

York and North Yorkshire Local Enterprise Partnership (LEP) Internationalisation Strategy

Report 01 **Sub-Regional Strengths and** **Global Market Opportunities** May 2021

For the York and North Yorkshire LEP
(managed by Enterprise Growth Solutions
on behalf of the Department for
International Trade)



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MANAGEMENT SUMMARY

This contextual report is part of a series of reports to inform an internationalisation strategy for York and North Yorkshire (Y&NY).

1.1 INTERNATIONAL BUSINESS: INWARD INVESTMENT AND FOREIGN-OWNED COMPANIES

Inward investment can make a significant contribution to a local economy, from job creation and wages to productivity gains and fostering innovation, research and development. There have been some substantial regional investments in food and drink. However, the proportion of investors stating that their UK investment projects are still going ahead has dropped from 72% to 43% since the last survey in spring 2020. Of those, 21% intended to increase their investment, perhaps due to health and technology-based investments becoming more salient following the COVID-19 pandemic. COVID-19 has led to significant shifts in investor preferences. Specifically, there has been significantly increased interest in cleantech, digital, meditech and sustainability. Y&NY's strengths in agritech and sustainable technology could benefit from this change in focus.

There has also been a shift in policy interest since COVID-19, with 36% of investors naming resilient systems which have strong safety and security measures in place to minimise impact from crises as a key priority. Increasing manufacturing capacity in the Y&NY area will be one way to attract these investors who want to localise their supply chains and minimise the impact of future crises.

Foreign-owned companies (FOCs) are more productive than domestically owned ones. Their presence can also boost the spread of knowledge and productivity. There are 94 FOCs in Y&NY. Seven have more than 500 employees and five have a turnover of more than £100 million. Some 24% of foreign-owned businesses work in financial and professional services, followed by advanced engineering (22%). A total of 45% of FOCs are in York. However, there are clusters in Harrogate, Craven and Scarborough.

1.2 INTERNATIONAL CONNECTIONS

North Yorkshire attracts more than 4,500 international students to the University of York and York St John University (YSJ), while the sub-region has education infrastructure in place to encourage language learning, including the University of York's [National Centre for Excellence for Language Pedagogy](#). Net migration is down from 1,761 in 2009/2010 to 1,533 in 2018/2019, a 12.9% decrease. However, the effects of Covid-19 and Brexit have yet to reach sub-regional statistics. Measures may be required to make up the shortfall in agricultural migrant workers, and the region's R&D and science facilities must continue to retain highly skilled global workers. The analysis shows that, after Polish, Chinese and Asian languages feature highly in terms of those spoken.

According to VisitYork's August to October 2020 Quarterly Visitor Survey, 36% of people surveyed were visiting from Yorkshire, 63% were from elsewhere in the UK, and only 1% came from overseas. Staycations will remain popular, while short-haul European markets will recover quicker than long-haul tourism markets. The region has strong twinning links with France (four twin towns) and Germany (six twin towns), as well some further-flung destinations, which could be revitalised for trade and other purposes.

Regarding connectivity, east-west corridor route improvements have been identified as part of the North Yorkshire Local Transport Plan 2016-2045,¹ while proposed rail improvements will include double tracking and electrification of the York-Harrogate-Leeds railway as well as improved access to conventional and future high speed rail stations. The sub-region has six airports within a two-hour drive and commercial ports in Whitby and Scarborough. Approximately 140 vessels, with imports of 120,000t and exports of 34,000t, are handled annually at Whitby. Continued investment in this infrastructure will enhance business access international markets, encouraging outward and inward overseas trade and investment.

1.3 SUB-REGIONAL STRENGTHS: AGRITECH, THE BIO-ECONOMY AND FOOD & DRINK

A global problem that needs solving is that demand for food is growing. The world's population is on track to reach 9.7 billion by 2050, requiring a corresponding 70% increase in the calories available for consumption. Additionally, the cost of the inputs needed to generate those calories is rising. By 2030, the water supply will fall 40% short of meeting global water needs, while rising energy, labour and nutrient costs are putting increasing pressure on profit margins.

It is estimated that approximately one-quarter of arable land is now degraded and needs significant restoration before it can once again sustain crops at scale. Constraints on global resources, such as food and water, will increasingly play into the global expansion of the knowledge-intensive bioeconomy. Regulation and the ensuing demand for, and investment in, low carbon solutions are set to increase.

These changes mean that key industry and agri-food players, from corporates to growers, are looking for new technologies and solutions that can give them an edge in terms of productivity and competitiveness. The development of new communications and digital technologies including AI, precision robotics, computer vision, sensors, autonomous systems and geospatial technology are set to revolutionise the fields of food and drink, agriculture and the bioeconomy across global markets. Digital transformation is driving new investment globally.

Major changes in consumer tastes, as well as concerns over sustainability and animal welfare, are driving new consumption profiles with profitable, new market segments such as alternative proteins (plant-based meat and dairy), controlled environment agriculture and bio-based additives (seaweed) growing strongly. Traditional geographic markets such as the EU and US will continue to be promising for Y&NY companies, despite current challenges around new EU-exit trade frictions. Looking ahead, newer markets in Asia, Latin America and Africa will open, while markets such as Japan could grow significantly on the back of the recent free trade agreement (FTA).

Recognising the market opportunity, Y&NY LEP is aiming to be the UK's first carbon-negative region by 2040. It can do this and grow its economy by learning from global cities like Copenhagen, which has continuously attracted more international students, skilled professionals and innovative businesses to help maintain its high level of human capital, productivity growth and inward investment in a virtuous cycle of 'green growth'.

The Y&NY region has a rich and vibrant narrative that can be explored around the three key sectors, with many specialist and complementary businesses – both large and small – in local authority areas supporting the wider region's ambitions on internationalisation. In particular, the Y&NY regional

¹ North Yorkshire County Council (2016), North Yorkshire Local Transport Plan (2016-2045). [Available here.](#)

strengths in intellectual property (IP), innovation and R&D, as well as its plethora of knowledge-based private and public sector assets, including multinationals, SMEs, universities and research centres, will support the growth of these market opportunities.

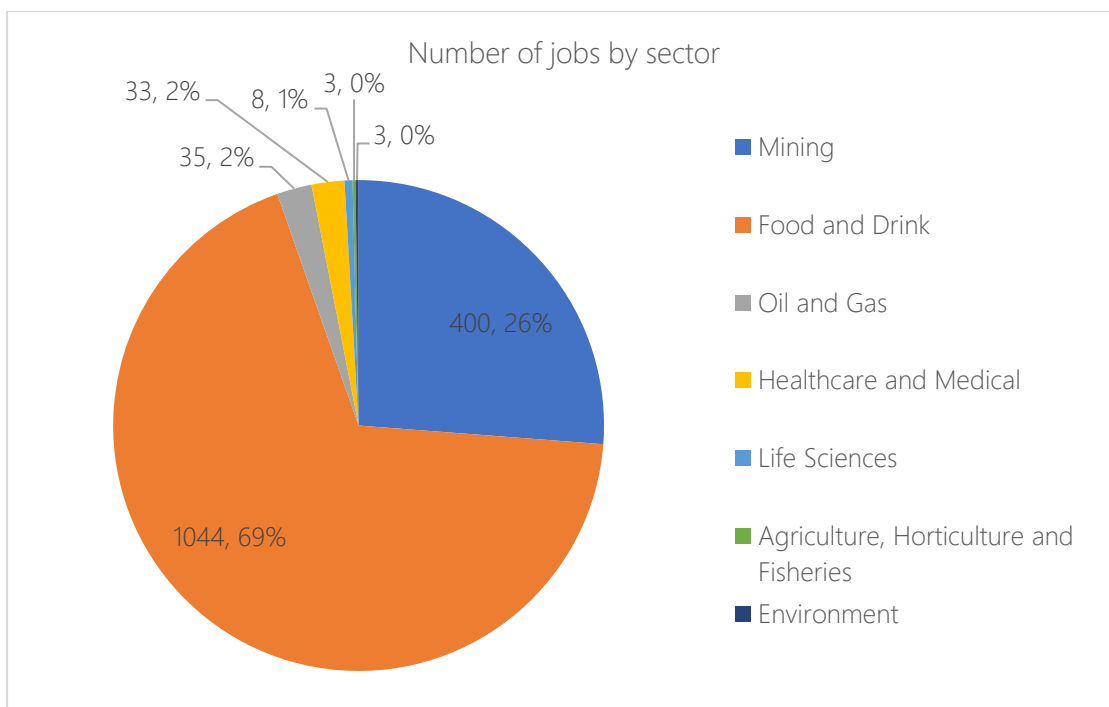
The regional innovation ecosystem will benefit from further strengthening – with a greater focus on R&D (both public and private) to drive innovation and higher-margin activity as well as the need for new funding to support international collaborations. There will need to be a much greater emphasis on the successful commercialization of new ideas and technologies as well as a real focus on go-to-market support, an area in which the UK has traditionally underperformed. The region is well placed to attract a greater share of investment finance and capital into the region’s ecosystem and companies and so exploit global markets, but it needs additional resource and ‘boots on the ground’ to do this effectively.

1. INTRODUCTION: OVERVIEW OF INTERNATIONAL BUSINESSES – INWARD INVESTMENT AND FOREIGN OWNED COMPANIES

This contextual report is part of a series informing an internationalisation strategy for York and North Yorkshire (Y&NY). This chapter summarises two key aspects of internationalisation: inward investment and foreign-owned companies. Inward investment can make a significant contribution to a local economy – beyond job creation and wages to productivity gains and fostering innovation, research and development. Similarly, foreign-owned firms are more productive than domestically owned ones and their presence can boost the spread of knowledge and productivity.

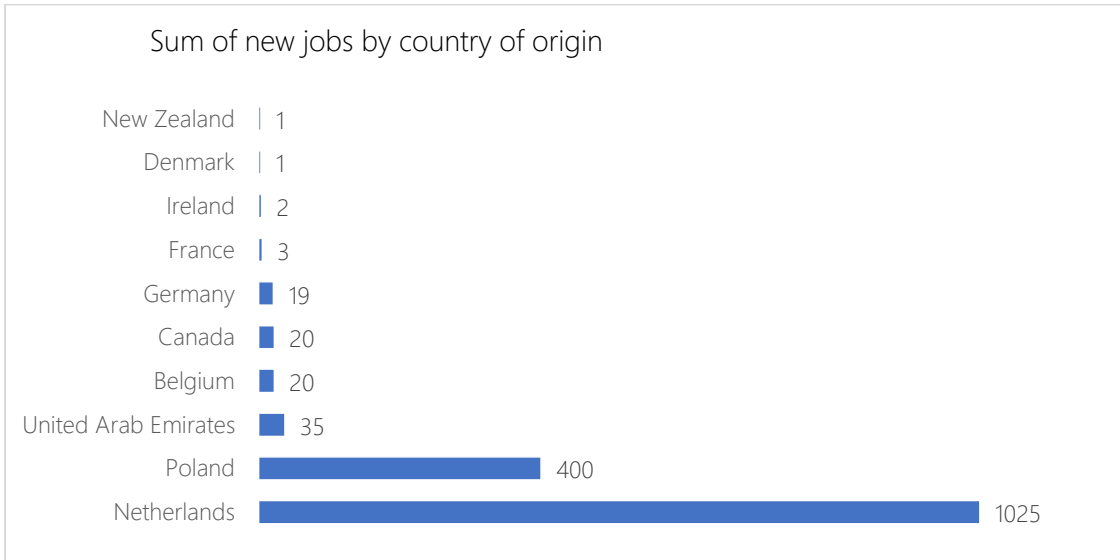
1.1 INWARD INVESTMENT

FDI SUMMARY FOR 2019/2020

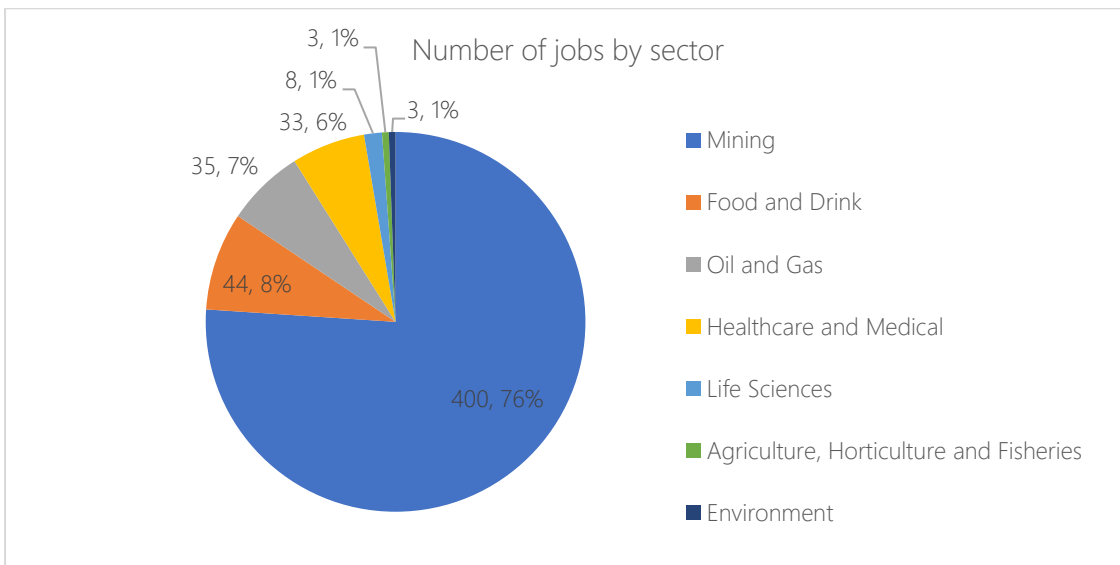


The Department for International Trade (DIT) recorded 104 projects across Yorkshire and the Humber, creating 2,264 jobs and safeguarding 351 existing jobs in 2019/2020. Of these, there were 11 new inward investment projects in Y&NY, creating 218 new jobs and safeguarding a further 38. A further four multi-region FDI projects secured 39 jobs. DIT data further showed that an increasingly high proportion of inward investment projects (34%) went to London, and 61% in total went to other major cities (including members of the Core Cities group) across England, Scotland and Wales. This demonstrates that significant work must be done to improve investment in the North while existing businesses must be retained and their expansion promoted. New FDI jobs have centred primarily around the food and drink sector, as demonstrated in the below chart.

Most new jobs came from investments from the Netherlands due to a 2018 investment in pubs by Heineken, which created 1,000 jobs. However, this is not specific to Y&NY.



The following chart excludes the Heineken jobs and focuses on York and North Yorkshire projects, including collaborative projects with the Humber.



The large proportion of mining jobs is due to a contract between Sirius Minerals and Canadian DMC Mining, a subsidiary of Polish KGHM, for sinking four polyhalite mining shafts below the North Yorkshire Moors. Whilst this is primarily a mining project, the extracted mineral will then be used for Sirius' sustainable multi-nutrient fertiliser, providing an additional agricultural benefit. The mine itself, once constructed, should provide a further 1,000 jobs in North Yorkshire.

IMPACT OF COVID-19 ON INWARD INVESTMENT

The Autumn Update of Ernst & Young's (EY) UK Attractiveness Survey 2020 analysed investor sentiments in relation to COVID-19. Investors remain reasonably convinced of the UK's economic resilience. However, the proportion of investors stating that their UK investment projects are still going ahead has

dropped from 72% to 43% since the last survey in spring 2020. Of those, 21% intended to increase their investment, perhaps due to health and technology-based investments becoming more salient following the COVID-19 pandemic. EY considers it likely that 2020 will show a sharp drop of up to 40% in FDI across the UK relative to previous years but thinks that 2021 will show normalised FDI figures once the COVID-19 situation has stabilised. This is due to the UK's underlying resilience.

Overall, COVID-19 has led to significant shifts in investor preferences. Regarding sector, there is a significantly increased interest level in cleantech, digital, meditech and sustainability. Y&NY's strengths in agritech and sustainable technology could benefit from this shift in focus.

There has also been a shift in policy interest since COVID-19, with 36% of investors naming resilient systems which have strong safety and security measures in place to minimise impact from crises as a key priority. When asked to select three European countries with the most credible recovery plans, more than half of investors (57%) named Germany, with 43% naming France and the UK coming third at 37%. In contrast, interest in local skills and labour is down to 19% and 17% respectively, from 25% and 21%. This suggests that Y&NY needs to focus on improving resilience and planning to attract inward investment. The region cannot rely on developing the local skill base alone. One way to improve crisis resilience is by making more local supply chains viable; indeed, 32% of respondents intend to increase their operation of local-based supply chain models. Increasing manufacturing capacity in the Y&NY area will be one way to attract these investors who want to localise their supply chains to minimise the impact of future crises.

RECENT INVESTMENTS

The image overleaf shows some substantial planned and recent investments in the sub-region, including food and drink investments:

- An £80m plant expansion in Selby for Sedamyl UK, a manufacturer of starches, sweeteners, proteins and alcohol.
- A £42m production and warehouse expansion by soft drinks market Cawingredients at Leeming Bar Industrial Estate.
- A £20m L'Anson Brothers investment in one of the most technologically advanced feed mills in Europe.
- A £7m vegan research hub for Quorn.
- A £1.5 investment in machinery for Heck.

Within York, inward investment since 2015 has been led by Make It York, who also deliver tourism and other business activities. Successes include investment in the York Bio-Tech Campus. Investment at the local authority level is covered in Annex 2.

Soft drinks maker Cawingredients is investing £42M in its site at Leeming Bar Industrial Estate in North Yorkshire, creating more than 100 jobs and boosting production and warehouse capacity.

£1m investment in Catterick Garrison manufacturing plant

January 13, 2021 Joe White News

Job boosting £105m business park opens



First phase of £17m former prison redevelopment now open for business



HECK INVESTS £1.5M IN MACHINERY



WORK BEGINS ON £20M I'ANSON BROTHERS FACILITY

October 20, 2020 Yorkshire Property, Manufacturing

Biotech campus emerges as York agri-tech centre recognises recent evolution

Covid-19 research and other wider work has seen a change of emphasis for York site

NEWS
20th February
Work to start next week on Millennium Green for York Central

Quorn to build £7m vegan research hub in UK as food sales soar

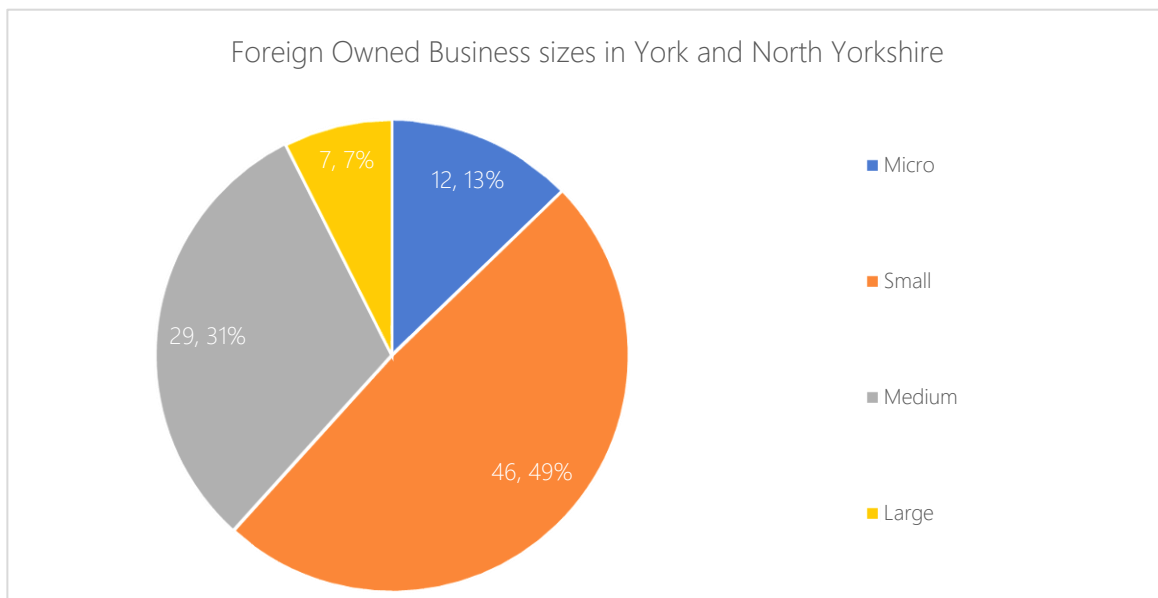
The food maker's new plant in North Yorkshire will create hundreds of jobs and aim to capitalise on a growing appetite for meat-free products



Sedamyl provides boost to Yorkshire economy and signals growth ambitions with £80m expansion of Selby plant

February 2021

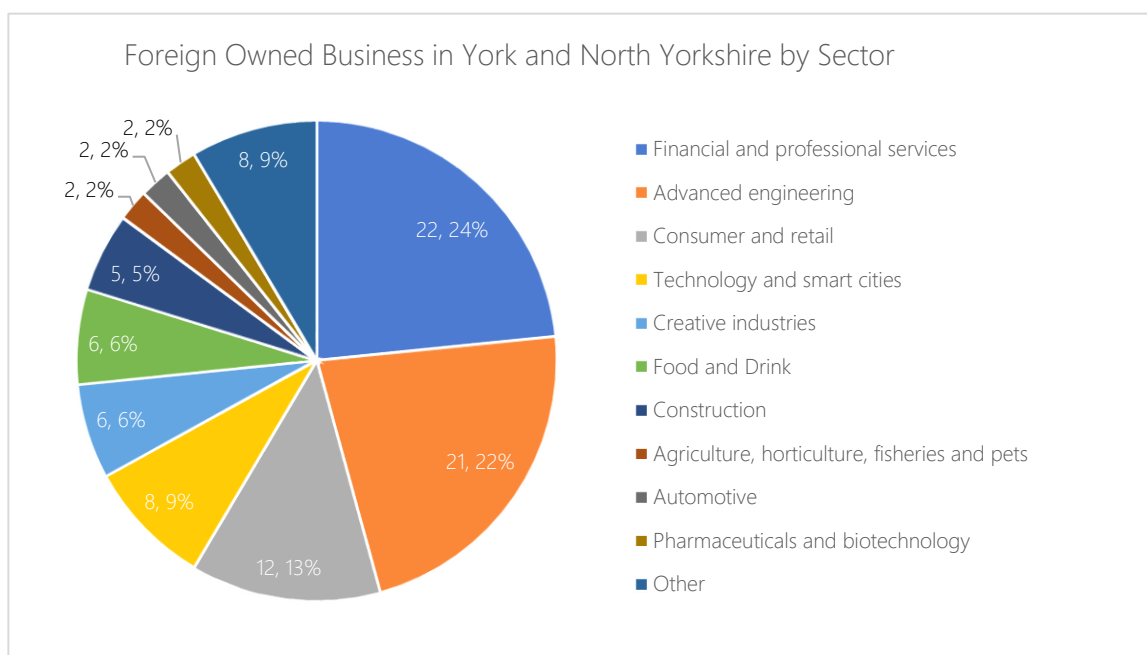
1.2 FOREIGN OWNED BUSINESSES



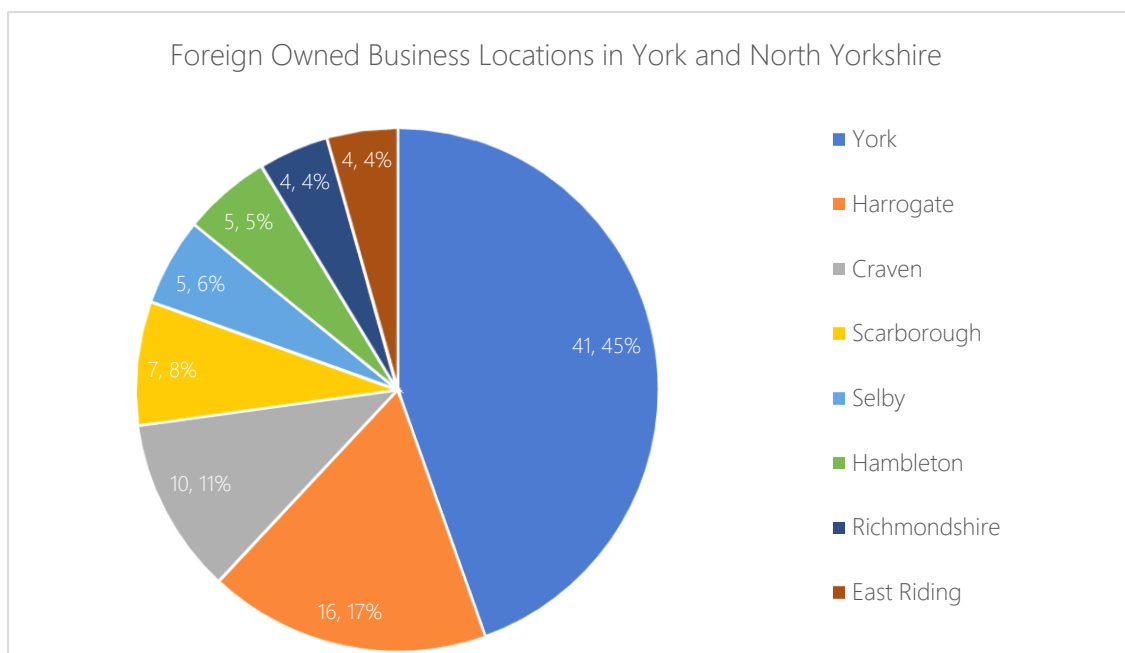
There is a substantial body of evidence showing that foreign-owned firms are more productive than domestically owned ones (see [Griffith et al. \(2004\)](#) and that their presence can boost the spread of knowledge and productivity. For example, [Haskel et al. \(2007\)](#) document the existence of knowledge spill-overs from foreign companies located in the UK to domestic companies. [Griffith et al. \(2002\)](#) find that greater foreign presence within an industry increases the speed with which technology in that industry converges towards that of the world's most productive firms.

A review of commercial data relating to foreign-owned companies identified 94 foreign-owned businesses in Y&NY. Of those, 13% (12) were micro businesses (less than ten employees), 49% (46) were small (10-149 employees), 31% (29) were medium (50 to 499 employees) and 7% (7) were large (more than 500 employees).

The foreign-owned companies cover a broad range of sectors, including LEP priority sectors. Financial and professional services were most abundant (24%, 22 businesses), followed by advanced engineering (22%, 21 businesses), and consumer and retail (13%, 12 businesses). Six per cent (six) of foreign-owned businesses operate within the food and drink sector while 2% (two) operate within agriculture, horticulture, fisheries and pets. There may be scope to attract more foreign-owned firms in the priority sectors given the level of investment identified earlier, particularly in food and drink.



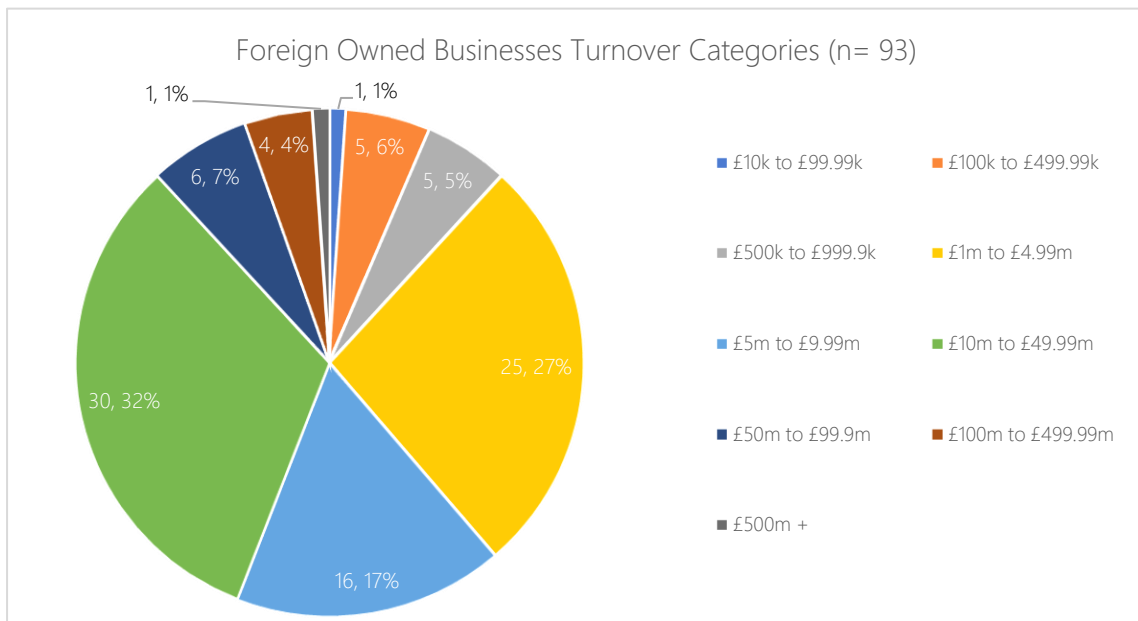
Whilst there is a cluster of foreign-owned companies in the cities, they are reasonably scattered across the sub-region. Just under half of all foreign-owned businesses are in York (45%, 41 businesses), followed by Harrogate (17%, 16 businesses, including four in Knaresborough and two in Ripon) and Craven (11%, 10 businesses in Skipton). Scarborough has 8% of the foreign-owned businesses (seven businesses), including two in Filey. The other districts have between four and five foreign-owned businesses each. It is interesting that there are clusters of firms in Scarborough and Craven (seven and 10 businesses respectively).



The turnover of these foreign-owned companies is somewhat significant. Almost a third (32%, 30 firms) of foreign-owned companies have a turnover of between £10m and £49.99 million. A further 27% (25 companies) have a turnover of between £1m and £4.99m, while 17% (16 firms) have between £5m and £9.99 million. Eleven (12%) businesses have a turnover of £50m or more. Key foreign-owned companies include:

- Sedamyl UK, a leading manufacturer of starches, sweeteners, proteins and alcohol.
- Kinnerton, a nut-safe chocolate company that has offices in Australia. This is a division of Zertus, a German food manufacturing group based in Hamburg and with groups across Europe.
- CEMEX, a huge global company with an annual turnover of around \$15billion, runs the Selby Asphalt Plant and Depot which supplies major contractors around the area.
- The Fuelcard Company, the largest commercial reseller of company fuel cards in the UK.
- MHT Technology, part of the Swiss company Endress and Hauser, is a Richmond-based digital specialist in processing bulk liquid storage and handling solutions.
- McCain Foods Ltd, a US\$7bn Canadian company with a major presence in the UK frozen food market and a UK head office in Scarborough.
- Covance, which is a US (New Jersey) based CRO biotech company operating as the drug development business for Laboratory Corporation of America Holdings (Labcorp) and the world's most comprehensive drug development CRO service company.

Other notable internationally focused companies with a base in the region include Gear4music (global), Pavers Shoes (India), Unicorn Anaplan (US HQ), Hiscox (Australia), Aviva (India outsourcing) and Piksel (US). Other foreign-owned firms are mentioned in the local authority profiles in Annex 2.



1.3 SUMMARY

- There have been some substantial investments in food and drink in the region.
- There are seven foreign-owned companies with more than 500 employees in Y&NY.
- 45% of the region’s foreign-owned businesses are in York.
- 24% of the foreign-owned businesses are in financial and professional services, closely followed by advanced engineering (22%).
- Five of the Y&NY’s foreign-owned businesses have a turnover of over £100 million.
- The most common turnover category for foreign-owned businesses is £10m-£49.9 million.

2. INTERNATIONAL CONNECTIONS

This chapter explores other international connections, including educational links, tourism, language, migration and twinning.

2.1 EDUCATION AND INTERNATIONALISATION

INTERNATIONAL STUDENTS

International students bring economic benefits, social and cultural diversity and promote inter-country relationships. They also bring enterprise, research and employment benefits. This last year during the pandemic, universities and local economies have come to realise the important contribution international students make.

North Yorkshire attracts more than 4,500 international students to the University of York and York St John University (YSJ). In 2017, the University of York ranked 28th in the Times Higher Education's league table of the world's most international universities.² Furthermore, in the 2018/19 academic year, the University had 4,185 international students, equating to more than one in five (22%) of its student community.³ The three largest international student groups were from Asia (2,575), followed by the European Union (845), and North America (275). At the University of York, students and staff come from more than 100 countries, making a strong international community on the campus.

York St John University has a student population that is approximately a third of the size of the University of York's.⁴ In the academic year 2018/19, YSJ had 350 international students (5.3% of the total student population). A high percentage of those students are from Asia and North America. The University also offers a 'Global Campus' programme to international and UK students. The programme includes regular trips and weekly café visits that encourage students to explore the city and share cultural learning.⁵ Both universities have a global reach, offering study exchanges and global partnerships as well as undertaking research that aims to tackle global challenges.

International students are also attracted to the colleges located in York and North Yorkshire, such as [Askham Bryan College](#) in York, and [Bishop Burton College](#) near Beverley. Askham Bryan is predominantly an agricultural, land-based college, while Bishop Burton has an international travel and tourism management course as well as courses in agriculture, animal management and environmental conservation.

UNIVERSITIES, SCHOOLS AND INSTITUTIONS LANGUAGE CAPACITIES

The University of York has a [Languages for All](#) offer which is open to the public and provides eight-week and year-long courses in 14 languages.

² University of York (2017) One of the World's Most International Universities. [Available here.](#)

³ HESA Non-Domiciled HE Students by HE Provider and Country of Domicile. [Available here.](#)

⁴ YSJ Equality Data. [Available here.](#)

⁵ YSJ Global Campus Programme. [Available here.](#)

The following languages are on offer: Arabic, Classical Latin, Chinese, French, German, Italian, Japanese, Medieval Latin, Modern Greek, Polish, Russian and Spanish. The University also offers undergraduate degree courses in French, German, Italian and Spanish.

In 2019, the University of York was awarded a £4.8 million contract to run a 'centre of excellence' for languages in collaboration with the Department for Education, known as the [National Centre for Excellence for Language Pedagogy](#)⁶. It works with nine best-practice language hub schools across the UK to improve foreign language teaching and increase the number of students learning foreign languages. The Centre provides residential training for language teachers, collates resources for language teaching and supports the dissemination of teaching best practice among language teachers.

Sixth forms in Y&NY mostly teach French, Spanish and German, with [York College](#) also offering adult learning courses in Italian, Greek and British Sign Language. [York Chinese Community School](#) offers weekend courses in Chinese for adults alongside regular Chinese language and culture classes for children.

Most of the region's specialist language schools teach English to non-native speakers, with many catering for international students on language and travel courses. Popular languages taught in the region's non-English language schools include French, German and Spanish. Providers such as [Language Matters Scarborough](#) are in this latter group.

There are also language organisations without physical schools which provide learning resources in the area. These include the North Yorkshire branch of [My Language Exchange](#), which links people who wish to learn languages with one another. For instance, the site includes Thai- or Korean-speaking immigrants who wish to exchange Thai or Korean lessons for English lessons.

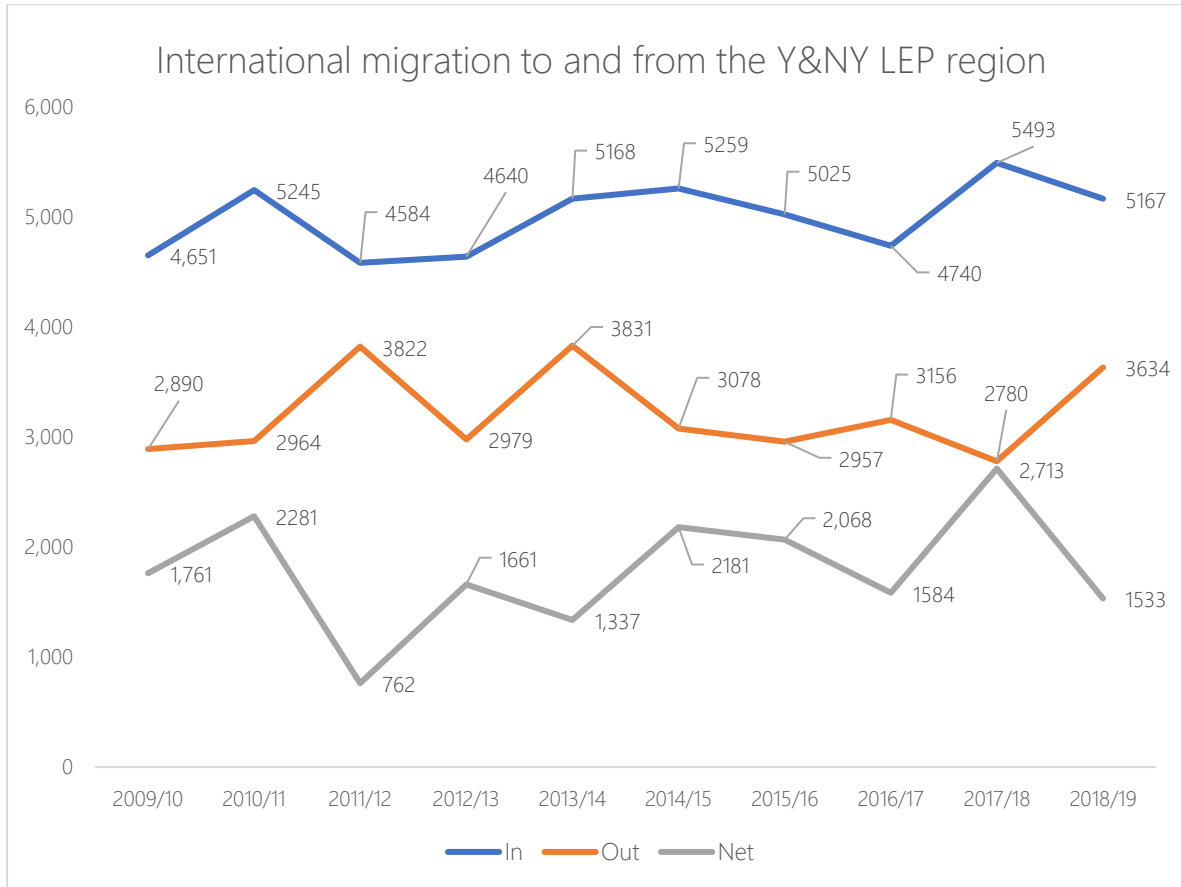
2.2 MIGRATION AND LANGUAGES SPOKEN

LEVELS OF MIGRATION IN RECENT YEARS

Across Y&NY, international immigration increased between 2009/2010 and the current time, although the pattern in net migration is more complex. In 2009/2010, there were 4,651 international immigrants, while in 2018/2019 there were 5,167, representing an 11% increase. However, net migration is down from 1,761 in 2009/2010 to 1,533 in 2018/2019, a 12.9% decrease.

The next chart demonstrates the overall trend in migration. Net migration has remained relatively steady, at between 1,000-2,000 net immigrants per year.

⁶Schools Week (2019), University of York to run £4.8m languages 'centre of excellence'. [Available here](#).



Whilst the data does not reflect this yet, COVID-19 is likely to have resulted in many fewer people leaving and entering the region. Most of these migrants in 2018/2019 moved to York (54%), followed by Harrogate (17.8%) and Scarborough (8.4%). Harrogate was the only place in Y&NY in 2018/2019 to experience negative net migration – 921 people migrated internationally to Harrogate, whilst 1,061 people emigrated abroad.

MIGRATION BY SECTOR

Whilst local data is not available, 19% of national professional and scientific workers are migrants, as are 19% of manufacturing workers⁷. Additionally, the agricultural industry relies heavily on EU migrant labour for farm work such as crop picking. Some local businesses are worried about a lack of unskilled labour for agriculture due to the new points-based system⁸. Migration Yorkshire laid out the impacts of the new EU immigration laws on local agriculture, clarifying that whilst the new agricultural seasonal workers' pilot visa should make up some of the shortfall, there may still be a labour gap given that low-skilled labour is not encompassed and the minimum threshold for the visa is a £25,600 salary⁹. Between 1945 and 2012, the Seasonal Agricultural Workers Scheme (SAWS) supplied many of the required agricultural low-skilled workers for Yorkshire farms. This scheme was discontinued in 2012 once the UK Government felt that sufficient countries had joined the EU to make the pool of low-skilled EU labour large enough to rely

⁷ The Migration Observatory (2021), Migrants in the UK labour market: an overview. [Available here.](#)

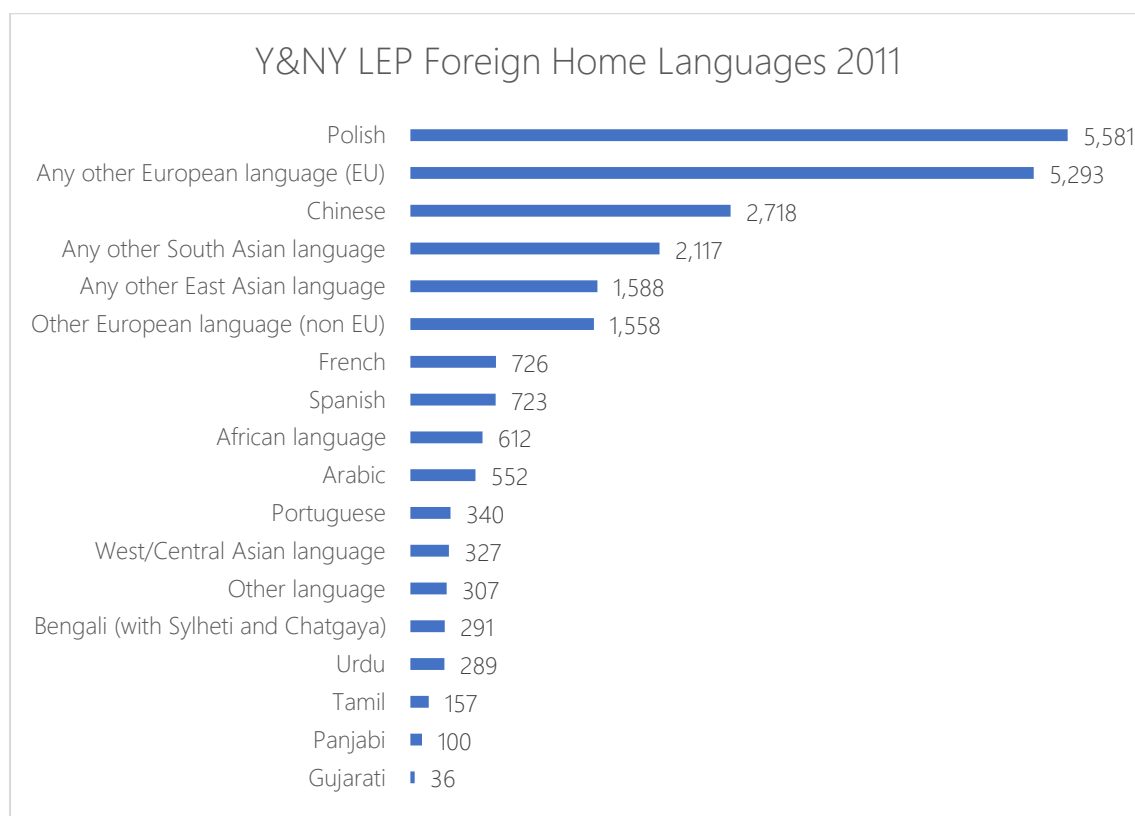
⁸ Business Inspired Growth (March 2020), Business Board Meeting. [Available here.](#)

⁹ Migration Yorkshire (2020), Post Brexit immigration policy briefing paper. [Available here.](#)

upon¹⁰. This suggests that, with Britain having left the EU, new measures may be required to make up the shortfall.

LANGUAGES SPOKEN IN THE AREA

The most recent granular data available for the Y&NY region on languages spoken in homes is from the 2011 census data. According to the census, 97% of people in the region spoke English at home. The chart below shows that of the remaining 3% (23,315 foreign language speakers), 23.9% (5,581) spoke Polish, 11.7% (2,718) spoke Chinese, approximately 3% spoke French and another 3% Spanish. It is interesting that Chinese and Asian languages feature highly given the current push towards these markets for international trade purposes.



Another relevant aspect of local languages is the extent to which people speak both English and their home language, and the extent to which local facilities and institutions can provide services in other languages. One useful proxy for determining this is to look at local interpretation services. Interpreter services such as the North Yorkshire branch of [Bostico](#) work with most common languages.

North Yorkshire County Council provide [Talk To Us](#), an interpretation service in which community interpreters support county councils and public bodies in more than 50 languages. In response to a [2017 FOI request](#), North Yorkshire County Council stated the following instances of interpretation in 2016/2017, with Arabic, Polish and Sorani (also known as Central Kurdish) being the most frequently used languages:

¹⁰ Yorkshire Agricultural Society, the implications of 'Brexit' for UK agriculture. [Available here](#).

Language	Number of translations/interpreters
Arabic	168
Polish	145
Sorani	29
Thai	9
Bulgarian	6
Spanish, Urdu	5
Hungarian, Portuguese, Russian	4
Cantonese, Mandarin, Turkish	3
Fijian Hindi, Kurdish, Nepalese	2
French, Italian, Japanese, Latvian, Punjabi, Tigrinya, Wolof	1

Whilst specific to one location, this data gives some indication of non-English speakers and services not provided in other languages. Language can still be a significant barrier to integration and cooperation. In 2020, the BBC found that, of 25 North Yorkshire pharmacies, only four could provide an Arabic interpreter, with one suggesting that the customer ring around 'until they got a Muslim pharmacist'¹¹. This is despite the fact that NHS services are expected to provide access to interpretation services where required.

2.3 TOURISM:

PRE-COVID-19 DOMESTIC AND INTERNATIONAL TOURISM

The average annual domestic tourism for North Yorkshire in 2017-2019 amounted to 43.5 million visits and £2.4 billion in expenditure.¹² On average in this period, the area received 38.6 million-day visitors per year, equating to a spend of £1.46 billion. There were 4.9 million overnight domestic visits to North Yorkshire, equating to £914 million.

In 2019, there were 445,890 visits to North Yorkshire by international tourists (down 13% on the previous year), amounting to a total expenditure of £168.35 million. The average length of stay was 5.7 nights, with an average spend per visit of £378. The most popular time to visit was between July and September (40.8% of visits). Just over half of the visitors travelled to the county for holiday purposes (52.8%). From 2015-2019, the number of international visits to North Yorkshire peaked at 513,880 in 2018, whilst the total expenditure peaked at £195.5 million in 2017.

In 2019, the top five inbound tourism markets for North Yorkshire varied depending on the purpose of travel (see table below). The largest tourist markets for the past five years in North Yorkshire have been the USA, Australia, China, Germany and the Netherlands. Since 2017, there have been fewer visitors from the USA, Germany and the Netherlands, whilst China has seen an increase and Australia's market has remained relatively consistent.

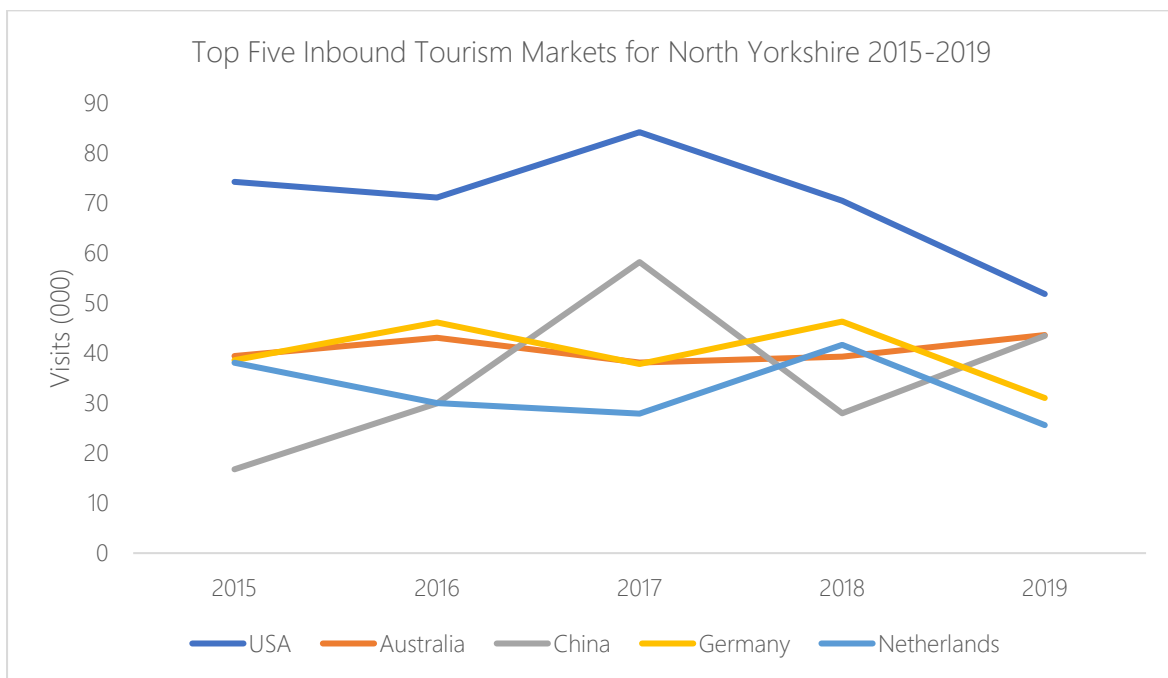
¹¹ BBC News (2020), North Yorkshire refugees 'struggle to access pharmacy interpreters'. [Available here.](#)

¹² VisitBritain local authorities combined analysis (domestic and overnight visits). [Available here.](#)

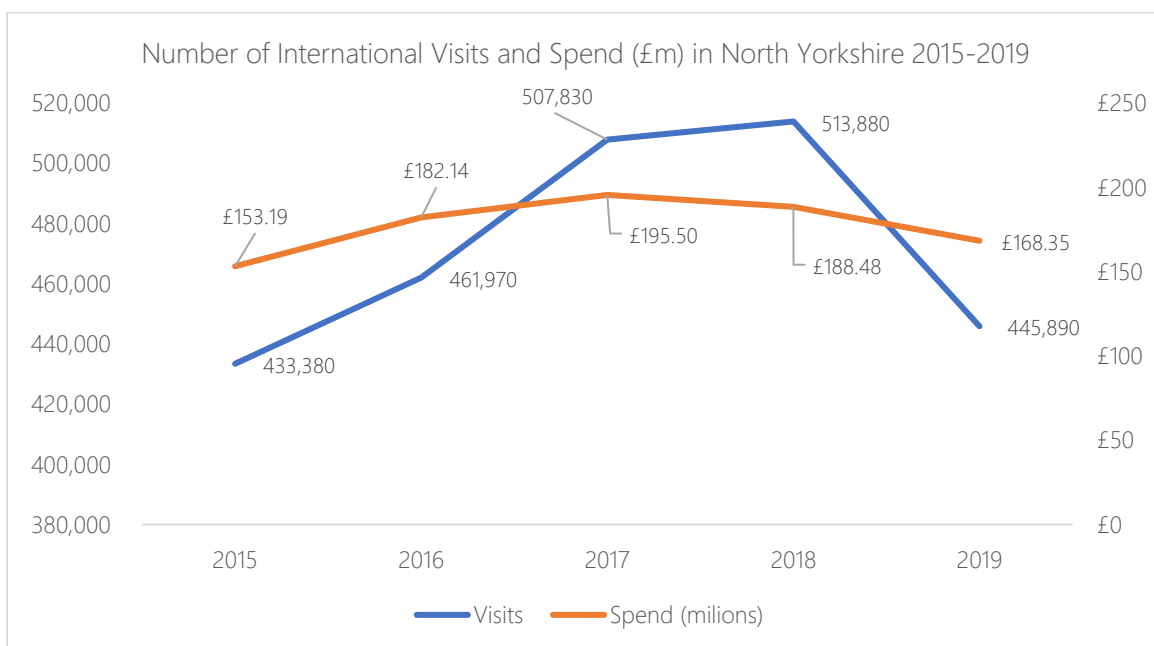
Top Five Inbound Tourism Markets by Travel Purpose

Ranking	Top Five for Holidays		Top Five for VFR*		Top Five for Business		Top Five for Study	
	Country	No	Country	No	Country	No	Country	No
1	USA	39,000	Australia	21,000	Netherlands	5,000	China	4,000
2	China	34,000	Canada	15,000	Poland	5,000	Brazil	2,000
3	Australia	22,000	Spain	14,000	USA	4,000	Switzerland	1,000
4	Germany	18,000	Portugal	12,000	Germany	3,000	Netherlands	<1,000
5	France	13,000	Eire	12,000	All other E. EU	3,000	N/A	N/A

*Visits to friends and relatives. Source: International Passenger Survey, ONS. [Available here.](#)

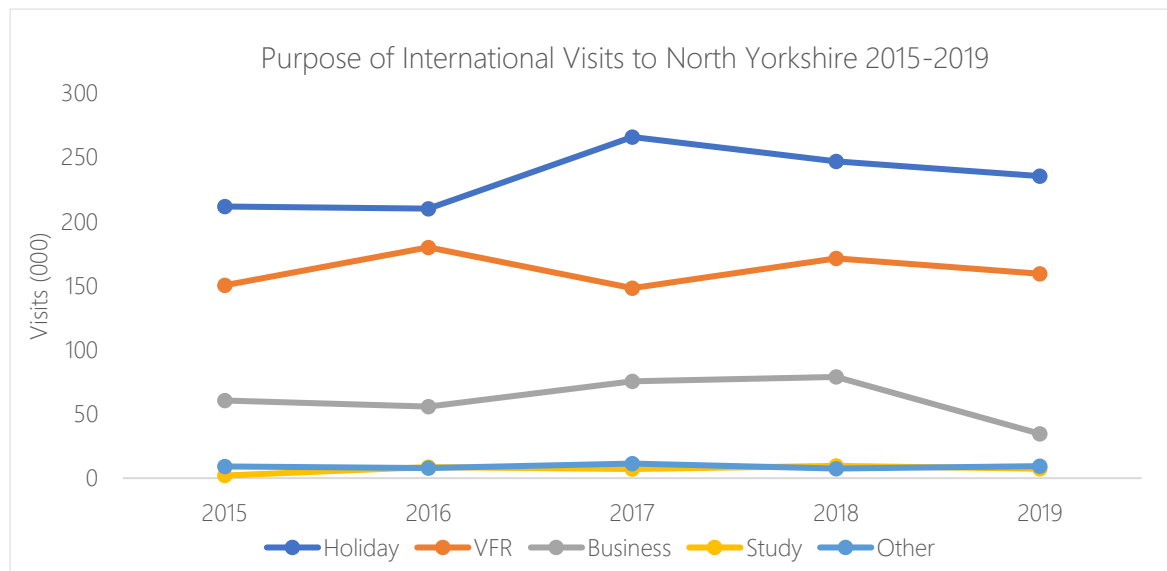


Source: International Passenger Survey, ONS. [Available here.](#)



Source: VisitBritain Inbound nation, region and county data. [Available here.](#)

The reasons for travel between 2015 and 2019 largely followed a similar distribution throughout, with holiday being the most common purpose, followed by visits to see friends and relatives (VFR) and travel for business. Tourist attractions are covered in greater detail in Annex 2.



Source: ONS International Passenger Survey data. [Available here.](#)

COVID-19 IMPACT ON TOURISM

According to VisitYork's August to October 2020 Quarterly Visitor Survey, 36% of people surveyed were visiting from Yorkshire, 63% were from elsewhere in the UK, and only 1% were visitors from overseas. Some 52% of people stayed overnight in the city (13% visited but stayed outside York), while 34% visited for a day trip.¹³ At the time of writing, North Yorkshire was subject to a national lockdown, halting any domestic or international visits to the area.

VisitBritain forecasts that inbound tourism to the UK in 2020 has declined to 9.7 million visits. This is a drop of 76% compared to the previous year (40.9 million), representing a loss of 32.3 million visitors compared to the pre-Covid-19 forecast.¹⁴ Similarly, inbound visitor spending is forecast to be just £5.7 billion, 20% of the previous year's £28.4 billion, and a loss of £24.7 billion compared to the pre-Covid-19 forecast.¹⁵ VisitBritain forecasts some recovery in 2021, predicting 11.7 million inbound visits, which is up 21% on 2020 but still only 29% of the 2019 level. This is expected to result in £6.6 billion of lost spending by overseas visitors. It is projected that short-haul European markets will recover quicker than long haul tourism markets.

It is likely that North Yorkshire has also experienced a similar decline in inbound tourism due to the pandemic. The county may also experience a similar trend for the overall 2021 UK forecast for 2021.

¹³ VisitYork Quarterly Visitor Survey. [Available here](#)

*225 responses to the survey

¹⁴ VisitBritain 2021 Tourism Forecast. [Available here.](#)

¹⁵ VisitBritain inbound tourism forecast for 2021 predicts first signs of slow recovery (December 2020). [Available here](#)

2.4 TWINNING

TWIN LINKS AND PROJECTS

Twin links between towns can encourage internationalisation by promoting cooperation and mutual investment, often in the form of tourism and shared projects. Twinning links are usually maintained by local authorities and volunteer associations in both towns, who promote mutual support and projects. Eleven towns were identified which had at least one twin town. There are strong links with France (four twin towns) and Germany (six twin towns). This is mainly due to post World War diplomacy programmes linking French, German and British towns to promote mutual friendship and peace.

[York](#), for example, is twinned with Dijon in France and Münster in Germany, as well as Nanjing in China. These relationships are actively maintained, with York's twinning organisation meeting bi-monthly. The relationship with Münster is particularly strong, with citizens of both towns in contact through Facebook pages. The Mayor of York visited Münster with a delegation to celebrate the 60th anniversary of the twinning in 2017.¹⁶ Additionally, York's twin towns provided financial assistance after York experienced flooding in 2015. The below table show which towns are twinned, and with which countries.

Town	Twin Towns	Country
York	Dijon	France
	Münster	Germany
	Nanjing	China
Harrogate	Luchon	France
	Montecatini	Italy
	Barrie	Canada
	Wellington	New Zealand
Kirkbymoorside	Himmighausen	Germany
Scarborough	Osterode am Harz	Germany
	Cahir	Republic of Ireland
Knaresborough	Bebra	Germany
Selby	Carentan	France
	Filderstadt	Germany
Skipton	Simbach	Germany
Whitby	Anchorage	Alaska
	Cooktown	Australia
	Waimea	Hawaii
	Port Stanley	Falkland Islands
Northallerton	Ormesson-sur-Marne	France
Richmond	Vinstra	Norway

2.5 TRANSPORT CONNECTIVITY

Transport for the North (TfN) highlight the importance of international connectivity. They note that a better-connected North "will it make it faster and cheaper for businesses to access international markets,

¹⁶ York Press (2017), Top international award for York-Munster city twinning deal. [Available here.](#)

encouraging outward and inward overseas trade and investment which will facilitate economic growth.”¹⁷ Connectivity at a LA level is covered in Annex 2.

ROADS

The highway is the main network for travel in York and North Yorkshire, with the A1(M) road running through the area. The A64 road goes from Leeds to Scarborough, passing through York on route. Maintaining the highway network is seen as the highest priority for North Yorkshire County Council. A map overleaf outlines how the area is connected to the surrounding cities.

Within the towns, traffic congestion can lead to long and unreliable journey times. Harrogate and Knaresborough, Scarborough, Northallerton, Malton/Norton, Selby and Ripon have been identified by North Yorkshire County Council as priority towns for reducing congestion. The Council has also identified that where there are more peripheral areas- further from each other and the highways- there is a significant impact on local economic performance. To combat this, the Council is committed to working with TfN. They have contributed to the Northern Powerhouse measures and identified priority east-west corridor routes for improvement as part of the North Yorkshire Local Transport Plan 2016-2045.¹⁸

RAIL

The five busiest train stations in the sub-region are listed in the table below. York had the most entries and exits in 2019/20, followed by Harrogate and Skipton. North Yorkshire County Council is prioritising several rail improvements such as the double tracking and electrification of the York-Harrogate-Leeds railway. The Council aims to improve access to conventional and future high speed rail stations, outlined in the North Yorkshire Local Transport Plan 2016-2045.¹⁹

Station Name	Entries and Exits (2019-20)	Entries and Exits (2018-19)
York	10,089,306.00	9,990,538.00
Harrogate	1,770,554.00	1,661,406.00
Skipton	1,212,320.00	1,217,432.00
Scarborough	973,424.00	958,026.00
Northallerton	712,450.00	717,638.00

Source: Office of Rail and Road. Available [here](#).

FLIGHTS

The sub-region has six airports within a two-hour drive. The closest (Leeds-Bradford) is 30 miles from York.

Airport	Distance from York	Driving time (approx.)
Leeds-Bradford Airport	30 miles	50 mins
Durham-Tees Valley Airport	47.4 miles	1 hr
Doncaster-Sheffield Airport	49.4 miles	1 hr 5 mins
Humberside Airport	54.5 miles	1 hr 15 mins
Manchester Airport	83.5 miles	1 hr 40 mins
Newcastle Airport	95 miles	1 hr 50 mins

Nearest airports to York. Source, Skyscanner. Available [here](#).

¹⁷ [International Connectivity | Transport for the North](#)

¹⁸ North Yorkshire County Council (2016), North Yorkshire Local Transport Plan (2016-2045). [Available here](#).

¹⁹ North Yorkshire County Council (2016), North Yorkshire Local Transport Plan (2016-2045). [Available here](#).

PORTS

North Yorkshire has commercial ports in Whitby and Scarborough. Whitby Harbour has first-class cargo facilities located on Endeavour Wharf, which has 5,000m² of open quay storage for shipping.

It is also one of the few eastern coast ports able to provide safe, sheltered berths and cargo handling facilities without requiring lengthy river navigation. Historically, Whitby is an established timber handling and steel port. The port regularly handles softwoods from Scandinavia and the Baltic area and is also well equipped to handle project consignments and cargoes involving long, wide and heavy lifts, alongside dry bulk commodities, particularly fertiliser imports and animal feeds. General cargoes, including containers, can be handled at both Endeavour and Eskside Wharves. Approximately 140 vessels with imports of 120,000t and exports of 34,000t are handled annually at Whitby.²⁰

Scarborough's port consists of two harbours of 1.8ha and 3.2ha. The traffic at Scarborough is mostly small, coastal dry cargo vessels, fishing boats and pleasure craft.²¹ In the past three years, the port has not handled cargo vessels. Bridlington is looking to become the lobster capital of Europe.²²

2.6 SUMMARY

- North Yorkshire attracts more than 4,500 international students to the University of York and York St John University (YSJ).
- The sub-region has some capacity to encourage language students, including the University of York's [National Centre for Excellence for Language Pedagogy](#).
- Net migration is down from 1,761 in 2009/2010 to 1,533 in 2018/2019, a 12.9% decrease. However, the effects of Covid-19 and Brexit have yet to impact sub-regional statistics.
- Measures may be required to make up the shortfall in agricultural migrant workers. It is key that the region's R&D and science facilities continue to retain highly skilled global workers.
- The analysis shows that, after Polish, Chinese and Asian languages feature highly in the region.
- According to VisitYork's August to October 2020 Quarterly Visitor Survey, 36% of people surveyed were visiting from Yorkshire, 63% were from elsewhere in the UK, and only 1% were visitors from overseas. Staycations will remain very strong and short-haul European markets will recover quicker than long-haul tourism markets.
- There are strong links with France (four twin towns) and Germany (six twin towns).
- East-west corridor route improvements have been identified as part of the North Yorkshire Local Transport Plan 2016-2045,²³ while proposed rail improvements include double tracking and electrification of the York-Harrogate-Leeds railway as well as improved access to conventional and future high speed rail stations.
- The sub-region has six airports within a two-hour drive and commercial ports in Whitby and Scarborough. Approximately 140 vessels with imports of 120,000t and exports of 34,000t are handled annually at Whitby.

²⁰ ShipNext, Whitby Port. [Available here](#).

²¹ ShipNext, Scarborough Port. [Available here](#).

²² [Bridlington could officially become the Lobster Capital of Europe - Hull Live \(hulldailymail.co.uk\)](#)

²³ North Yorkshire County Council (2016), North Yorkshire Local Transport Plan (2016-2045). [Available here](#).

3. SUB-REGIONAL STRENGTHS: AGRI-TECH

This chapter discusses the sub-regional context for agri-tech as well as the sector’s key global trends and markets and the suggested actions for Y&NY.

3.1 GLOBAL CONTEXT

Demand for food is growing as the world’s population is on track to reach 9.7 billion by 2050, requiring a corresponding 70% increase in calories available for consumption. Additionally, the cost of the inputs needed to generate those calories is rising. By 2030, the water supply will fall 40% short of meeting global water needs, while rising energy, labour and nutrient costs are already pressuring profit margins. It is estimated that approximately one-quarter of arable land is degraded and needs significant restoration before it can once again sustain crops at scale.²⁴

The 2018 Global Agricultural Productivity index below shows that global agricultural productivity growth is not accelerating fast enough to sustainably meet the food, feed, fibre and biofuel needs of nearly ten billion people by 2050. In particular, low-income countries are not increasing their food production fast enough to keep pace with future demand.²⁵

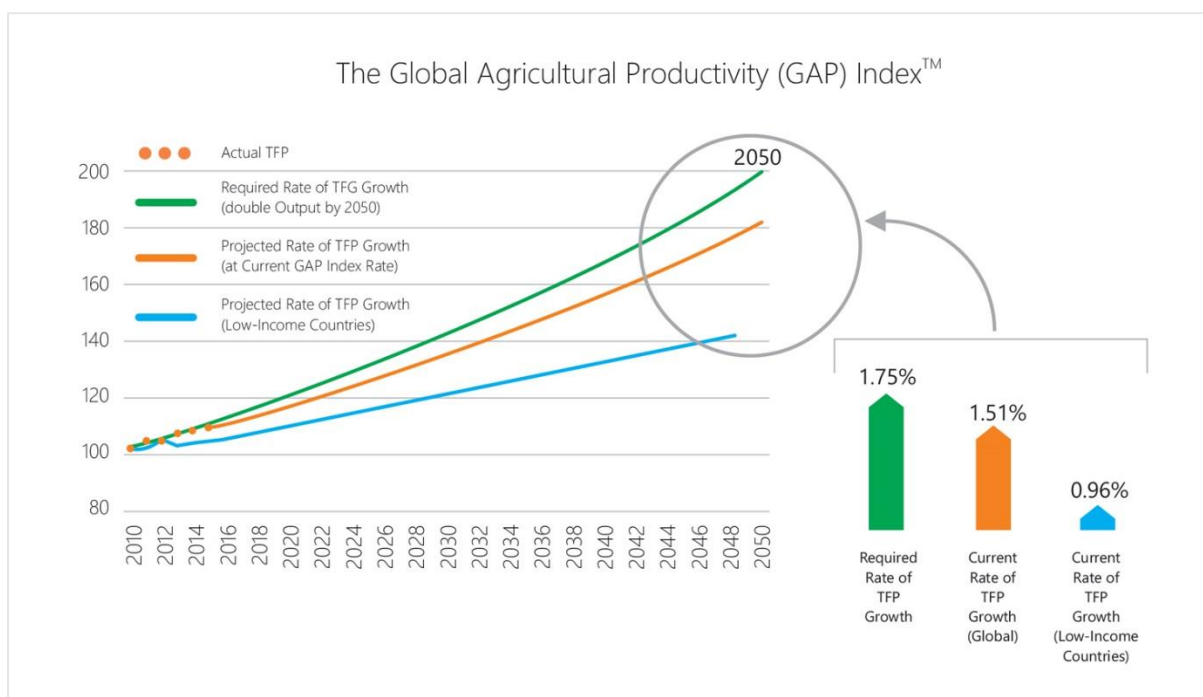


Table 1: Global agricultural productivity gap up to 2050, GAP Report 2018. TFP indicates agricultural efficiency as the ratio of total agricultural output (crops and livestock) to total production inputs (such as land and materials)

Enhanced use of technology will be one way to close the gap, improve efficiency and ensure hunger is eradicated. McKinsey has estimated that enhanced connectivity could add US\$500 billion to the global economy by 2030, meaning that the degree of digital transformation taking place in global agri-tech

²⁴ McKinsey (October 2020), Agriculture’s connected future: How technology can yield new growth. [Available here.](#)

²⁵ Global Agricultural Productivity Report (2018). [Available here.](#)

markets, alongside investment plans and scale, will be critical for understanding where the opportunities are for Y&NY firms moving forward.

The development of new communications and digital technologies including AI, precision robotics, computer vision, sensors, autonomous systems and geospatial technology are set to revolutionise the fields of food and drink, agriculture and the bioeconomy. New concepts such as Controlled Environmental Agriculture (CEA), for example, vertical farming, in which the UK is developing a leading-edge, are starting to gain traction in global cities where space is at a premium and workforce skills and mobility are increasingly constrained.

3.2 SUB-REGIONAL STRENGTHS

R&D AND COMMERCIALISATION STRENGTHS

The Y&NY LEP area is a gateway for agri-tech research in the North of England. The University of York has several separate institutions focusing on agri-tech research into crop system innovation.

The [Crop Health and Protection Centre \(CHAP\)](#) is an agri-tech innovation centre funded by Innovate UK, one of four government-funded agri-tech centres (of which two, CHAP and CIEL, are in the region). It brings together academics, farmers, businesses and scientific advisors to work on crop system innovation. It aims to increase crop productivity by developing new and innovative agricultural technologies and to encourage market adoption of newly developed technology, including sustainable soil precision approaches and problem-solving deep-water hydroponics.

The [Centre for Novel Agricultural Products \(CNAP\)](#), established in 1999, uses bioscience and genetics to maximise plant value as microbial and algal-based renewable resources, thus developing sustainable food crops and biofuels. The centre received the Queen's Anniversary Prizes in 2005 for Higher and Further Education. It plays a leading role in several global and national biotechnology networks, including the High-Value Biorenewables Network and the Biomass Refinery Network. CNAP works with charities, governments and industry to develop and establish biotechnology capabilities.

The [Green Chemistry Centre of Excellence \(GCCE\)](#) researches, promotes, develops and implements green and sustainable solutions. A world-leading facility, the GCCE provides educational programmes and strategic alliances for industry organisations and universities. The dedicated Industrial Engagement Facility (IEF) allows visiting industrial partners to conduct their own specialised research.

The [N8 Agri-Food Resilience Programme](#) pools the collective capabilities of the N8 universities' (Durham, Lancaster, Leeds, Liverpool, Manchester, Newcastle, Sheffield and York) to research ways to boost resilience across the global agri-food supply chain. They have received £16 million in start-up funding for five years from the Higher Education Funding Council for England, with an overall research programme of £40 million.

Just outside the sub-region, the University of Leeds also hosts several specialised agri-tech research centres. The [Global Food and Environment Institute](#) offers an interdisciplinary research community, bringing together leading academics and industry specialists. Facilities include a farm, pig centre and terrestrial observatory – a large-scale, outdoor laboratory forming part of the Global Food Environment Institute. More than 85 academic staff hold a research portfolio of £40 million. The [Centre of Innovation](#)

[Excellence in Livestock \(CIEL\)](#) is one of the biggest livestock research alliances in the world, bringing new research and technology to livestock food production, and is another of the four government-funded agri-tech innovation centres. They recently secured £1.1 million of funding from Innovate UK for a [poultry research project](#) with Chinese institutions.

There are also specialist higher education facilities in and around the sub-region. [Askham Bryan College](#) in York runs an agri-tech innovation centre which undertakes research in animal science, ecology and conservation, equine science, farm trials, plant science and rural business. It has a particular focus on dairy cattle and agri-business. Just outside the sub-region, [Bishop Burton College](#) in Beverley has a world-leading equine centre which offers horse-based training at college and university level, including a research degree in equine science and another in equine business management. As part of the Yorkshire Institute of Technology, the college also offers degree courses in Precision Crop Technology and Agriculture, working with business partners such as CATCH and the Skipton Building Society.

GLOBALLY RENOWNED RESEARCH, TECHNOLOGY AND INCUBATION CENTRES

- [Fera Science Ltd](#) at Sand Hutton in York is a world-leading science consultancy which provides crop health services, resources, testing facilities and expertise to their partners. Fera employs 350 scientists and 70 PhD students²⁶ and collaborates with partners across science, government and marketing. Facilities include ecotoxicology laboratories, aquatic laboratories, spectrometry equipment and a molecular technology unit. They focus on agri-food science, applying their significant scientific capabilities to implement and develop cutting-edge technology.
- The [Stockbridge Technology Centre](#) provides horticultural expertise, training and experimental crop development. It is a grower-led independent centre supported by producers and suppliers. It is also a registered educational charity and conducts trials on edible crops and seed production for pharmaceuticals.
- [C4DI Northallerton](#), North Yorkshire, is a tech campus focusing on agriculture, food and drink, with sister campuses in Hull and Poland. The campus is under development but will support local start-ups who are developing innovative tech solutions in agriculture and the food industry.

MEMBERSHIP ORGANISATIONS IN THE SUB-REGION INCLUDE:

- The [Yorkshire Agricultural Society](#) in Harrogate provides grants and support for farmers across Yorkshire. This includes the Farmer Scientist Network, which helps fund innovative work in the industry and informs UK policymakers. The network connects scientists, farmers and businesses, forming research relationships. Among other successes, the Farmer Scientist Network has secured grant funding from the European Innovation Partnership for a series of two-year wheat trials, and another grant supporting Yorkshire hill sheep farmers who are researching Liver Fluke disease in their sheep.
- [Grow Yorkshire](#) is an organisation focused on 'cultivating enterprise' by supporting agriculture with research and innovation. It functions as a hub, bringing together and collating the support

²⁶Business Inspired Growth (2020), Annual Report. [Available here.](#)

offered by local agricultural organisations to enterprises in Yorkshire. This includes a toolkit of research and innovation support, linking to local networks and development centres.

The sub-region is also home to private sector bioeconomy research and consultancy organisations such as NNFCC at the Biocentre on York Science Park and the Stockbridge Technology Centre. The latter provides technological developments for the horticultural industry as an independent centre of excellence, supported by both the production and supply sectors of the industry.

Y&NY has a growing strength in Controlled Environmental Agriculture (CEA)/vertical farming (hydroponics, aquaponics, aeroponics). It is a major agriculture-focused region with knowledge, skills and experience in growing outdoor crops which are transferable to indoor farming. This strength is focused in Selby and wider North Yorkshire and supported by the wider Leeds City Region. Technology and consumable examples include:

- [Phytoponics](#) in Selby, which has an R&D facility at Stockton Technology Centre. The company designs and manufactures 'deep water culture' hydroponic systems.
- [Vertically Urban](#) in nearby Leeds is a small developer and supplier of high-tech LED lighting for CEA systems.

OTHER EXAMPLES IN AND AROUND THE SUB-REGION INCLUDE:

- [P3P Horticultural Technology Park](#) in Camblesforth, Selby, which has onsite R&D labs, CHP, vertical farming and glasshouse production. The Park houses companies such as Perfectly Fresh, which has built an R&D facility in Selby, Yorkshire, comprising of two germination rooms and four test growing areas, with a further 5,000 square metre production facility operational in 2020.
- Agri-tech and chemicals companies such as ICL Speciality Fertilisers in Leeds and Breeders' Seeds in Hull.
- York Biotech Campus (previously NAFIC) is now focusing on the biotech economy.²⁷
- Exciting new companies such as Labskin (UK/Leeds Uni spin-out, lab-grown, full-thickness human skin model), and the US-based CRO biotech company Covance.
- Downstream in the wider region, there are 7000 food companies and headquarters of two leading supermarkets to support the local ecosystem.

3.3 KEY GLOBAL TRENDS²⁸

- Vertical farming - in addition to leafy greens, new markets are developing for food, cosmetic, medicinal ingredients, clean tech and insect husbandry.²⁹
- Precision agriculture is increasingly being developed to enhance productivity, drive improved yields, develop new services and business models as well as overcome workforce and skills shortages – using robotics, computer vision, sensor and communications technologies, including geospatial and blockchain tech.
- Green finance offers new funding opportunities, particularly in technology-related areas.

²⁷ York Biotech Campus [available here](#) and Business Live article [available here](#).

²⁸ Some of the trends in this sector are the same as those driving food and drink.

²⁹ LCR and Y&NY HPO document.

- Plant-based alternatives are increasingly in demand, as meat replacement represents a growing market in more developed markets.
- Quality, provenance and traceability are increasingly important while the cost of being able to track and trace items is decreasing. Using quantum technologies to prevent counterfeiting of goods is an example of this.

MARKET OPPORTUNITIES

Reducing emissions from land use will be critical in the future, as agriculture plus forestry and land use account for 18.5% of global greenhouse gas emissions. Technological solutions to reduce agriculture emissions are driving capital market confidence in the companies, commercialising them globally. For example, digital crop-trading company Indigo Ag is now the world's most highly-valued agriculture tech start-up.³⁰

Agri-tech usage cases include crop and livestock monitoring, building and equipment management, drone farming and autonomous farming machinery, where the use of enhanced connectivity is already in its early stages and is most likely to deliver higher yields and lower costs as well as greater resilience and sustainability. The scale of the opportunity according to McKinsey can be seen in the schematic below, with the biggest global opportunity in Asia and for cereals for smart crop monitoring. The **US and Europe** present opportunities for **more high-tech solutions using drones and intelligent robots** where there are higher levels of communications technologies and investment as well as shortages of labour due to restrictive immigration policies.³¹

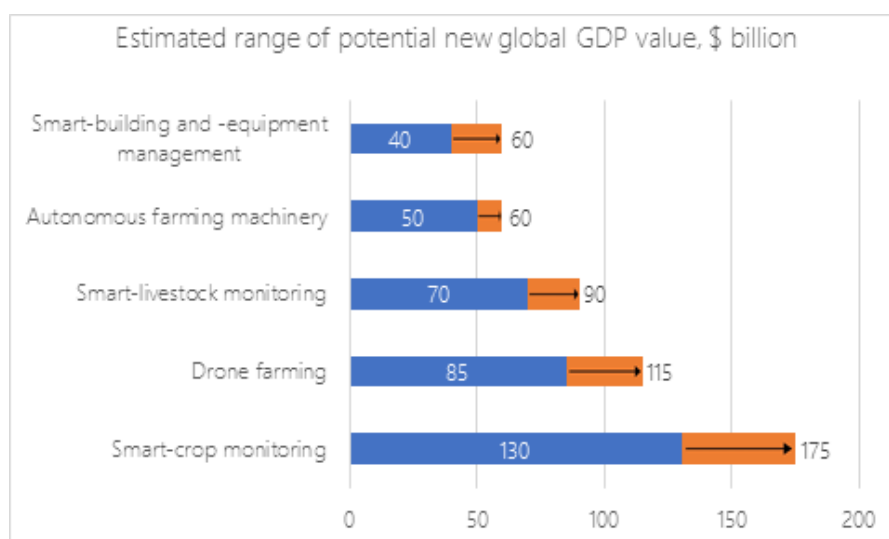


Table 2: Estimated range of potential new global GDP through new technologies by 2030, McKinsey 2020

In **India**, the adoption of technology could potentially help solve a plethora of major challenges across agriculture and food value chains. Examples of these challenges include post-harvest supply chain (rotting food wastages were estimated at 40% in 2014 by UN FAO; this remains a major problem³²), crop

³⁰True Animal Protein Price Coalition (July 2020), Global meat production decline. [Available here.](#)

³¹ McKinsey (October 2020), Agriculture's connected future: How technology can yield new growth. [Available here.](#)

³² FT (April 2014), India tackles supply chain to cut food waste. [Available here.](#)

harvesting inefficiencies, poor-quality testing and traceability and (lack of) innovative finance. These opportunities have been estimated to be worth up to US\$24bn by 2025.³³

Indian farmers' use of technologies such as IoT and sensors in agriculture is growing, leading to the growth of indigenous companies such as Bangalore-based StellApps, which provides 'one-stop dairy supply chain digitalisation via IoT'.³⁴ The company was founded by IIT Madras alumni and is using data science and analytics to derive new insights for its clients. It has grown rapidly in recent years following investment from Omnivore Capital and is connected to Mumbai-based, diversified agri-business Godrej Agrovet Ltd. StellApps has established a European base in France (Brittany), but not yet in the UK.

In **China**, agriculture accounts for only nine per cent of Chinese GDP, yet the industry employs more than 320 million people. The nation's expanding cities are consuming farmland rapidly, soil health is an issue and the farm workforce is ageing. China must feed one-fifth of the world's population from only one-tenth of its arable land. By 2030, when its population is expected to level off at around 1.5 billion, it will need to produce an additional 100 million tons of food each year.³⁵

To help address this productivity challenge, the Chinese government has issued a new policy that seeks to bridge the urban-rural divide by 2025. By that time, China's development plan maintains that agricultural digital economy must account for 15% of China's agricultural added value (Digital Agriculture and Rural Development Plan 2019-2025). It is reported that there is also a lack of specialised sensors for agriculture as well as poor adaptability of agricultural robots and intelligent agricultural machinery.³⁶

Technologies such as 5G, AI, blockchain and geospatial technology are being encouraged to support more efficient farming techniques and increase productivity. These are all areas where the UK has significant strengths to offer potential clients and partners. **China** will remain a challenging destination for UK tech companies due to the dangers of changing regulatory requirements and IP misuse. Regarding the latter, the enforcement of IP rights in China has increased significantly in recent years, as more Chinese companies have expanded globally and new indigenous innovations have come to the fore.

New business models are emerging in **China** for connecting farmers to consumers and restaurants, directly cutting out wholesalers, with unicorn companies such as the Beijing-based Meicai ('beautiful vegetable') providing consumers with fresh produce during the Covid-19 pandemic.³⁷

The global market for vertical farming is estimated to be more than US\$3bn in 2020, with the **US** accounting for more than a quarter of the market and **China** growing quickly over the next decade, given its population size and food constraints, as well as the density of its urban areas. **Japan and Canada**

³³ EY (September 2020), How agri-tech start-ups are changing the face of Indian agriculture. [Available here.](#)

³⁴ StellApps (no date), One-stop dairy supply chain digitisation via IOT. [Available here.](#)

³⁵ Business Weekly (January 2019), China courts UK agri-tech expertise. [Available here.](#)

³⁶ Food Ingredients 1st (January 2020), China's agri-tech acceleration could spell dramatic shifts for global food chains. [Available here.](#)

³⁷ China.org. (April 2020), Going digital amid epidemic. [Available here.](#)

are also forecast to grow, whilst in Europe, [Germany](#) is expected to lead the way, given high levels of consumer interest in sustainability.³⁸

[New and emerging markets such as those in African countries](#) offer an interesting opportunity for Y&NY companies in the agri-tech sector, in particular around the investment needed to increase productivity in sub-Saharan Africa. Markets including Ethiopia, Nigeria and Tanzania all offer substantial potential. Consolidation amongst farmers is taking place as more people move to the city and smaller holdings merge to form more efficient farms.

Urbanisation is also driving dietary changes, with proteins and dairy on the rise. There is potential to help African farmers enhance their agriculture yields through technology and innovation as well as to reduce the importation of grains from Asia. Clearly, a region hit by famine, drought and other environmental and energy challenges, as well as enduring conflict and a lack of basic infrastructure, will face challenges in their operational environment. However, UK technology companies that invest in Africa long term, helping to raise capacity and capability locally, tend to reap the benefits that come with having a strong local presence.

Given the scale of the challenges in Africa, a cross-government approach is critical. Innovate UK, part of UK Research and Innovation, had up to £2 million from the Global Challenges Research Fund to support knowledge transfer partnerships between UK researchers and businesses based in the Federal Republic of Nigeria, or the Republics of Ghana, Kenya or South Africa.³⁹ UK Export Finance is increasingly supporting UK agri-tech firms across Africa in markets such as Angola, which are trying to reduce their reliance on imports.⁴⁰

Targeted support from DIT in the Africa region and, locally, the East of England region, has illustrated what can be achieved. The East of England has been successful in boosting its agri-tech exports to Africa. It has delivered strong performance across a wider range of agri-tech products and services, from plant genetics to mobile platforms. Markets such as [Nigeria, Rwanda, Mozambique, Uganda, Tanzania](#)⁴¹, [Kenya and Namibia](#) can provide fertile grounds for UK technology and expertise, especially if support is 'joined up'.⁴²

Latin American agri-tech, whilst still nascent, has shown rapid growth in recent years due, in particular, to Colombian agri-food startup Rappi. There have also been promising Latin American developments in precision agriculture, with key startups such as Leaf Agriculture and Solinftec providing innovative digital agriculture solutions.⁴³

³⁸ Global Newswire (July 2020), Global vertical farming industry. [Available here.](#) |

³⁹ Innovate UK (October 2020), Taking agri-tech skills to Africa: Apply for funding. [Available here.](#)

⁴⁰ Agri Investor (August 2019), UK Export Finance's \$73m loan to help rehabilitate Angola's cattle sector. [Available here.](#)

⁴¹ AGRInsight (2019), Ubia Soko. [Available here.](#)

⁴² Agri Epicentre (May 2019), UK - West Africa agri-tech trade & investment mission. [Available here.](#)

⁴³ AgFunder News (July 2020), A mini guide to Latin American agrifood-tech on 2020. [Available here.](#)

3.4 SUGGESTED ACTIONS/IMPLICATIONS

- ✓ **Ensure the region is plugged into cross-governmental initiatives** that are happening in growth markets such as the US and emerging locations such as Africa. This will ensure that the UK Govt departments and stakeholders, including UKRI, are aware of the sub-regional strengths on offer for trade and FDI as well as where there may be further opportunities for collaboration.
- ✓ **Focus FDI activity around Controlled Environment Agriculture** and High Performance Opportunity (HPO) targeting markets such as the US and Germany.
- ✓ **Ensure the region's company and asset strengths feature prominently** in initiatives such as DITs Developing Sector Knowledge (DSK) and proactively follow up with post, ITA network and sector teams.
- ✓ **Consider developing a trade mission programme** specifically to explore the potential in Africa, drawing on R&D-led initiatives in the public and private sector as well as commercial players. Engage with other UK regions, such as the East of England, that have a track record of winning business in this part of the world.
- ✓ **Identify and provide enhanced support** to those local digital and technology-based companies that have the potential to scale in large but challenging global agri-tech markets including India and China.

4. SUB-REGIONAL STRENGTHS: FOOD AND DRINK

This chapter highlights Y&NY's strengths in the food and drink sector, as well as the sector's key global trends and markets. It also offers suggested actions for the sub-region.

4.1 GLOBAL CONTEXT

Demand for food is growing globally, with the population forecast to increase to 9.7 billion by 2050. At the same time, constraints on land and the supply of food are challenging supply chains while uncertain trade policies and tariff regimes are increasing.⁴⁴

India is forecast to overtake China in terms of its population by 2027, with both countries capturing a larger share of global demand. Growth rates of population and income are key drivers of food demand. In developing countries, this tends to shift towards an increase in demand for animal products such as meat. According to McKinsey, half of the increase in global meat consumption in the past ten years can be attributed to China.⁴⁵

In the most developed countries, alternatives to meat and dairy are increasingly being sought for health, environmental and sustainability reasons. Consumer awareness of food safety is also growing. As shown below, Bloomberg Green forecast a 3% drop in per-capita meat consumption for 2020, which will be the biggest decline since at least 2000.⁴⁶

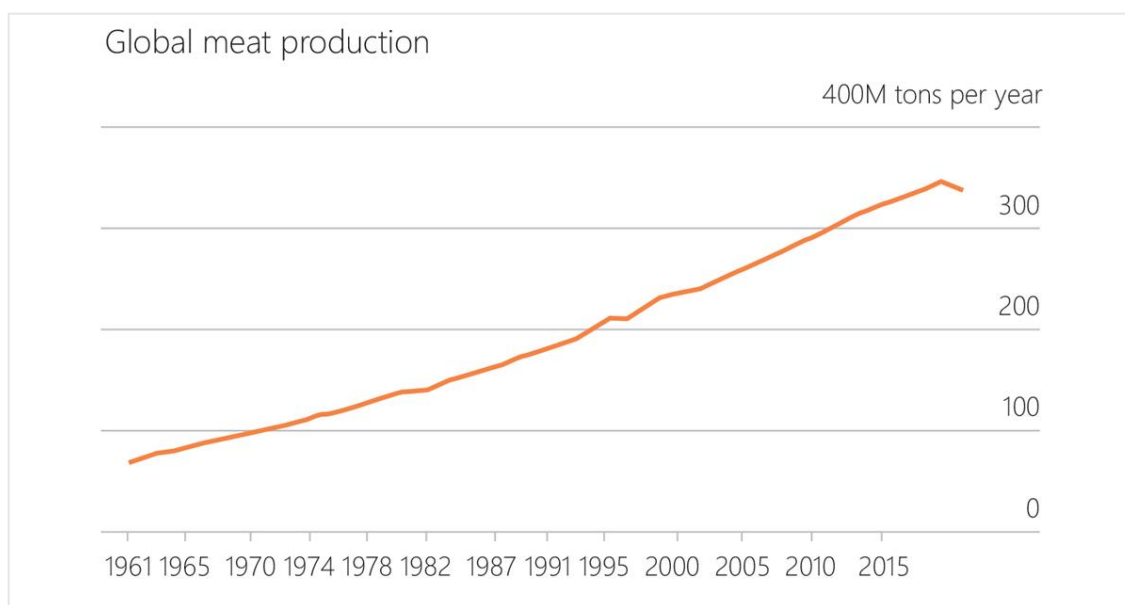


Table 1: Global Meat Production, Bloomberg Green

⁴⁴ United Nations (June 2019), Growing at a slower pace, world population is expected to reach 9.7 billion in 2050 and could peak at nearly 11 billion around 2100. [Available here.](#)

⁴⁵ McKinsey (October 2018), How the global supply landscape for meat protein will evolve. [Available here.](#)

⁴⁶ True Animal Protein Price Coalition (July 2020), Global meat production decline. [Available here.](#)

Water shortages and climatic changes, as well as growing energy and nutrient costs, continue to squeeze profit margins across the food value chain, meaning that key players are looking for new technologies and solutions that can give them an edge in terms of productivity and competitiveness. New technologies such as AI, IoT, blockchain - and even quantum - are transforming the way supply chains operate, ensuring that provenance and traceability become more important to food security.

The Y&NY food and drink sector is probably one of the sectors most likely to be impacted by the UK's EU exit given the relatively high volume of trade the region does with that market. The new trading regime that will be set up as a result – border operating model, customs and tariffs, import quotas, rules of origin, labelling and packaging requirements – will require local companies to adapt and will lead to an increase in costs.

4.2 SUB-REGIONAL STRENGTHS

FOOD AND DRINK BUSINESSES

Y&NY has a strong food and drink sector. Regionally, this sector accounted for 42% of manufacturing GVA in 2017 – almost three times the national average.⁴⁷ Although the global food and drink sector and markets are fragmented and regulatory barriers to entry relatively high, Y&NY has significant tradable strengths.

These include specialised, niche food and drink offerings which are hand-crafted, strongly Yorkshire place-based identity brands (such as Wensleydale Cheese, Yorkshire Tea and Spring Water), as well as manufacturing and production-based, speciality suppliers (alcohols, cereals, smokehouses), selling to global brands and major supermarkets. Examples include companies in the table below, as well as towns such as Malton, which is considered Yorkshire's food capital.

Spirits – Alcohols	<ul style="list-style-type: none"> • Black Sheep (Masham) – brewery selling to Nordics • ICB (Harrogate) – lower-alcohol drinks and contract manufacture • Masons of Yorkshire (Northallerton) (EC) – gin, was looking to export to China in 2019 • Saltaire Brewery (Shipley) (EC) – craft beer exported to Europe, Japan and the US⁴⁸ • Sloemotion (York) – artisan spirits distillery • Independent Brewers (Malton) • Yorkshire Explorer (York) - gin/rum – developed seaweed rum with Seagrown
Speciality Drinks	<ul style="list-style-type: none"> • Bettys and Taylors (Harrogate) - Yorkshire Tea • Corinthian Brands (Knaresborough) – soft drinks and alcoholic beverages • Harrogate Spring (Harrogate) (EC) – was looking to grow its exports by 20% to markets such as Japan • Taylors of Harrogate (Harrogate) (EC) – exports tea and coffee to Australia, US and Canada
Meat and Fish	<ul style="list-style-type: none"> • Dovecote Park (Pontefract) – supplies beef and venison to supermarkets, including Waitrose and Ocado • Brecks Foods (Selby) – protein, meat-free and cereal innovator – subsidiary is Plant & Bean (below)

⁴⁷ LCR Brexit Impact Assessment, June 2019.

⁴⁸ Enterprise Growth Solutions (August 2019), Exporter spotlight on Saltaire Brewery. [Available here.](#)

Plant-Based Alternatives	<ul style="list-style-type: none"> • Heck sausages (Bedale, south of Catterick) – has developed a growing range of meat- and gluten-free produce • Plant & Bean (Selby) – new manufacturing unit in Lincolnshire with plans to expand into US and Asia
Confectionary, Ice Cream	<ul style="list-style-type: none"> • Froneri (Northallerton) – the second largest manufacturer of ice-cream in Europe, operating in 20 countries with more than 10,000 employees • Grandma Wild's Biscuits (Steeton) – exports to Canada • London Deli company (York) – was previously exporting globally • Yummycomb (York) – premium honeycomb chocolate targeting the US
Speciality Ingredients	<ul style="list-style-type: none"> • Seagrown (Scarborough) – seaweed/aquaculture farm
Digital and Tech	<ul style="list-style-type: none"> • Authenticate IS (Harrogate) - track and trace software • Red Black Software (York) – bakery management software • Requench (Harrogate) – advanced water condensing technology • York Testing Laboratories (York) – food intolerance testing

Table 2 – Regional Food & Drink Strengths (EC - DIT Export Champion)

In the 12 months until September 2019, food and beverage exports from the Yorkshire and Humber region totalled £1 million; an increase of 5.0% on the 12 months until September 2018, and an increase of 27.1% over the past three years.⁴⁹

R&D STRENGTHS

There are also several institutions specifically focused on food and drink research in Y&NY. These include the NAFIC (National Agri-Food Innovation Campus) in Sand Hutton near York, which was recently rebranded as the [York Biotech Campus](#). Home to more than 850 scientists, it provides laboratory and office space to private and public organisations including Fera Science and the University of Leeds Centre for Innovation Excellence in Livestock (see section 2.2). Other organisations based at the Campus include the Crop Health and Protection Centre, the Food Innovation Network and government agencies such as the [Animal and Plant Health Agency](#) and DEFRA. Specialist facilities available at the York Biotech Campus include controlled environment rooms, glasshouses and workshop spaces. Apart from the excellent facilities, the co-location of so many agri-tech partners is highly advantageous for collaboration and an attractive proposition for inward investors.

In York, Nestlé run a [Product Development Centre](#) as part of their global research network, which was built in 1988 and expanded in 1990. The centre includes a pilot factory which can trial new confectionary in small runs. There is a focus on low-sugar, lighter product development at the centre, which employs 150-200 people.

In the neighbouring LCR, the University of Leeds also has working groups dedicated to food and drink research. These include the [School of Food Science and Nutrition](#) (SFSN), which works on food colloids, lipid biophysics, remote sensing and novel food scanning processes. Leeds claims to be a leading global University for food science, offering expertise around the quality, safety and sustainability of food and diets. The [Human Appetite Research Unit](#) (HARU) at Leeds features world-leading facilities and resources

⁴⁹ Business up North (December 2019), Yorkshire brews up a festive storm in Scandinavia. [Available here.](#)

for investigating human appetite, including equipment for measuring bone mineral density and body composition as well as research on appetite control and energy balance.

4.3 KEY GLOBAL TRENDS

Global food and drink opportunities for Y&NY firms are extensive. Traditional markets such as the EU and the US will continue to be promising, whilst markets such as Japan could grow on the back of the recent FTA.

The growth in food-and-drink-related digital technologies across the supply chain from farm to fork are being driven by an increasing consumer and industry demand for knowledge about provenance and traceability. In particular, new technologies such as AI, IoT and blockchain are becoming more prevalent for driving market efficiencies.⁵⁰

New consumer trends are becoming more marked. Consumption profiles for food, drink and calorie intake across the world depend on many things, including geography, climate, culture and stage of societal development. Higher consumption of meat and sugar in developed countries has led to chronic levels of obesity, which risks spreading to developing markets as they consume more meat and sugar-related products. Health-conscious choices will thus become more important.

The increased focus on sustainable production will lead to less waste (in the form of plastic packaging) and less resource-intensive production methods, as well as a shift to novel production methods and more natural ingredients. For example, in line with the need for sustainability in the food chain whilst supporting the green economy, the market for seaweed-related products is forecast to grow. The cell-based meat market is also set to be worth US\$140bn in the next decade.⁵¹

At the same time, consumer tastes are becoming more refined, driving an increasing demand for high quality, niche products with interesting ingredients as well as original flavours and taste. From flavoured gins and exotic rums to special tonic waters, the growth of this category in mature markets is set to continue. Yorkshire Explorer Rum, which is infused with seaweed from local company Seagrown, is a perfect example of local innovation tapping into this trend.

"Distilled in Yorkshire, Explorer Rum is made with Sugar Kelp grown on the Yorkshire coast. Sugar Kelp is combined with the sweetness of vanilla, locally foraged heather and honey, and the rich warmth of clove and ginger to create the Explorer's unique sweet and salty flavour profile, which is as rich in flavour as it is in the provenance of its ingredients."⁵²

Covid-19 has driven a move to online sales and e-commerce as a route to market. This presents an opportunity for local firms to increase the global reach of their products with discerning consumers.

Digitalisation is increasingly impacting the food and drink sector, with 'foodtech' becoming a key sub-sector. From delivery apps and digital aggregators providing increasingly specialised and niche offerings and more individually customised food experiences (such as Gaucho), to the 'robotisation' of the food

⁵⁰ New Food Magazine (May 2020), Applications of blockchain technology in the food industry. [Available here.](#)

⁵¹ Bloomberg Green (December 2020), Lab-grown meat is getting closer to supermarket shelves. [Available here.](#)

⁵² Yorkshire Explorer Distillery (2020). [Available here.](#)

chain from production, picking and packing to preparation and delivery. Technologies such as AI, computer vision, sensors and IoT, in which the UK has a strong innovative capacity, are facilitating this.

MARKET OPPORTUNITIES

According to a recent report by Santander, the UK’s food and drink industry is the largest manufacturing sector, contributing £31.1bn to the economy annually and employing 450,000 people. **Ireland, the USA, France, the Netherlands and Germany** are the top export markets. **China, Japan, South Korea and Taiwan** are growing strongly, albeit from a smaller base; export growth to non-EU countries was four times that of Europe. Producers identified **China, India, the Gulf** (with a focus on the **United Arab Emirates**), **USA and Japan** as growth targets.⁵³

The **USA** is the UK’s largest export market for food and drink. The table below shows UK exports doubling from 2010 to US\$2.4bn in 2019. Spirits, fish and seafood, as well as beer are the UK’s top exports, along with speciality products. Given its size, the US will remain a key priority for the region’s producers of high value and differentiated products.



Table 3: UK food and drink exports to the US, Food & Drink Federation

However, barriers to further growth still need to be overcome. Tariffs of 25% apply to a range of valuable UK food and drink exports including single-malt whisky, biscuits, pork and dairy products.⁵⁴

Japan has a large, wealthy middle class as well as a thirst for high-quality, differentiated products which the Y&NY region can provide. With UK exports to Japan growing in the last few years, there is room for further upside on the back of the recent FTA and the postponed Tokyo Olympics (2021). **China** is a huge market, while the UK has a relatively small share. Industry bodies are looking to support exporters by facilitating access to ‘consolidators’ who know the market and networks and can navigate the complex regulatory and regional landscapes.

⁵³ Santander (2020), Food and drink industry report. [Available here.](#)

⁵⁴ Food & Drink Federation (2019), Exports snapshot. [Available here.](#) Retaliatory US tariffs on goods from the UK and certain EU countries have been applied since 18th October 2019 in response to a WTO ruling on Airbus subsidies. However, the UK has signalled that it intends to drop tariffs applied to Boeing to help pave the way for a trade deal.

Exports to **India** are dominated by fast-growing sales of spirits. Although tariff barriers are high, increased discretionary spending by the emergent middle class offers growth prospects. The **UAE** has a large, wealthy foreign population, with Dubai catering to a high-end, affluent clientele that seeks speciality food and drink offers. **Latin America** has some potential, although complex market regulations and tariff barriers prevent UK exporters from maximising this opportunity.

Small, profitable global niches which Y&NY could exploit are expected to grow rapidly. For example, the global seaweed market was estimated to be worth around US\$12bn in 2015; by 2024, it is predicted to grow to more than US\$87bn, due to increases in numbers of vegetarians and vegans as well as new uses being found for the plant. The demand for seaweed continues to rise, as it is a reliable source of raw material for end-applications, including phycocolloids,⁵⁵ fertilisers, fodder and human food as well as for biochemical and medical uses.

The Asia Pacific promises a robust growth during 2018-2028, driven largely by rising demand from **China**. Countries such as **China, South Korea and Japan** traditionally consume seaweed extracts, which are widely embedded in various cuisines. Moreover, varieties of red and brown seaweeds are becoming popular for industrial use in the region. Currently, a high proportion of raw seaweeds are used for the production of hydrocolloids (seaweed extracts) in the region. Globally, one million tonnes of wet seaweeds are harvested to produce hydrocolloids.

The growth in plant-based meat alternatives is set to continue in Western markets as awareness increases of the damage meat consumption does to the environment and health. The global plant-based meat market was valued at US\$11.1 billion in 2019 and is expected to grow at a CAGR of 15.8% during 2020-2027. Initially, **the US and Europe** are likely to be the main growth markets, as can be seen from the chart below.⁵⁶

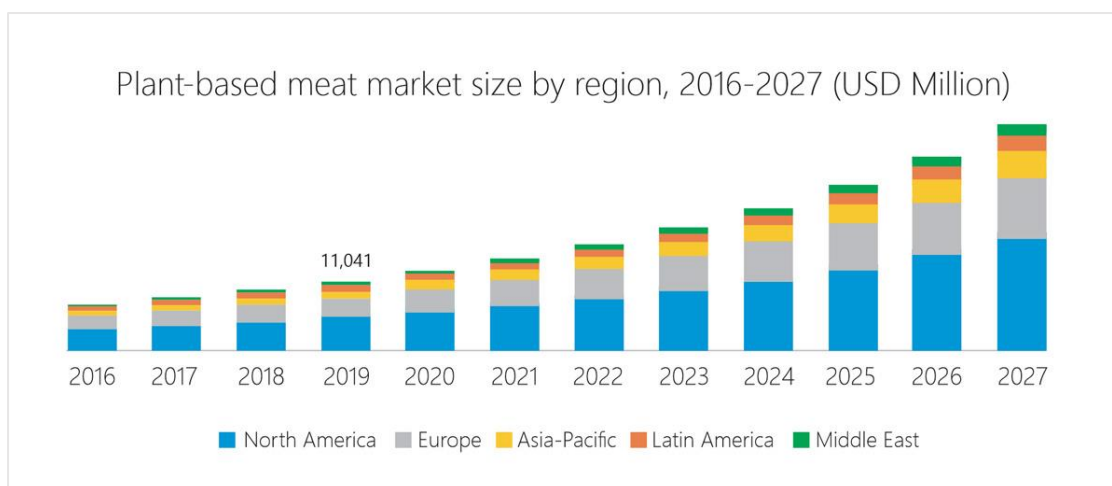


Table 4: Plant-based meat market size by region 2016-27, Polaris

⁵⁵ Britannica, Algae-ecological and commercial importance. [Available here](#). Carrageenans are used as gels and thickeners.

⁵⁶ Polaris (July 2020), Plant-based meat market share, size, trends, industry analysis report. [Available here](#).

The quality and appeal of these plant-based alternatives are increasing, and the price is becoming more affordable as consumers make more conscious choices about what they eat. Venture capital (VC) investment in meat replacement companies has soared in recent years, as can be seen from the chart below.⁵⁷

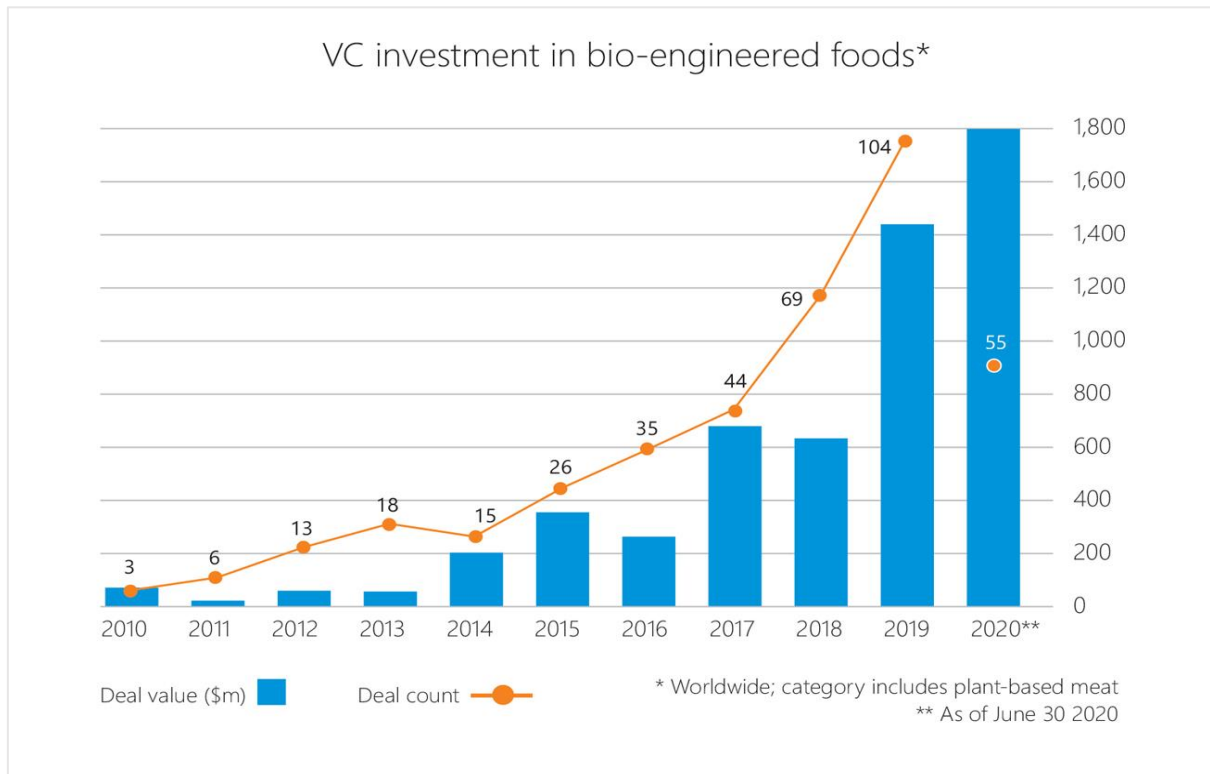


Table 5: VC investment in bio-engineered food, Pitchbook

The growth of US companies such as Impossible Foods and Beyond Meat or Swedish company Oatly reflects increasing consumer interest in experimenting with plant-based alternatives.

The market for lab-grown meats is also set to grow significantly once production costs can be cut and regulatory hurdles overcome. [Singapore](#) has become the first country to allow the sale of cultured meats. Globally, more companies are looking at trials to produce lab-grown meats such as beef and chicken.⁵⁸

Selby-based Plant & Bean, a subsidiary of Breck Foods, has recently announced the setting up of the UK's first plant-based meat production facility in Lincolnshire to serve the European market, with plans to expand into the US and Asia in the next two years. It has also collaborated with Singapore's Institute of Technology around food and sustainability.⁵⁹

⁵⁷ Financial Times (September 2020), Venture capital floods into food tech. [Available here.](#)

⁵⁸ Bloomberg Green (December 2020), Singapore becomes first country to approve lab-created meat. [Available here.](#)

⁵⁹ Food & Drink International (December 2020), Plant & Bean to open Europe's largest plant-based production facility. [Available here.](#)

4.4 SUGGESTED ACTIONS/IMPLICATIONS

- ✓ Given the increasing importance of FTAs, Y&NY should **develop closer alignment with wider cross-Government initiatives** such as the Trade and Agriculture Commission, Agriculture and Horticulture Development Board (AHDB) and Department for Environment, Food and Rural Affairs (Defra).
- ✓ **Concentrate on innovation and productivity** due to the serious realignment of global supply chains in the food and drink sector that will take place over the next few years due to EU Exit and wider geopolitical tensions. This will mean the competitiveness and innovations of UK firms will be crucial for gaining a global market share. Products that can command a premium and drive higher margins will help the region, whilst lower margin products that trade on price alone will struggle.
- ✓ **Sustained and intensive production, commercial and export support** over the next 12-18 months will be needed for the sector to be able to adjust to and compete in the new post-EU Exit trading environment. Working more intensively with key stakeholders such as the Food and Drink Federation (FDF) and Food and Drink Exporters Association (FDEA) as well as DIT initiatives targeting major food and drink events such as SIAL (Paris 2022), Anuga (Cologne October 2021) and Gulfood (Dubai February 2021).
- ✓ **Research and evaluate emerging markets**, such as the lab meat and meat alternative market, to see whether the region's skills in science and manufacturing can be used to attract new inward investors in these emerging sectors.
- ✓ **Exploit new distribution channels across the sector** by tapping into the increasing use of e-commerce platforms and on-line purchasing by discerning customers globally, which will drive the growth in on-line as a key distribution channel, both B2B and B2C.

5. SUB-REGIONAL STRENGTHS: THE BIOECONOMY

This chapter discusses the bioeconomy. The sub-region's strengths are investigated as well as the key global trends, markets and suggested actions for Y&NY.

5.1 GLOBAL CONTEXT

Environmental pressures, volatile fossil fuel prices and increasing life expectancy are all drivers of bioeconomy growth. Constraints on global resources, such as food and water, will increasingly play into the global expansion of the knowledge-intensive bioeconomy. Regulation and the ensuing demand for low carbon solutions is set to increase. This will lead to a greater realisation of the benefits for the planet of renewable energies, augmented natural ingredients and synthetic biology technologies that reduce our carbon footprint, while also increasing consumer awareness of more sustainable behaviour.⁶⁰

According to McKinsey, as much as 60% of the physical inputs to the global economy could, in principle, be produced biologically; approximately one-third of these inputs are biological materials (wood or animals bred for food) while the remaining two-thirds are nonbiological (plastics or fuels) but could be produced or substituted using biology. Potential use cases cover human health and performance; agriculture, aquaculture and food; consumer products and services; materials, chemicals and energy production.⁶¹

The bioeconomy is wide-ranging and includes sectors that produce bio-based products, such as forestry, agriculture, horticulture, food and drink, water utilities and industrial biotechnology and bioenergy.

*"The bioeconomy in Europe is not a single one – in Northern EU countries, forestry dominates, while large proportions of the bioeconomy in the South West concern fibres, bio-based textiles and high-quality food. There is growing interest in the blue bioeconomy in Northern and Southern Europe. This diversity implies not a weakness but a strength: instead of focussing on e.g. corn (as the US), forest (Canada), palm oil (Indonesia), soy (Argentina) or sugarcane (Brazil), the diversified EU bioeconomy is **more resilient to changes in feedstock supply, market dynamics and technology innovation.**"⁶²*

The UK exemplifies this resilience and is well-placed to support these changes in global eco-innovation through its companies and university knowledge base, providing it can continue to collaborate

⁶⁰ Bio East, Bioeconomy. [Available here](#). According to a definition provided by the European Commission, the bioeconomy encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products and bioenergy independently of the processing technologies. It thus includes agriculture, forestry, fisheries, food and pulp and paper production, as well as parts of chemical, biotechnological and energy industries.

⁶¹ McKinsey & Company (May 2020), The Bio Revolution: Innovations transforming economies, societies and our lives. [Available here](#).

⁶² European Commission EU Science Hub (2020), Future transitions for the bioeconomy towards sustainable development and a climate-neutral economy - knowledge synthesis final report. [Available here](#).

effectively, access the best talent globally and attract new investment in this volatile and fragmented sector. The UK Government has recently restated its ambition to lead the Green Industrial Revolution.⁶³

5.2 SUB-REGIONAL STRENGTHS

Y&NY LEP has an ambition to be the UK's first carbon-negative region. The aim is to be carbon neutral by 2034 and carbon negative by 2040. It will work with local authorities, businesses and communities to co-create a "Roadmap Towards Carbon Negative".⁶⁴ Regional activities align with UK Government policies in the 2018 national bioeconomy strategy ('Growing the Bioeconomy') and recent commitments to create a green industrial revolution.⁶⁵

In 2016, the York North Yorkshire and East Riding LEP established the Bio-Economy Growth Fund, a competitive capital fund, to give a significant boost to the bioeconomy in York, North Yorkshire and East Riding. Of the £938m business R&D spent in the Y&H region in 2017, 26% was in chemicals manufacturing. Some 23% of the employment in R&D roles is in chemicals manufacturing (UK is 14%).⁶⁶

Several institutions in Yorkshire focus on the bioeconomy or produce outputs which can be considered beneficial for the bioeconomy, under the banner of [Biovale](#). This is a non-profit organisation associated with the University of York which promotes the bioeconomy in Yorkshire by improving value from biowastes and advanced biorefining. Biovale also aims to develop Yorkshire into a strong bioeconomy with a focus on renewable raw materials and low-carbon agriculture. Other institutions linked to the University of York are:

- The [Biorenewables Development Centre](#) (BDC) helps businesses develop ways to convert plants, microbes and biowastes into profitable biorenewable products. The BDC allows SMEs to test their innovative technologies using their cutting-edge facilities, conduct biorenewable research, and test and scale-up green processes. It offers a broad variety of biological and chemical research services across the biorenewables supply chain.
- The [York Structural Biology Laboratory](#) (YSBL) investigates the use of small molecules to probe cellular biology, software and methods development and exploitation of enzymes in biocatalysis. Facilities include a wet laboratory with the capacity for gene cloning and sequencing.
- [BioYorkshire](#) is a project led by the University of York, Askham Bryan College and Fera Science to develop bio-based supplies of fuel, chemicals and materials. The project aims to help more than 800 start-ups and spinouts to create 4000 highly skilled jobs by 2030 and generate £5 billion for the North of England.
- The THYME project (a £5m collaboration between Teesside, Hull and York Universities called 'Mobilising Bioeconomy Knowledge Exchange') aims to simplify and enable knowledge exchange as well as attracting inward investment in the bioeconomy sector. The consortium has already been funded £1 million in research.

⁶³ UK Government Press Release (November 2020), PM outlines his ten-point plan for a green industrial revolution for 250,000 jobs. [Available here.](#)

⁶⁴ Business Inspired Growth (September 2020), Business programme board meeting notes. [Available here.](#)

⁶⁵ UK Government Press Release (November 2020), PM outlines his ten-point plan for a green industrial revolution for 250,000 jobs. [Available here.](#)

⁶⁶ West and North Yorkshire economic assessment, April 2019

- The [Green Chemistry Centre of Excellence](#) at the University of York carries out leading research into microwave chemistry, alternative solvents, clean synthesis and bio-based mesoporous materials, producing spin-outs such as Starbons Ltd (carbonising starch).

BIOECONOMY SECTOR COMPANIES INCLUDE:

- Drax's Bio-Energy Carbon Capture & Storage (BECCS) technology, as well as strengths in innovation and biotechnologies, are at the heart of a zero-carbon Humber cluster, including current studies into producing more sustainable animal feed products (fish food) for aquaculture and improving crop yields.⁶⁷
- Micro companies such as Tetragen (gasification), Rural Development (biomass), Wilson Bio-Chemical (waste-to-energy; received a £340k grant from IUK in 2018 to reduce industrial waste from sugarcane processing in India, led by Jesmond Engineering along with BDC and the University of York⁶⁸), 3-G Resources (energy services) and Precision Decisions (Map of Ag group).
- Airedale Chemicals in Craven – manufacturing chemicals for a wide range of sectors.
- Specialist Marine Consultants – energy services.
- Optima Energy Systems in Craven (acquired by Australian company Bill Identity in Dec 20) – energy data management and visualisation software.
- Wider regional strengths in the bioeconomy producing niche products such as WeAreConscious near Goole, producing gin from excess potatoes, water from Swaledale and on-farm produced CHP power.

WIDER RENEWABLES ASSETS:

- Endeavour Wharf in Whitby Harbour is used to support Dogger Bank offshore wind farm development, offering an operations and maintenance base. Whitby is the closest serviceable port to the offshore wind farm and can offer maintenance ships 24-hour access to the North Sea. Dogger Bank A & Dogger Bank B will have a combined capacity of 2.4 gigawatts when fully operational.
- Several large solar farms, including more than 90,000 panels, across 200 acres of farmland near Easingwold. This farm is the first in the country to track the path of the sun as it crosses the sky. The 34.7MWp farm, the largest in the region, will generate electricity for Warrington. The project is led by Norstar, in conjunction with European Energy, and is currently developing 14 solar farms, mainly in Yorkshire, the North East and Lincolnshire.⁶⁹ There are also plans for more farms.⁷⁰
- Various commercial and domestic anaerobic digestion plants. A feasibility study for a community-based anaerobic digester plant which will use local food and agricultural waste to create heat and energy for Malton and Norton is near completion. The 'circular economy' is envisaged to help re-ignite North Yorkshire's market towns.

⁶⁷Drax, bioenergy projects (no date). [Available here.](#)

⁶⁸Innovate UK (2018), Newton UK-India industrial biotechnology (BBSRC). [Available here.](#)

⁶⁹Yorkshire Post (2020), Norstar to play its part in Britain's green energy revolution. [Available here.](#)

⁷⁰Richmondshire Today (2020), Plans unveiled for huge solar farm near Richmond. [Available here.](#)

5.3 KEY GLOBAL TRENDS

- Increasing regulation and sensitivity to the finiteness of Earth's resources with the UK (in advance of COP26), EU and China claiming leadership positions and the incoming US administration repositioning towards greener policies.
- A growth in synthetic biology with four areas of bio-innovation around biomolecules – mapping and engineering intracellular molecules; biosystems – mapping and engineering cells, tissues and organs; bio-machine interfaces and biocomputing.
- Greater use of digital technology to unlock new bio-based markets such as blockchain and the use of technologies such as AI, computer vision and sensors to provide new low-carbon, high-fidelity solutions.
- The evolving use of natural and farmed products such as seaweed in higher value application areas including food and drink, health, supplements and cosmetics.
- Investment in the bio-renewables sector is currently in its infancy and demand for waste is volatile, partially dependent on global commodity and fluctuating fossil fuel prices.

MARKET OPPORTUNITIES

Recent figures suggest the UK's bioeconomy is estimated to be worth £220bn gross value added (GVA). The UK Government's published bioeconomy strategy has set ambitious targets to double its size by 2030.⁷¹ In 2016 for Yorkshire, the GVA of the sector was cited as £8.7bn, employing 105,000 people, though most of whom worked in the farming and food sectors.⁷²

According to an EU JRC technical report, the European bioeconomy represents 11% of EU GDP.⁷³ The EU will continue to pursue an aggressive climate change agenda and has agreed to cut emission levels by 55% compared to 1990 levels by the end of this decade. A number of **Eastern European** countries such as **Poland, Hungary and the Czech Republic** are more dependent on fossil fuels than other member states and will find this transition more challenging. With a legislative driver to catch up, these EU countries present a potential target for Y&NY businesses looking to support the transition to a greener economy.

An analysis of 2017 Eurostat data shows that the turnover of the total bioeconomy, including food and beverages, as well as the primary sectors of agriculture and forestry, was just over €2.4 trillion in the EU-28, an increase of 25% since 2008. As can be seen in the chart below, roughly half of the turnover is accounted for by the food and beverage sector, roughly 30% is contributed by bio-based industries, such as bio-based chemicals and plastics, pharmaceuticals, paper and paper products, forest-based industries, textiles, biofuels and bioenergy. The remaining 20% is generated by primary sectors – agriculture and forestry.⁷⁴

⁷¹ Biorenewables Development Centre (April 2020), Funding received to support Yorkshire's bioeconomy innovations. [Available here.](#)

⁷² Business Inspired Growth (October 2016), The bioeconomy- what's it all about? [Available here.](#)

⁷³ European Commission JRC Technical Report (2020), How big is the bioeconomy? [Available here.](#)

⁷⁴ Biomarket Insights (September 2020), New figures reveal that the bioeconomy is worth €2.4 trillion to the European economy. [Available here.](#)

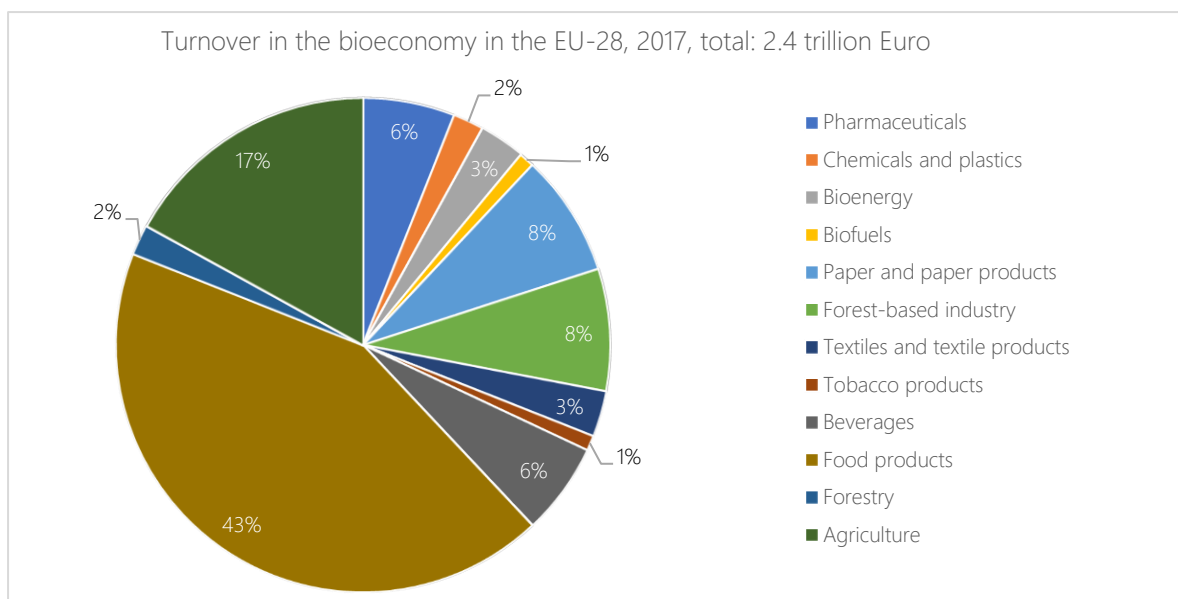


Table 1: Turnover in the bioeconomy in the EU-28

Authors of a recent EU technical report indicated that “...*biomaterials and ecosystem services will gain significantly, strengthening EU competitiveness, creating employment and enhancing the health of ecosystems. Biomass for construction materials, fibre, food and feed, furniture and textiles is expected to grow, especially innovative biomaterials such as bio-based chemicals, lubricants, and bio-based plastics, which offer high value added per mass unit.*”⁷⁵

The authors of the US National Academies of Science, Engineering and Medicine 2020 report ‘Safeguarding the Bioeconomy’⁷⁶ estimated that the US bioeconomy measured approximately US\$1 trillion, with a potential size of approximately US\$1.4 trillion, based on the portion of the economy that could become bio-based using existing technology. This would amount to approximately 7.4% of the US’s entire GDP.⁷⁷

As shown below, funding for the synthetic biology industry is still in relatively early stages. However, given the scale of the challenge, the opportunity for growth is large.

⁷⁵ European Commission JRC Technical Report (2020), How big is the bioeconomy? [Available here](#).

⁷⁶ The National Academies of Sciences, Engineering and Medicine (2020), Safeguarding the Bioeconomy. [Available here](#).

⁷⁷ Forbes (May 2020), New McKinsey report sees a \$4 trillion gold rush in this one hot sector. Who’s selling picks and shovels? [Available here](#). *(includes SynBioBeta data chart on the next page)

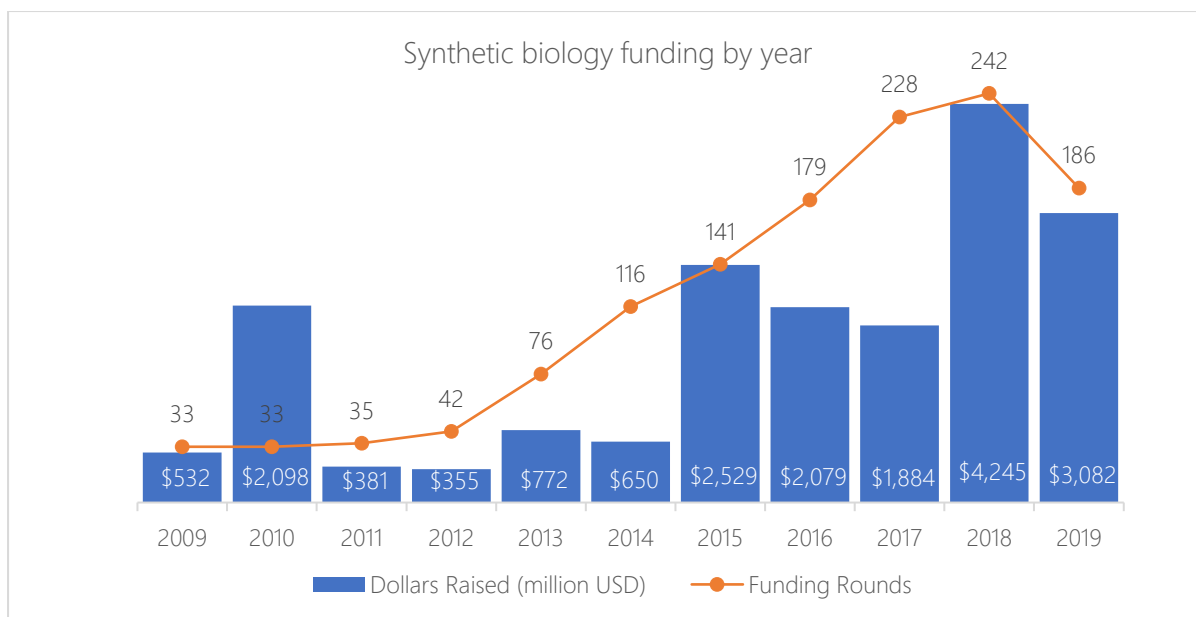


Table 2: Synthetic biology funding 2009-19, SynBioBeta*

The Blue (bio) Economy includes non-traditionally exploited groups of marine organisms (such as macroalgae or seaweeds) and their commercial biomass applications.⁷⁸ Although these have previously been used as fertiliser or food in agriculture, new commercial applications are under development which drive a small but growing lucrative global market. These include high-value bioactive compounds for nutra- and pharmaceuticals as well as cosmetics.

Algae biomass is widely used in [Asia](#) as food and is increasingly popular in Western diets for human consumption, including flavouring additives to achieve refined or unusual taste benefits, or for potential health and wellness benefits.

Although in Europe the algae biomass-related sector is one of the most developed, it only accounted for 0.57% of the 33m tonnes produced globally in 2016. The sharp growth in global macroalgae biomass production can be seen in the chart below. [China, Indonesia and South Korea](#) are the main producers, as is [Norway](#) in Europe.⁷⁹

⁷⁸ European Commission (2020), Blue Economy Report. [Available here.](#)

⁷⁹ European Commission EU Science Hub (January 2020), Algae biomass production for the bioeconomy. [Available here.](#)

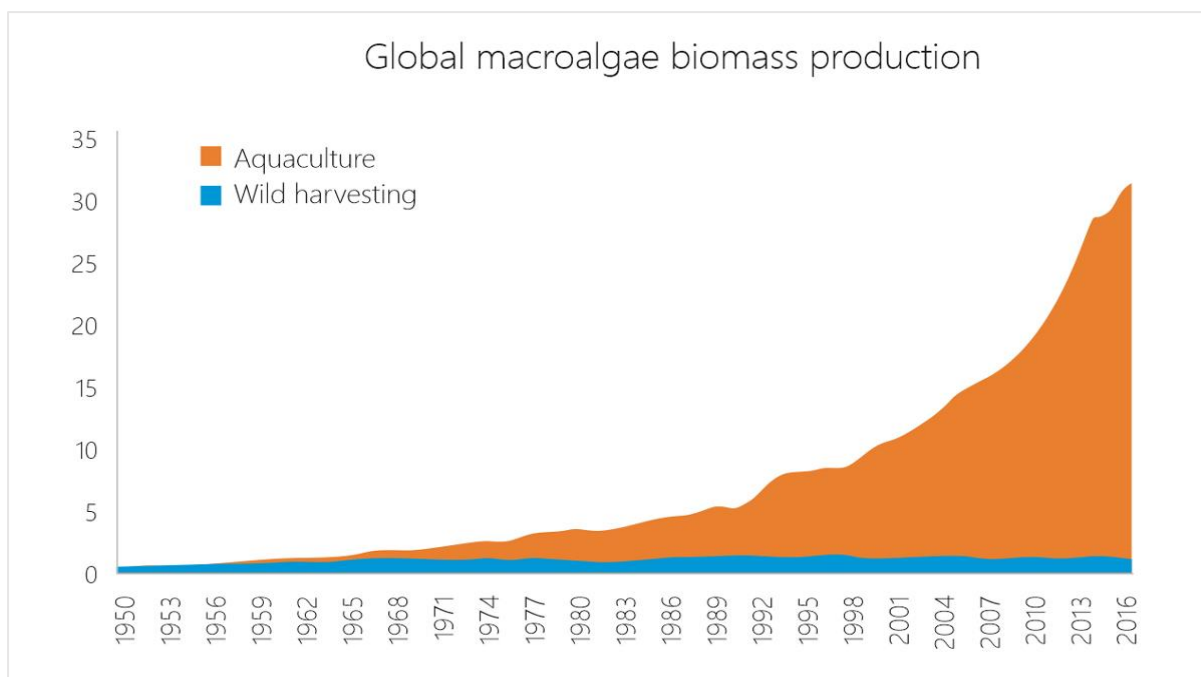


Table 3: Global macroalgae biomass production, European Commission EU Science Hub

According to researchers, the global algae market was valued at US\$717.14m in 2018 and is projected to reach **US\$1,365.8m** by 2027.⁸⁰ Countries such as the US, Canada and Mexico house more than 135 companies engaged in algae cultivation. This is a key factor driving the algae market in the region, with the US constituting approximately 90% of the market by volume and value.

The **US** is anticipated to dominate the algae market in the next few years due to the expansion of production facilities and efforts to overcome the demand-supply gap. It is considerably more mature than other regional markets such as Europe, Asia Pacific, Latin America and MEA, and thus represents a potential target destination for both FDI and trade for the Y&NY region.

Aquaculture is another growing global niche of interest to Y&NY, exemplified by companies such as Seagrown. **India** is the second-largest country in the world (after **China**) to produce fish from aquaculture, contributing to approximately 6.3% of global aquaculture.⁸¹ Supply chain issues are problematic in India; hence technology is driving innovation in distribution and provenance. UK companies such as IntelliAqua are looking at India as an export market due to its readiness to adopt digital transformation in traditional industries.

The Indian Government has recognised this potential and appears to be increasing its support for the emerging aquaculture sector. Venture capital money is flowing into this niche, with Omnivore (part of Indian agri-conglomerate Godrej Agrovet) recently investing in Chennai-based AI and data analytics company Aquaconnect.

⁸⁰ Transparency Market Research (April 2020), Algae market to reach valuation of ~US\$ 10.7 bn by 2027. [Available here.](#)

⁸¹ SlideShare (2018), Growth of aquaculture in Telangana - AirOxi Tube. [Available here.](#)

*"Rising animal protein and dairy consumption will push technology adoption across the animal and fisheries value chain... technology will allow us to tend to each animal individually and increase safety, and productivity across all sources."*⁸²

Aquaconnect's Farm Mojo platform offers forecasting tools for farm management and creates a networked marketplace that allows farmers to connect with feed producers, laboratories, equipment manufacturers, hatcheries, processors, exporters, certification bodies, banks and insurance companies.⁸³ The company had previously been supported by an aquaculture specialist accelerator and VC fund Hatch Blue, which is currently seeking new investment opportunities.⁸⁴

Africa is set to be the region most affected by climate change, despite having contributed the least towards it. It is hoped the continent can become a leader on transition, leapfrogging now-discredited phases of industrialisation and embracing some of the low-carbon technologies that will promote sustainable and inclusive growth.

UK firms in the bioeconomy and wider renewables field are already successfully exporting to Africa, providing software, technology and skills to connect remote communities to the energy grid, helping African energy companies become more competitive through productivity-enhancing technologies such as IoT. Supported by UKRI, UK R&D institutions including Lancaster University are helping build capacity and capability around the circular economy in Ghana by concentrating on finance, skills, technologies, good practice, policy and governance.⁸⁵

The UK's focus on Africa is increasing, using Commonwealth connections and influence as well as several programmes to support local capacity building (for example, GC Research Fund, DCMS-led Tech Hubs or DIT-led initiatives including 'Tech for Growth'). Opportunities exist in public health and food security, green chemicals and new biobased materials, improving agro-processing systems, converting bio-waste to useful products and facilitating the shift to a greener economy as part of the African global competitiveness agenda.

Illustrative of progress, seven countries in **East Africa (Burundi, Ethiopia, Kenya, Rwanda, South Sudan, Tanzania and Uganda)** are developing a regional innovation-driven bioeconomy strategy. BioInnovate Africa is a regional science and innovation network based in Nairobi and supported by the Swedish development agency.⁸⁶

⁸² Omnivore, the Future of Indian Agriculture & Food Systems: Vision 2030 Report - funded by CDC Group via UK Aid. [Available here.](#)

⁸³ Seafood Source (September 2019), Indian aquaculture tech firm scores USD 1.1 million from Hatch, Omnivore. [Available here.](#)

⁸⁴ Hatch, the Hatch portfolio. [Available here.](#)

⁸⁵ European Commission (January 2020), Algae biomass production for the bioeconomy. [Available here.](#)

⁸⁶ Rural 21 (2020), Why East Africa chose to develop a regional bioeconomy strategy. [Available here.](#)

5.4 SUGGESTED ACTIONS/IMPLICATIONS

- ✓ **A greater focus on IP commercialisation, knowledge transfer and global partnerships** will help the region overcome the challenge of scale in global markets – a presence at major events such as the World Bioeconomy Forum with the support of DIT will help the region and the UK promote its leadership in the bioeconomy.
- ✓ **Use the UK presidency of COP26⁸⁷** as an opportunity to significantly raise the international profile of Y&NY companies, in particular the region's innovation and R&D offering with global policymakers, investors and target partner countries such as the US and India.
- ✓ The region should focus on **increasing international R&D collaborations** in this area and developing an ecosystem to support the commercialisation of new knowledge-based technologies with global partners. With the uncertainty surrounding future funding for consortia (following EU exit), the region must not lose the investments made to date.
- ✓ **Using the improving trade, investment and R&D collaboration between India and the UK**, pilot an aquaculture mission to markets to test both the demand for local products and market the region's offer to prospective clients and investors.
- ✓ **Raise the profile of the local bioeconomy offer** by curating high-quality content for DIT sector and international network and targeting companies for inclusion in profile-raising programmes such as Tech Nation's 'Net Zero'.

The following map summarises some of the key sectoral assets within the sub-region.

⁸⁷ UN Climate Change Conference UK 2021. [Available here.](#)

6. ASSET MAP

York and North Yorkshire LEP Area Assets Map (Priority Sectors and R&D Capabilities)

Agritech Sector

- 1 Crop Health and Protection centre (CHAP)
- 2 Centre for Novel Agricultural Products (CNAP)
- 3 Biorenewables Development Centre (BDC)
- 4 Green Chemistry Centre of Excellence (GCCE)
- 5 Global Food and Environment Institute
- 6 Centre of Innovation Excellence in Livestock (CIEL)
- 7 Stockbridge Technology Centre
- 8 Askham Bryan College
- 9 Bishop Burton College
- 10 Grow Yorkshire
- 11 Yorkshire Agricultural Society
- 12 Fera Science Ltd
- 13 C4DI Northallerton

Food and Drink Sector

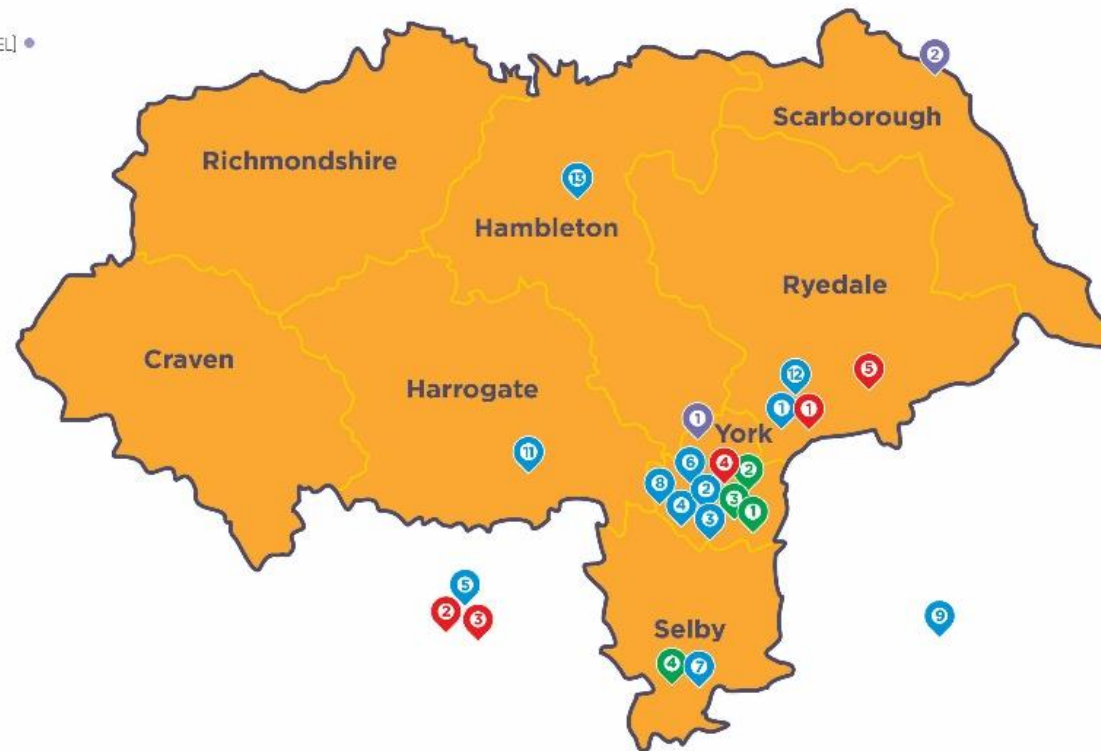
- 1 York Biotech Campus
- 2 School of Food Science and Nutrition
- 3 Human Appetite Research Unit
- 4 Nestle Product Development Centre
- 5 Malton – Yorkshire's Food Capital

Bioeconomy Sector

- 1 Biovale
- 2 York Structural Biology Laboratory
- 3 Biorenewables Development Centre
- 4 P3P Horticultural Technology Park

Other

- 1 York Central Enterprise Zone
- 2 Endeavour Wharf in Whitby



● Research Centre ● Incubator/Tech Park/R&D Facility ● Educational Institution ● Trade/Membership Organisation or Brand ● Enterprise Zone ● Port Infrastructure

7. R&D AND FUNDING

This final chapter outlines the R&D and funding landscape in the region, including ambitions, implications and funding sources. Links to further funding information can be found in Annex 3.

7.1 CONTEXT

R&D intensity (the amount spent on R&D as a proportion of GDP) is often seen as a proxy for innovation capacity. Evidence suggests that on average £1 of public R&D investment generates around £7 of net benefit to the UK.⁸⁸ As can be seen from the chart below, R&D funding in the UK is lagging behind international competitors and government and industry are working hard to change this.

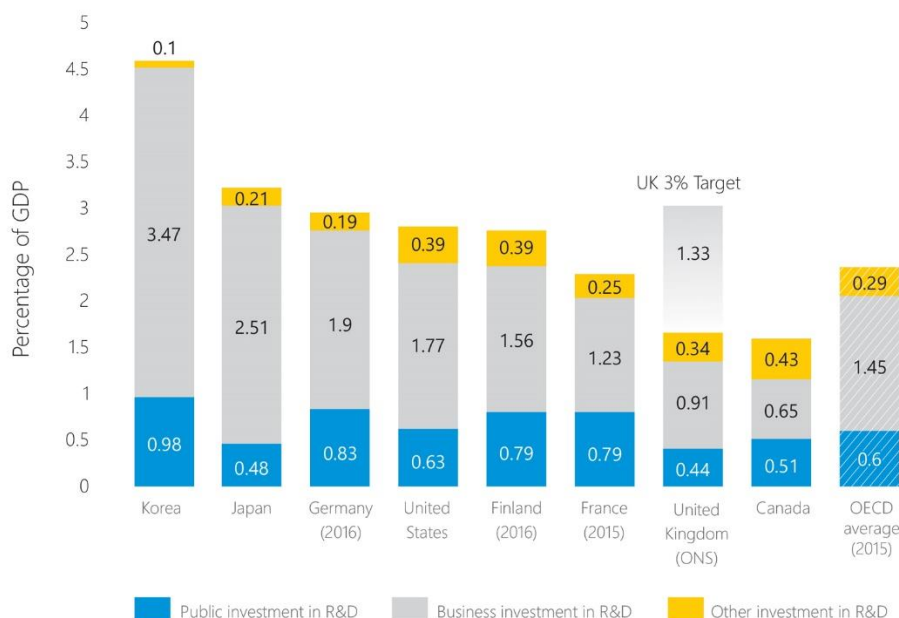


Table 1: UK R&D funding, Royal Society 2019⁸⁹

Responses to the January 2021 UK government consultation on the future direction of R&D spending suggests that long term strategic goals and funding priorities have not hitherto been aligned. The UK government’s plan is to cement the UK’s status as a global leader in science and innovation by investing £14.6 billion in R&D in 2021 to 2022 and to consolidate the UK’s position as a science superpower, aiming towards spending 2.4% of GDP on R&D by 2027.⁹⁰

⁸⁸ Parliament, Level of ambition of the 2.4% target ([available here](#)) and OECD Gross domestic spending on R&D ([available here](#)).

⁸⁹ Ibid

⁹⁰ BEIS (2021), UK R&D Roadmap survey: summary of responses. [Available here](#).

However, this still falls short of the leaders in the field such as Israel, the US and China, and according to Nesta much of the R&D spent in the UK is still too concentrated in London and the South East.⁹¹

The North and North Yorkshire region has set out its ambition to become a much more R&D led economy and it has the assets and sectoral strengths to do so (cf Nestle's R&D hub, Drax's work on alternative food sources, Fera's agrifood strengths, Biovale etc). A 10-year plan launched by the University of York and partners aims to transform the region into a hub for green innovation and enterprise drawing on world class research and knowledge in crop science, agri-tech and industrial biology.

'BioYorkshire' is led by the University of York, Askham Bryan College and Fera Science and the project will harness scientific expertise to develop bio-based supplies of fuel, chemicals and materials. It will also work with the region's farmers and agricultural industries to drive innovation while enabling more productive and sustainable crop production and land use. Ultimately, it aims to cement the region as the UK's centre of innovation and commercialisation in the bioeconomy.⁹²

Selective, small scale funding opportunities in the bioeconomy are currently available via the Biorenewables Development Centre e.g. anaerobic digestion.⁹³

According to Innovate UK data⁹⁴, recent recipients of R&D funding in the York and North Yorkshire region are spread across a relatively limited number of organisations and include the likes of CHAP, one of the UK's agri-tech innovation centres of excellence funded by InnovateUK, Precision Decisions - a precision agriculture specialist, Sylatech Lusstech, McCain Foods and Abingdon Health. Projects that have received funding include vertical farming, biopesticide technology, farming analytics, nutrient recovery from water, slug monitoring and potato crop protection (Kenya focus).

Additional funding has been secured to help the region transition to carbon neutral in areas such as electric vehicles and associated technical skills.⁹⁵ Investments in digital infrastructure and smart technologies will help drive productivity and competitiveness which will be critical for trading internationally and attracting new forms of inward investment. The UK-EU TCA includes a special, time bound clause on battery technology exports with a six-year phase-in of the requirement for battery electric vehicles (BEVs) to have a maximum of 45% content from outside Europe, reducing from 60% to 55% to 45% over the period.⁹⁶ Although Nissan has committed to additional battery production in the North East⁹⁷, the UK has to catch up with the EU in attracting new battery production investment if it is to remain competitive in the future.

Future UK wide innovation and R&D funding themes will include emerging technologies (like quantum), new forms of mobility (drones, electric transport), cross cutting net zero and low carbon, novel and advanced materials, advanced communications and ICT technologies e.g. 5G and 6G, biosecurity, synthetic biology and advanced healthcare technologies.

⁹¹ Nesta (2019), Fuelling the future of UK innovation. [Available here.](#)

⁹² University of York, BioYorkshire. [Available here.](#)

⁹³ Bioenergy Insight (2021), Yorkshire businesses urged to apply for AD funding. [Available here.](#)

⁹⁴ Innovate UK Funded Projects. [Available here.](#)

⁹⁵ Y&NY LEP, York, North Yorkshire & East Riding's Local Energy Strategy. [Available here.](#)

⁹⁶ UK in a Changing Europe (2021), Battery production: a challenge after Brexit. [Available here.](#)

⁹⁷ BBC (2021), Brexit: Nissan commits to keep making cars in Sunderland. [Available here.](#)

Commercialising R&D investments and developing robust go-to-market pipelines, encouraging more business university interaction around R&D and innovation, and attracting the financial and relational capital to support global roll out of new products and ideas are key areas for development.

According to local stakeholder interviews, in food and drink for example, more innovation and funding support is needed to develop innovative new flavours using globally inspired, new production and testing technologies; and in bioeconomy the focus should be on industrial biotech and commercialising value streams from waste, at the same time as better promoting the assets that the region has both locally and internationally.

7.2 HORIZON EUROPE – ASSOCIATE STATUS FOR UK

Funding for businesses to continue to innovate is critical to the region's future development and the departure of the UK from the EU has led to a high degree of uncertainty for business, sector specific support organisations and universities around sources of funding for supporting innovation, collaborative R&D and attracting the best talent to come to the region.

Horizon Europe is the European Union's next seven-year research and innovation programme (€95.5 billion budget), running from 2021 to 2027 and successor to the Horizon 2020. As part of the agreement reached between the UK and the EU, the UK has announced that it will associate to Horizon Europe subject to ratification of the overall deal and finalisation of the regulations. Association will give UK scientists, researchers and businesses access to funding under the programme on equivalent terms as organisations in EU countries.⁹⁸

LCR based academics and researchers will be able to apply for grants from Horizon Europe (see below), the EU's €85 billion (£75 billion) research programme, which started in January, as the UK now becomes an 'associate' member. This extends to the European Research Council and Marie Skłodowska-Curie Actions fellowships, but not the new European Innovation Council Fund for start-up and university spin-outs.⁹⁹

The timeline for UK association is to be confirmed but draft text in the EU-UK Declarations sets out an ambition for the UK to associate to Horizon Europe in time to participate from the beginning of the programmes.

IUK is encouraging UK researchers and businesses to proactively form collaborative partnerships with EU and international counterparts and prepare to bid into Horizon Europe funding calls in the coming months. Money from this programme will take a few months to start flowing once the EU has finalised its regulations for Multiannual Financial Framework for 2021-27.

⁹⁸ Horizon 2020: what it is and how to apply for funding ([available here](#)). As of early Jan 2021, IUK interpretation of the agreement is that UK will Associate in all parts of Horizon Europe programme except for the EIC Accelerator (under Pillar 3). For current UK recipients of Horizon 2020 funding, the terms and conditions will remain the same as agreed under the Withdrawal Agreement. UK entities can continue to participate in Horizon 2020 programmes and receive EU grant funding for the lifetime of individual projects, including projects finishing after 1 January 2021. Successful UK bids will continue to receive grant funding from the Commission. This includes calls that end after 1 January 2021.

⁹⁹ Chemistry World, what does the Brexit Deal mean for research and industry? [Available here](#).

7.3 TRAINING AND SKILLS

The UK also reached agreement with the EU and Euratom to associate to the next Euratom Research & Training (R&T) Programme 2021-2025 subject to ratification of the overall deal and finalisation of the regulations.¹⁰⁰

A new flagship 'Turing' scheme starting in September 2021 will replace the UK's participation in Erasmus+.¹⁰¹ The programme will provide similar opportunities for UK students to study and work abroad as the Erasmus+ programme and will include countries across the world.¹⁰² Northern Ireland will continue to participate in Erasmus. Although UK has exited the student exchange programme Erasmus+, the new Turing Scheme doesn't provide as much funding per student and doesn't fund incoming (foreign) students.

The increased cost for EU students to come and study in the UK will act as potential disincentive to come and study in the region. There will initially be a high degree of uncertainty around offering internships in critical technology and R&D areas to both EU and non-EU students until new visa rules are fully understood by both universities, faculties and departments, students and candidates themselves.

New rules on movement of people and mutual recognition will have already led to the leakage of and slowdown in EU talent and candidates. The flow of international researchers will be affected by the new points-based system for skilled workers wanting to work in the UK and the global talent visa, a more rapid route to permanent settlement, for workers named on research grants. New rules on mutual recognition of qualifications between UK and the EU will also apply meaning a more restrictive working environment.¹⁰³

7.4 FUTURE FUND

The UK Government launched the Future Fund back in May 2020 with loans from £125k to £5m to help support companies struggling with the effects of Covid-19.¹⁰⁴ Once matched with private sector investment, some of these loans can be converted into equity. According to the FT¹⁰⁵, the Treasury confirmed that £1bn had been lent to more than 1000 start-ups in this way. Two thirds of the funds were reported to have gone to start-ups in London and the South East.

¹⁰⁰ Gov Rules, Guidance and Support (2020), Participating in EU nuclear research from 1 January 202. [Available here.](#)

¹⁰¹ Turing Scheme, funding opportunities. [Available here.](#)

¹⁰² Gov education, training and skills (2020), new Turing scheme to support thousands of students to study and work abroad ([available here](#)) and University Finder (2021), all you need to know about the replacement Erasmus programme: the Turing scheme ([available here](#)).

¹⁰³ *ibid*

¹⁰⁴ BEIS (2020), apply for the coronavirus Future Fund. [Available here.](#)

¹⁰⁵ Financial Times (29th January 2021), State takes stakes in UK start-ups under £1bn convertible loan scheme. [Available here](#) (paywalled).

7.5 UK SHARED PROSPERITY FUND¹⁰⁶

There remain questions to be answered on future structural funding for UK regions, including the UK Shared Prosperity Fund, which is due to replace EU structural funds, as well as the impact on business engagement in economic development.

In September 2020, the UK government introduced the UK Internal Market Bill, which will give Ministers the power to make payments to any person across the UK for the purposes of economic development, including directly in the devolved nations, in areas of devolved competence.

In the Spending Review in November 2020, the UK government set out that it will use these new powers to deliver the Shared Prosperity Fund and explained that this fund would operate on a UK-wide framework. It committed to publish further details of the scheme in the Spring 2021 and it has been reported that this fund would be operated centrally from the Treasury, rather than via the devolved regions.¹⁰⁷

7.6 IMPLICATIONS

The regional innovation ecosystem will need strengthening – with a greater focus on R&D (both public and private) to drive innovation and higher margin activity and new funding needed to support international collaborations. With leading Universities and assets in areas like industrial robotics, data analytics, artificial intelligence, cyber security, crop science, and animal health, the region is well placed to capitalize on global opportunities.

Increased need for Universities to double down on developing innovative programmes of business support to engage with local and regional businesses to drive innovation and economic development, using the skills, talent and trusted networks in the universities to collaborate more effectively and easily with local SMEs and (prospective) inward investors.

There will need to be a **much greater emphasis on the successful commercialization of new ideas and technologies** and a real focus on go-to-market support, an area in which the UK overall has traditionally underperformed, as well as attracting a greater share of investment finance and capital into the region's ecosystem and companies to exploit global markets.

7.7 R&D FUNDING SOURCES

UK RESEARCH AND INNOVATION (UKRI) / INNOVATE UK (IUK)

UKRI is the UK's innovation agency¹⁰⁸. BEIS will continue to fund UKRI and IUK and has launched new services such as Innovateuk Edge¹⁰⁹ are being developed (incorporating the former European Enterprise Network (EEN)).

¹⁰⁶ UK Parliament (2021), research briefing: The UK Shared Prosperity Fund. [Available here.](#)

¹⁰⁷ BBC News (January 2021), new UK Shared Prosperity Fund to bypass Holyrood. [Available here.](#)

¹⁰⁸ UKRI, [available here.](#)

¹⁰⁹ UKRI Innovate UK Edge. [Available here.](#)

UK registered organisations can apply for a share of £25m (incl. Smart Grants) to deliver disruptive R&D innovations with project size ranges from £25k to £2m.

Also runs the Knowledge Transfer Network (KTN) which is a platform designed to connect business and innovators and runs sector focused innovation events like Food and Drink (Food, Nutrition and Health - March 2021) ¹¹⁰. It is well worth York and North Yorkshire businesses in the key sectors getting in contact with the KTN's sector teams.

INDUSTRIAL STRATEGY CHALLENGE FUND (BEIS)

The Industrial Strategy Challenge Fund (ISCF) is UKRI's flagship challenge-led innovation programme. Around £2.6 billion of public money and £3 billion in matched funding from the private sector have been invested in projects that bring together researchers and businesses to tackle the big societal and industrial challenges of today. There are four key themes, clean growth, ageing society, mobility and AI and data.¹¹¹

GLOBAL CHALLENGES RESEARCH FUND

This £1.5bn programme (2016-21) is funded as part of the UK's ODA programme and is designed to address global challenges in developing countries through cutting edge research and collaborations between UK academic and international partners. It is due to end in 2021.¹¹²

INTERNATIONALISATION FUND (DIT)

As well as new export advisors, business and sector champions, and workshops to support local business, ERDF funded internationalisation fund envisages match funded support for go-to-market plans.¹¹³

INTERNATIONAL FUNDING (FCDO AND DIT)

FCDO and DIT sector teams are increasingly putting out funding and challenge calls linked to specific markets and sectors in the local market. There would be an opportunity for UK suppliers to form consortium partner bids with international partners to help with the delivery.

¹¹⁰ KTN, food industry innovation 2021- food, nutrition & health. [Available here.](#)

¹¹¹ UKRI, what is the Industrial Strategy Challenge Fund. [Available here.](#)

¹¹² UKRI, Global Challenges Research Fund. [Available here.](#)

¹¹³ Department for International Trade (2020), HMG launches Export Growth Plan to help businesses ([available here](#)) and Enterprise Growth Solutions, DIT Internationalisation Fund ([available here](#)).

ANNEX 1: GLOBAL BEST PRACTICE EXAMPLES

Copenhagen - Increasing GVA whilst reducing carbon emissions

The Danish capital Copenhagen first made a commitment to go carbon neutral in 2010. Sustainable growth in Copenhagen’s metropolitan economy, measured as (GVA) per capita, grew by nearly 25% from 1994 to 2010, as can be seen from the chart below. Over the same period, greenhouse gas (GHG) emissions per capita in the City of Copenhagen decreased by 40% from 7.31 tCO₂e to 4.38 tCO₂e.⁶⁷

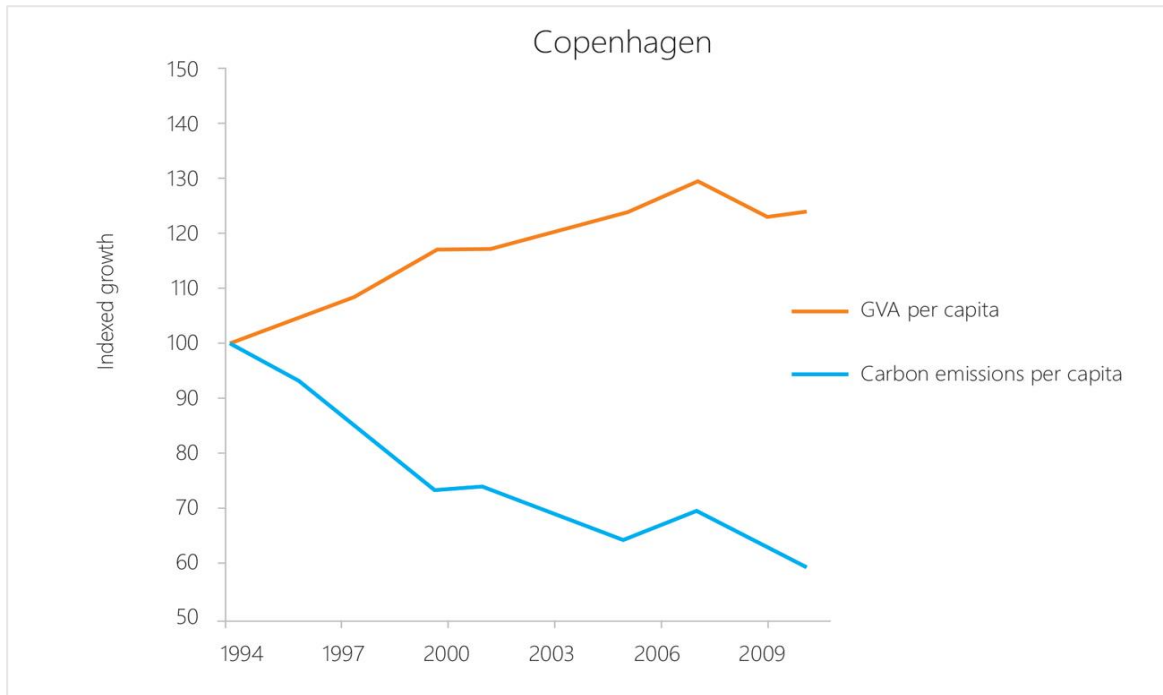


Table 1: Sustainable growth in Copenhagen, London School of Economics and Political Science

According to the city’s Executive Climate Programme Director, Jorgen Abildgaard, key drivers of the reduction in greenhouse gases have been maintaining energy and resource effectiveness and reducing carbon emissions through use of district heating and wind energy and improving air and water quality.

Part of Copenhagen’s success in reducing environmental impacts is likely to be due to its high levels of wealth, which have driven environmental improvements. However, as Copenhagen’s urban environment continues to become greener, the economic benefits have increased. As the city’s ‘green appeal’ has grown, it has attracted more international students, skilled professionals and innovative businesses that help maintain Copenhagen’s high level of human capital, productivity growth and inward investment in a virtuous cycle of green growth.

“This green appeal nests within Copenhagen’s broad strategy of using quality of life as a driver for economic growth, as many features of the two are synonymous.”⁶⁸

⁶⁷LSE Copenhagen Green Economy Leader Report. [Available here.](#)

⁶⁸ Ibid

Competing at the Edge through Net Zero – the New Zealand Advantage

New Zealand has a large landmass and relatively small population size (like Y&NY), and has become one of the world's leaders in agritech innovation. This is partially due to the 'Zero Carbon Act' legislation passed by the New Zealand Government to make the country carbon neutral by 2050 and penalise financial primary sector industries that pollute. This has encouraged even greater collaboration between industry, government and universities, which have come together to develop technologies to reduce emissions.

The support of New Zealand's research and innovation support body Callaghan Innovation and Agritech New Zealand has been helpful in positioning the country as a knowledge leader in international markets. This support has also been instrumental in helping local companies such as weed extraction specialists Greentech Robotics - who use camera, LIDAR and software technology - to penetrate the US.⁶⁹

⁶⁹ Callaghan Innovation, Customer stories, weed beaters. [Available here.](#)

ANNEX 2.1 SCARBOROUGH INTERNATIONALISATION PROFILE

SPATIAL CONTEXT AND INTERNATIONAL CONNECTIVITY

- With a population of 108,800 people, Scarborough is a coastal local authority with a large proportion of micro and small businesses.
- It comprises a number of market towns, including the Coastal towns of Scarborough and Whitby, extending into the North Yorkshire Moors in the West, Redcar and Cleveland in the North and Filey in the South.
- An attractive coastline and natural landscape mean that tourism and leisure is an important part of the local economy.
- It has good international rail connectivity to cities like York and is well connected by the road and rail network to regional airports and parts of the North and wider UK market.

SUB-SECTORS, NICHEs AND LOW CARBON CREDENTIALS

- Fishing – Scarborough is the 2nd largest shellfish processing port in England.
- Mining – hosts a £1.7bn potash (polyhalite) mine (Woodhead Mine) on the moors above Whitby, owned by Anglo American, exporting an agri-food product.
- Engineering and electronics - has a long history of engineering prowess, notably at Plaxton's coach manufacturer.
- Food and drink – has significant indigenous food and drink manufacture (McCains – Cooplands) and has a developing food and drink sector on the back of a growing visitor economy.
- Creative, tech and digital sector, with companies like Electric Angel Design supported by the Woodend Creative Workspace, and GCHQ base for cyber security at Irton Moor.
- Strong low carbon credentials:
 - World's first 'sustainable mine' (Anglo American).
 - Successful exporters of low carbon products and services such as Anglo American, Castle Group, Cirrus Research and Dale Power Solutions.
 - Schneider Electric is using the latest waste reduction and low carbon technologies in the extension of its state-of-the-art paint facility.

FDI AND FOCS AND GLOBAL EXPORTERS

- [Anglo-American](#) – world leading mining company developing the 100 year [Woodsmith project](#) -a sustainable, deep mine from which new global exports of polyhalite are to be sold for export as a low chloride, multi-nutrient fertiliser, suitable for organic use that can boost crop yields and aid more sustainable farming.
- [Castle Group](#) - at the forefront of environmental measurement and monitoring technology, offering hardware, software and cloud solutions to customers worldwide.
- [Cirrus Research](#), one of the world's leading designers, manufacturers and suppliers of noise measurement instruments based in North Yorkshire. Has recently won a large international tender in India.
- [Dale Power Solutions](#) - one of the UK's largest suppliers of service and support, providing complete asset life-cycle management to Generators and UPS.
- [Festo](#) - a German owned leading world-wide supplier of automation technology and the performance leader in industrial training and education programmes.
- [Firmac Ltd](#) – family-owned business that designs and manufactures high quality sheet metal duct forming equipment which is sold worldwide via agents.

- [McCain Foods Ltd](#) - US\$7bn Canadian company with a major presence in the UK frozen food market with UK head office in Scarborough.
- [Plaxton](#) (Alexander Dennis) – the UK's largest coach builder and has been at the forefront of coach design, engineering and innovation since 1907. In recent years, sales have expanded into Europe and even as far as New Zealand.
- [Seagrown](#) – UK's first offshore seaweed and aquaculture farm, producing novel products such as seaweed flavoured rum with York based drinks specialist Yorkshire Explorer and a new premium priced seaweed mineral bath soak.
- [Schneider Electric](#) – French owned global specialist in energy management with operations in more than 100 countries and extended local manufacturing on back of increased global demand.
- [Unison Ltd](#) – CNC pipe and tube bending specialist, the first designer and manufacturer of all-electric tube-bending technologies, working with global companies.
- [Whitby Seafoods](#) – one of the largest Scampi factories in the world trading with the EU.

R&D & RESEARCH CAPABILITIES, TECHNOLOGIES AND OTHER ASSETS

- [Scarborough's UTC](#) for 14-18 year olds is backed by industry and enjoys links with Hull University, as well as Sheffield and Coventry Universities, in areas such as engineering and design collaborations
- [Coventry University](#) has a campus in Scarborough for technical and vocational skills in engineering, ICT and nursing and is looking to attract more international students.
- [Scarborough Science and Engineering Week](#) brings together key players and talent.
- Recent investments:
 - Anglo American's mine contains the largest, highest grade resource of polyhalite to be found anywhere in the world, amounting to some 2.69 billion tonnes, giving a potential lifespan of over 100 years.
 - GCHQ - base for GCHQ which has invested over £100m in the site.
 - McCain Foods - continued investment in its potato processing factory (one of four in the UK).
 - Schneider Electric- recent expansion included a new, 1,000sq m extension and a £1.5 million state-of-the-art paint facility. The site upgrades will also tie in with local initiatives on reducing waste and achieving net-zero emissions by 2025.

DISTINCTIVE FEATURES AND INWARD INVESTMENT PITCH

- Diverse economic make-up - fishing, farming, agriculture, manufacturing, tourism and hospitality, retail, health, education and cyber security all feature.
- Globally connected - track record of supporting a diverse range of serial exporters and large, loyal FDIs that carry out successful international business from Scarborough as a base.
- Excellent range of educational and vocational training facilities to support the strong, local, technical and technology skills base.
- Low operational costs and high quality of life with a 20-minute commute to seaside or countryside
- Value for money and loyal workforce - high degree of industry, university and UTC collaboration to support the pipeline of skills development.
- Niche sectors like mining (Anglo American) utilising state-of-the art and sustainable mining technologies and driving global exports in agri-food related compounds.
- Pro-active local business networks - [Scarborough Business Ambassadors \(SBA\)](#) network.
- [Sirius Minerals Foundation](#) is now an independent charity aiming to leave a sustainable community legacy from the Woodsmith Mine.

ECONOMIC AND INVESTMENT PRIORITIES

- Grow awareness of supply chain opportunities with Anglo American.
- Attract new businesses leveraging the local vocational skills strengths in engineering.
- Nurture vibrant start-up community around tech, digital and creative.
- Develop the food and drink sector and the emerging cultural hub – independent restaurants and cafes, lively night-time economy.
- Cyber – potential growth of GCHQ.
- Fishing – mitigate impact of quota reductions, Covid-19 (demand slump) and EU exit (supply chain disruption).
- Plans to create a bio, agri-food R&D centre in Scarborough- a small scale centre to start with, but 5-year time horizon (confidential).

ANNEX 2.2 RICHMONDSHIRE INTERNATIONALISATION PROFILE

SPATIAL CONTEXT AND INTERNATIONAL CONNECTIVITY

- Richmondshire is a district of North Yorkshire covering a large (1,319 km) northern area of the Yorkshire Dales.
- Its economic geography gives rise to a unique, rich tapestry of urban areas like Richmond and Catterick, market towns like Hawes and Leyburn, as well as deeply rural locations like Swaledale and Wensleydale.
- Strategically located along the main arterial A1 transport corridor that runs north south and the A66 which runs east west, which intersects at the famous Scotch Corner.
- International connectivity to global markets is assured by links to Teesside, Newcastle and Leeds Bradford airports.
- Rail links – proximity to East Coast main line via Darlington and Northallerton stations.
- Port links – PD ports at Teesport.
- Tourism is a significant contributor to the local economy with visitors attracted by the rural heartland and wider Yorkshire Dales national park.

SUB-SECTORS, NICHE AND LOW CARBON CREDENTIALS

- Food and drink - processing and manufacturing with extremely well-established local supply chains, and speciality products developed with locally sourced ingredients.
- Agriculture – large mechanised pig farmers like HM Pigs in Richmond.
- Logistics and distribution taking advantage of the strategic road connections.
- Manufacturing and engineering is quite diverse and agile.
- Health and life-sciences.
- Tourism - niche retail and diverse visitor economy.
- Green, renewable and low carbon technologies offer potential across key sectors, especially around manufacturing, contracting, engineering – evidence of novel biogas, waste to energy, and solar usage.

FDI AND FOCS, GLOBAL EXPORTERS

- [Bulk Logistics](#) – Bedale based logistics and haulage group.
- [MHT Technology](#) – (Swiss company [Endress and Hauser](#)) a Richmond based digital specialist with a system for processes in bulk liquid storage and handling.
- [Hilcovision](#) – US (MA) and Hawes based eyewear and eye-care company.
- [Integrated Polymer Systems](#) – Brompton-on-Swale based eco-friendly, bio-solar and green roofing specialists.
- [Metcalf Farms](#) – large Leyburn based farm, logistics and agri-business, state-of-the-art milking facility using robotics and IoT technology. Using waste to develop energy and heating.
- [OpenCRM](#) – Richmond based niche CRM and cloud technology supplier.
- [Propharma Group](#) - Richmond based pharma specialist with global offices including North America and EU.
- [Razor Blue](#) Catterick based IT and managed service provider.
- [Swaledale Cheese](#) – Richmond based specialist cheesemaker since 1156, famous for its ewe's cheese and a potential beneficiary of future trade deals
- [Wensleydale Creamery](#) - famous cheese manufacturer with a global brand based in the town of Hawes in North Yorkshire, England. The company could benefit from enhanced market access from new trade deals signed with the likes of Japan and future ones like the US.

- [Yorkshire Dales Distillery](#) – local small batch distiller of gin and vodka based at Catterick Garrison.
- [Yorkshire Dales Meat Company](#) – supply restaurants and homes across the UK with meat products.
- Mixed industry like [Bremsen Technics](#) (automotive parts), [Biker Group](#) (construction services) and [Hambleton Steel](#) (steel).

R&D & RESEARCH CAPABILITIES, TECHNOLOGIES AND OTHER ASSETS

- Natural linkages to Teesside University's Darlington and Middlesbrough campuses and healthcare specialisms.
- Newcastle, York and Durham Universities accessible, all part of the [N8](#) research partnership, which has recently launched its Net Zero North programme (incl. grow smarter).
- [National Biologics Manufacturing Centre](#) – which aims to support the commercialisation of biologics
- [NEPIC](#) – chemicals and processing cluster.
- [North East Technology Park](#) – links to Sedgefield business and innovation cluster.
- Recent investments:
 - Biogas - Wensleydale Creamery planned to use cheese waste (primarily whey) from the Creamery to help heat 4,000 Yorkshire homes with renewable 'green gas'.
 - Solar - plans to develop a new 49.5MW solar farm were submitted in summer 2020 by investment company Ritchie Bland Energy Ltd and Knaresborough based renewable energy developer Harmony Energy.
 - Agriculture – farmers such as Metcalfe using waste products to make energy for heating.

DISTINCTIVE FEATURES AND INWARD INVESTMENT PITCH

- Strong technical and technology vocational skills base through local light manufacturing, ideally primed for low carbon technology development.
- Availability of local workforce – draws its workforce not only from North Yorkshire, but also close proximity to Tees Valley, especially Darlington and also from South Durham area – Barnard Castle and Sedgefield.
- Strong biodiversity and natural heritage credentials are part of the economic fabric of the district and have always played an important part of local economic development considerations.
- The important part the region can play in ensuring the UK's future resilience in food sustainability and supply chains.
- Four main business associations across the district and strong co-operation with business networks such as the North East Chamber of Commerce in Teesside are vital in supporting local exporting companies.
- Less densely populated areas will become more popular with visitors and businesses in the post Covid era, especially when combined with a flexible, 'work-from-anywhere' culture.
- Great place to live, work and play. with a focus on a high quality of life, plus work life balance with access to fantastic countryside and open space.

ECONOMIC AND INVESTMENT PRIORITIES

- New sites under development at J53 and J52 for light manufacturing, commercial and logistics, plus mixed-use hospitality and retail.
- Plans for J53 at Scotch Corner include a designer village. J52 is a large site and includes new motorway services and manufacturing, engineering on the Catterick Garrison side.
- New and alternative different routes to market for attracting inward investment need to be explored, as well as enhanced visibility for shovel ready sites.

- The development and roll-out of the rural ‘smart places’ and full fibre connectivity agenda to enhance the digital infrastructure in the rural economy.
- Build on collaborations to the east of the district with the internationally recognised processing and chemicals centres of expertise.
- Opportunity to target new growth areas in light industry, higher value manufacturing and digital technologies.
- More resources for a visible presence at key events like MIPIM, Multimodal, Offshore
- Focus will include sectors that provide significant opportunities for better paid, skilled work which will encourage young people to stay and work locally.
- Local industrial estate development in Leyburn (Metcalf Farms).

ANNEX 2.3 HAMBLETON INTERNATIONALISATION PROFILE

SPATIAL CONTEXT AND INTERNATIONAL CONNECTIVITY

- Diverse district with small hamlets and large market towns, varied landscape and a broad range of businesses- including many SMEs.
- Sixth largest local authority district in the UK (506m²), located north of York and south of Teesside, in the heart of North Yorkshire.
- Includes some of the North York Moors National Park in its boundary, 'gateway to the Dales'.
- High-quality environment, excellent transport links on the East Coast Main Line, A1 and A19.

SUB-SECTORS AND NICHE AND LOW CARBON CREDENTIALS

- Food and Drink Manufacture (e.g. Leeming Bar Industrial Estate).
- Structural Steel cluster and specialist construction (e.g. Dalton).
- Agri-tech and agri-food.
- Public sector and professional services sector in Northallerton.
- Circular economy linked to agriculture, biodiversity and waste streams (AD facility in Leeming and solar adjacent to A1).

FDI AND FOCS AND GLOBAL EXPORTERS AND HPO (HIGH POTENTIAL OPPORTUNITIES (HPO))

- [Froneri](#) - global ice cream manufacturer (part of Nestle since 2016).
- Soft drinks manufacturers and beverage co-packer Cawingredients.
- Thirsk based family run [Heck](#) Sausages.
- Soup Manufacturer [Yorkshire Provender](#) – now part of the Hains Daniel Group.
- [Quorn](#): owned by Monde Nissin (leading Filipino food consumer goods companies).
- Agri-tech Masham-based [l'Anson Brothers](#).
- [Inspired Pet Nutrition](#) based at Dalton near Thirsk (produces pet foods under the Wagg, Harringtons and Nineteen 87 brands, exports globally).
- [Labman](#) design and build custom robotic solutions for industrial, laboratory and medical applications, operating in 54 countries.
- [IT-IS International Ltd.](#) Agile product development company with a life science industry focus, recently acquired by [Novacyt](#).
- [Cleveland Steel and Tubes](#) (largest UK steel tube stakeholder), [National Tube Stockholders](#), and [Severfield](#) (healthy order book across Europe and India including a [UK Commercial Reactor Decommissioning Project](#), clients include the Shard, the Olympic Stadium and the Paris Philharmonic Hall, has an office in India).
- [Kerfoot Group](#), speciality oils group, owned by French Group Avril.
- Global swiss-owned [Firmenich](#) (fragrances, flavours and ingredients) have a UK base at Dalton.
- [Thermopatch](#) (Dalton) are being supported to expand in Hambleton rather than move to Europe. They service over 65,000 customers worldwide with textile labelling, transfers and emblems.
- Recent inward investment enquiries from Saudi, India, Poland.
- [Cargill](#) – international animal nutrition company with £2.1b annual turnover have a large site at Dalton with over 80 employees.

R&D & RESEARCH CAPABILITIES, TECHNOLOGIES AND OTHER ASSETS

- Food and Drink Clusters at Leeming Bar Industrial Estate and Dalton.
- Structural Steel cluster at Dalton (former RAF base).

- Technologies – Digital and automation
- Recent investments:
 - Cawingredients has invested £42m into operations including new canning line and warehouse expansion.
 - Heck is building two £1.5m robots production sites to meet export demand. Plans to export to the Middle East, Asia and the US (current markets include Australia, Holland and Germany).
 - Vale of Mowbray Pork Pies increased national mail order business turnover in May and April 2020 ten-fold in response to lockdown, are intending a £3m investment in 2021 new product launches.
 - l’Anson Brothers purchased a site at Dalton New Bridge for a £20m, 23,000 ft² feed mill to produce micronized feeds, specialty rations and horse feeds to expand their export operations (currently in over 40 countries). This builds on their strong international links, having welcomed international farmers from Canada, the USA, Australia and New Zealand to tour the mill as part of the 2017 International Farm Management Association’s annual congress.
 - Yorkshire Provider (£2.9m expansion of Leeming Bar manufacturing site in 2015)
 - [Quorn R&D lab](#) – invested £7m into Global Innovation Centre in Stokesley to drive export business as part of £150 investment into world’s largest meat alternative production facility.
 - Cleveland Steel and Tubes [investing in apprentices](#) to drive their future workforce, selling as far afield as Australia and Hong Kong.

DISTINCTIVE FEATURES AND INWARD INVESTMENT PITCH

- Road and rail connectivity and central location attractive to manufacturers
- Beautiful location – great quality of life for families - proximity to East Coast and the North York Moors, 90 minutes from the Lakes, 2 ½ hours to London by train
- Food cluster (proximity to raw materials and farms) including Europe’s biggest ice cream factory
- High skills workforce and educational attainment
- Rural district, home to the historic market towns of Bedale, Thirsk (cultural centre), Northallerton, Easingwold, and Stokesley (association with food) – each with their own unique qualities.

ECONOMIC AND INVESTMENT PRIORITIES

- Five key [economic development](#) priority areas: business support, inward investment, driving growth, vibrant market towns and supporting activity.
- £17m redevelopment of former prison site by Central Northallerton Development Company Ltd (CNDCL), a joint venture formed by leading Yorkshire property developer Wykeland Group and Hambleton District Council
 - C4DI offering managed workspace for agri-tech and technology adoption in agriculture, horticulture and food processing
 - E-campus – FE/HE satellite
- Key research centres of Stocksbridge and NAFIC at Sand Hutton are close by
- Developers Opus North and Rougemont have submitted a request for outline planning permission for Dalton 49 Thirsk, a 43-acre logistics park, to Hambleton District Council. Formerly part of RAF Dalton, the site is capable of delivering around 650,000 sq. ft. of employment space
- Investment in flood prevention.

ANNEX 2.4 RYEDALE INTERNATIONALISATION PROFILE

SPATIAL CONTEXT AND INTERNATIONAL CONNECTIVITY

- The largest district in North Yorkshire, spanning 575m² of predominantly rural land interspersed with relatively small towns and settlements.
- 43% of residents live within one of the district's five towns (Helmsley, Kirkbymoorside, Malton, Norton and Pickering).
- The combined Malton and Norton conurbation make up the largest settlement.
- There are 4,160 businesses in Ryedale, of which 3,261 are micro businesses with fewer than 10 employees.
- Manufacturing is the largest employment sector (5,000 employees, 2018, 18% of jobs) followed by agriculture, forestry and fishing; wholesale and retail trade (both 3,500); and accommodation and food services (3,000), each providing over 10% of Ryedale's jobs.
- Road and Transport links - A170 to Thirsk/Scarborough and the A64 to York/Scarborough, as well as Malton rail station running York/Scarborough.

SUB-SECTORS AND NICHE AND LOW CARBON CREDENTIALS

- (a) Land Industries employ 3,500 people in Ryedale, 12% of total jobs.
 - 1,200 farm holdings, farming 121,500 ha. Just under a fifth of the North Yorkshire's agricultural capacity with 48,000 hectares of farmland (40%) used to grow cereals (wheat, barley etc.).
 - Specialism in pig farming, 5% of the national and 27% of the County's pig population (211,000 pigs in 2016). There are also 51,000 cattle, 223,000 sheep and 1.2m poultry (1% the national total).
- (b) Production and Engineering including food production (2,250 jobs), basic metals manufacturing (650 jobs), plastics manufacturing (600 jobs) and fabricated metal products (500 jobs).
- (c) Bio-Agritech - nationally significant cluster of food and health science R&D includes DEFRA, Public Health England, the Animal & Plant Health Agency and FERA Science Limited, all located at NAFIC alongside other R&D and science-tech activities.
- (d) The Visitor and Creative Economy; largely due to regionally significant visitor economy assets, including key attractions at Castle Howard, Flamingoland, Eden Camp, Ryedale Folk Museum, The North Yorkshire Moors Railway, Dalby Forest and parts of the North Yorkshire Moors National Park.

FDI AND FOCS AND GLOBAL EXPORTERS AND HPO (HIGH POTENTIAL OPPORTUNITIES (HPO))

- Breweries – four well-known breweries in the area – Bad Seed, Helmsley Brewing Company, Malton Brewery, and Brass Castle- which exports globally.
- [Sylatech](#) makes aerospace parts for global aerospace companies.
- Ellis Patents makes cable clips and cleats including work [for Hong Kong underground](#)
- HMI Elements has locations in the US as well as Malton and recently began providing the [oil and gas industry's first hazloc computer rental service](#).
- Flamingoland involved in international breeding programme shown on TV, which may attract international interest.
- Karro Food – pork product food company exporting globally, have been doing well during the pandemic with [large recruitment drives](#).
- [Rack Systems](#) ceased their normal production of office equipment during the pandemic to make 3500 hospital beds and have now pivoted to home office spaces and Covid-19 screens.

R&D & RESEARCH CAPABILITIES, TECHNOLOGIES AND OTHER ASSETS

- The location of the National Agri-Food Innovation Campus (NAFIC) at Sand Hutton is a key focus for the bio-agritech sector, which employs around 1,200 people locally.

DISTINCTIVE FEATURES AND INWARD INVESTMENT PITCH

- Malton is known as [Yorkshire Food Capital](#) - a food town built around its famous local produce, award-winning monthly food markets, annual Food Lovers Festival, the high number of food manufacturers and three breweries based in Malton and Norton, and some of the best food shops in Yorkshire, making it a year round foodie destination. The range, diversity and quality of the producers is impressive.
- Yorkshire's First Circular Market Town (#CircularMaltonNorton) is testing circular economy approaches at a micro-scale. Small enough to convene a high proportion of stakeholders to achieve critical mass, yet large enough to achieve the scale required to close the loop on material and resource flows.
- Horse racing – large number of stables and renowned trainers in the region, including Richard Fahey.
- Large number of Eastern European workers with links home, some of whom are now starting their own businesses.

ECONOMIC AND INVESTMENT PRIORITIES

The Ryedale Local Plan provides for the identification of up to 45 ha of land for employment purposes, initially through the promotion of 37 ha of employment land, followed by a further 8 ha to be released if required over the Local Plan period (2012–2027). By 2017 a significant proportion (29.3 ha) of the initial 37 ha had been released and was committed, underway or delivered, largely due to the release of over 17 ha of land at Eden House Road in Old Malton - the Defra pathfinder Malton Food Enterprise Zone (FEZ). Economic development priorities include:

- Improving collaboration between the large companies already exporting to increase access to markets,
- Using big export companies as ambassadors to encourage export in others.
- Increasing the potential of local assets – more hotels would improve the tourism industry, current lack of high-quality bed spaces.
- Providing business advice and expertise to smaller businesses – both simple business advice and advice on promoting their business credentials given their lesser-known location
- A desire to enhance capacity and focus are issues and develop local messages and market the area more thoroughly.

ANNEX 2.5 CRAVEN INTERNATIONALISATION PROFILE

SPATIAL CONTEXT AND INTERNATIONAL CONNECTIVITY

- Craven is well-connected, with the A65 linking Ingleton and Skipton to Leeds, the A59 linking to Harrogate, and the A682 linking towards Manchester.
- Train links to Leeds, Bradford, up to Carlisle, and one daily through service to London from Skipton. Plans to invest £5.8m in [Skipton Rail Station](#).
- Proximity to Leeds Bradford Airport.
- Contains a large section of the Yorkshire Dales.

SUB-SECTORS AND NICHEs

- Large healthcare cluster in Skipton with Systagenix (wound care products), Principle Healthcare (vitamins and minerals), Dechra Pharmaceuticals (veterinary pharma) and Health Innovations (nutritional supplements).
- Tourism – Yorkshire Dales are highly attractive to visitors, with walking and mountain biking routes and a high concentration of hotels, B&Bs and campsites, as well as attractions such as the Embsay and Bolton Abbey Steam Railway, as well as Skipton Castle.

LOW CARBON CREDENTIALS

- Craven is making movements towards a low-carbon future via its Climate Emergency Strategic Plan 2020-2030. On 6th August 2019, Craven District Council unanimously declared a Climate Emergency. The council has committed towards becoming carbon neutral by 2030.
- This includes seven key themes: carbon neutral energy, carbon neutral development, travel & transportation; low carbon waste, land & nature work, use of materials and council actions. Expanding markets in energy efficient technologies, low carbon construction, electric vehicles and small-scale energy generation will provide new opportunities for local businesses.

FDI AND FOCS AND GLOBAL EXPORTERS AND HPO (HIGH POTENTIAL OPPORTUNITIES (HPO))

- Skipton Healthcare and Pharma Cluster:
 - Systagenix, world leader in advanced wound care products based in Skipton, [recently acquired by Scapa for £31m](#).
 - Principle Healthcare, leading producer of vitamins, minerals, food supplements serving more than 7,500 supermarkets and pharmacies worldwide – CEO recently awarded MBE, [recently acquired by private equity firm Capiton](#).
 - Health Innovations (UK) in Skipton formulates and produces solid dose nutritional supplements, shipping worldwide, invested £3m in Skipton manufacturing plant in 2020.
 - Dechra Pharmaceuticals Manufacturing – publicly traded world-leading veterinary pharmaceutical manufacturing and packing with a base in Skipton, as well as in the Netherlands and the US.
 - [Hilco Vision](#) is an industry leading US-owned global eyewear/eye care company with EU headquarters in Hawes.
- Fibrelite, glass reinforced plastic manufacturer with sites in Skipton, the US and Malaysia, [including radio-signal boosting manhole covers](#).
- Finance and service industry: Skipton Building Society, the UK's fourth largest building society with £21 billion of assets which provides over 2,000 jobs, and Computershare (formerly HML), one of the

largest financial outsourcers in the UK and Ireland, with over 1,500 staff working across its Skipton and Crossflatts offices.

- Broughton Hall Business Park, sprawling country estate and stately home with tourism facilities and workspaces for [more than 50 companies](#).
 - Hosts companies including the headquarters since 1936 of Silver Cross prams and Peel live entertainment production company - filming venue hosting productions such as Wuthering Heights and Gentleman Jack.
- Food and Drink: Dark Horse Brewery, Naylor's Brewery, Yorkshire Dales Ice Cream, The [Yorkshire Dales Food and Drink Festival](#) in Skipton every year.
- CCWA (All Clear Water Ahead) offers water treatment and wastewater and bio-solids recycling technologies. ACWA was incorporated into Consolidated Contractors Group (CCC) in 1991. CCC has an annual revenue of over \$3 billion and is one of the largest construction companies in the world, with over 110,000 employees and operations in over 40 countries, with a head office in Athens.
- Creative sector: [Craven Arts Studio](#) in Skipton hosting artists including Virpi Kettu (Wallace and Gromit animator, Radiohead music videos), Peel (live entertainment production company creating productions for cruise ships, hotels, universities and private companies). Burberry luxury fashion manufacturing plant at Cross Hills in Craven.

R&D & RESEARCH CAPABILITIES, TECHNOLOGIES AND OTHER ASSETS

- Craven College sixth form and higher education degrees in everything from aviation to photography. Aviation Academy at Craven College offering flying tuition and aviation industry teaching.

DISTINCTIVE FEATURES AND INWARD INVESTMENT PITCH

- Beautiful location with swathes of the Yorkshire Dales with some of the best walking and mountain biking opportunities in Britain, with miles of footpaths and bridleways and many long-distance routes.
- Has the starting point of the Settle - Carlisle Railway, regarded by many as one of the most scenic railway journeys in the world. The spectacular scenery around Malham has inspired writers, artists and photographers for centuries; many artists and craft workers sell in local outlets. Picturesque villages are dotted along the length of Wharfedale and many [visitor attractions](#) within the borough.
- High concentration of healthcare manufacturing.

ECONOMIC AND INVESTMENT PRIORITIES

- [District Council Plans](#):
 - Carbon Neutral Craven – see priorities above.
 - Free up 17% more spare for commercial development and inward investment
 - Improve road links to East Lancashire and Manchester and rail connections to Leeds and HS2.
- Developing South Skipton Employment Zone and Engine Shed Lane area.
- New employment spaces at Langcliffe and Threshfield quarries.

ANNEX 2.6 SELBY INTERNATIONALISATION PROFILE

SPATIAL CONTEXT AND INTERNATIONAL CONNECTIVITY

- Well-connected M62 running through southern end, A1 through the western part, A64 through the Northern part of the borough.
- The East Coast main line comes through the area and there are direct rail links to Leeds, York, Hull, Manchester and London.
- Sherburn Enterprise Park has 24 companies covering technology, transport and manufacturing.
- A large number of large brownfield employment sites, including former airfields and coal sites such as Selby coalfield (large-scale deep underground mine closed in 2004).
- 89,106 residents (2018), highest predicted population growth in North Yorkshire.
- Highly qualified workforce, with high rates of people working in neighbouring areas.
- Three market towns – Selby, Tadcaster and Sherburn-in-Elmet – with town centre revitalisation plans in each.

SUB-SECTORS AND NICHES

- The Council [has seven priority growth areas](#): Agri-tech, creative industries, energy, advanced manufacturing, construction and logistics.
- Agri-tech – key assets include the Stockbridge Technology Centre and business parks along the A19, as well as cluster of agri-food research around P3P Food Technology Park.
- Creative Industries – the council is working on 'Create Yorkshire', a dedicated creative and media hub, to work alongside places such as the Yorkshire Studios in Selby.
- Energy – power plants include Drax Power and Eggborough Power upgrading to and investing in gas energy rather than coal, with Drax planning to install carbon capture technology by 2027 and recently [signing £180,000 deal to train a future clean tech workforce](#).
- Advanced Manufacturing – high number of small and large-scale manufacturing businesses in Selby,

LOW CARBON CREDENTIALS

- Green-energy focus with energy plants switching to gas over coal, cycling action plan underway - Selby hosted the Tour de Yorkshire and the UCI Road World Cycling Championships in 2019.
- Investing in new and emerging technologies such as battery storage, using key sites along the M62 corridor such as Selby Energy Park.

FDI AND FOCS AND GLOBAL EXPORTERS AND HPO (HIGH POTENTIAL OPPORTUNITIES (HPO))

- ForFarmers – Selby – part of nationwide animal feed manufacturing group [with a plant in Selby](#).
- [Lambert Engineering Ltd](#) – Tadcaster-based global solutions provider for factory automation & process innovation.
- CEMEX, a huge global company with an annual turnover of around \$15billion, runs the [Selby Asphalt Plant and Depot](#) which supplies major contractors in the region.
- Warehousing cluster near Sherburn including Eddie Stobart, Sainsbury's, DHL, Debenhams, and Bowker Group (International Freight and Transport, Warehousing bought the [Potter Logistics operations in Selby in 2016](#), including a 25,000m² distribution centre).
- Sherburn2, [£105m employment park opened in 2019](#), currently constructing warehouses and manufacturing buildings.
- [Valley Tankers](#) – recently invested in a fully automatic manufacturing system.
- Food and Drink:

- o Greencore Group plc is a leading manufacturer of convenience foods supplying chilled, frozen and ambient foods to retail and food service customers in the UK (head office Dublin).
- o Sedamyl, a leading manufacturer of starches, sweeteners, proteins and alcohol, [completing an £80m expansion of Selby plant in 2021](#) – originally Italian company, now has bases in both countries.
- o Kinnerton - [nut safe chocolate](#) with offices in Australia – division of Zertus, a German food manufacturing group based in Hamburg but with groups across Europe.
- o Pecan Deluxe Candy – wholesale confectionary company with sites across US, Europe and Asia – [invested £3m in upgrading its manufacturing facilities in 2018](#).
- o Whitworth Bros (bread manufacturer) bought the [Hovis manufacturing plant](#) in Selby and is planning a £40m investment in manufacturing in the area.
- o Three breweries – Sam Smiths, John Smiths, and Coors.
- o Rigid containers is part of VPK - an international packaging supplier. The firm consists of more than 6,200 employees in over 65 plants in 20 countries.
- o Tadweld Ltd is a specialist engineering and fabrication business. The Tadcaster-based firm provides steel solutions, for clients including global brands AB InBev, Nestle and Heineken.

R&D & RESEARCH CAPABILITIES, TECHNOLOGIES AND OTHER ASSETS

- [Stockbridge Technology Centre](#) – Agri-tech research centre including a full vertical farming research facility.
- [Sciantec Analytical](#) – Agri-tech research centre, subsidiary of Cawood Scientific with branches across the UK and Ireland focusing on animal feed.
- P3P Food Technology Park in Camblesforth [creating up to 250 jobs](#).

DISTINCTIVE FEATURES AND INWARD INVESTMENT PITCH

- Skilled workforce, with a third of people educated to degree level.
- Commuting distance of Leeds, York and Doncaster, excellent road links with the A1(M), M1, M62 and only 2.5 hours to London.
- Doncaster International Railport and Wakefield Europort nearby.
- Major manufacturing centre dominated by food and drink.
- Major investments – [Sherburn2 business park](#), [Church Fenton creative and TV studios](#), and [Kellingley Business Park](#) with rail access.
- Selby College offering sixth form education as well as higher education including degree courses in leadership, computing and more.

ECONOMIC AND INVESTMENT PRIORITIES

- Priority growth sectors – creative industries, visitor economy and hospitality, energy, agri-tech, advanced manufacturing, logistics, construction.
- Encouraging enterprise and business growth through investment in business parks and infrastructure.

ANNEX 2.7 YORK INTERNATIONALISATION PROFILE

SPATIAL CONTEXT AND INTERNATIONAL CONNECTIVITY

- York is a small city in global terms, but it punches well above its weight and is often recognised internationally as the capital of Yorkshire.
- Strategically located, it lies at the confluence of the Rivers Ouse and Foss, about midway between London and Edinburgh.
- Trading with Europe for over 2,000 years, part of the Hanseatic League.
- Highly prized visitor economy with significant attractions such as York Minster and Jorvik VC
- Connectivity is in York's DNA, especially rail – the East Coast mainline was created in York and York to London is 1 hour and 40 minutes on the train.
- Good rail connections to Leeds Bradford and Manchester airports, but also Doncaster airport and access to coastal cities like Hull.
- High calibre digital connectivity through fast full fibre network – UK's first Gigabit City.
- Twinned (civic and education) with Dijon, Muenster and Nanjing.

SUB-SECTORS AND NICHE AND LOW CARBON CREDENTIALS

- Rail tech and rail engineering, particularly around signalling with lots of international consultancies present and scope for new technologies like AI to impact rail developments both on trade and FDI side.
- Insurance, financial and intermediary services – National Farmers Union Mutual Vale of York insurance.
- Agritech, food and drink and related manufacturing and testing strengths, with local companies tapping into new global growth areas.
- Biotech and bioeconomy incl. green bio-renewables and green chemistry, and especially health, plant and animal related technologies.
- Healthcare, life-science and diagnostics with strong link to manufacturing capability, growth from health-related technologies (incl. testing) will drive growth post-Covid.
- Retrofitting of existing York city infrastructure to ensure green credentials, large employers such as Nestle's sustainable manufacturing/packaging, as well as green transport network like rail and cycling.

FDI AND FOCS AND GLOBAL EXPORTERS

Agritech, Food and Drink:

- [Nestle](#) - the Swiss HQ'd multi-national food and drink company has a confectionery R&D centre and KitKat manufacturing unit in York and a focus on sustainability.
- [Precision Decisions](#) (Map of Ag group) - provides a variety of products and services to the agricultural sector including soil sampling, sensor technologies, farm consultancy services and a range of software solutions for clients principally through its MiFarm platform. Map of Ag group has connections in Argentina and New Zealand.
- [Sloemotion Distillery](#) an artisan spirits distillery and [Yorkshire Explorer](#) a gin and rum maker, which has developed highly novel flavoured seaweed rum with local company Scarborough based Seagrown. Also snacks producers like [London Deli](#) company, which has previously exporting globally and [Yummycomb](#) - a premium honeycomb chocolate targeting the US.
- [York Testing Laboratories](#) (York) - food intolerance and allergy testing company.

Bioeconomy:

- [Abingdon Health](#) - a leading diagnostics company specialising in the development, manufacture and commercialisation of lateral flow rapid tests, readers and connected data solutions and global expansion planned incl. US on the back of recent flotation.
- [Aptamer Group](#) - a world leading provider of Optimer® reagents for use in research, diagnostics and therapeutics. Clients include global pharma companies, diagnostic development companies, and research institutes.
- [Covance](#) - a US (New Jersey) based CRO biotech company operating as the drug development business of Laboratory Corporation of America Holdings (Labcorp) and the world's most comprehensive drug development CRO service company.
- [Deepverge](#) (ex Integumen) - a vertically integrated business specialising in AI, clinical research, medical devices. Life science and environmental science. Global connections including with Innocare Group in Shanghai, China.
- [Labskin](#) - spin out producing lab-grown, full thickness human skin models. Specifically developed to host harmful skin bacteria which allows the introduction of toxins, bacteria, viruses, and other foreign substances that trigger an immune response.
- [Starbon Ltd](#) - spin out from the University of York focusing on carbonising starch and producing mesoporous materials derived from biorenewable polysaccharides for biodegradable, sustainable solutions used to separate materials.
- [Wilson Bio Chemical](#) - a waste-to-energy specialist with over 50 years' experience in the design, construction and supply of steam process systems in the waste industry. Received a grant from InnovateUK in 2018 to reduce industrial waste from sugarcane processing in India, led by Jesmond Engineering along with BDC and University of York.

Other notable internationally focused companies include the likes of [Gear4music](#) (global), [Pavers Shoes](#) (India), unicorn [Anaplan](#) (US HQ), [Hiscox](#) (Australia), [Aviva](#) (India outsourcing), [Piksel](#) (US).

R&D & RESEARCH CAPABILITIES, TECHNOLOGIES AND OTHER ASSETS

- 'BioYorkshire' - led by the University of York, [Askham Bryan College](#) and Fera Science and the project will harness scientific expertise to develop bio-based supplies of fuel, chemicals and materials.¹¹⁴
- The [Biorenewables Development Centre](#) (BDC) in York - involved in EU funded research, recently awarded additional funding of £0.5M to drive the growth of the emerging bioeconomy sector¹¹⁵.
- [Biovale](#) in York - an innovation cluster to support and promote development of the bio-based economy in Yorkshire and the Humber.
- [CHAP](#) - a UK Agri-Tech Centre funded by Innovate UK, brings together leading scientists, farmers, advisors, innovators and businesses to understand industry challenges, drive research and innovation and develop and trial solutions that transform crop systems.
- [Fera Science Ltd](#) - based at the York Biotech Campus, Fera has 450 researchers. It supports government and industry partners to develop new products and services across the agri-food chain, improving global food security, sustainability and safety.
- [Green Chemistry Centre of Excellence](#) at the [University of York](#) - leading research into microwave chemistry, alternative solvents, clean synthesis and bio-based mesoporous materials, producing spin outs like Starbon Ltd (carbonising starch).

¹¹⁴ <https://www.york.ac.uk/bioyorkshire/>

¹¹⁵ <http://www.biorenewables.org/funding-received-support-yorkshires-bioeconomy-innovations/>

- [York Biotech Campus](#) (previously the National Agrifood Innovation Campus/NAFIC) - focusing on the biotech economy and home to organisations such as Labskin, Abingdon Health, Covance and Fera Science that span the sector from agri-tech, food, biotechnology, environmental, medical, healthcare, diagnostics and patents.
- [York Science Park](#) - situated on the University of York campus, the facility enables businesses to connect with world class research at the University.
- [University of York](#) - world class, multi-disciplinary research strengths in green chemistry, biology and agri-science. Maths dept. works with chemicals company Croda on developing novel algorithms via a KTP. Exploring and testing autonomous farming using robotics and drones. Biology dept involved in genetic engineering of plants to produce novel pharma.
- Recent investments:
 - Labskin is expanding laboratories in York to have two Containment Level 3 (CL3) facilities.
 - Fera Science - recent job increases on the back of new significant testing opportunities, partially connected to EU exit. Has brought in investment worth £8m from IUK and EU projects.
 - [Plant & Bean](#) - a collaborative venture between [Brecks Food Meat Free Division](#) in the UK and Thai company NR Instant plc. Has acquired a large-scale R&D facility at York Biotech Campus with the purpose of reducing costs of plant-based production on an international level. It also has a collaboration with Singapore's Institute of Technology around food and sustainability.
 - Nestle - York based Product Technology Centre has been involved in researching new materials and the plan to switch all Smartie packaging worldwide from plastic to recycled material. Invested in new machinery to support global sales of the iconic KitKat brand in 2020.

DISTINCTIVE FEATURES AND INWARD INVESTMENT PITCH

- Hosts highly innovative, R&D intensive companies addressing some of the most acute and challenging global problems like Covid-19 and food shortages.
- York's USP includes its reputation as a global Science City, and a very strong research base (part of the N8 Group), through its two Universities and R&D assets.
- Knowledge capital and knowledge intensive activities in the local science-based businesses themselves and able to attract external funding both from public and private sector sources.
- York has many global exporting companies with international connections and strong inward investment links to the EU, US and Asia Pacific. Expertise/services/IP are key strengths.
- Strong technical and technology driven vocational skills base to complement the higher-level scientific, business, professional and R&D skills. 50% of the workforce have NVQ level 4 or above.
- Strong intermediary base of professional service firms serving the City providing access to international talent and deal flow.
- York is a home base magnet for top talent working in London, so useful connections to wider UK and global (financial) markets.
- Strategic location between London and Scotland, access to the East coast and West Yorkshire hubs of Leeds and Sheffield.
- High quality of life offer, university city with lively atmosphere and night-time economy combined with strong historic, heritage, entertainment and cultural offering.

ECONOMIC AND INVESTMENT PRIORITIES

- [York Central](#) is a £750m ten-year master-planning development opportunity and is one of the largest brownfield sites in the UK, which also has Enterprise Zone status.
- Need to support a balanced portfolio of York centric sectoral activity – to encourage investment both from the UK and overseas in sectors that will provide higher number of better-paid jobs, as well as in the high value, R&D driven sectors.
- [Make It York](#) is the City's inward investment agency, part of the council at arms' length. Continues to build pro-active links with major global markets like US, Europe, Australasia and Asia Pacific.
- [York BID](#) continues to support improvements to the city centre as the post Covid-19 era dawns.

ANNEX 2.8 HARROGATE INTERNATIONALISATION PROFILE

SPATIAL CONTEXT AND INTERNATIONAL CONNECTIVITY

- Harrogate district covers Harrogate town, Knaresborough and Ripon with a number of smaller towns together forming a total population of 161,000.
- It is a major tourism destination and has many visitor attractions including spa waters. Situated on the edge of the Yorkshire Dales and the Vale of York, polls voted the town as "the happiest place to live" in Britain three years in a row (2013 to 2015).
- The town is within 15-minutes of the A1(M) by motor vehicle and has the A61 connection to Leeds and Ripon, and the A59 to York in the east and Skipton to the west.
- Trains to Leeds in the morning run every 23 minutes on average with direct links to York which is on the East Coast main line to London and Edinburgh.
- Harrogate has a highly skilled workforce working within the district and commuting to Leeds, York and Bradford. It has above average GB earnings and graduate qualifications.
- Includes four large business parks (Hornbeam, Follifoot, Calderdale and Oakwood), with over 250 companies including medical, technology, manufacturing and leading head offices.

SUB-SECTORS AND NICHES

- The Economic Growth Strategy has identified four growth sectors: creative and digital, logistics, financial and professional services and science research and development.
 - Creative and Digital - a significant activity of expansion in the local economy, with computing and information services registering a 14% growth between 2012-2018. Companies such as Welcom Digital focusing on design and development of software solutions and credit provider systems for lending and collection.
 - Logistics - has Europe's largest cold storage facility. Enquiries near Junction 47 of the A1(M) from companies such as Amazon and Hermes.
 - Financial and Professional services - businesses with international operations and leaders of innovation in Fintech. A data centre in the Harrogate district switches 3.5 billion card transactions per year, processing over £400m daily.
 - Scientific research and development - one third of medicines on the market developed by Covance, a world leading contract research organisation. This has generated a number of life sciences spin-offs investments such as Smithers Viscient who established a site in Harrogate focusing on environmental testing.

LOW CARBON CREDENTIALS

- The Economic Growth Strategy (2017-35) aim is to *"...prioritise and support 'good growth' in the district, to achieve a sustainable and resilient economy by 2035..."*
- The Council's ambitions include the aim of becoming carbon neutral by seeking to promote and establish economic, operational and sustainable activities.
- Smithers Viscient - has advanced purpose-built laboratories servicing clients in agro and industrial chemical, pharmaceutical, and health industries conducting environmental studies.
- Quants Environmental - provides ecological and arboricultural consultancy services.
- Adler and Allan – provide environmental risk reduction and spillage services to the oil industry.

FDI AND FOCS AND GLOBAL EXPORTERS AND HPO (HIGH POTENTIAL OPPORTUNITIES (HPO))

- Bettys and Taylors of Harrogate (including Yorkshire Tea) combine confectionary, baked goods, teas and coffees as part of their online and exporting products.
- Covance is a leading global life sciences company employing 1000 people in the district, providing contract research services to the drugs and medical industry and to agri-tech and chemical industries.
- Smithers Viscient - new site in Harrogate focusing on environmental testing.
- EnviroVent – manufacturer and installers of ventilation systems such as humidifiers. Spanish owned, has built new factory with office space.
- Adler and Allan – environmental services to the oil industry including supplier of spill response, technical, fuel and environmental risk reduction services.
- MNR Sportscars – kit car manufacturer, hand-built road and race cars.
- Vocalink – payment systems operating 65,000 ATMs and handling 90% of UK salaries, has a location in the district (headquarters in Rickmansworth).
- Worldpay – operates in retail and restaurant outlets processing payments of purchased goods.
- Welcom Digital – providing design and development of software solutions and credit systems for lending and collection in retail and commercial activities.
- Inhealthcare – remote patient monitoring and digital health services using a national platform for clinicians for over 1m users/patients and widely used by NHS.

R&D & RESEARCH CAPABILITIES, TECHNOLOGIES AND OTHER ASSETS

- Collaboration with nearby universities in York and Leeds.
- Life science companies growing within the district led by Covance and attraction of other digital health and healthcare businesses.
- Growing digital profile of companies such as Welcom Digital in the design of software
- Smithers Viscient - new site in Harrogate focusing on environmental testing.

DISTINCTIVE FEATURES AND INWARD INVESTMENT PITCH

- Skilled workforce, with 45% of people educated to NVQ Level 4+.
- Commuting distance of Leeds, York and Bradford, excellent road links with the A1(M), A61 and A59; 30-35 minutes to Leeds and York by rail; and Leeds Bradford Airport within 10 miles.
- High numbers of professional/scientific, health and hospitality sectors activity.
- Harrogate is the only district in North Yorkshire, beside York, with dedicated resources focused on inward investment.
- Life science and digital hubs in the area.
- Promotion of quality of life, excellent schools and access to beautiful countryside and workforce talent are key strengths of the Harrogate area.
- Available sites near Junction 47 of the A1(M); up-to-date fibre-optics and technical facilities for science, manufacturing and quality offices accommodation in Hornbeam, Follifoot, Calderdale and Oakwood business parks.
- Harrogate College offering sixth form education as well as foundation degree courses in biomedical and pharmaceutical sciences, cyber security and management leadership.

ECONOMIC AND INVESTMENT PRIORITIES

- Priority growth sectors – creative and digital industries, logistics, financial and professional, science research and development and associated sectors of Fintech and payment technology, Life sciences, visitor economy and hospitality.
- Real opportunity to market the area especially with upcoming potential of devolved powers.
- Encouraging enterprise and business growth through investment in business parks and infrastructure.
- Increase resources devoted to internationalisation with any move to combined local authority.

ANNEX 3: FURTHER FUNDING INFORMATION

HORIZON EUROPE

- Horizon Europe dedicated website - <http://ec.europa.eu/horizon-europe>
- European Innovation Council - <http://ec.europa.eu/research/eic>
- EU budget for the future - http://ec.europa.eu/budget/mff/index_en.cfm
- EC Participant Portal (where to find funding calls) - <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-search>;
- Network of UK contact points - <https://www.gov.uk/business-finance-support/horizon-2020-business-grants-uk#find-your-uk-national-contact-point-for-advice>
- Science Business Journal <https://sciencebusiness.net/framework-programmes/news/uk-eu-research-deal-glance> and <https://sciencebusiness.net/framework-programmes/news/uk-excluded-european-innovation-council-fund-brexit-treaty-confirms>
- Euratom Research and Training Programme 2021-25 - <https://www.gov.uk/guidance/nuclear-research-from-1-january-2021>

NATIONAL INNOVATION FUNDING SUPPORT

- UKRI – <https://www.ukri.org/>
- UKRI Industrial Strategy Challenge Fund - <https://www.ukri.org/our-work/our-main-funds/industrial-strategy-challenge-fund/what-is-the-industrial-strategy-challenge-fund>
- UKRI Funding Finder - <https://www.ukri.org/opportunity/>
- IUK Edge - <https://www.innovateukedge.ukri.org/>
- Knowledge Transfer Network - <https://ktn-uk.org/opportunities/>
 - Food, nutrition and health event, March 2021 - <https://ktn-uk.org/events/food-industry-innovation-2021-food-nutrition-health/>
 - Connect Agro Summit - <https://ktn-uk.org/events/connect-agro-summit-ukcol-information-webinar/>
- UKTI International collaborations - <https://www.ukri.org/our-work/collaborating-internationally/>
- Global Challenges Research Fund - <https://www.ukri.org/our-work/collaborating-internationally/global-challenges-research-fund/>
- Newton Fund - <https://www.newton-gcrf.org/>
- Turing Scheme - <https://www.turing-scheme.org.uk/funding-opportunities/>

REGIONAL SUPPORT

- York and North Yorkshire LEP - <https://www.ynygrowthhub.com/how-we-can-help/coronavirus/coronavirus-financial-support/>
- York University - <https://www.york.ac.uk/business/funding/>
- Bioeconomy funding (anaerobic digestion) - <https://www.bioenergy-news.com/news/yorkshire-businesses-urged-to-apply-for-ad-funding-2/>
- Biovale - <https://www.biovale.org/what-we-do/business-support/innovation-funding/>
- CHAP – IUK funded agritech centre - <https://chap-solutions.co.uk/about-chap/>
- EGS/DIT Internationalisation Fund - <https://www.enterprisegrowtholutions.co.uk/dit-internationalisation-fund/>

PRIVATE SECTOR INNOVATION AND R&D SUPPORT (ILLUSTRATIVE)

These consultancy organisations operate different models (success fee, commission, delivery slice), and can be useful in helping SMEs access funding as they are experts in bid submission. They tend to know what the assessors are looking for, as well having a broader understanding of what funding pots might be available for innovative companies to tap into.

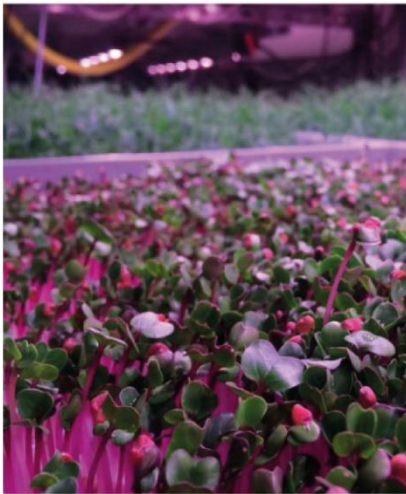
- TBAT <https://www.tbat.co.uk/services/grant-funding-calls/> and <https://www.tbat.co.uk/services/rd-tax-credits/>
- INVENTYA - <https://www.inventya.com/opencalls/open-calls>
- RTC North - <https://www.rtcnorth.co.uk/>

Research Centre Profile:

N8 Agrifood Resilience Programme challenges global food insecurity



N8 AgriFood is a collaborative research programme aimed at tackling the challenges of food security on a regional, national and global scale. The programme (originally funded by HEFCE) brings together the expertise of eight top research universities in the north of England. These universities are:



- Durham University
- Lancaster University
- University of Leeds
- University of Liverpool
- University of Manchester
- Newcastle University
- University of Sheffield
- University of York



The programme takes a systems approach to tackle the challenges facing global food security – generating healthy diets from a healthy environment and sustainable and equitable food economy. A food systems approach relies on bringing together different perspectives and disciplines – the power of N8 AgriFood is the ability to integrate science and social science disciplines and a wide variety of facilities to address this complex challenge – going beyond what a single university can offer. The collaborative partnership has driven significant change in the research culture at the N8 universities, initiating hundreds of cross-disciplinary interactions both between and within universities. Through effective collaboration and knowledge exchange with business, policymakers and civic society, N8 Agrifood generates new knowledge, innovation and action to achieve transformational improvements in the global food system.



Since its inception in 2015, the programme’s achievements include supporting regular networking and learning events across the N8 universities, catalysing over 180 agri-food projects (many of which involve food system stakeholders and/or international partners), attracting more than £40 million of research funding to support collaborative agri-food projects across N8 partners, and running an international food systems summer school with researchers from the UK and Ghana as well as young food professionals in Ghana. Recent highlights include leading two large, 5-year food systems research programmes awarded as part of the Transforming Food Systems Strategic Priorities Fund.

In 2020 the N8 Food Systems Policy Hub was launched. Traditionally, challenges in food production, supply and consumption have been tackled in isolation and responsibility for policy within these areas is distributed across different ministries and departments. There is now a growing recognition that effective change requires coherent policymaking across the food system, addressing multiple outcomes simultaneously. The Policy Hub uses the expertise and partnerships of N8 AgriFood to provide independent research evidence and thought leadership to inform policy at local, national and international levels. The Hub also applies scientific, technological and social science expertise to achieve business practice and policy innovations, for example, a toolkit to develop sustainable sourcing plans.

N8 AgriFood has initiated global partnerships in the agri-food community to drive change in agri-food and environmental policy and practice at home and overseas.



N8 AgriFood has initiated global partnerships in the agri-food community to drive change in agri-food and environmental policy and practice at home and overseas. The collaboration between 8 universities has enabled the programme to work with some of the world’s leading agri-food institutions. The N8 AgriFood programme is helping drive global interest in collaborating with UK agri-food experts, bringing innovative ideas to the UK and also exporting expertise to work on research projects around the world. N8 AgriFood has worked closely with the FCDO Science Innovation Network to build new partnerships and identify opportunities for joint R&D. Looking to the future, there is scope to increase the opportunities for industry to co-design projects and to catalyse work on innovation and internationalisation with industry partners.

Research Centre Profile:

UK Agri-Tech Centre, Crop Health and Protection (CHAP), looks to expand internationally



“The Glasshouse builds upon existing CHAP capabilities, such as early-stage biopesticide discovery and development, mesocosm-scale ecotoxicology trials and highly controlled field trials using precision spray application.”

**Dr Jenna Ross,
International Business
Development Manager**

Crop Health and Protection (CHAP), headquartered at Sand Hutton (near York), is a UK Agri-Tech centre funded by Innovate UK. It brings together leading scientists, farmers, advisors, innovators and businesses to understand industry challenges, drive research and innovation, and develop and trial solutions that transform crop systems. It works with partners to translate and promote these solutions for market adoption and improved crop productivity. Its mandate is to increase crop productivity for future generations through the uptake of new technologies. The centre will help the UK:

- Turn agricultural innovations into commercial opportunities for UK businesses
- Encourage inward investment
- Improve farming practices.

International Business Development Manager, Dr Jenna Ross, was appointed to promote CHAP's capabilities, facilities and expertise on the global stage. She is developing international relationships, networks and building consortia to secure grant and commercially funded projects. She hopes the centre will help UK companies and organisations take their expertise and technologies overseas, and vice versa. CHAP has also launched an international membership scheme to grow its global network and create an ecosystem to accelerate the development and adoption of innovation. In addition, in April 2021, CHAP launched the International Dual Membership in collaboration with its sister Agri-Tech centre, Agri-EPI centre. CHAP also works closely with the DIT and the Foreign, Commonwealth & Development Office.

Jenna explains that some of their capabilities and facilities, such as the Advanced Glasshouse at Stockbridge Technology centre, have significant international potential. Jenna adds:

“This facility enables new plant protection products and integrated crop protection programmes to be robustly assessed in glasshouse and hydroponic systems. This benefits food producers by providing more reliable trial conditions for their products, especially for biopesticides, with consequent benefits to the global crop production sector in the form of increased product availability.”

The Advanced Glasshouse Facility provides a flexible and customisable fully controlled glasshouse, permitting bespoke commercially representative testing of plant protection products and integrated pest management programmes. It includes a suite of 60 custom-designed deep-water hydroponic units, allowing both plant protection programmes and aquatic ecotoxicology studies to be conducted.

The Glasshouse builds upon existing CHAP capabilities, such as early-stage biopesticide discovery and development, mesocosm-scale ecotoxicology trials and highly controlled field trials using precision spray application.



"It's about innovation and collaboration, and pulling stakeholders together across academia, industry and government. It's also about looking at market failures and how we can harness our expertise and capabilities to help drive forward innovation to fill gaps but also meet the market need for farmers and other clients."

**Dr Jenna Ross,
International Business
Development Manager**

Jenna notes, "we have a number of additional offerings at the Stockbridge Technology centre, including the Vertical Farming Development centre. This facility enables growers, food producers and researchers to determine how different technologies in a controlled environment impact the economics of LED vertical farming. The aim is to develop technologies that will reduce production costs while maximising profits, potentially on a large scale. The development centre consists of two identical growth rooms each with full climate control (temperature, relative humidity, CO₂). Crops can be grown using a fully recirculating hydroponics system, and all inputs and outputs can be monitored."

A major question inhibiting investment in vertical farm technology is the economics of crop production. This facility has been designed with the primary goal of quantifying those economics for a wide range of crops. As there are two identical compartments, it is possible to compare the impact of different climate control strategies on energy efficiency and crop yields, leading to improved energy efficiency, sustainability, yields and economics.

The facilities provide the perfect location to test and develop new technologies aimed at improving all aspects of vertical farming. The system has been designed to achieve a high-care environment so a clean crop can be grown, potentially removing the need to wash harvested produce.

The Vertical Farming Development centre could be used to test and trial for various international markets. Jenna adds:

"If you think about markets such as Singapore, where they have such limited land availability, vertical farming and Controlled Environment Agriculture offer massive opportunities. We are also seeing this in the Middle East, where Covid-19 has accelerated the need for increased food resilience. The Vertical Farming Development centre is also applicable to markets such as Canada where there is a short growing season", Dr Jenna Ross

Jenna also sees some post Brexit opportunities as Defra focuses more on rewarding sustainable farming practices. "We're becoming more aware of how degraded our soils are, and when you combine this with the reduction in the chemical toolbox, there is a massive market need for the development of biopesticides. Our Advanced Glasshouse can play a key role in testing and trialling of these products."

CHAP also has capabilities housed at Fera. This includes the E-Flows mesocosm, Europe's most advanced edge-of-field water assessment facility, which enables environmental testing of plant protection products to meet the most stringent regulatory standards, helping to introduce a wider range of more effective products to market more quickly and to help farmers tackle threats to their crops.

CHAP also collaborates with Fera on CropMonitor Pro. Jenna adds:

"It's a state-of-the-art sophisticated decision support tool designed to aid decisions at the local field scale and has been launched in the UK for winter wheat, oilseed rape and potato crops. Landscape scale weather feed from UKMO - a 2km x 2km gridded weather dataset for current and forecast weather - delivers local weather services for each registered field location."

In addition, CHAP currently has an Innovate UK funded project in Kenya looking to develop a diagnostic tool for Potato Cyst Nematodes. In the wider offering, CHAP has the International Pest Horizon Scanning capability in collaboration with CABI that covers Ghana, Nepal, Peru, Vietnam, and Malawi.

Jenna has been raising awareness of CHAP's capabilities, facilities, and expertise internationally and has been working with the DIT to promote the centre within the wider UK Agri-Tech centres family. "That helps increase awareness for the centre as well as the wider UK offering. A key part of CHAP's international strategy is working with a wider range of stakeholders to promote Agri-Tech opportunities." She added:

"It's about innovation and collaboration, and pulling stakeholders together across academia, industry and government. It's also about looking at market failures and how we can harness our expertise and capabilities to help drive forward innovation to fill gaps but also meet the market need for farmers and other clients."

The team develop their global connections through international conferences, speaking opportunities, marketing content and existing networks within the team. The centre fits well with the subregion's zero carbon aspirations, says Jenna:

"Sustainability is at the heart of everything that we do."

Looking to the future, Jenna is keen to continue growing CHAP's international network, and harnessing this to develop grant and commercial projects, demonstrators, and the international membership.



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