020, we must start to plan for a range of possible scenarios. The two main ones could be reduced direct support and greater competition. In such situations, what is key for the UK production industry is to reduce costs and offer UK supply chains the quality and service to make the UK producer the preferred supplier.

This report starts with a summary of possible new export opportunities. As we undertook the research and analysis for this, it became clear that market access issues were less of a hurdle than the simple global market dynamics in cereals. The USA, for instance, no longer has the stranglehold on the global wheat trade it once had. Therefore, this report also profiles the competitors that UK grains would face in a global market and looks at the implications for UK producers.

Brexit itself creates uncertainty. Although the trade and agricultural policy scenarios have arguably narrowed since last June, the finalised detail is still a long way off. Therefore, we have looked at six potential scenarios to identify the associated risks that may impact the economics of UK production and exports. Put simply, the worldwide demand may be there but what do UK farmers need to do to ensure that we can compete? And if we can't, then what might be the challenging decisions that UK agriculture is faced with?

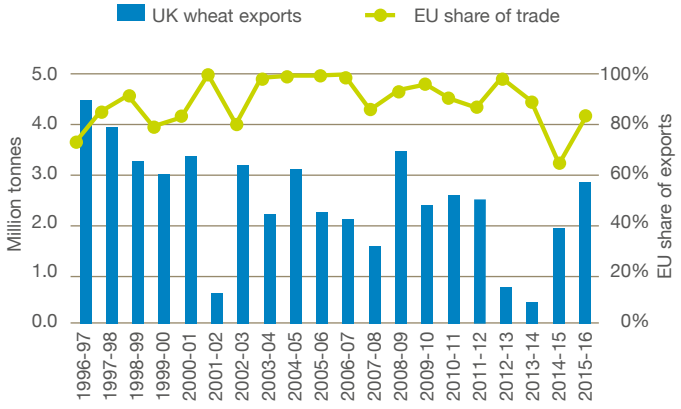
CURRENT TRADING DYNAMICS

The challenges of Brexit

Brexit presents two key challenges to the combinable crop industry. First, is the uncertainty surrounding direct support, used by many arable businesses to underpin the viability of production and/or help smooth out the effects of volatility. Second, is the issue of trade. Developing exports to non-EU markets has been touted as a way forward for the UK and the report will assess what opportunities these may hold.

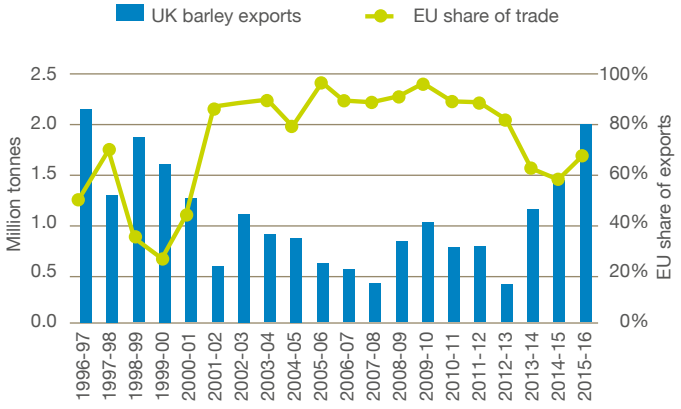
Typically the UK produces a surplus of grain, with the vast majority of this being readily exported to the EU as show in the charts below:

Figure 1
UK wheat exports



Source: UK HMRC

Figure 2
UK barley exports



Source: UK HMRC

For the export trade, in the event that the UK and EU are unable to agree a trade deal during Brexit negotiations which covers agricultural food products, Brexit would mean that UK grain would face some kind of tariff barrier when trying to enter the EU market and this may be substantial. This means that in years of surplus, the UK market would have to work harder to be export competitive i.e. lower prices for longer, to balance domestic supply and demand. The prospect of a tariff wall may well mean that the UK will have to look for some non-EU markets as an alternative.

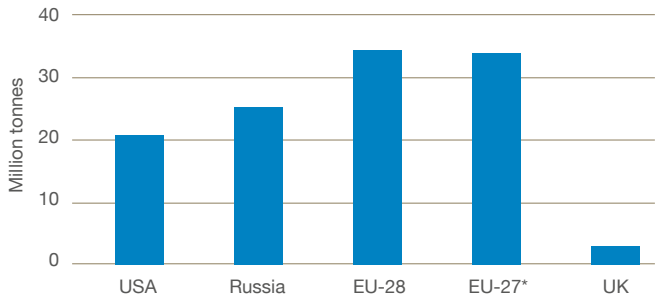
Under this scenario it is likely that the UK will find it more challenging to export grain surpluses in a post-Brexit world, which will have knock-on implications for ex-farm prices. Likewise, in terms of imports, the UK may put reciprocal tariffs in place to aid longer-term trade negotiations. This would serve to raise the import price 'ceiling'. This, in combination with tougher export conditions, more variable currency and the changing nature of the UK grain supply base could well lead to more 'home-grown' volatility in grain prices for the industry to deal with.

Competitiveness is everything when it comes to global grain trade

The harsh reality of the global grain market shouldn't be underestimated, with buyers' decisions being heavily driven by price at a specified quality level. As such, the global trade in grain has become a 'numbers game,' driven by high volume, low margins and dominated by relatively few multinational companies. As well as at the company level, the high volume nature of grain exports can be seen when looking on a country basis.

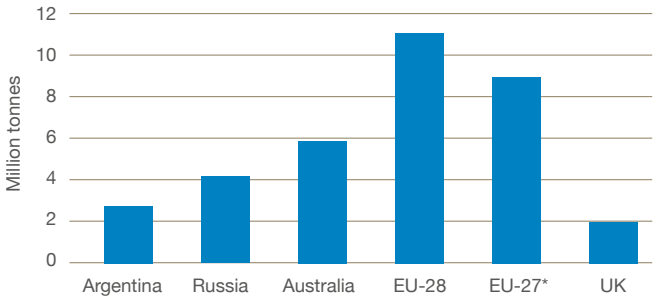
> *"Typically the UK produces a surplus of grain, with the vast majority of this being readily exported to the EU"*

Figure 3
Wheat exports in 2015/16



**EU-28 less UK non-EU trade*
Source: USDA, UK HMRC

Figure 4
Barley exports in 2015/16



**EU-28 less UK non-EU trade*
Source: USDA, UK HMRC

As a standalone trading nation, the UK has a relatively small volume of grain to offer the world market. This could well present an issue in a trade that is dominated by high volumes to generate sufficient margins for those involved. However, this does of course mean that the UK only has to find a handful of niches in the sheer scale of the global market to 'deal' with its surplus. The big question is, do these niches exist in a market so driven by 'price on the day'?

One way of overcoming the price driven nature of the grain market might be to de-commoditise and add value to grain before it leaves the shores of the UK.

Of all the agricultural commodities, because of its bulk, storable, free-flowing nature, grain is relatively cheap to ship around the world and as such, is extremely mobile. For example, International Grains Council data shows it cost between US$20 (£15.50) and US$27 (£21) per tonne to ship grain over the past year from Brazil to the EU.

The fiercely competitive nature of the grain market and the ease at which grain can move around the world mean that not only do we need to consider competition at a domestic level but also in the international market, with overseas competitors viewing the UK as a target market.

Trade isn't just about exports, is the UK going to become a target market?

In order to get a full picture of trade competitiveness, we need to look at both exports and imports.

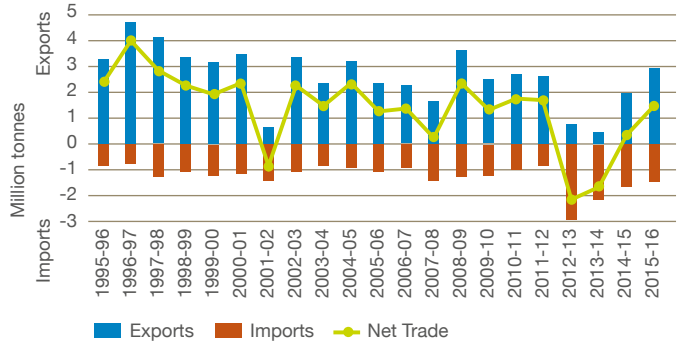
Imports have been playing an increasing role in the UK grain market in recent seasons. (see charts on next page).

Agronomic challenges, such as black-grass facing the arable sector has moved land away from wheat towards spring barley. This has served to help reduce the wheat surplus but increase that of barley.

Arguably, tougher trading conditions and a scenario of reduced support could put a question mark over arable production in marginal areas of the country and lead to a change in land use between agricultural sectors and even drive innovation in systems.

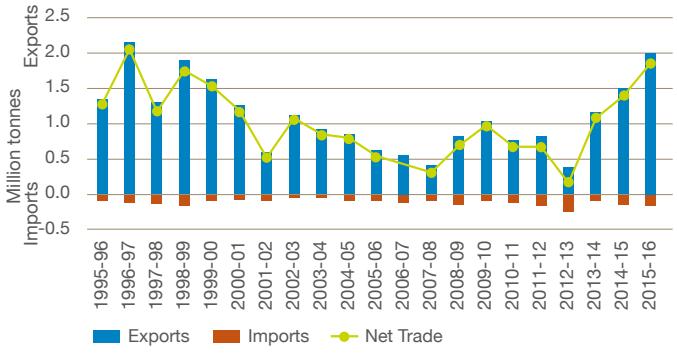
Maize has become an increasing feature in the UK market into feed, ethanol and distilling demand. This is particularly evident in Scotland, where domestic grain is being displaced by imported maize for distilling and Northern Ireland for feed usage. The largest origins for maize imported into the UK over the past five seasons (2010/11-2015/16) were France (37%), Ukraine (19%), Argentina (8%), Ireland (8%) and Romania (6%). With the UK outside of the EU and so potentially beyond the protectionism approach to GM imports, the UK could become a target of maize exports from the Americas.

Figure 5
UK wheat trade



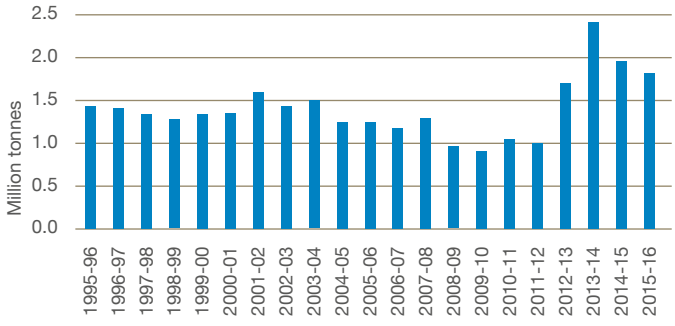
Source: UK HMRC

Figure 6
UK barley trade



Source: UK HMRC

Figure 7
UK maize imports



Source: UK HMRC

UK exports to non-eu markets

Relative to its competitors, the UK exports a low percentage of its wheat production at just 11% per season over the 2011/12 to 2015/16 crop years. This compares to 36% in Germany, 45% in the Ukraine and 51% in France. Back in the 1990s, the UK figure was close to 25% but has fallen in recent years due to a combination of increased domestic demand, the end of export refunds (a subsidy on exports out of the EU) and more recently, lower output.

For barley, over the 2011/12-2015/16 period, the UK exported 17% of production compared to 20% in Germany, 38% in Ukraine and 54% in France. The UK figure has been increasing in recent seasons in response to higher production, as the proportion of production exported in the previous five seasons was just 12%.

The total amount of wheat exported in the 2011/12–2015/16 period was 8.5m tonnes at a value of £1.29bn. The share of UK wheat going to non-EU markets was 20% in both volume and value terms.

For wheat, the largest non-EU market by volume for 2011/12–2015/16 was the Middle East and North Africa (MENA) region at 49%, followed by Asia/Oceania at 29% and North America at 19%.

Over the same period for barley, the volume of total produce going to non-EU markets was 2.2m tonnes at £300m. This was 23% in volume terms and 22% in value terms of total UK barley exports.

In the 2011/12–2015/16 period, the largest non-EU market for barley by volume was the MENA region at 84% of the total. Outside the MENA region, the largest single market was Japan at 9% of the total. Exports to other markets were minimal.

Figure 8
Top 5 non-EU markets for UK exports by volume, 2011/12 – 2015/16

Wheat			Barley		
Country	Volume ('000 tonnes)	Share	Country	Volume ('000 tonnes)	Share
Algeria	542,800	32%	Algeria	595,300	31%
USA	331,700	19%	Saudi Arabia	413,300	22%
Tunisia	210,300	12%	Tunisia	369,500	19%
Thailand	199,600	12%	Japan	168,000	9%
Japan	134,400	8%	Libya	128,300	7%

Source: UK HMRC

NON-EU MARKET OPPORTUNITIES

Projections by the USDA in its 2017 baseline projections show an increase in global wheat imports of 13% from 2015 to 2025. However, global barley imports are expected to fall by 7% over the same period as some countries reduce their reliance on imports. Despite this overall fall, growth is projected to increase for barley in some markets, such as the MENA region. Opportunities for barley will likely mean displacing competition in existing markets, as well as targeting growth markets.

Having strong projected import growth in a market does not necessarily mean that it offers opportunities for the UK. In order to be successful, having a product at the right price and specification, such as moisture content or protein content, is key. In addition, the distance of some importing countries require larger load sizes, further restraining opportunities. Shipping to a distant market may require co-operation to fill the ship.

Costs of production in the UK are typically higher than other major producers, such as Russia and the Ukraine. Currency fluctuations, tariffs and transportation costs can further reduce the UK's competiveness in export markets. Russia and the Ukraine have grown their market share over the past 30 years as they increasingly export more of their production.

Having supplies available to export is also needed and this would be further impacted by any trade deal with the EU. If the UK is faced with prohibitive tariffs to supply the EU, then more supplies may be available for non-EU markets.

Of the non-EU markets, China and South East Asia, along with Africa and India are predicted to have the biggest population growth between 2015 and 2050. The share of developing countries in the world population is expected to increase from 84% to 88%, indicating that these markets will become increasingly important in world trade. However, the main drivers of consumption are income levels and their distribution as well as population size and growth. A significant trend which combines all of these drivers is the global surge of the middle class. Forecasts suggest the number of middle class consumers will grow by 165% over twenty years,

with the Asia Pacific region experiencing the most rapid expansion (The World Bank, Kharas and Gertz 2010). This region will see its share of global middle class consumers expand from 28% to 66%, as a result of population and economic growth.

Asia has the largest grocery market in the world and IGD forecast a 6.3% compound annual growth rate (CAGR) to 2020. Although the size of the retail grocery market is relatively small in Africa and the Middle East, IGD forecast that it is set to see the fastest growth of any of the world regions until 2020, at 10.4%.

AHDB has examined the potential opportunities for wheat and barley in non-EU markets and identified a list of 10 key countries/regions to consider. Focusing on wheat and barley, the report looks at the competitive threat from maize, which due to its biology can more efficiently convert sunlight into stored energy. The analysis has taken into account a range of issues including:

- Countries' domestic production
- Countries' economic growth
- Projected future import growth
- Tariff/non-tariff barriers, including product specifications where possible
- Existing trade with the UK
- Ease of transportation/logistics
- Competitive threat
- Consumer/retail and feed purchasing trends

Summary of the opportunities

There are a variety of challenges the UK would be faced with in trying to develop non-EU export markets. The markets that have forecast growth are typically ones which would be highly difficult for the UK to supply and compete in. There are a number of issues including strong competition and meeting product requirements, such as demand for high protein bread wheat and grain with low (sub 13%) moisture content. Having sufficient quantities to export and any loss of EU preferential treatment in terms of market access are also potential inhibiting factors.

Sanitary and Phytosanitary (SPS) requirements of target countries are not covered in detail in this report. There may be challenges in exporting to some markets but the largest issue in developing exports is technical specification as well as competitiveness. The UK has existing market access to non-EU countries via agreements negotiated by the EU and so SPS standards would need to be re-confirmed with non-EU countries through new bilateral agreements.

The opportunities for milling wheat and feed barley are shown in the table below:

Arguably, the markets which present the best opportunities for hard and soft milling wheat, as well as barley are those where demand is stable and that the UK is able to supply in 'typical' years. Namely, these are Tunisia for hard and soft milling wheat, plus Algeria and Saudi Arabia for feed barley. These are also markets the UK currently supplies where there would be little change in the tariff structure applicable but it should be noted that growing the UK's market share would require competing successfully against some of the world's major exporters.

It's worth noting here that the existing and potential opportunities for soft milling wheat are dependent on the UK having sufficient supplies to both meet domestic demand and export. The area planted to soft wheat varieties has been in decline as they struggled to compete in terms of yields against feed wheat varieties, especially given variable premiums. For example, nabim Group 3 varieties (soft wheat, typically used for cakes and biscuits) accounted for 31% of the GB wheat area in 2007 but in 2016, this had declined to 5% (AHDB).

Figure 9
An assessment of non-EU market opportunities for UK wheat and barley

Strength of opportunity		Hard milling wheat (medium protein)*	Soft milling wheat	Feed barley
increasing	UK able to supply in a 'typical'** year & growing demand			
	UK able to supply in a 'typical'** year & stable demand	Tunisia	Tunisia	Algeria, Tunisia, Saudi Arabia
	UK able to supply in a 'typical'** year but declining demand, could face increased tariffs post-Brexit or there are other barriers to trade	Algeria, Morocco	Algeria^, Morocco	Japan, Morocco,
	Could provide infrequent opportunities e.g. tight global supplies	Kenya & East Africa, South East Asia	Kenya & East Africa, South East Asia	United Arab Emirates, South East Asia, China
decreasing	Underlying issues e.g. moisture content, which are currently or may prohibit trade in future	Egypt, Saudi Arabia, United Arab Emirates	Saudi Arabia, United Arab Emirates	
	UK produce doesn't meet typical requirements e.g. high protein milling wheat	China, Japan		

** Medium protein levels and gluten strength in a global context e.g. around 12–13% protein*

*** Able to supply assumes sufficient UK crop size and average quality*

^ Not currently supplying but could provide an opportunity. State buyer only purchases bread grades so would need to demonstrate the merits of UK biscuit wheat to the private sector and have sufficient volumes to supply.

Source: AHDB

The main barrier to supplying milling wheat to a number of markets in the MENA region is the moisture content required by these countries, for example a maximum of 13% is required by Egypt and Saudi Arabia. Lower grain moisture contents are required, especially in wheat for human consumption, for food safety and wastage reasons due to the climate in the region. The maximum level accepted varies by country but they are lower than is commonly achieved in UK grain e.g. the 5 year average moisture content for nabim Group 1 wheat (typically used for milling and baking) is 14.6% (AHDB Cereal Quality Survey).

As a result, in most seasons, substantial levels of drying would be required to reduce the moisture content of UK grain to acceptable levels, for example for Egypt's state buyer, the General Authority For Supply Commodities (GASC). This would likely require investments in port infrastructure and industry cooperation. However, the cost of reducing the moisture content to these levels would reduce the UK's competitiveness in already highly price sensitive markets and may not be cost effective as a result.

Slightly higher moisture levels are generally permissible in feed barley imports to the region due to its usage in animal feed, rather than for human consumption. As a result, there are more opportunities here but growth in these markets is limited. Indeed in some global markets, such as Japan and China, demand for barley is in decline.

The loss of EU preferential treatment post Brexit could also reduce or remove UK access to some markets, such as Morocco, where the EU's advantage is considerable in some seasons. The UK may also be subject to slightly higher tariffs in Algeria. A trade agreement between the UK and these countries would be required in order to regain such access. In Japan, the recent 2015 Japan-Australia Economic Partnership Agreement increased the competitive advantage for Australia and resulted in UK barley shipments to the country declining.

The UK also faces tough competition from the major producing and exporting countries in many of the non-EU markets, e.g. in South East (SE) Asia, the main competition is Australia. The lower cost base for these major exporters (covered in more detail later) often combined with a geographical advantage, would likely be too tough to compete against in many seasons. However, in certain seasons e.g. in years of tight global supplies, UK grain may be competitive.

Although wheat demand is strong for China and Japan, these countries require hard milling wheat with high protein levels i.e. 14%+, such as Canadian Western Red Spring (CWRS) or Dark Northern Spring (DNS). The UK only produces very limited quantities of Hard Red Spring (HRS) wheat, mostly on specific end-user supply contracts, which offer a premium for doing so due to the challenges of producing these grades in the UK. For example, HRS wheat typically yields around 3–5.5 tonnes/ha (Premium Crops), compared to the UK five year average wheat yield of 7.9 tonnes/ha (Defra). Indeed, it is estimated that fewer than 20,000 hectares of the crop have been grown in the UK in recent years (Agro Business Consultants). As a result, it would challenging to increase the UK's output of these grades and the cost of doing so is likely to prohibit trade with China and Japan. Even if production was successfully increased, arguably better value could be achieved by supplying the UK market, as high protein wheat is one of the products typically imported from Germany and Canada.

Feed wheat exports are driven by price and global supply, i.e. feed wheat's competitiveness against maize. This is slightly different to feed barley, which has more of cultural niche. Therefore, there will be opportunities to export feed wheat (e.g. to Asia) but they will depend on the season, both from a UK supply point of view and in terms of the importers' requirements.

There may also be some opportunities in Asia for malting barley but the requirements are very specific to the end-user (e.g. variety or nitrogen content) and would require deeper investigation. There is also the question of whether shipping barley or malt (processed in the UK) would return better value to the UK supply chain.

To look at these opportunities in depth please refer to the Appendix where we have profiled the markets listed above.

COMPETITION

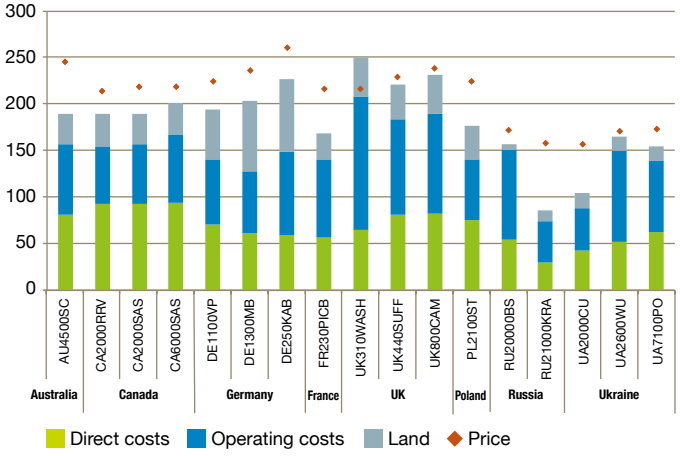
Tough competition

As highlighted in the Introduction, the global grain market is highly competitive and price is the principal consideration, even for human consumption. Furthermore, the current principal suppliers to the ten target markets profiled in this report are the world's largest wheat and barley exporters, where scale amongst other factors, offer significant cost advantages.

Taking Egypt as an example illustrates how price often overrides wheat functionality, security of supply and other considerations. Its policy of providing subsidised bread to a significant part of the country's population is important to national stability. Indeed, reports the government was considering reducing the daily allowance from five to three loaves per day recently sparked protests across the country (April 2017, Reuters).

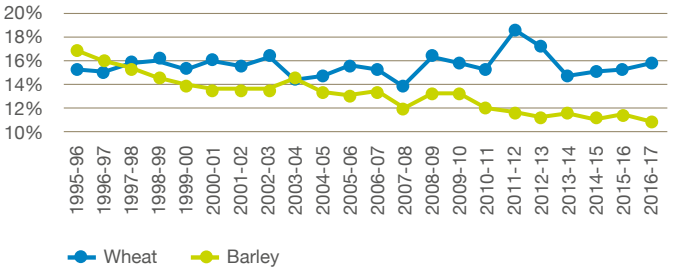
Consequently, grain producers with the lowest cost bases are at a significant advantage when competing into these markets. Arguably the Black Sea region, which produces similar grades of wheat to the UK but at a much lower cost, and France. due to its scale, are the main competition. Russian, Romanian and Ukrainian wheat accounted for over three-quarters of purchases by Egyptian state buying agency, GASC, in 2015/16. Data from the Thünen Institute of Farm Economics shows that costs of production are not only significantly lower in Russia and the Ukraine but are also less in Western European competitors, such as France and Germany. This is largely due to lower operating costs, plus lower land costs.

Figure 10
Wheat key cost and prices in US$/tonne (av. 2008 - 2015)



Labels shown under the X axis above refer to typical farms in each country.
Size is shown in hectares e.g. 4500.
Source: Agribenchmark team, Thünen Institute of Farm Economics

Figure 11
Grains fed to animals worldwide - proportion accounted for by wheat & barley



Source: USDA

This is further backed up back by analysis from the Australian Export Grains Innovation Centre (AEGIC), which estimated the cost of production for Russian wheat in mid-2016 at approximately AU$121/tonne. Even at current exchange rates (£1 =AU$1.76), which are more favourable to the UK than in mid-2016, this still equates to just £69/tonne.

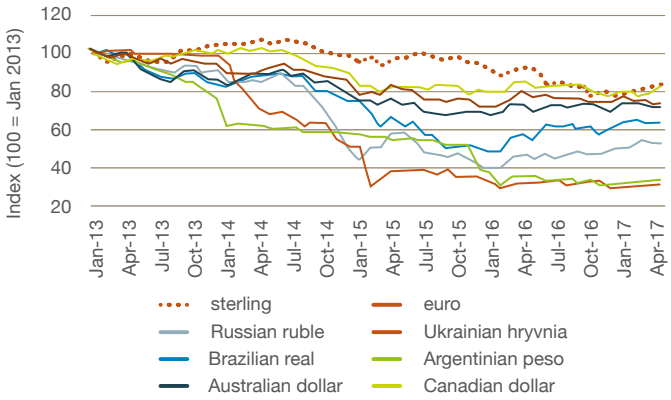
Price is also the main consideration when it comes to animal feed demand and that means competing against maize, especially in non-EU markets. Approximately two-thirds of all grain fed to animals worldwide is maize, followed by wheat at 15% and then barley at 11% (USDA, 2015/16). Maize's share is also sharply up from 20 years ago, when it was 57% and is forecast to continue growing, although views differ on the extent of the growth. However, outside the EU maize already accounts for three-quarters of all grain used as animal feed.

Maize yields are higher than those for wheat and barley and have also increased at a faster pace, supporting its competiveness against both grains. Sharp growth in global pig and broiler meat production (26% growth between 2005 and 2015, USDA), where barley inclusions in rations are restricted, has helped cement maize as the dominant feed grain.

Although maize is dominant, there are exceptions, such as in 2012/13. In that season, adverse weather sharply reduced the size of the US maize crop and pushed up maize prices around the world. As can be seen in the previous chart, in that season the amount of wheat used as animal feed was above trend. In seasons, such as this, when maize supply is disrupted, there is likely to be an enhanced opportunity for feed wheat exports. Although other extreme or unusual events, such as prolonged industrial disputes or large currency movements may also impact the competitiveness of the various grains, all of these only occur sporadically.

In 2015/16, UK exports benefited from a weakening sterling against both the euro and US dollar. This made UK produce more competitive in international markets while still returning the same or even higher values to UK producers. However, some of the world's top grain exporters, including Russia, Ukraine and Argentina, have seen far greater devaluations in their currencies (see chart below). This has benefited the competitiveness of grain from these countries to a far greater extent.

Figure 12
A basket of currencies against the US dollar



Source: Reuters

And set to get even tougher?

Global wheat demand is forecast to rise, with imports by the identified countries expected to expand. On the face of it, this presents a better opportunity for the UK. However, wheat production is also expected to increase among the competition (see next table), and with price a main focus for wheat purchases, this suggests limited 'easy wins'.

Figure 13
Forecast change in production and exports between 2015/16 and 2025/26 - major exporters

	Production	Exports
Global	9%	15%
Argentina	44%	90%
Australia	11%	18%
Canada	21%	13%
EU	2%	17%
Russia	1%	9%
Ukraine	11%	8%
USA	4%	28%

Source:USDA

Yield gains are expected to be the main route of production expansion in the world's top exporters, albeit at a slower pace than in that last ten years. The depressed global prices of the past few seasons are not expected provide adequate incentive for bringing more marginal land into production.

For example, even in the bumper year of 2016 the Russian average yield was still only 2.8 tonnes/hectare (SovEcon). Local sources of key fertilisers, subject to credit availability and room for known technical breeding improvements, could also support yield gains. Argentina is also expected to continue to grow its exports of wheat following the liberalisation of trade in late 2015 (subject to economic conditions).

For barley, only small increases in demand amongst the key importing nations are forecast by 2025 and this is partly expected to be met by higher domestic production, for example in China and North Africa. Therefore, for the UK to export larger volumes to non-EU destinations it would have to win trade from the existing suppliers by competing on price.

Barley also faces increased competition from maize for animal feed. A cultural aversion to using wheat has long supported barley's place as the main feed grain in the MENA region. However, with global maize production growing and policy encouraging greater compound feed usage, there are signs that this preference for barley is slowly being eroded.

UK priorities – domestic demand vs export

The UK was once used to having consistent surpluses of both wheat and barley available for export, as previously covered. Indeed, exports were a key part of balancing production to support UK prices. However, that is now changing, especially for wheat.

Wheat

Domestic demand has been slowly but steadily rising since the early 1990s and has received sporadic boosts in recent years, following the introduction of bioethanol production. Against this, in the face of tougher production economics and due to measures to tackle black-grass, the UK wheat area seems to be establishing a new, lower 'norm' at close to 1.8m hectares. This combination of rising UK demand and a smaller area has, generally speaking, reduced the amount of grain available for export in recent years.

In the twenty seasons to 2010/11, the UK imported more wheat than it exported just once (2001/02). However, in the past five seasons UK wheat imports have exceeded exports twice and it will be a close call as to whether imports or exports will be greater this season (2016/17).

Should the UK wheat area remain around the 1.8m hectare mark and should bioethanol demand remain, the UK's future as a consistent exporter of wheat looks in doubt. Yield growth may offset some of the impact but there is likely to be a greater degree of variation with regard to the UK's status as either a net exporter or importer.

In seasons, such as 2012/13 and 2013/14 when UK wheat output was sharply reduced by adverse weather, tight domestic supplies pushed UK prices higher relative to world markets, attracting imports. In contrast, when the UK has a large surplus and a need to export, prices must be competitive with the major exporters, including France.

There is also a question around the value achieved for the UK supply chain from exports, compared to the costs of importing. Over the past ten seasons (2005/06 - 2015/16), the UK has shipped a total of 23m tonnes of wheat but only imported 16m tonnes. However, the value of these trade directions was broadly similar at circa £3bn. This equates to an average value of £141/tonne for exports but the average value of wheat imports was £201/tonne. This is a very crude measure and encompasses all grades of wheat but does suggest the UK is generally exporting lower value and importing higher value grain. This then poses the question of whether greater value could be achieved for the UK supply chain by displacing imports?

Barley

Driven by a need to widen rotations and utilise cultural control measures to try to tackle black-grass, both the UK barley area and production have risen in recent years. In addition, demand for Scotch whisky overseas has helped support barley consumption. As production has increased, the proportion of the UK barley crop exported has also risen. Indeed in 2015/16 exports reached nearly 2m tonnes or 27% of the UK crop, levels not seen since the late 1990s.

As previously noted, this proportion is comparable to some sizeable barley exporters around the world such as Russia, Germany and Canada, although higher proportions are shipped by the world's largest barley exporters. Australia typically ships at least 5m tonnes or 64% of its output, while France exports on average more than half its crop (6m tonnes) and Argentina moves nearly two-thirds (3m tonnes).

However, barley export markets look to get even more competitive in the years ahead. Tougher competition is likely to bring pressure on UK barley prices, relative to other grains in order to try to win export demand. While the expansion in barley plantings has been agronomic, rather than market-led, a fall in relative returns could begin to challenge that rationale.

Questions of scale

For both wheat and barley, exporting to non-EU destinations generally requires loading large vessels quickly. The UK is capable of loading such size vessels, as was seen in June and July 2016. However, consistently loading such large ships (without incurring demurrage) would present more of a challenge for the supply chain. It requires, amongst other factors, being able to draw grain off farm quickly, large port storage, quick loading capacity and good haulage availability.

Bulk road haulage capacity has been challenged in recent years by the profitability of the sector and the resulting consolidation. It's also worth noting that outside of the bulk supply chain, including grains, more of the trade is taking place via containers at smaller volume but higher value.

As exports are based on an agreed average quality for the whole cargo, being able to select from a large 'pool' of grain is also important to support large scale exports. Trends in domestic production mean this is likely to be more of a challenge for wheat than barley. Nonetheless, purchasing grain to fill large cargos changes the way the market operates, so could have wider implications than seem likely at this stage.

SCENARIOS

As there are a number of different factors to consider, the future scenario facing the UK grain industry is not a linear piece of analysis. The reality will be that a combination of multiple scenarios will face the industry. The 'goal posts' of the scenarios are set out below and then some possible scenario combinations and implications are discussed.

AHDB is undertaking quantitative analysis of the potential impact of Brexit on each of our sectors, based on future scenarios. This work will be completed later this year and will be communicated via our Horizon series of publications, which may be found here.

www.ahdb.org.uk/brexit

Variables impacting post-Brexit scenarios

Maintained equivalent to current levels	**Direct payments / successor scheme**	Significant reduction in support
Comparable scheme to UK	**Nature of farm support in the EU post 2020**	'Higher' EU support relative to UK
Reciprocal access to the single market	**EU trade deal**	No deal – UK exports to EU face tariffs
Reciprocal to EU levels and WTO MFN	**UK tariffs on imported grain**	'Beacon of free trade' – no tariffs
Tariff-free access to key markets	**Trade agreements with grain importing countries**	Less preferential access for UK grain
WTO MFN tariffs / EU legacy tariffs	**Trade agreements with grain exporting countries**	Grain used as bargaining chip in wider FTA
Legacy EU approval scheme	**UK approach to imports of GM grain as a non-tariff barrier**	Fewer restrictions on GM imports

Source:AHDB

Scenario combinations and implications

Scenario combination and description	Implications
Maintaining the status quo, as far as possible: From a trade perspective maintaining tariff free access to the EU market, by far the biggest export destination for UK grain. Continued use of import tariffs and quotas to 'protect' the UK from an influx of global wheat supply and non-tariff i.e. strong GM approval mechanism, from maize. Rapid replication of EU agreements on market access and phytosanitary with key importing countries e.g. Morocco. Post-2020 arable farm support scheme comparable to the new CAP to maintain a 'level playing field'.	By its very nature, there would be few implications from what we know today but would likely mean a continuation of the current theme. The nature of the farm support package would be important to ascertain the ability of the industry to drive productivity and competitiveness. The likelihood of this scenario has to be treated as relatively low at this stage.
Free Trade Agreements (FTAs): UK prioritises FTAs with key global economies such as USA, Canada and Australia. Coincidently, these economies have grain to export and tariff free access to UK grain demand becomes a bargaining chip. Agreements with grain importing countries seen as a lower priority for the overall UK economy.	UK produced grain faces greater competition from imports with domestic prices more frequently capped by international availability. Increased difficulty in accessing grain export markets means the UK market has to work harder in times of surplus.
Supporting emerging economies: UK offers solidarity measures e.g. continued tariff free access for Ukrainian grain, partly in return for access to emerging demand in other sectors e.g. services.	As above, UK grain demand is more readily available to be exploited by global supplies and displace domestic production if it is competitively priced. Availability, price and quality of imported grain from developing economies is likely to be uncertain due to lack of data from these origins. This could expose UK supply chains to inconsistent and volatile supply, which is difficult to influence.

Scenario combination and description	Implications
Building of non-tariff walls: UK reduces approval hurdles for GM grain imports from the Americas to support competitiveness in the livestock sectors. In doing so though, non-tariff barriers would likely emerge between the UK and EU to prevent the trans-shipping of non-approved GM varieties into the EU via the UK.	In times of global surplus, more imported feed grain (maize) is readily available to the UK market helping drive costs lower in livestock systems. This could displace domestically produced feed grain causing long term viability issues for marginal production. Due to association with a more liberal approach to GM imports, the EU market may well want to put additional checks and measures around imports from the UK. The reason for this would be cited as protecting the EU GM import approval process.
Sloping playing field: Direct or equivalent support for UK arable is significantly reduced whilst post 2020 CAP goes relatively unchanged.	Although not formally linked to production, direct payments and equivalent support measures help farmers maintain production during low prices. With a difference in support levels between UK and EU, the domestic industry would find it harder to compete with its nearest export rivals and indeed imports. UK production would need to somehow make up the difference i.e. by driving productivity to build competitiveness of production that would likely require industry and system (e.g. rotation) restructuring.
Worst case: UK grain exports face tariffs into EU, whilst UK becomes 'free trade leader' and lowers import tariffs unilaterally. Minimal level of farm support.	Despite currency devaluation, the UK would find it harder to export and easier to import grain during periods of global surplus. Less competitive regions/ businesses would likely find it very challenging to continue in arable production. At best, the number of arable farming businesses would consolidate significantly. Land use change e.g. more pasture would likely occur with significant pressure on farmers to find new systems of crop production. With a likely reduction in production, UK consumers would likely be more reliant on imported grain. This would give access to 'cheap' grain in periods of global glut but UK prices would be more exposed to periods of global supply shortage and potentially higher price peaks.

ALTERNATIVE APPROACHES AND CONCLUSIONS

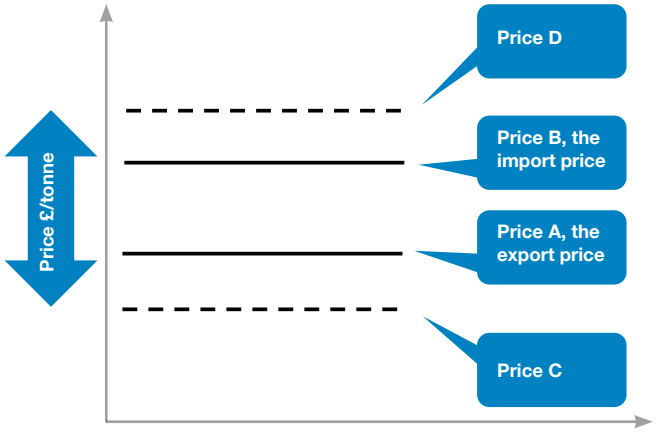
Discussion: Key areas of consideration for UK grain trade post-Brexit

The UK "window" of price volatility

Over the past 25 years, CAP has been moving away from being a protectionist market management tool and this has increasingly exposed UK grain supply chains to world price levels and volatility. However, on that journey towards an increasingly freer market, the UK has largely maintained a surplus of both wheat and barley that has had to compete into both EU and global markets. This made the world market highly influential on UK prices, something, of course, the industry has become well accustomed to.

However, as we have seen for the 2016 crop and could well see post Brexit, the UK grain price (aside from currency) is becoming increasingly influenced by domestic, as well as global forces. As such, it could be argued that the UK grain market is likely to be subject to an increased level of 'home-grown' volatility as demonstrated below.

Figure 14
UK grain price volatility



- **Price A:** The traditional price the UK grain industry is most associated with. The UK operates at this level in order to compete for export business during periods of surplus. When a surplus is fully exported, or there is insufficient domestic production to meet demand, the price moves away from the export level toward….
- **Price B:** The level at which the UK starts to attract grain imports.
- **Price C:** If UK exports face tariffs when entering the EU market, the market would have to establish a lower export price level to overcome the barrier.
- **Price D:** If the UK puts reciprocal tariffs in place, this would raise the import price ceiling.

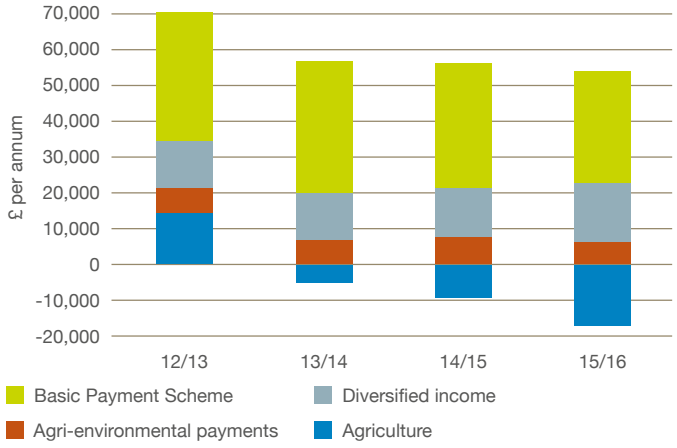
The introduction of tariffs would essentially increase the domestic influence on grain price volatility, on top of the existing global level.

Changes in farm support mechanisms may also influence the amount of home-grown volatility. This largely comes down to how farmers respond to periods of low price. As it stands, even when prices are below costs of production, there is little in the way of market response in terms of reduced grain area. The thinking here is that direct payments play a role to support farmers to continue production during periods of low price. Under a scenario of greatly reduced farm support, farmers are generally likely to be less able to maintain production on a loss-making outlook. This may well force more rationalisation in the crop area during periods of low price, if arable farmers see a fall in cash resilience. A fall in the crop area would clearly have impacts for production, the amount of surplus/deficit and so the pricing of UK grain relative to the rest of the world.

Although only depicting the "average", the chart on the next page shows in the previous three seasons there has been reliance on direct payments to offset losses from production and provide cash resilience.

> *"it could be argued that the UK grain market is likely to be subject to an increased level of 'home-grown' volatility"*

Figure 15
Sources of farm business income for English cereal farms



Source: Defra Farm Business Surveys

Pressure on existing structures and systems

Access to export markets and farm support policy are the two key themes of Brexit for the combinable crop sector. In the scenarios where market access has barriers and where support is significantly reduced, there will likely be a structural / systems impact upon the industry. This is largely because of the delicate nature of the sector in terms of the components of income.

If trade barriers were in place and support was reduced, the profitability of current production systems would likely see further negative impact. With support reduced, the current structure of the farming industry would find it difficult to underpin periods of unprofitable production due to less cash resilience.

The upshot is that any change in trade and support mechanisms will likely lead to some level of systems and structural change given the 'knife-edge' situation the industry is currently in.

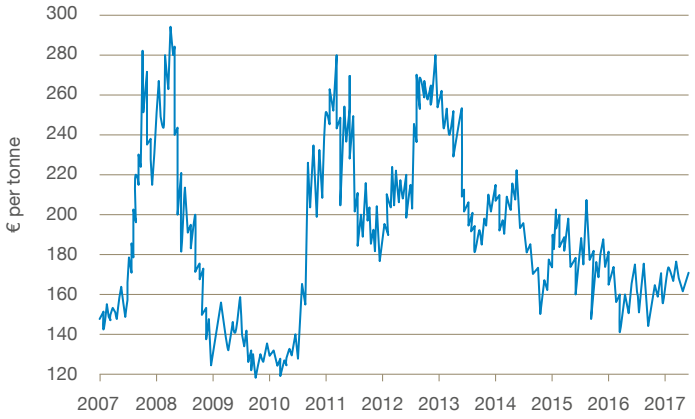
Possible changes could involve:

- Further farm level consolidation to drive efficient economies of scale;
- Market led production decisions, whereby producers laydown some fields to cover crops or green manures during periods of low price to provide economic but indirect financial benefit to following crops in the rotation;
- Less cereals grown in the rotation due to relative impact of tariffs on the crops involved;
- A return to more of a style of mixed farming but more likely through co-operation between competitive specialist farming businesses and land owners;
- A greater fixed cost focus, such as in the early 2000s i.e. a better understanding of what drives: depreciation (age vs use), resale value, transaction costs and hire/ shared ownership.

Figure 16
Nearby UK wheat futures

Source: AHDB

Figure 17
Nearby Paris milling wheat futures



Wheat at €250/tonne		
€1 = £0.70	€1 = £0.80	€1 = £0.90
£175/tonne	£200/tonne	£225/tonne
Wheat at €200/tonne		
€1 = £0.70	€1 = £0.80	€1 = £0.90
£140/tonne	£160/tonne	£180/tonne
Wheat at €150/tonne		
€1 = £0.70	€1 = £0.80	€1 = £0.90
£105/tonne	£120/tonne	£135/tonne

Source: AHDB/Euronext

Where in the commodity cycle will we be?

The immediate impact of post-Brexit trade and support policy will likely be influenced by the state of the commodity markets farmers sell into as price, of course, is heavily linked to profitability. If the UK is presented with relatively high prices due to short global supplies then the UK may in fact experience relative ease in moving grain surpluses onto the global market. The high price element of this would be supportive to farm profitability. However, in this scenario, post-Brexit arable farming risks being lulled into a false sense of security because as farmers know all too well, periods of high prices don't last long. The full impacts may not be entirely seen until the market (at some point in the future) returns to the bottom end of the cycle.

If Brexit happens when the global grain market is abundant with competitive supply, grain surpluses will likely find it very difficult to compete for export business. The resultant low price impact could well accelerate the implications of Brexit on the industry.

There is clearly a huge amount of market action to happen before the UK gets near to Brexit and as such, it is uncertain as to what state grain prices will be in come 2019/20.

Tariffs, currency, fertiliser and break crops

Although all the impacts of Brexit have yet to reveal themselves to the industry, currency has already moved and had a price impact. Clearly future movements, as ever, remain uncertain but it is important to gauge what this all means.

The adjacent chart looks at the history of the EU wheat market in €/tonne terms and the tables convert the selected euro prices into £/tonne using different currency scenarios.

Even using the lower €/tonne prices, the currency scenarios (within which the pre- and post- referendum realities sit) show the clear impact on £/tonne prices.

Looking at trade with the EU, it could be argued that the currency movements have already offset the impact of low level grain tariff barriers into the EU market. We can define the low level tariffs as those that apply to EU imports from third countries within a certain quota. Most imports into the EU occur within these quotas as opposed to the 'cliff-edge' level of €95/tonne. The future of EU import quotas will need be to be watched closely as there could be Brexit impacts given that some of these imports currently come to the UK.

Although from a trading perspective the tariff offsetting impact of currency movements might be seen as a 'fix', this doesn't mitigate the impact upon the production economics.

The fall in the value of sterling has helped support the grain price but at the same time would have pushed up the cost of key inputs, especially fertiliser. Usually, this scenario still results in net gain for the farmer given the higher total value of the grain versus the fertiliser and so a greater currency impact. However, if the currency movement in the grain price is being used now to overcome a tariff barrier, what is the true impact on the production economics?

The upshot is, in a scenario where exports face tariffs, this will ultimately feed straight back into crop profitability. Therefore, crops which face lower or no tariffs e.g. oilseed rape and pulses, will see their profitability supported relative to the grains. Whether this is enough to have a significant impact on the cropping mix will be dependent on a number of factors, including the state of the underlying markets.

With a weak currency giving relative strength to fertiliser prices, a key production cost, crops that require lower inputs e.g. malting barley and pulses, will receive a relative boost in their cost competitiveness versus higher input crops. It would also raise the appeal of non-cash crops that improve the nutrient status of soils. Again though, the overall impact on the cropping mix will depend on other factors as well.

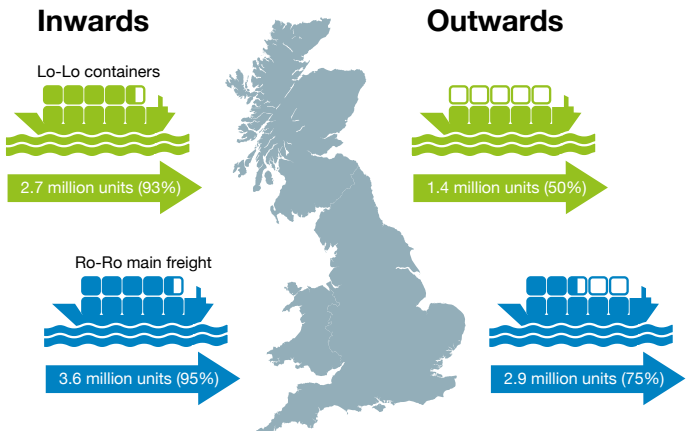
The containerised age

Although some distance from the 'coal face' of the arable industry, the way the UK trades physical product continues to change. According to UK freight statistics from the Department for Transport, bulk freight accounted for 61% of all cargo (by volume) through major UK ports in 2015 , which was down from 68% in 2005 and 75% in 1995. At the same time, unitised cargo rose to 34% from 27% in 2005 and 21% in 1995. Unitised cargo is either "roll-on, roll-off" (Ro-Ro) i.e. on lorries or "load-on, load-off" (Lo-Lo) essentially containers.

Although an interesting trend, this in itself is of little use to the arable sector. However, there is a useful observation to make on the flow of containers (Lo-Lo) in and out of the UK.

In 2015, 93% of containers coming into the UK were full but 50% of those leaving, left empty. Could this present an opportunity for UK agri-food supply chains? Given the cost constraints, transport of raw commodities by container is unlikely to be viable but does it present opportunity for partially/fully processed and value added products?

Figure 18
UK container movements in 2015 – Number of units + % full



Source: Department for Transport

Conclusions and recommendations for industry

A free trade deal with the EU is of critical importance for the cereals industry. Without preferential access to the EU there is a very real and significant risk that in a post Brexit world the UK will find it more challenging to export surplus grain into the EU, which currently takes the lion's share of trade. To compensate, UK grain exports may well have to look outside of the protection of the EU tariff system and take on staunch competition from the dominant producer-exporters.

There are a variety of challenges the UK would be faced with in trying to develop non-EU export markets. The markets that have forecast growth are typically ones which would be highly difficult for the UK to supply and compete in. Key issues in supplying these markets would be:

- Strong price competition from lower cost producers, such as Russia and Ukraine.
- Requirements for low moisture content (13% or less), typically in the MENA region. This would require industry co-operation and investment in infrastructure, which would further add cost reducing competitiveness, and reducing returns to UK producers.
- Market requirements are for grades of wheat that the UK does not produce or only produces in limited quantities, such as high protein milling wheat.
- Without further negotiations by the UK government, tariff barriers could prove challenging as the UK would lose access to preferential EU agreements that have been negotiated with non-EU countries, such as Morocco.
- The traditional preference for barley as an animal feed in the MENA region is slowly being eroded and feed barley is likely to face tougher competition from maize.

There are countries with stable demand which the UK currently supplies where the UK could increase its market share, if it can compete on price with countries such as Tunisia for wheat and Saudi Arabia for barley. Lowering costs of production and having sufficient supplies available for export would also be required to extend the UK market share.

Infrequent opportunities may exist in non-EU markets for example in years of tight global supply and this is particularly likely for feed wheat. In mid-2016, large UK wheat stocks and favourable exchange rates coincided with strong import demand, enabling the UK to ship large volumes to SE Asia.

With trade though, exports are only half the story. Imports like maize, have already become an increasing feature of the UK grain market. This could become more of a feature if access to UK grain demand is provided as part of broader trade agreements with some of the world's biggest and rapidly emerging markets.

This all provides a very real risk the UK grain industry could be caught between a more challenging export environment and potentially freer access for the world market to UK processing capacity.

However, the economic sustainability of UK arable production is already experiencing challenges. To that end and despite all the uncertainty, the industry needs to prepare for and drive change in a proactive way.

Key recommendations:

In all, five key recommendations are proposed:

1. **Improve competitiveness, which is the best form of protection:**

   Whether it's competing for export market share or that of the domestic demand, being able to sustainably compete on price and quality is critical. The industry needs to benchmark its own costs and increasingly better understand sources of poor performance relative to international /domestic competitors and act. Benchmarking tools such as AHDB's FarmBench can help businesses with this. As the Agibenchmark data has shown, the UK loses competiveness in its operating (labour and machinery) costs. The cost of depreciation is likely to be a significant factor here so the industry may well be challenged to find new ways of accessing machinery, fully grasp what depreciation actually is (machine age vs use vs market value) and in the longer term consider new technology such as driverless tractors.

   This may involve restructuring to achieve efficient economies of scale that are agile in changing market conditions. To achieve this, UK arable agriculture needs to be driven by long term profit and viewing farming as a business is critical.

2. **Drive productivity:**

   This is a pre-requisite of competitiveness and it is important to remember, however, that it is not necessarily linked to high production. The tradition CAP has created is a mindset of "the more we produce, the better off we must be." In the interests of long-term growth in productivity and profitability, less is sometimes more and largely depends on what stage of the commodity cycle the industry is facing.

   Delivering all of this requires a significant culture shift from one driven generally by tradition and policy to one of commercial acumen. Farming businesses need to adopt a corporate style to drive decision and strategy making. This will drive the desire to 'be the best' and continually seek out margin improving innovations that either reduce cost or add value. Focussed businesses are not wary of change, they create it!

3. **Businesses in the same supply chain can't exist in isolation:**

   Supply and consuming businesses in the same supply chain are largely interdependent on each other. Taking a whole chain approach to driving competiveness is likely to be highly beneficial. Agriculture has a long history of generally low collaboration and trust in its supply chains, so some form of catalyst might be required, such as a change in government policy.

   A more collaborative approach that enables farmers to amalgamate production volumes and integrate with supply chains, would allow:

   - A more responsive movement of volume into the domestic or export market where pre-agreed pricing mechanisms are used. This would also reduce the emotiveness that emanates from 'price on the day' syndrome, which often blocks volume flow. It also gives all involved a longer term focus rather than the present day short-termism.
   - A quality consistent supply to domestic processors – something that is now achieved by importing grain – see next recommendation.
   - The ability to be opportunistic when export opportunities arise. Demand is not a constant, therefore a supply chain which monitors the export market and has a responsive flow is more able to exploit opportunities.
   - Sharing of data up and down the supply chain to enable the right quality grain to be in the right place at the right time and drive continuous improvement. Learn from integrated poultry supply chains about how data is used to produce confidential producer ranking data, with the sole purpose of driving performance.
   - Identifying of the best soft wheat growing businesses in the UK and mobilising into supply groups to drive competitiveness, cost leadership and technical best practice for producing the best soft wheat in the world.

   Soft wheat looks like a very real example of where collaboration could yield significant benefits. Much could be learnt from specific supply groups in the malting barley sector. Within such groups, farmers make a specified volume commitment and choose from a selection of pre-agreed pricing mechanisms. This allows volume to move in response to supply chain needs. This level of organisation can also help producers drive group level performance versus the open market and facilitate two way flow of information to drive continuous improvement.

4. **Improve consistency of UK grain quality:**

   The nature of modern day grain processing means that systems of 'just in time' delivery are in place with little handling / storage capacity at many plants. This means that a processor needs to be sure of consistent raw material quality to ensure a consistent end product. As well as price, consistency can often be cited as a key driver for say a miller to select imported wheat over domestic supply.

   At the individual farm level it could be argued that say, German wheat, is no more consistent than UK origin. However, on its journey to the processor, the imported wheat would have been blended to a bulk, agreed and consistent average quality. Suppliers tend to do that when loading vessels and drawing supplies from multiple farms and stores. Compare that to the fragmented supply direct to mill from individual farms in the UK, which is mainly done on a load by load basis.

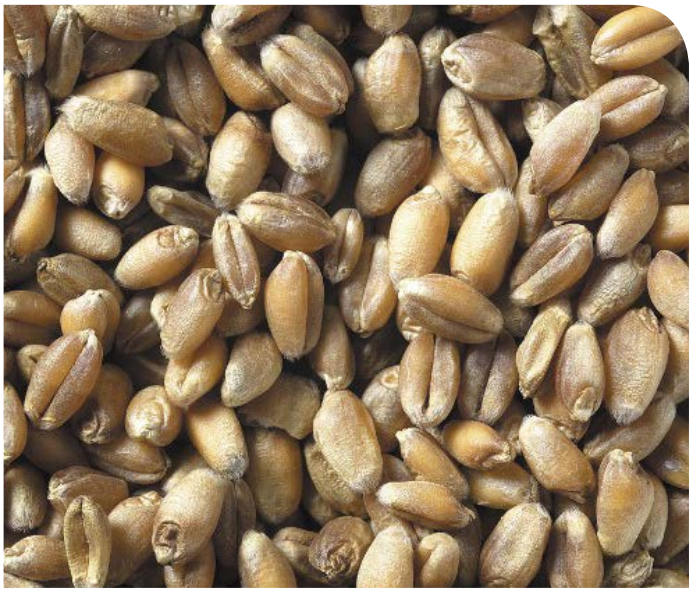
   There is opportunity for UK grain supply to compete on a consistent quality basis with imported grain. A system of collaboration needs to be in place before grain reaches the mill, which enables proactive identification of where the quality is in various stores and how it can be blended. This would help smooth out the understandable natural variation that occurs at the farm and field level. This essentially serves to better meet the needs of the customer and would help domestic supplies compete with imports.

5. **Getting to grips with potential grain and product niches - look for the opportunities outside of the box:**

   In 2015/16, global wheat trade was 173m tonnes (USDA). As a proportion of global wheat exports that season, the UK was 1.6%. Clearly the UK doesn't have the scale of a big exporter but the point of difference could well be in finding a handful of niches for either raw grain or products.

   Historically, export programmes have been mass market commodity led, with investment made by the industry to understand requirements. As such, there hasn't been a need or desire to identify possible niches that might exist. That may need to change if the UK arable industry wants a presence in the export market. We have merely touched the surface in this report, but there is more detail to uncover.

   A part of this might well involve identifying the technical barriers, i.e. specification, that innovations in crop production systems might help overcome e.g. getting the right protein content. This links with commercial acumen of the industry, with true entrepreneurs constantly looking for innovations to overcome technical barriers. AHDB's Strategic Farms are an example of a platform that can be used to drive innovation, accelerate the uptake of innovation through testing and demonstrating novel practices on commercial farms. They provide an accessible and dynamic vehicle to test and showcase cutting edge research and on-farm innovations to improve productivity, profitability and competitiveness in the UK arable sector.



Earlier in the report we outlined how 50% of the containers leaving the UK in 2015 were empty. Where were they going? What demand is in those countries that UK agri-food supply chains could exploit?

As it stands at present on the pure price and quality factors that drive global grain trade, the UK will likely struggle to continue as is. The agri-food industry needs to better understand the product, rather than commodity opportunities on the global market. Once those have been identified, then actions for the underlying supply chains need to be implemented. Whisky, chocolate and craft beer are the current value-added export examples. To support the success of processed products it is essential that the supply chain beneath them is acting as one, to drive the competitiveness and value of it.

The growth in global demand for whisky, albeit in a cyclical nature, is the leading example of product trade and value adding. Scotch whisky is the leading UK export, with overseas sales of over £4bn in 2016, adding value to malting barley from Scotland and the wider UK. However, the success of the product is only as solid as the competiveness of the supply chain beneath it. For the supply chain to protect its provenance and that of the broader distilling sector it, as a whole, must strive for competiveness. Securing the right raw material supply and having sufficient investment in processing capacity are two key fundamental building blocks for delivering a product that is both unique and at a desired price point. Individual products will have specific requirements from the supply chain. It is vital that these requirements are communicated and the whole supply chain supports change where needed to help the continued success of the product in its markets.

One challenge to keep in mind is where tariffs do exist, they are generally greater for processed products as economies look to protect domestic manufacturing industries.

In summary, the challenges facing the future of UK grain trade are significant and as a result survival is likely to require an element of change. A strong-minded commercial and collaborative approach as laid out in these recommendations can help proactively deal with the challenges rather than the industry waiting for change to hit it.

APPENDIX - COUNTRY PROFILES

Here we look more in depth at the 10 non-EU markets identified as possible targets for the UK.

The country profile tables in this section of the report show 10-year import projections from the OECD-FAO for wheat/maize and from the USDA for barley. Total growth projections of 0-19% over the 2015-2025 period, equivalent to a 1.8% compound annual growth rate (CAGR) have been classed as Low, 20-39% (CAGR 1.8% - 3.4%) as Medium and 40%+ (CAGR above 3.4%) as High.

Algeria

The Algerian economy and consumer confidence is under pressure from depressed crude oil prices which is expected to limit growth in the food and drink sector in the next couple of years. Wheat is the main diet staple, with baguettes most widely consumed. Biscuits are a popular snack food, while increased interest in convenience productions, such as frozen pizza bases, is also evident.

Around two-thirds of the country's wheat needs are imported. Office Algérien Interprofessionnel des Céréales (OAIC), the state owned cereals office, buys via international tender and supplies wheat to the private mills at subsidised prices in order to moderate the cost of bread. Private imports also take place when prices are favourable.

Around half of the country's barley and almost all maize requirements are imported, though the volumes needed vary, depending on domestic barley output and pasture conditions. Barley is predominately used as animal feed, including for cattle, sheep and camels, while maize is mainly used by the beef, poultry and dairy sectors. Algeria has some breweries but only small amounts of malting barley are imported, mainly from the EU. Longer term, the government plans to increase domestic grain production, through improved irrigation, encouraging the use of certified seeds, as well as increasing mechanisation and storage.

In response to the economic pressure, VAT on barley and maize was increased from 7% to 9% on 1 January 2017; wheat remains VAT free. Barley trade has also been partially liberalised with the removal of a set sale price, though the government still guarantees the price to Algerian growers. Other measures are also expected to be implemented.

Measure	2015	2022 (f)	CAGR % change
Population (m)	39.96	45.32	1.8
GDP at current prices (US$bn)	164.78	202.24	3.0
GDP per capita (US$) at current prices	4,123	4,462	1.1
GDP per capita (US$) PPP	14,518	16,843	2.1
Real GDP % change	3.8	2.3	

(f) forecast
Source: IMF, April 2017

Imports '000 tonnes	2015	% change overall to 2025 (f)	Major suppliers shares
Wheat and Meslin (1001)	8,505	Medium	France (48%), Germany (12%)
of which Durum (100111 & 100119)	1,763	n/a	
Barley (1003)	756	Low	Russia (31%), France (16%)
Maize (1005)	4,418	Low	Argentina (62%), Brazil (23%)

(f) forecast
Source: Trademap, OECD-FAO, USDA , AHDB.

Wheat: Only approved trading firms are allowed to participate in OAIC tenders, however, approval is by company, rather than by grain origin. Non-durum wheat exports (excluding seed) to Algeria are subject to a 5% tariff. The EU benefits from a duty free access to the Algerian market for up to 403,000 tonnes (non-durum wheat, other than seed). This is arguably not prohibitive and only covers a small proportion of Algeria's import needs but may well be a factor influencing the EU's dominance.

Imports are mainly bread wheat (both OAIC and private importers) and some biscuit grades (private importers). UK bread milling wheat can and has recently met OAIC requirements, which include 12-13% protein, minimum 220s Hagberg Falling Number (HFN), minimum 78kg/hl and maximum 14.5% moisture (with discounts).

Barley: A tariff of 5% is also applicable to all barley imports (other than seed) and the EU doesn't have a tariff free quota (TRQ). Imports are predominantly feed grade and the UK has been competitive in this market over recent seasons. However, extending this share would mean winning trade off low-cost producer Russia.

Conclusion: With the UK leaving the EU the UK would lose access to the EU quota for duty-free, non-durum wheat and may have to pay a 5% tariff. The UK already supplies both bread wheat and feed barley to Algeria, and these represent the best opportunities going forward, though winning a greater share means competing on price with France and Russia. There may also be an opportunity to export biscuit grade wheat to Algeria, if the UK produced sufficient quantities.

Morocco

The Moroccan economy experienced a delicate situation in 2016, with rising inflation exacerbated by currency depreciation, restrictions on imports and dry weather affecting its agriculture sector. All of these factors reduced consumer spending power. However, the IMF predicts the economy will pick up in their forecasts to 2022.

Morocco has an increasingly westernised culture, with sweet and savoury snack products a real area for value growth Euromonitor anticipates that by next year the sweet and savoury snack market in Morocco will be worth US$150m, compared with just US$36m in 2009. Although traditional pastries are mainly consumed at breakfast, biscuits are being increasingly consumed as an alternative. There are also growing trends for both convenience and healthier snacks, which include more fibre.

Morocco has the potential to produce relatively large grain crops but production is volatile. For example, in the past five years, wheat production has ranged from 8m tonnes in 2015/16 down to 2.7m tonnes in 2016/17. For this reason, import opportunities for the UK are heavily dependent on domestic conditions.

Measure	2015	2022 (f)	CAGR % change
Population (m)	33.50	35.74	0.9
GDP at current prices (US$bn)	100.59	139.44	4.8
GDP per capita (US$) at current prices	3,003	3,901	3.8
GDP per capita (US$) PPP	8,180	11,530	5.0
Real GDP % change	4.5	4.7	

(f) forecast
Source: IMF, April 2017

Imports '000 tonnes	2015	% change overall to 2025 (f)	Major suppliers shares
Wheat and Meslin (1001)	3,215	Low	France (36%), Canada (19%)
of which Durum (100111 & 100119)	744	n/a	
Barley (1003)	375	Negative	France (24%), Sweden (7%)
Maize (1005)	2,081	Low	Argentina (47%), Brazil (30%)

(f) forecast
Source: Trademap, OECD-FAO, USDA, AHDB

Wheat: Domestic production is protected through the use of variable import duties, which can be prohibitively high and TRQs. Morocco has free trade agreements with the EU and USA, granting reduced tariff access for agreed volumes of soft wheat, though again volumes and rates do vary.

State buyer L'Office National Interprofessionnel des Céréales et des Légumineuses (ONICL) imports wheat through a regimented tender process, with the structure of imports controlled in recent years. Flour is viewed as a key product and production is subsidised to keep it accessible for more impoverished areas of the country. For bread wheat, a minimum protein content of 11.5% is required, plus a HFN seconds of at least 220 and a specific weight of 77kg/hl, plus a maximum moisture content of 14%.

One of the growing markets as mentioned previously is the sweet and savoury snack market. The UK already exports biscuit wheat to Morocco and this could be a potential growth area in the region. UK bread wheat is generally able to meet the requirements of the Moroccan market, though drying may be required to meet moisture limits.

Barley: Imports are largely dependent on local weather conditions, although the long term demand trend is in decline and as such, presents limited opportunity for consistent trade. Trade is most likely to be opportunistic going forward. The EU also receives favourable treatment in terms of tariffs for barley and it's also worth noting that the EU and USA both have duty free access for the competing feed grain maize.

Conclusion: At present, the UK has reduced tariff access via the EU-Morocco free trade agreement. Although Morocco does present opportunities for the UK, mainly in terms of bread and biscuit wheat, post-Brexit dialogue would be needed to establish favourable access for the UK. Unless the UK can negotiate access independently, exports to Morocco would likely become more challenging, if not impossible.

Tunisia

The Tunisian economy has faced headwinds in recent years, which has dented consumer confidence. Growth is expected to pick up in the years ahead, the International Monetary Fund (IMF) reports that significant macroeconomic challenges persist. Tourism earning are down after the terrorist attack in 2015, although increased numbers from Russia are partly offsetting lower tourist numbers from Western Europe.

The retail sector is supported by high rates of urbanisation (BMI Research). Snack foods, particularly biscuits, are expected to see growth due to busy lifestyles and a drive towards convenience as more women join the workforce. Breakfast cereals are a small but growing market. However, bread remains the first staple food in the Tunisian diet, with baguettes accounting for the overwhelming majority.

The country also has the highest alcohol consumption per capita in the MENA region, primarily of beer, although there is also a long tradition of wine production and consumption in the country. Beer consumption is boosted by tourism and more recently, government tax cuts in an effort to reduce the unofficial market for alcohol, where spirits have a stronger presence.

The government is trying to incentivise local cereal production with minimum or set farm gate prices and subsidies for seed, farm machinery and irrigation equipment. Tunisia typically imports around 60% of its grain (wheat, barley and maize) needs but this varies depending on local wheat and barley production. Imports are controlled by the ONICL and some bread prices are subsidised.

Measure	2015	2022 (f)	CAGR % change
Population (m)	11.11	11.93	1.0
GDP at current prices (US$bn)	43.16	50.85	2.4
GDP per capita (US$) at current prices	3,884	4,262	1.3
GDP per capita (US$) PPP	11,486	15,487	4.4
Real GDP % change	1.1	4.5	

(f) forecast
Source: IMF, April 2017

Imports '000 tonnes	2015	% change overall to 2025 (f)	Major suppliers shares
Wheat and Meslin (1001)	1,954	Low	Ukraine (25%), Canada (16%)
of which Durum (100111 & 100119)	825	n/a	
Barley (1003)	532	Low	Russia (44%), UK (15%)
Maize (1005)	1,110	Low	Ukraine (65%), Brazil (11%)

(f) forecast
Source: Trademap, OECD-FAO, USDA, AHDB

Wheat: Although Tunisia has a trade deal with the EU, wheat imports from all origins are tariff free. The broad specifications included in the official tenders are said to result in lower quality, price oriented purchases.

Barley: The duty on barley imports (other than seed, which is duty free) is currently 17% for the majority of origins, including the EU. It's worth noting that negotiations between the EU and Tunisia area ongoing for a Deep and Comprehensive Free Trade Area (DCFTA) and agriculture is within the scope.

Imports are generally feed grade and used as supplementary feed for cattle and as such, the volumes are dependent on pasture conditions. Locally grown barley is used mainly in food products, such as soups, bread and couscous. The UK has consistently exported barley to Tunisia.

The growing beer market is dominated by Société Frigorifique et Brasserie de Tunis, with an 83% market share (Euromonitor, 2015). Despite the growth, the overall volumes of malting barley required are limited and so unlikely to represent an opportunity for UK barley.

Conclusion: Leaving the EU will not affect the tariff rates applicable to either UK wheat or barley, although there may need to be some consideration around phytosanitary requirements. The best opportunities for the UK going forward look to be for bread wheat and feed barley. However, the ongoing Tunisian free trade talks with the EU could present a challenge for barley if the EU gains a tariff advantage as a result.

Egypt

Egypt is heavily dependent on food imports, including wheat (for human consumption) and maize (for animal feed). The government has subsidised the cost of bread for a large proportion of the population (over 70m people). The retail food sector is growing as incomes rise and the population grows and foreign companies had been investing in the sector. Choice and higher quality are becoming more important amongst wealthier consumers, though value is still the key factor for much of the population. Further growth is expected for the sector, with the rate dependent on the economic outlook and political stability.

In the near term, strong inflation is a key factor for Egyptian consumers, with the Consumer Price Index above 30% in March 2017, and food inflation at over 40%. The Egyptian pound devalued sharply on 3 November 2016 after it was floated as a condition of IMF funding and is now (4/5/17) 53% weaker against the US dollar when one dollar was worth 8.8 Egyptian pounds. Given the reliance on food imports, this has reduced the country's purchasing power and resulted in increasing inflation. The IMF expects inflation to moderate in the medium term.

Measure	2015	2022 (f)	CAGR % change
Population (m)	89.00	103.39	2.2
GDP at current prices (US$bn)	332.08	n/a	n/a
GDP per capita (US$) at current prices	3,731	n/a	n/a
GDP per capita (US$) PPP	12,041	16,813	4.9
Real GDP % change	4.4	6.0	

(f) forecast
Source: IMF, April 2017

Imports '000 tonnes	2015	% change overall to 2025 (f)	Major suppliers shares
Wheat and Meslin (1001)	10,636	Medium	Russia (43%), Ukraine (17%)
of which Durum (100111 & 100119)	10	n/a	
Barley (1003)	95	Medium	Russia (54%), France (36%)
Maize (1005)	7,951	Low	Ukraine (36%), Brazil (25%), Argentina (20%)

(f) forecast
Note: Due to political unrest the 2015 Egyptian import data is unreliable so export data to Egypt has been used.
Source: UNComtrade, OECD-FAO, USDA, AHDB.

Wheat: Regular tenders by state buying agency, GASC, account for around 40% of the country's total wheat imports. Imports are tariff free and cost is the overriding consideration in terms of wheat purchases.

The UK is on the official GASC approved supplier list and this is not thought to be dependent on its EU membership. GASC tenders typically require wheat with a minimum of 10-12% protein, 200 seconds HFN and 76kg/hl specific weight, plus a maximum of 13% moisture and limits on impurities, admixture, defects and damage. UK wheat would typically meet the requirements in terms of protein, HFN and specific weight. However, the moisture content of UK wheat has averaged 14.9% over the last ten years (2007-2016, AHDB Cereal Quality Survey). Although fall-backs are applied up to 14%, moisture limits are important for storage safety and waste reasons due to the country's climate. This requirement would make the shipment of wheat to Egypt infeasible in the vast majority of seasons, without a significant improvement in port drying facilities across the UK.

GASC also requires 55-60kt vessels and there are a limited number of ports which can load this size of vessel in the UK. With one-port loading also preferred, being able to mobilise large volumes of grain quickly is important. There is some indication that private importers will accept smaller vessels (25-50kt), which would be more feasible but still require lower moisture contents than are typically seen in the UK.

Barley: Egypt currently imports very little barley, although there are no tariff restrictions and import levels are not expected to change. Maize is the principal feed grain.

Conclusion: Brexit will not impact the trade situation with Egypt. Imports of wheat from all origins are tariff free so leaving the EU would have no impact on the tariffs applicable. While UK wheat could meet some of the Egyptian requirements, moisture content and loading capacity are the main barriers, which would need overcoming for trade with this highly cost conscious buyer to be feasible.

Kenya

Kenya is the largest economy in Eastern Africa and acts as a hub for the surrounding region. It enjoys a good degree of diversification, which makes it less vulnerable to commodity price fluctuations. Kenya's economy has faced challenges in recent years, however, prospects are improving as the country consolidates its recovery.

The retail market in Kenya grew 13% in 2016 and continues to experience considerable growth. This can be attributed to increased purchasing power of the middle-class population and the availability of quality goods. Another factor is improved infrastructure that has allowed for ease of movement of goods.

Measure	2015	2022 (f)	CAGR % change
Population (m)	44.20	53.52	2.8
GDP at current prices (US$bn)	63.62	112.80	8.5
GDP per capita (US$) at current prices	1,439	2,108	5.6
GDP per capita (US$) PPP	3,218	4,622	5.3
Real GDP % change	5.6	6.5	

(f) forecast
Source: IMF, April 2017

Imports '000 tonnes	2015	% change overall to 2025 (f)	Major suppliers shares
Wheat and Meslin (1001)	1,226	High	Russia (39%), Ukraine (21%)
of which Durum (100111 & 100119)	0	n/a	
Barley (1003)	<1	High	Tanzania (77%), South Africa (23%)
Maize (1005)	459	Low	Tanzania (78%), Uganda (18%)

(f) forecast
Source: Trademap, OECD-FAO, USDA, AHDB.

Maize: Maize remains the staple food crop in Kenya and consumption is expected to continue increasing despite the diversification of Kenyan diets. Maize imports (non-seed) from all countries outside the East African Community (EAC) are subject to a 50% tariff. Furthermore, Kenya does not currently allow imports of genetically modified (GM) products, limiting potential origins.

Wheat: Wheat consumption in Kenya continues to increase due to changing dietary patterns and an expanding and robust food service sector. By 2030, around half of the country's population is expected to live in urban areas, which will further boost demand for packaged baked goods. International breakfast cereal brands are also popular.

The demand for wheat in Kenya is enhanced by the export of wheat products to the neighbouring countries, within the Common Market for Eastern and Southern Africa (COMESA). The COMESA region, with a population of over 400m people, provides a large market for Kenyan wheat products. There is limited use of wheat as animal feed in the region.

Domestic wheat production is constrained by unstable weather conditions, widespread use of farm-saved seed and the resultant prevalence of the wheat stem rust disease. As a result, domestic supply only meets 20% of consumption needs. Wheat imports are largely from Russia and Ukraine, suggesting price is a key consideration.

Barley: Imports are negligible as needs are dominated by local suppliers. Imports into Kenya by registered regional millers attract a 10% ad-valorem tariff, otherwise the EAC external tariff of 35% applies.

Rest of EAC: Tanzania and Uganda, which are also EAC members, may also offer potential for UK. Wheat is Tanzania's fourth most important crop after maize, cassava and rice. The current production of about 100,000 tons per year accounts for only 10% of total domestic consumption and the rest (approximately 1m tonnes) is met by imports.

Conclusion: The EU does not receive preferential tariffs on trade into the EAC, so the UK leaving the EU would not affect the tariffs applicable. There may be some opportunities in an expanding Kenyan (& EAC) wheat market for milling wheat to be used in baked goods production but competition from Russia and Ukraine is likely to prove the main barrier. Barley imports are negligible and not likely to offer any opportunities for the UK.

Saudi Arabia

Saudi Arabia is the largest economy in the MENA region, with its wealth derived from oil revenues. Recent fiscal austerity measures, on the back of depressed crude oil prices, have dented consumer confidence and are weighing on household spending.

Saudi Arabia is heavily dependent on imports of food including wheat (for human consumption), barley (for animal feed) and increasingly maize (for animal feed). Wheat and barley production is now virtually non-existent as part of water conservation measures.

Demand for wheat is expected to remain strong, with government targets to grow tourism, particularly relating to pilgrimages. The Saudi government's "vision 2030" aims to triple the number of people making pilgrimages to Mecca. Growth areas in retail include breakfast cereals, biscuits and snack bars. There is also a developing focus on health and wellness due to rising obesity levels.

Barley has traditionally been fed to livestock in a 'raw' format but the increasing marketing of compound feed is resulting in higher demand for other feed ingredients, including maize.

Measure	2015	2022 (f)	CAGR % change
Population (m)	31.02	35.75	2.0
GDP at current prices (US$bn)	651.76	837.25	3.6
GDP per capita (US$) at current prices	21,014	23,421	1.6
GDP per capita (US$) PPP	54,949	60,820	1.5
Real GDP % change	4.1	2.1	

(f) forecast
Source: IMF, April 2017

Imports '000 tonnes	2015	% change overall to 2025 (f)	Major suppliers shares
Wheat and Meslin (1001)	1,404	Low	Germany (44%), Poland (22%)
of which Durum (100111 & 100119)	0	n/a	
Barley (1003)	6,494	Low	Russia (38%), Ukraine (25%)
Maize (1005)	2,318	Low	USA (44%), Argentina (34%)

(f) forecast
Source: Trademap, OECD-FAO, USDA, AHDB

Saudi Grains Organization (SAGO) is responsible for both hard milling wheat and feed barley imports, issuing regular international tenders. Companies, rather than grain origins, need to be approved by SAGO to take part in the tenders. Imports of both grains are tariff free.

Wheat: SAGO requirements include a minimum of 12.5% protein content, minimum 77kg/hl specific weight and a HFN greater than 270 seconds. The biggest barrier to exporting UK milling wheat to Saudi Arabia is the requirement for a maximum moisture content of 13%.

The growth in biscuit and breakfast cereal products could open some doors for the export of soft milling (biscuit) varieties. This is a developing market with an increasing number of western branded sweet products being sold in the region.

Barley: A minimum 62kg/hl specific weight and a maximum 14% moisture content are amongst SAGO's requirements. The UK can and does meet these requirements, though some drying may be required to reduce moisture content in some seasons.

Conclusion: Imports of both wheat and barley into Saudi Arabia are tariff free for all suppliers and so the UK leaving the EU will not impact these. The UK already does already export feed barley to Saudi Arabia, though reducing growth in barley feed demand could act as a significant barrier for the UK to increase its market share. For wheat, the requirement for lower moisture is the main barrier the UK would have to overcome.

The United Arab Emirates

The United Arab Emirates (here after UAE) population has grown on average by 3% per annum over the past five years, reaching around 9.58m people in 2015. Food consumption in the UAE has been growing at a rate of 12% per year. Demand for food has increased as a result of the population growth, economic recovery and an influx of tourists. The country's prominent position as a re-export hub in the region is also a factor.

With limited food production, the UAE depends on imports. As a result, food supply disruption and or price changes are likely to significantly impact its food security, making food security a critical policy issue. Consequently, the UAE government is taking measures to secure and control food supply by signing offshore farming contracts. Wheat and barley imports are tariff free.

At present the UAE federal government does not provide subsidies for wheat, barley, rice, or maize. However, the Emirate of Abu Dhabi provides a subsidy to end-users of these products i.e. registered mills and processors.

Measure	2015	2022 (f)	CAGR % change
Population (m)	9.58	11.77	3.0
GDP at current prices (US$bn)	370.30	541.05	5.6
GDP per capita (US$) at current prices	38,650	45,988	2.5
GDP per capita (US$) PPP	67,082	77,803	2.1
Real GDP % change	3.8	3.2	

(f) forecast
Source: IMF, April 2017

Imports '000 tonnes	2015	% change overall to 2025 (f)	Major suppliers shares
Wheat and Meslin (1001)	895	Low	Russia (55%), Canada (31%)
of which Durum (100111 & 100119)	32	n/a	
Barley (1003)	505	High	Australia (40%), Argentina (27%)
Maize (1005)	546	Low	Argentina (46%), Brazil (33%)

(f) forecast
Source: Trademap, OECD-FAO, USDA, AHDB

Wheat: Wheat is primarily imported through a handful of food buyers and mills in the UAE, with Russia and Canada currently the key suppliers. According to the USDA, 70% of wheat imported into the UAE is white medium, hard and 30% is blend of white hard and soft varieties. Historically, the UAE has imported wheat in a protein range of 12.5%-15.5%. Wheat is consumed in the forms of bread, cake, pastry, snacks, and sweets. The most popular breads in the UAE are tandoori bread, pita or flat bread and chapatti bread.

Barley: Barley is imported, largely from Australia and Argentina for use in animal feed. Providing economic conditions remain favourable, a developing livestock sector will likely stimulate demand for barley as animal feed in future years.

Conclusion: Imports of both wheat and barley are tariff free for all suppliers and so the UK leaving the EU will not have an effect on the tariffs applicable. The UAE and other countries in the Gulf region such as Qatar, Kuwait, Oman and Iran could offer opportunities for wheat, though protein content may prove a challenge, and feed barley. Due to the Middle Eastern climate, the maximum permissible moisture content in wheat is also likely to be a consideration, though this will need to be clarified.

China

The People's Republic of China (here after China) was the most populous country in the world in 2015. It was also the world's second-largest economy and the world's third-largest importer of agri-food and seafood products (considering the EU as a single market).

Rapid economic growth and development in China has produced over 300m consumers with higher levels of disposable income and an appetite for shopping. It is estimated that this emerging middle class will reach 500m people by 2020. This is fuelling a rapid expansion of the processed food and foodservice sectors, along with growth in convenience, premium and specialty products, including craft beer.

China is the second largest producer of maize and wheat in the world (behind the USA and EU respectively). Policy places a large role in Chinese agriculture, with financial incentives for the production and usage of specified grains.

Measure	2015	2022 (f)	CAGR % change
Population (m)	1,374.62	1,432.26	0.6
GDP at current prices (US$bn)	11,226.19	17,706.63	6.7
GDP per capita (US$) at current prices	8,167	12,363	6.1
GDP per capita (US$) PPP	14,328	23,960	7.6
Real GDP % change	6.9	5.7	

(f) forecast
Source: IMF, April 2017

Imports '000 tonnes	2015	% change overall to 2025 (f)	Major suppliers shares
Wheat and Meslin (1001)	2,973	High	Australia (42%), Canada (33%)
of which Durum (100111 & 100119)	1,707	n/a	
Barley (1003)	10,732	Negative	France (41%), Australia (41%)
Maize (1005)	4,730	High	Ukraine (81%), USA (10%)

(f) forecast
Source: Trademap, OECD-FAO, USDA, AHDB

Wheat: Demand for high protein, strong gluten wheat is increasing due to the expansion of the affluent middle-class. China's national objective is to expand the area, yields and quality of wheat to meet consumer demand. However, the high support prices domestically make imported high protein wheat more attractive.

Wheat faces strong competition from maize for animal feed demand, with wheat usage driven by availability, quality and price.

In addition, China operates significant barriers to international trade of imported grains. First, wheat imports are controlled by a TRQ. The annual TRQ for wheat is set at 9.64m tonnes and the only origins eligible are Australia, Canada and the USA. The TRQ is dominated by China's state owned enterprises; the private sector is allocated only 10%. This is currently being challenged, along with China's price support mechanisms by the USA via the WTO. Out of quota imports and imports from the EU face a tariff of 65%.

Sanitary and phytosanitary requirements are also a potential barrier to trade, being extremely variable and uncertain for imported goods. The General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) has the ability to amend and create new import rules independently which makes the future direction of import regulation highly opaque.

Barley: Domestic barley production does not receive any government price support and is as such, is more open to global supply and demand influences. Like feed wheat, feed barley faces strong competition from maize. In March 2016, China removed a price-floor for domestic corn which meant that domestic prices reduced to align with cheaper imports. Short term, the lower domestic maize prices have reduced the incentive to feed barley to animals and usage has dropped to its lowest level in five years.

Unlike wheat and maize, barley imports are not controlled by quotas and are only subject to low tariffs (0% seed, 3% other). However, AQSIQ have made import protocols more difficult in recent months to allow excess domestic maize reserves to be eroded. Australia is able to export barley tariff free under the China-Australia Free Trade Agreement.

Australia, Canada and France have been the largest exporters of barley into China due to favourable quality specifications for dual use feed/malting barley. Australia and Canada's ability to produce high quality, large volume malting barley shipments may create difficulties for the UK to export high volumes of malting barley. The UK has protocol approved to ship barley to China but as yet, no barley has yet been shipped from the UK to China.

Demand for imported craft beers are expected to increase in demand as consumer appetites switch to a more western style. Domestic UK craft beers and ales could see an increase in demand from China in the future, and so support UK domestic malting barley demand.

Conclusion: In terms of tariffs, the EU does not have a competitive advantage into China so the UK's leaving would have little impact on this aspect of trade. However, the type of milling wheat for which demand is growing is not currently what the UK produces, and furthermore, unless a favourable trade deal could be arranged, the tariff levels would be prohibitive to trade. Barley would need to compete against Australian and Canadian supplies and is also to an extent subject to Chinese policy decisions.

Japan

Japan is the fourth largest net importer of agri-food products worldwide, as the country has a shortage of arable land. In addition, Japan's food and drink market is one of the largest globally, with high per capita spending and consumption levels. However, growth in food sales is forecast to be sluggish due to on-going weak economic growth and a declining population.

A tendency towards eating out and consuming 'ready to eat' meals containing wheat has led to a 4% increase in per capita wheat consumption over the past ten years. Bread, rice and cereals value sales are forecast by BMI Research to continue to increase by more than 2% per annum to 2020.

The beer market in Japan has been declining and is forecast by BMI Research to continue to decline by around 1% per annum in value in their forecasts from 2016 to 2020. In contrast, spirit sales are forecast to rise by 6.5% per annum over the four years to 2020. Japan is one of the world's largest whisky producing countries and domestic demand is on the rise.

Measure	2015	2022 (f)	CAGR % change
Population (m)	126.98	123.83	-0.4
GDP at current prices (US$bn)	4,382.42	5,368.19	2.9
GDP per capita (US$) at current prices	34,513	43,351	3.3
GDP per capita (US$) PPP	40,312	50,075	3.1
Real GDP % change	1.2	0.6	

(f) forecast
Source: IMF, April 2017

Imports '000 tonnes*	2015	% change overall to 2025 (f)	Major suppliers shares
Wheat and Meslin (1001)	5,531	Negative	USA (50%), Canada (29%)
of which Durum (100111 & 100119)	221	n/a	
Barley (1003)	1,111	Negative	Australia (19%), Ukraine (17%)
Maize (1005)	14,708	Low	USA (80%), Brazil (16%)

*estimates, (f) forecast
Source: Trademap, OECD-FAO, USDA, AHDB

The Japanese agricultural ministry (MAFF) is heavily involved in the import trade. As well as direct purchases, MAFF issues weekly Simultaneous-Buy-And-Sell (SBS) tenders, where the end-user specifies the origin, price, and volume of grain required for a shipment and delivery period. The government then issues the global tender and receives offers, which it then decides to accept or not.

Maize is historically the largest feed grain used and imported. Feed grain import demand is price driven and a sluggish livestock sector limits growth.

The EU does not have advantage over other countries when it comes to tariffs. Japan implements ad valorem and fixed tariffs and these vary by commodity code.

Wheat: Quality wheat opportunities may be limited as Japanese millers favour American, Canadian and Australian grades, such as Hard Red Winter (HRW), Dark Northern Spring (DNS), Canadian Western Red Spring (CWRS) and Australian Standard White (ASW), which are used for bread and / or noodles. This is due to historic use and strong trade links with country of origin.

Feed wheat demand fluctuates depending on price competitiveness to other feed grains but demand is limited by the shrinking livestock population and vast historic corn usage. Demand for feed wheat imports has been strong through 2016/17 as Black Sea feed wheat prices have been competitive with corn and sorghum into feed rations.

Although Australia has a tariff advantage for feed wheat via the 2015 Japan-Australia Economic Partnership Agreement (JAEPA), none has been imported since 2013/14. The sheer competitiveness of Black Sea supplies has more than offset the tariff advantage Australia has. To compete into the Japanese market the UK would have to overcome the Black Sea competitors and tariff advantage that Australia enjoys.

Barley: Barley imports are controlled under the SBS system in two categories: category 1 for bulk shipments and 2 for containers. JAEPA resulted in feed barley imports from Australia being liberalised. This could act as a barrier to future trade with the UK. The UK had success in 2014/15 but a year later shipments fell by 70%. This could be related to the preferential access that Australia now has.

Declining livestock inventories are expected to curtail opportunities for feed barley import growth. Meanwhile, food, seed and industrial consumption is expected to remain largely unchanged.

Conclusion: The UK leaving the EU would have no effect on tariffs at present as the EU has no preferential trade deal. Japan and the EU are in talks about a possible free trade deal but as yet it is not clear what this would cover. It is possible therefore, that the EU could have a competitive advantage in the future if lower tariffs were introduced for EU countries.

The USA is also currently looking at a bilateral trade deal with Japan now that it has exited from the Trans-Pacific Partnership agreement (TPP). Under the TPP it is possible Australia may gain further preferential access to Japan if negotiations continue.

Despite the distance involved, Japan is one of the UK's largest non-EU markets and further opportunities may be available, particularly for malting barley, although competition is strong. Feed wheat and barley may represent more of an opportunistic prospect, dependent on global maize prices, UK supplies and crop conditions in Australia and the Black Sea.

South East Asia

South East Asia's food and drink industry is forecast to show strong growth, with food consumption patterns also expected to become more sophisticated. This will be driven by rising affluence and mass grocery provision. Growing middle classes and demand for convenience, coupled with growing tourism, particularly in Thailand and Vietnam, is driving increased interest in premium products.

Wheat consumption is expected to increase, with most of the growth set to come from convenient wheat-based products, such as, instant noodles and bakery products. However, exporters will be faced with complex supply chains due to a lack of deep water ports, challenging road and rail logistics as well as, regulatory diversity across the region.

UK bread wheat would generally not be suitable for bread making in this region as hard, high protein wheats, such as US DNS and CWRS are favoured. UK biscuit wheat could be suitable if it could compete on price, particularly against Australian soft wheat. UK bread and biscuit wheat could have some limited use in noodle production but it would only be for certain types of noodle and would need to be blended.

For the four countries considered here (Thailand, Vietnam, Indonesia, and the Philippines), the EU gains no advantage over other nations in terms of the tariffs applicable on imports. Overall, this region could offer some opportunities for bread and biscuit wheat, plus feed wheat but the UK would face strong competition. In general tariff levels for wheat and barley are low in the region.

Looking specifically at the key countries:

Thailand:

Thailand's food sales have been increasing at over 6% per annum and this is projected to rise over 7% in the years to 2020. This is being driven by increased affluence and tourism.

However, OECD-FAO projections are for low growth for wheat imports into Thailand to 2025. Subsequent to this, legislation imposed in January 2017 seems likely to lead to a decline in feed wheat imports. Permits are now needed to import feed wheat and the importer must show a 3:1 domestic maize usage ratio (3 tonnes of domestic maize to 1 tonne feed wheat). The restrictions are aimed at protecting domestic maize producers.

Milling wheat imports are forecast to increase as demand from the baking and food sector increases. A protein content of 14% has historically been required and the UK may struggle to achieve this.

Alcohol sales are predicted by BMI Research to decline over the next four years due to activity by Thailand's strong anti-alcohol lobby, suggesting limited opportunities for barley imports.

Vietnam:

Particularly strong growth in retail sales, including food, beer and spirits, is forecast for the period to 2020 due to rising incomes. Wheat imports are forecast to grow marginally on the back of ongoing economic development. The UK is subject to a tariff of 5% on wheat but Australia, Russia and Kazakhstan have tariff free access. Barley is tariff free for all Most Favoured Nations.

Indonesia:

Despite a recent slowdown, Indonesia's economy will continue to make advances, with consumers likely to enjoy higher levels of disposable income. Indonesia does not produce wheat and is fully reliant on imports. Indonesia's per capita flour consumption has been increasing due to stable economic conditions allowing the middle/upper class to move towards a more westernised diet. Feed wheat and barley imports are expected to fall dramatically as the government restricts imports to encourage usage of domestic maize.

Philippines:

The continued inflow of remittances from overseas Filipino workers and the sustained growth of the business process outsourcing sector, along with a lower inflation has helped drive the Philippine retail sector. Food sales are forecast to grow at over 8% per annum to 2021 with bread, rice and cereals growing at around 5% (BMI Research). Both beer and spirit sales are forecast to grow strongly due to the emergence of craft beer and a developing cocktail culture.

The Philippines is highly reliant on wheat imports and the USA is largest supplier of milling wheat. Demand is growing as the population expands by 2% per annum and two new flour mills are set to open this year, with two more due to be commissioned next year. Long term expansion of milling and feed industries, as well as government backed infrastructure development, is expected to keep grain consumption on an upward trend. Milling wheat can be imported at zero tariff, whilst feed wheat imports have a 7% duty.

The UK may stand to gain from feed wheat exports in future years when prices are competitive against other feed grains and wheat export origins. Barley imports are small and tariff free. The craft beer culture could offer opportunities for malting barley imports but the UK would face strong competition from Australia, the current major supplier.

Profile: Other countries/regions

A number of other countries were not considered within the scope of this report but could merit further investigation in the future. These include:

USA:

The UK's second largest non-EU export market for wheat over the past five seasons. The USA is amongst the world's largest producers of both wheat and maize and so usually has ample supplies of both human and feed grain supplies. However, the logistics of the country can occasionally make internal transport to specific regions challenging or more expensive. In these sporadic situations, imports of feed grade wheat can be attractive and prove useful to negating positions. However, these are purely sporadic opportunities.

Mexico:

The country currently imports large quantities of milling wheat from the USA, supported by the North American Free Trade Agreement and from Russia / Ukraine for blending purposes. However, the Trump administration has signalled a desire to revisit this agreement. If it is revisited, some limited opportunities may emerge. Mexico imported 4.8m tonnes of wheat, 14.0m tonnes of maize and 0.2m tonnes of barley in 2015/16 (USDA). Although Mexico and the EU have a free trade agreement, it does not cover sensitive agricultural products, including cereals. Australia is looking to gain tariff free access through the TPP within 10 years for wheat. Current wheat tariffs for non-seed are typically 15%.

Israel and Lebanon:

Although, the UK shipped some wheat to Lebanon and barley to Israel last season, the two countries import less wheat, barley and maize than many of the countries considered within this report. Combined, they typically require in the region of 2.1m tonnes of wheat, 2.0m tonnes of maize and 0.3m tonnes of barley. Geographical proximity gives Russia, Ukraine and other Black Sea exporters' considerable advantage.

Iceland and Norway:

Production of grain in both countries is limited compared to their needs and they currently import wheat (and barley in the case of Norway) from the UK. However, these requirements are relatively limited compared to the other countries considered in this report. Norway imported 36,000 tonnes of wheat and 21,000 tonnes of barley in 2015/16, while Iceland generally imports around 35,000 tonnes of wheat and 15-20,000 tonnes of barley per year. Although both countries are members of the European Economic Area (EEA), there is relatively little advantage compared to non-members in terms of the tariffs payable on imports of wheat and barley by Norway and Iceland.

West Africa:

The region collectively imported 8.8m tonnes of wheat in 2015/16 (USDA) but has strong historical trading ties to France and the USA.

Cuba:

Imports by the country are relatively small, with approximately 0.5m tonnes of wheat and 0.6-0.8m tonnes of maize in recent years. The USA is the main supplier and has a strong geographical advantage.

GLOSSARY

Abbreviation	Definition
AEGIC	Australian Export Grains Innovation Centre
AQSIQ	The General Administration of Quality Supervision, Inspection and Quarantine, a ministerial-level department under the State Council of the People's Republic of China
ASW	Australian Standard White wheat
CAGR	Compound Annual Growth Rate, the mean (average) rate of growth over the defined period
COMESA	Common Market for Eastern and Southern Africa
CWRS	Canadian Western Red Spring wheat
Current prices	Current prices are the market prices of goods for the current reporting period. Also known as nominal price. Also known as the market value, the current price is the price at which goods are currently being sold in the market
DCFTA	Deep and Comprehensive Free Trade Area
DNS	Dark Northern Spring wheat
EAC	East African Community
EEA	European Economic Area
EU	European Union
FTA	Free Trade Agreement
GASC	General Authority For Supply Commodities, the state buying agency in Egypt
GDP	Gross domestic product (GDP) is a monetary measure of the market value of all finished goods and services produced within a country's borders in a specific time period
GDP per capita	The GDP of a country divided by the population of that country as of 1 July of that year
GM	Genetically Modified

Abbreviation	Definition
HFN	Hagberg Falling Number (measured in seconds)
HRS	Hard Red Spring wheat
HRW	Hard Red Winter wheat
IMF	International Monetary Fund
JAEPA	Japan-Australia Economic Partnership Agreement
MAFF	Ministry of Agriculture, Forestry and Fisheries, the Japanese government ministry
MENA	Middle East and North Africa
MFN	Most Favoured Nation
OAIC	Office Algérien Interprofessionnel des Céréales, the state buying agency in Algeria
OECD-FAO	Organisation for Economic Co-operation and Development - Food and Agriculture Organisation
ONICL	National Interprofessional Office for Cereals and Leguminous Plants, the state buying agency in Morocco
PPP	Purchasing Power Parity (PPP) is measured by finding the values (in US$) of a basket of consumer goods that are present in each country. This then allows for comparison of GDP in terms of what it can purchase in each country. This is expressed in US dollars
Real GDP	Real gross domestic product (GDP) is a macroeconomic measure of the value of economic output adjusted for price changes (i.e. inflation or deflation)
SAGO	Saudi Grains Organization, the state grain buyer for Saudi Arabia
SE Asia	South East Asia
SPS	Sanitary and Phytosanitary Standards
TPP	Trans-Pacific Partnership
TRQ	Tariff Rate Quota
USDA	US Department of Agriculture
WTO	World Trade Organisation

Authors

Helen Plant | Senior Analyst
T: 024 7647 8759 **E:** helen.plant@ahdb.org.uk

Jack Watts | Lead Analyst
T: 024 7647 8760 **E:** jack.watts@ahdb.org.uk

Martin Doherty | Senior Analyst
T: 024 7647 8847 **E:** martin.doherty@ahdb.org.uk

In addition, a number of other colleagues from across the Market Intelligence team contributed to this report.

Many thanks to:

Dave Aldridge, James Webster, Sarah Baker, Amandeep Kaur Purewal, David Swales and Phil Bicknell.

AHDB
AGRICULTURE & HORTICULTURE DEVELOPMENT BOARD

Agriculture and Horticulture Development Board
Stoneleigh Park
Warwickshire
CV8 2TL