Food Science and Technology, Volume 32, Issue 4, December 2018, pp. 56-61
DOI:10.1002/fsat.3204_16.x

Framework for productivity

Carol Wagstaff, Fiona Kendrick, Colin Dennis, Phil Hollington, Tim Hess, John Brameld, Mitch Crook, Michael Wilkinson, Jerry Roberts, Craig Farrell *and* ***Barbara Mason*** *look at skills shortages and careers pathways in the agrifood industry.*

A highly diverse industrial sector short of human capital

The agriculture, food and drink industry contributes more to the UK economy per annum than that of the automotive and aerospace industries combined. In 2017, food and drink businesses alone had a turnover of £196bn and generated over £10bn per annum for HM Treasury, with exports exceeding £22bn, 60% of which were traded with the EU[1].

Sustaining the agriculture, food and drink industries requires human capital. Current estimates calculate that the agrifood supply chain employs approaching 4m people of whom over 10% are within the food and drink sector[2]. The sector has built a reputation for being economically resilient, producing high quality goods, making an average annual investment of over £350m in research and development (R&D) and bringing around 16,000 new products to market every year[3]. Despite the high profile of some major food and drink manufacturers and retailers, over 96% of food businesses are classified as SMEs. These smaller enterprises are particularly concentrated in regions of low employment and productivity, such as the South West of England, Wales and rural parts of Scotland[4]. The diversity of companies in the sector, both in terms of portfolio and size, enables people to pursue a range of career pathways. Furthermore, in a billion-pound industry there is as much need for financial, legal and sales expertise as there is for product development, production and technical processing skills.

Despite being the largest manufacturing community in the UK, the agrifood sector has seen the size of its workforce fall during a period of rapid technological advances. Pressures on costs and margins, off-shoring and globalisation, extensive merger and acquisition activity and growth in market power of major retailers, have all contributed to this decline. Between 2000 and 2007 over 80,000 jobs were lost, which equates to a 16% drop in employment levels[5]. However, the value of the sector continues to expand and it is predicted that there will be an increasing need for individuals with the skills to become managers, senior officials, professionals and skilled technical experts[6]. The 2017 Nesta report 'The Future of Skills: Employment in 2030' indicated that the food preparation and hospitality occupations are likely to show the largest growth of any industry in the UK (>70%)[7]. The authors associate this with the increased presence of 'differentiated products' e.g. artisan goods and services, such as roasting, butchery, bartending, that have become increasingly valued by consumers[8].

The food and drink industry has identified that it will need over 140,000 new recruits by 2024[9], plus a further 595,000 in agriculture to replace those retiring or leaving the sector for other reasons[10]. There is a particular shortage of

Published by John Wiley & Sons on behalf of the Inst. of Food Science Technology. This is the Author Accepted Manuscript issued with: Creative Commons Attribution Non-Commercial License (CC:BY:NC 4.0). Please refer to any applicable publisher terms of use.

experience in food engineering, food science, crop technology, engineering and automation, and management, with higher-level skills shortages across the sector. Agrifood currently has one of the lowest take-up of apprenticeships and tends to be more reluctant to invest in formal staff training and development compared with other sectors. The Food and Drink Federation has pledged to triple apprenticeships within the food and drink industry by 2020 to address the staff shortages experienced by companies at all levels[9].

The Industrial Strategy and its challenges for the agrifood sector

The 2017 Industrial Strategy White Paper states that by 2030 the Government aims for: '*the UK to be the most innovative country in the world*' with businesses '*investing in R&D and the skills needed in a changing work environment to maximise the rewards and benefits innovation can bring to everyone in the UK*'[11]. This is a particularly welcome aspiration for a sector that is short of skilled workers and which needs innovation in order to adopt technologies that will enable the intensification of production, a reduction of the environmental footprint of the industry and a replacement of some jobs with engineering solutions. However, much as it would appear that the Government should be pushing on an open door, the Future of Skills & Lifelong Learning Foresight Report (2017) indicates that the availability of training does not correlate with engagement. The Report describes this as implying '*that education providers are not offering, or students are not selecting, the courses that match with employers' skills needs, and that future skill needs are not being fully anticipated*'[12]. Businesses are not able to recruit new staff with the necessary skills straight from the education system. Employers therefore need to recognise the broader impact of skills shortages on their business. A 2015 survey of 6,469 employers reproduced in the Foresight Report revealed that the majority recognised the impact of skills shortages in the business on other employees, but few were aware of the consequences on the ability of the business to develop new products or services or to introduce technological change (Figure 1).

***Figure 1. Negative impacts of skill-shortage vacancies on employers according to UKCES survey of 6,469 employers (2015). Reproduced from the Foresight Report* (2017)[13].**

The Foresight Report further notes the need for workers to continue training throughout their careers in order to keep up with technological changes and market influences. However, despite most companies recognising that they are experiencing a skills shortage, work-based training has been in decline since 2001. Employer investment in training in England fell by 14.5% in real terms between 2005 and 2011[14]. A survey of 30,721 employees (Office for National Statistics, 2017) show that training in the early part of careers is more likely to be undertaken by men, whereas women are more likely to pursue training as they get older (Figure 2). When the data are expressed in percentage terms, they

reveal a steady decline in the percentage of employees of either sex who undertook training as age increased (Figure 3).

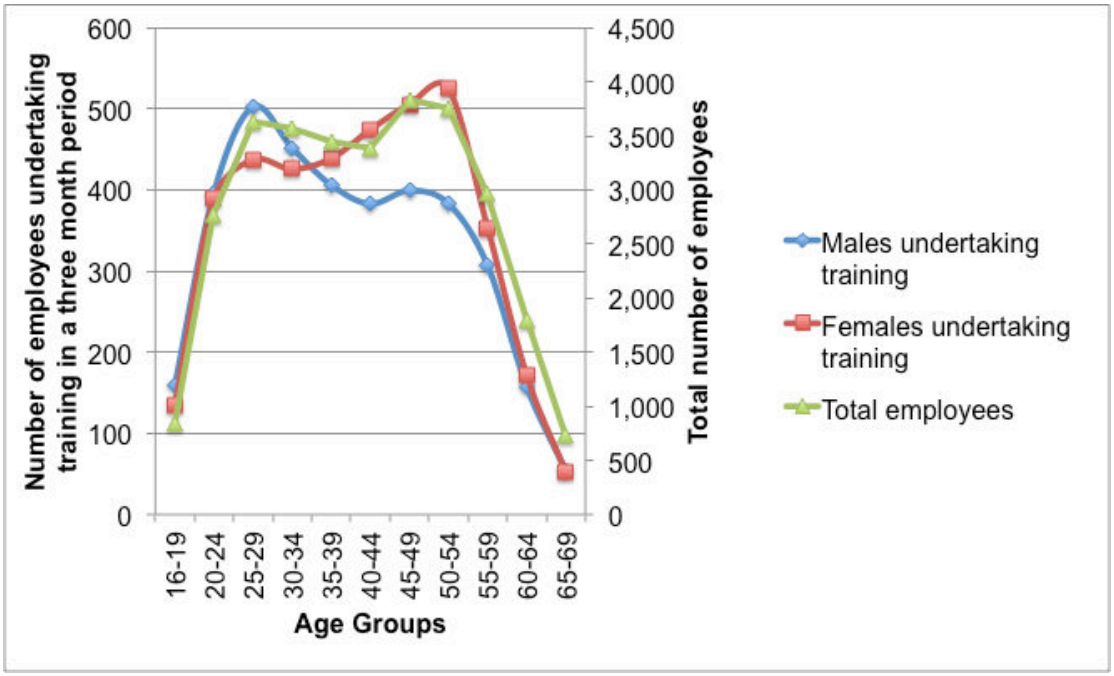

Figure 2. Number of male and female workers undertaking job-related training in previous three months (Q1, 2017, left hand y-axis) compared to total number of employees in the same period (right hand y-axis). Data taken from the Office of National Statistics[14].

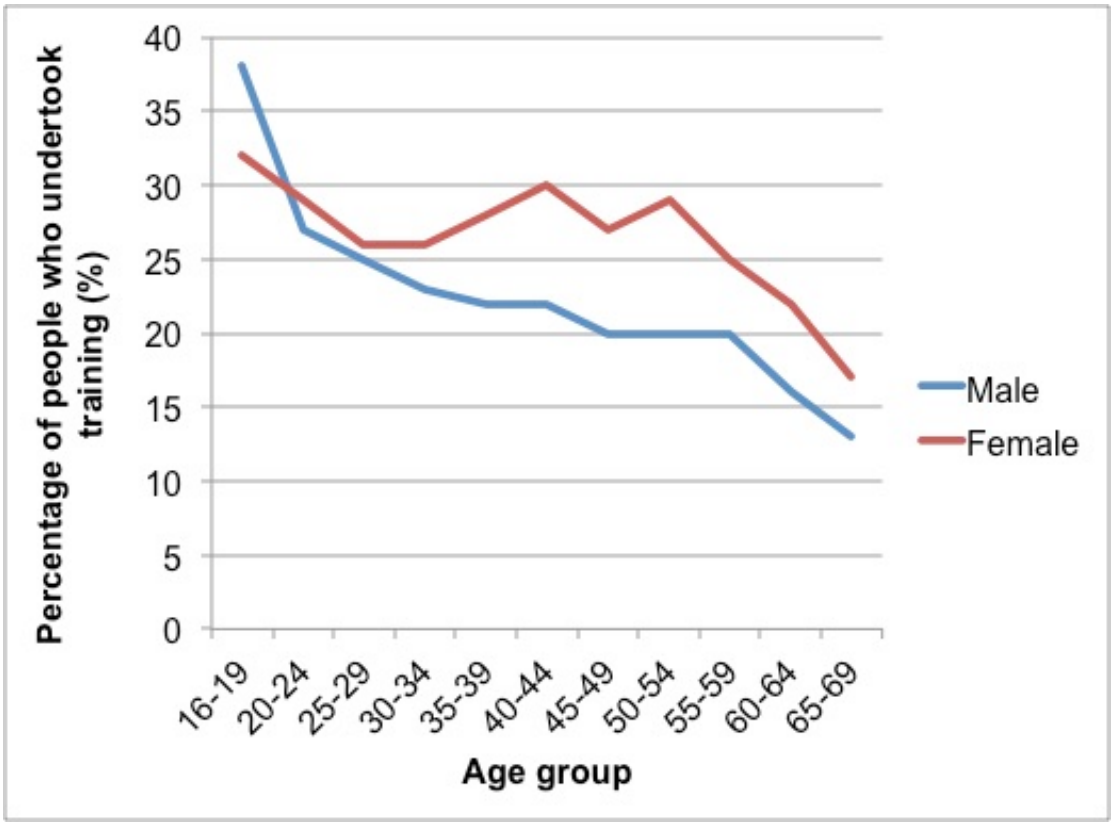

Figure 3. Percentage of male and female workers undertaking job-related training or education in the previous 3 months by age group, Q1 2017. Reproduced from the Foresight Report (2017)

The Industrial Strategy Challenge Fund, spearheaded by UKRI, includes specific challenges on Healthy Ageing and Transforming Food Production securing opportunities for academic-industrial collaboration to bring the latest research ideas into the real commercial world. However, unless suitable training is provided to ensure that workers have the skills and understanding to implement new ideas, the investment will not bring the practical outcomes desired by the Government. The Government has already invested £80 million in four Centres of Agricultural Innovation, the first of which (Agrimetrics) was launched in October 2015. It is imperative that the agriculture, food and drink industries engage with these centres so that government investment benefits the sector. The aim of the centres is to increase UK productivity; increased dialogue with industry stakeholders is critical to ensure that the centres remain relevant and develop tools and technologies that are fit for purpose.

Skills: a key priority for the Food and Drink Sector Council

Established in January 2018, the Food and Drink Sector Council is a formal industry partnership with government created to improve the productivity and sustainability of the UK food and drink supply chain. The Food and Drink Sector Council represents the whole of the food chain from farming and manufacturing, to retail, hospitality and logistics. It provides the gateway for government into the food industry to address the big challenges and opportunities in areas, such as raising productivity, reducing the environmental impact of the industry, improving public health and creating new employment opportunities across the UK.

One of the Council's key priorities is workforce and skills. Under the leadership of Nestlé UK & Ireland Chair and Sector Council member, Dame Fiona Kendrick, a Workforce and Skills Group has been set up to create some industry-led actions – that government can fully support – to secure a world-class, skilled workforce and should help the UK food and drink supply chain transition into a post-Brexit world. The Workforce and Skills Group is currently focusing on:

- Future workforce and skills needs of the UK food chain, which will be evidenced by a research project
- Apprenticeships
- Image of the sector
- Up-skilling the workforce

Career perceptions of the sector and training opportunities

One area of focus for the Workforce and Skills group is the image of the food chain and the perception of the industry – something that has often arisen as a challenge. Overall, the sector is not perceived as attractive to young people – despite the fact that it is well paid with excellent career opportunities and high earning potential. When a sample of UK undergraduates were asked about their

perceptions of the agriculture, food and drink industries, their awareness of the sector as a whole was extremely poor; they regarded it as an unattractive career option[15] using terms such as 'low paid; low skilled; dirty; long hours; shift work; stuck in a factory; and driving a tractor'. The reality is that the sector provides high flying career options that are extremely transferable, requiring people with management, finance, marketing, sales and creative skills to sit alongside technical knowledge of the sector and the products it generates. The food and drink industry needs to work with government to capitalise on opportunities to inform schools and students about the careers available.

Although the GCSE in Food Technology that is available in England and Wales is popular, it is not always taught from the scientific perspective desired by those within the industry and schools have a limited understanding of career paths available to students who are interested in food science. This is compounded by the A Level in Food Technology being discontinued in 2018, although Scotland offers an Advanced Higher level qualification in Health and Food Technology, which is split into two units: Food for Health and Food Science, Production and Manufacturing. Whilst the inclusion of health in the subject will encourage uptake from a broader cohort, there is remarkably little science in the course description, which does not encourage students who are interested in core sciences to consider the food industry as a career path[16]. There is huge potential to include food and agricultural real-world examples in mainstream STEM subjects, such as Biology, Chemistry and Mathematics, but to date the opportunity has not been seized and the industry is missing out on the talent pipeline emerging from schools.

The agrifood skills gap is widely acknowledged by both industry and government. Although it is often perceived that the gap is for low-level and seasonal workers, the reality is that the UK has a skills gap at all levels of career structure, with a particular vacuum existing between recent graduate employees and senior managers who are nearing retirement. Farming is in the most vulnerable position with the median age of a UK farmer being 60 and relatively few people under the age of 25 entering the sector compared to other industries[17].

Many of the problems related to skills shortages in the UK were present before Brexit, but the uncertainty and trends will only be increased by the outcome, particularly if freedom of movement of non-UK Europeans is restricted or if current non-UK employees in middle/senior management jobs are forced to, or feel inclined to, leave the UK. An Environment, Food and Rural Affairs select committee was informed in March 2018 that there is a substantial shortage in labour across the food and farming industry due to a sharp decline in the European workforce coming to the UK[18], a view further supported by a BEIS Select Committee report a month later[19].

A range of training organisations already operate within the sector, sometimes underpinned by formal qualifications, sometimes designed to be taken as Continuous Professional Development (Figure 4). At present there is reasonable progression to level 5 (mid-BSc), either by taking qualifications through land

based colleges or courses at providers, such as Campden BRI/Leatherhead Food Research. A gap then exists between level 5 and the current postgraduate offering provided by the AgriFood Training Partnership (AFTP), with few options available in the Level 6 (BSc) space. Degree apprenticeships, at both Level 6 and Level 7, may plug this gap but there are currently limited options for the agrifood sector and apprenticeships, particularly at the higher levels, do not suit the needs of all companies. Almost half of businesses that employ apprentices feel that the levy needs reform to provide more flexibility in how the funds set aside are used[20]. Training providers also need to consider the mode of training delivery in addition to content and timing, as people increasingly look to study online to enable them to combine this with other commitments.

The Sector Council's Workforce and Skills Group is investigating, why some parts of the food chain are successful in using apprenticeships while others struggle. In particular, the group is exploring solutions to the key barriers businesses face in trying to make better use of apprenticeships.

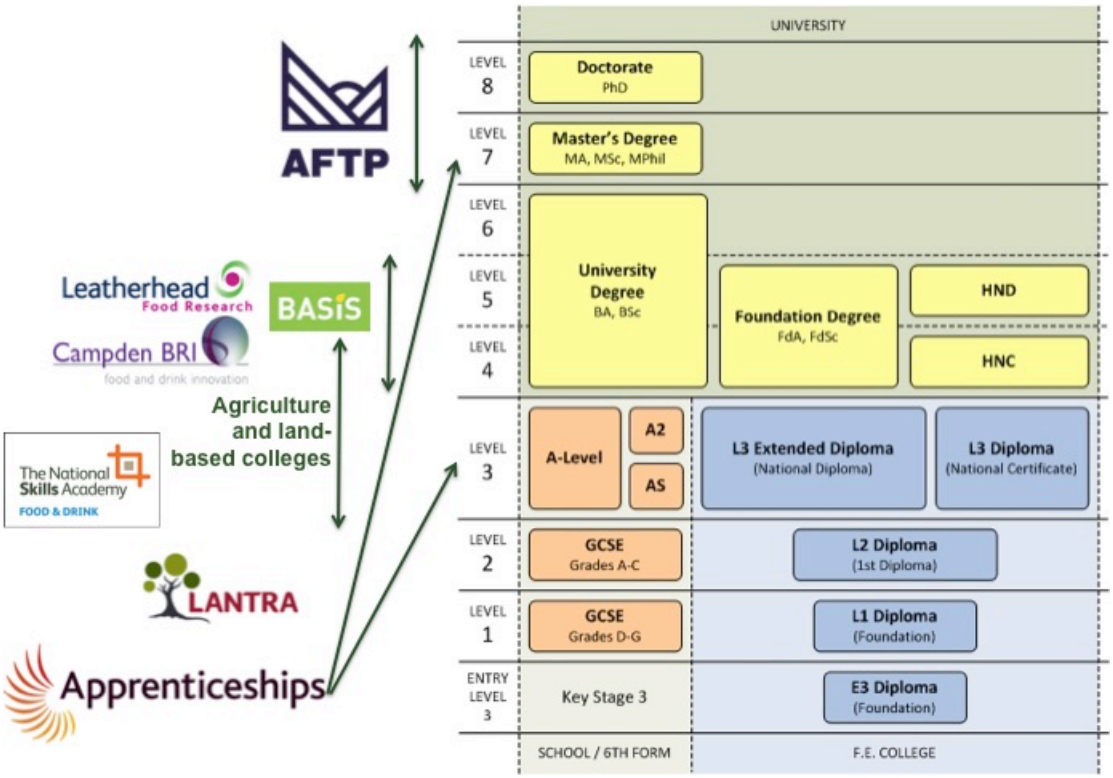

Figure 4. Training framework within the UK (using English schools qualifications as a benchmark). Training providers (some of whom are affiliated with UK HEIs) are indicated on the left. The list of training providers is by no means exhaustive but serves to illustrate the types of organization present at each level.

The AgriFood Training Partnership as a model for delivering enhanced skills to the sector

The AgriFood Training Partnership (AFTP) model has already demonstrated its ability to attract and train part time, work-based learners using a blended learning approach that fits well with employer and employee needs. It receives funding from the Biotechnology and Biological Sciences Research Council (BBSRC) to provide participants with postgraduate level training from Continuous Professional Development (CPD) at Level 7 to Professional Doctorate (Level 8). Qualifications are validated through a consortium of UK universities (Aberystwyth University, Bangor University, Cranfield University, Harper Adams University, The University of Nottingham and The University of Reading) that are globally recognised for their teaching and research in agriculture, food and nutrition. The AFTP runs Industrial Advisory Groups addressing Food and Nutrition, Livestock and Forages, Environment and Sustainability, and Crops and Fresh Produce. These groups are heavily populated by relevant representatives from each sector and seek to guide new developments within the partnership and ensure that existing courses remain relevant and focused on the industry's own perception of its needs.

The consortium's existing links with industry, particularly where lower-level apprenticeships are delivered, enables an innovation culture to be embedded into business through increasing staff skills and leadership at Level 7. Facilitating the AFTP consortium to develop platforms for delivering postgraduate level Degree Apprenticeships will assist in professionalising the agrifood industry and removing barriers to career progression that exist in areas where university education is not the norm for school leavers. Additionally, the AFTP enables participants to dip into its portfolio without pursuing qualifications, with all CPD endorsed by the Institute of Food Science and Technology, plus other specialist bodies as appropriate e.g. Association for Nutrition, DairyPro, BASIS. The quality and need for training platforms, such as the AFTP, was recently endorsed by Iain Ferguson, Co-Chair of the Food and Drink Sector Council: *'[The AFTP] have a central role to play [...] the way that you're already working with six or maybe even seven universities right across the chain is exactly the same model that we're trying to build in the Food and Drink Sector Council*[21].' Businesses have reported that dissemination of the learning by individual employees, who have undertaken AFTP training, results in enhanced professional practice, development and adoption of new manufacturing processes or technologies with a subsequent benefit to the bottom line of the business.

New directions for the agrifood sector

The sector needs to improve its ability to portray the career potential that it offers. Other sectors, such as engineering and IT, have employees possessing a wide range of skills that are applicable to agriculture and food, yet there is almost no movement between sectors. More graduates need to enter the sector with the right kinds of qualifications i.e. science, maths and engineering subjects. Some excellent resources are available for schools, such as the Tasty Food Careers document[22], , but the awareness of opportunities amongst career departments and the understanding that the industry needs applied scientists

remains inadequate, despite the efforts of the National Skills Academy for Food and Drink[23].

More agriculture, food and drink companies need to have a clearly defined staff learning and development policy - presently only 40% of those in Wales have one[24], whereas in Ireland the state has taken a more proactive stance towards facilitating lifelong learning through SOLAS (State Organisation with responsibility for funding, planning and co-ordinating Further Education and Training in Ireland). The Career Traineeship initiative has been developed by SOLAS in collaboration with Education and Training Boards (ETBs) and enterprise. Work-based learning, primarily at NFQ levels 4 and 5, is used as the main mode of delivery and is currently being piloted with the hospitality and engineering sectors, with the involvement of seven ETBs. Networks of employers have been created to facilitate partnerships with ETBs to identify training needs, design the training programmes, recruit learners and deliver the training on and off the job[25]. Throughout the UK there is a need for business to work increasingly collaboratively with training providers to design course curriculums so that businesses get people straight out of training who have the specific, and sometimes bespoke, skills they need.

The provision of skills training in SMEs is recognised to be worse than it is in large organisations. SME managers tend to recruit externally if they need a new skill rather than encouraging employees to take 'time out' to receive appropriate training. SMEs often lack the financial flexibility to invest in staff training, and are either unaware of opportunities to access funding support, or perceive the process as too time consuming. The opportunities for smaller organisations to access funding for existing staff development need~~s~~ to be simplified with the benefits of such training being more clearly articulated by the providers.

Local Enterprise Partnerships (LEPs) are the lynchpin of recognising the needs for skills investment for their regions. LEPs, such as the Midlands Engine, Heart of the South West and The Marches, are well positioned geographically to serve key agrifood areas. Dialogue about training needs should be encouraged over a broader range of business types and sizes, with clear pathways for skills and staff development identified as a result.

Business leaders need to be more aware of the 'training paradox', where investing in training makes people marketable commodities that are likely to move on. However, people who have a company investing in their future feel 'looked after' and are more likely to stay, thus bringing enhanced benefit to their employer. This is a far healthier situation than ignoring staff development, which can only result in a static business and untrained employees.

Apprenticeships can enhance both technical and management/leadership skills. Most food companies considering level 7 apprenticeships have expressed a need for enhanced management and leadership skills at this level. Further technical skills development will still be required, but potentially in more focused areas than can be offered through an apprenticeship scheme in its current format.

Graduate training programmes may in time be replaced by apprenticeships if the right format and content can be established.

Technology will undoubtedly replace some of the need for human capital. For instance, the Agri EpiCentre has developed the 'Hands-Free Hectare' to demonstrate that it is possible to produce and harvest an arable crop without direct human intervention. The Hands-Free Hectare crop currently costs more to produce than the value of the harvest at market rates, but as the technology moves from a demonstration prototype to routine production, this will inevitably change. Tractors and combine harvesters are now effectively IT studios on wheels, yet the perception of farming amongst school children, unless they are in rural areas, is that it is hard, dirty work than requires brawn rather than brain. A partial reversal of urbanisation needs to occur so that the countryside is seen as a vibrant place to work and invest. Undergraduate training in engineering and digital technologies needs to use agriculture as a way of contextualising its subject matter and to highlight the potential for exciting careers provided by the development of drones, field phenotyping and supply chain encryption technologies.

People will always be essential for the agrifood industries and particularly those where soft skills are integral to their delivery, such as customer service and hospitality. More collaboration is required between business, training providers, and schools to make career opportunities clear and to enable a structured pathway into the area. Scotland's College Development Network is a good example of how this tripartite arrangement can work; a business, an FE college and a university form each network, which is supported by centrally organised careers events (Figure 5).

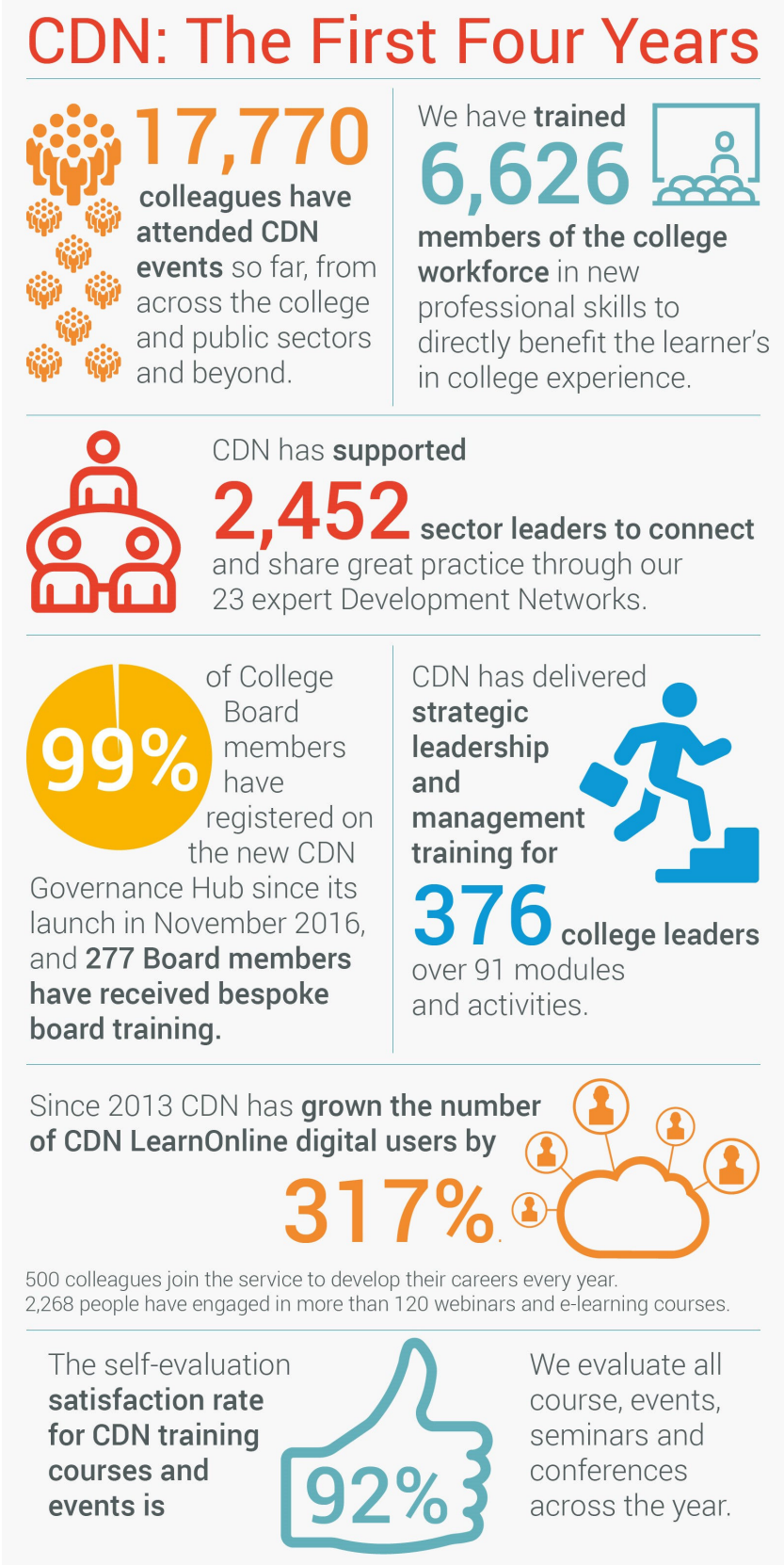

Figure 5. College Development Network, Scotland. Achievements in the first four years 2013-17[26].

Conclusions

The food system is changing across the UK, Europe and indeed worldwide. Consumers demand different products and different production standards compared to times gone by. Lifestyles are changing so that technology is embedded within consumers' daily lives; values, such as the cultural and ethical origins of food, are becoming more important.

Questions remain as to whether the industry is ready to adapt to this changing food system and how workers will acquire the necessary skills and competencies. The agrifood industry is characterised by its diversity, in terms of products grown or made, employee numbers and scope of the supply chain from ultra-local to truly global. Therefore, a one size-fits-all solution is unlikely to be successful. That the sector is facing a shortage in staff numbers and staff skills is an indelible truth. How it reacts to this situation remains to be seen, but the solutions will involve a wide range of training opportunities, revolutionary technological innovations and leadership at the highest level to enable businesses to invest in people and grow their productivity.

Carol Wagstaff[1,2], Fiona Kendrick[3], Colin Dennis[1], Phil Hollington[1,4], Tim Hess[1,5], John Brameld[1,6], Mitch Crook[1,7], Michael Wilkinson[1,8], Jerry Roberts[1,9], Craig Farrell[1,2], Barbara Mason[1,2]

Email: c.wagstaff@reading.ac.uk

Web: https://www.aftp.co.uk/

[1] AgriFood Training Partnership
[2] University of Reading, Department of Food and Nutritional Sciences, PO Box 226, Reading, RG6 6AP
[3] Food and Drink Sector Council
[4] Bangor University, School of Natural Sciences, Bangor University, Gwynedd, LL57 2UW
[5] Cranfield University, Cranfield Water Science Institute, College Road Cranfield, MK43 0AL
[6] University of Nottingham, School of Biosciences, Sutton Bonington Campus, Loughborough, Leicestershire, LE12 5RD
[7] Harper Adams University, Crop and Environment Sciences, Newport Shropshire, TF10 8NB
[8] Aberystwyth University, Institute of Biological, Environmental & Rural Sciences, Penglais, Aberystwyth, Ceredigion, SY23 3DA
[9] University of Plymouth, Office of the Vice Chancellor, 18 Portland Villas, Drake Circus, Plymouth, Devon, PL4 8AA

References

[1] Food and Drink Federation (2017), Exports Snapshot 2017. Available from: https://www.fdf.org.uk/publicgeneral/Exports_snapshot_2017_Full.pdf (accessed 5 August 2018)
[2] Department for Environment Food & Rural Affairs (2018), Food Statistics in your pocket 2017: Food Chain. Available from: https://www.gov.uk/government/publications/food-statistics-pocketbook-2017/food-statistics-in-your-pocket-2017-food-chain (accessed 5 August 2018)
[3] South East Midlands Local Enterprise Partnership (2015), Food & Drink Summary Report. Available from: https://www.semlep.com/modules/downloads/download.php?file_name=266 (accessed 5 August 2018)
[4] Food and Drink Federation (2017), FDF Economic contribution and growth opportunities,. Available from: https://www.fdf.org.uk/publicgeneral/FDF-Economic-contribution-Full-report.pdf (accessed 5 August 2018)
[5] South East Midlands Local Enterprise Partnership (2015), Food & Drink Summary Report
[6] Warwick Institute for Employment Research, Food & Drink Sector Information. [Summarising research from Improve AACS LMI Report (2010) and UK Labour Market Information Profile (2009/2010). Available from: https://warwick.ac.uk/fac/soc/ier/ngrf/lmifuturetrends/sectorscovered/food/sectorinfo/ (accessed 5 August 2018)
[7] Bakhshi, H., Downing, J., Osborne, M. and Schneider, P. (2017). The Future of Skills: Employment in 2030. London: Pearson and Nesta.
[8] Autor, D. H. and Dorn, D. (2013). The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market. American Economic Review 103, 1553–97.
[9] Food and Drink Federation (2018), Stats at a Glance. Available from: http://www.fdf.org.uk/statsataglance.aspx (accessed 5 August 2018)
[10] LANTRA (2014), The UK Land-based and Environmental Sector: Skills Assessment Update Spring 2014. Available from: https://www.lantra.co.uk/sites/default/files/The-UK-Land-based-and-Environmental-Sector_-Skills-Assessment-Update-Spring-2014_0.pdf (accessed 5 August 2018)
[11] Department for Business, Energy & Industrial Strategy (2017), Industrial Strategy: Building a Britain Fit for the Future, p.13 and p.63.
[12] UK Government, Office for Science (2017), Future of Skills & Lifelong Learning Foresight Report, p.7. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/727776/Foresight-future-of-skills-lifelong-learning_V8.pdf (accessed 5 August 2018)
[13] Ibid, p.63. Data collected from UK Commission for Employment and Skills. (2015), UKCES Employer Skills Survey 2015: UK Results. Evidence Report 97,
[14] Office of National Statistics (2017), Job related training or education in the last 3 months, UK, April to March 2017. Available from: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/adhocs/007354jobrelatedtrainingoreducationinthelast3monthsukapriltomarch2017 (accessed 5 August 2018)
[15] National Centre for Universities and Businesses (2015), Attitudes and Perceptions of Careers in the Agriculture and Food Sector. Available from:

http://www.ncub.co.uk/index.php?option=com_docman&view=download&category_slug=reports&alias=218-attitudes-and-perceptions-of-careers-in-the-agriculture-and-food-sector&Itemid=2728 (accessed 5 August 2018)

[16] Scottish Qualifications Authority (2015), Advanced Higher Health and Food Technology Course Specification (C736 77). Course description is available from: (https://www.sqa.org.uk/files/nq/AHCourseSpecHealthFoodTechnology.pdf; accessed 29/05/2018),

[17] Department for Environment, Food and Rural Affairs, et al. (2018), Agriculture in the UK 2017 Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/741062/AUK-2017-18sep18.pdf (accessed 5 August 2018)

[18] House of Commons, Environment, Food and Rural Affairs Committee (28 March 2018), Oral evidence: Labour Constraints, HC 776. Available from: http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environment-food-and-rural-affairs-committee/labour-constraints/oral/81111.html (accessed 5 August 2018)

[19] BEIS Select Committee report (April 2018). Available from https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/381/381.pdf (accessed 10 Octber 2018)

[20] Building the Workforce of the Future (March 2018). Lloyds Bank and London First. Available from https://www.londonfirst.co.uk/sites/default/files/documents/2018-05/LFLloydsBuildingWorkforce.pdf (accessed 14 October 2018)

[21] Ian's interview from the AFTP's 2018 conference is available from: https://www.youtube.com/watch?v=bEluix5HkS8&index=4&list=PLiTmduZrr3awML6nmXkMWCirE55MgOtwA&t=0s

[22] An overview of Tasty Careers (introduced by the National Skills Academy for Food and Drink) can be found at: https://nsafd.co.uk/tasty-careers and it's dedicated website: https://tastycareers.org.uk/

[23] National Skills Academy for Food and Drink https://nsafd.co.uk

[24] Warren-Thomas, E. and Henderson, E. The Food and Drink Industry in Wales (September 2017). National Assembly for Wales Research Service. http://www.assembly.wales/research%20documents/17-021/17-021-web-english.pdf (accessed 10 October 2018)

[25] Republic of Ireland, Department of Education and Skills (2016), Ireland's National Skills Strategy 2025. Available from: https://www.education.ie/en/Publications/Policy-Reports/pub_national_skills_strategy_2025.pdf (accessed 5 August 2018)

[26] College Development Network, Scotland. (2018), CDN 2013-17: The First Four Years. Available from: https://www.cdn.ac.uk/cdn-first-four-years/ (accessed 5 August 2018)

https://dspace.org/

Productivity framework: Framework for productivity

Wagstaff, Carol; Kendrick, Fiona; Dennis, Colin; Hollington, Phil; Hess, Tim M. ...

2018-12-04
Wiley
https://doi.org/10.1002/fsat.3204_16.x
Wagstaff C, Kendrick F, Dennis C, et al., (2018) Productivity framework. Food Science and Technology, Volume 32, Issue 4, December 2018, pp. 56-61

Downloaded from a DSpace repository. https://dspace.org/