



SKILLS SHORTAGES IN LAND-BASED INDUSTRIES

– An Edge Skills
Shortages Bulletin
special supplement



Foreword

The agricultural sector has long battled tired stigmas, from low wages to hammer-and-chisel labour. But step onto a modern farm and you'll find something quite different – a technology revolution is underway. You'll see guidance systems, telemetry and computerised controls that are closer to aerospace engineering than old-fashioned manual labour. Livestock wear electronic ID tags. Dairy units run precision feeding systems that track individual animals. This isn't the future – it's happening right now across the country, transforming how we produce food.

That transformation matters enormously because without agriculture, we cannot feed the nation. This has always been critical, but with global challenges threatening food security, it is now an imperative. But even as the sector becomes more sophisticated, the gap between cutting-edge technology and hands-on practical skills is growing.

Universities produce graduates well-versed in sustainable farming theory and ecology – vital for the sector's future. But we equally need technicians, farm workers and specialists with practical, hands-on skills. Technology is advancing so rapidly and becoming so industry-specific that mature engineers rarely transition from other sectors. In my corner of the industry, managing training for global agricultural machinery manufacturer AGCO Ltd, this makes apprenticeships essential – not a nice-to-have but the only way to recruit and cultivate the necessary skills. This pattern extends across land-based industries. Whether training someone to work with precision equipment, or managing livestock operations, hands-on vocational pathways plug skills gaps where other routes cannot.

However, vocational routes only succeed when we recruit effectively – and that requires understanding agriculture's fundamental geography. The manufacturer I work for is a global corporation, but we recruit apprentice technicians for our UK dealer network. Those dealerships are fundamentally local businesses. Flashy national campaigns and city-centre shows generate intrigue but rarely convert to employment. Young people need jobs within commuting distance of where they live. What works is targeting rural schools

in those parts of the country where the jobs are. A few hours of conversations with young people can spark genuine interest in these careers, meaning employers go from simply hoping someone applies for a role to selecting between candidates.

The path isn't easy. Poor funding means land-based FE colleges struggle to keep pace with industry standards. Equipment is often years behind what students will encounter on a farm. Skilled lecturers earn far less than they would in industry, making it almost impossible to attract and retain quality staff. Investment is essential. But despite these challenges, the sector's remarkable diversity and examples of innovation demonstrate what happens when we match training to industry reality, invest in the right places, and recognise that vocational pathways are critical for creating the skilled workers that the sector desperately needs.

The talent exists. Technology is transforming the industry. And opportunities abound for exciting careers that will shape the future of the sector. The case studies in this supplement highlight how we're connecting those dots – locally, practically, with investment and ingenuity. Perhaps most importantly, they demonstrate why we need to treat agriculture and land-based industries with seriousness and respect – not simply for the careers they offer, but for their fundamental role in feeding our society.

Charlie Rollason, Trustee, Edge Foundation



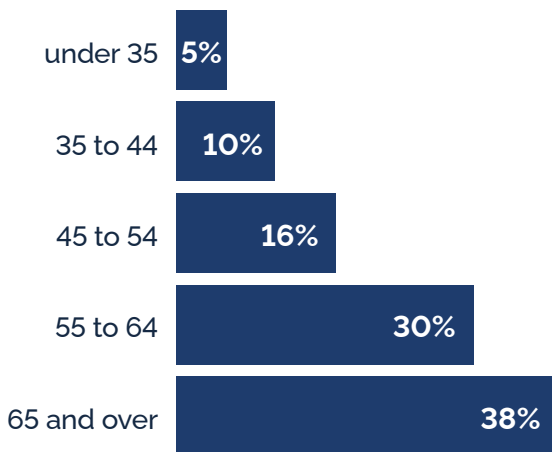


Growing the workforce

Despite explicit policy commitments, the land-based sectors remain peripheral in the nation's skills architecture, with tangible consequences for workforce sustainability and future productivity.

The UK's land-based industries occupy an awkward junction in current public policy. On the one hand, government strategy now names the need to build 'green skills' in agriculture, land management and allied fields. On the other hand, major skills frameworks and investment levers exclude these same sectors from their core priorities. This is despite the available evidence pointing to persistent and deepening labour shortages and skills gaps across farming, horticulture and related land-based work.

Age of agricultural workforce in England in 2024



(Farming evidence – key statistics, DEFRA)

The agricultural workforce

The agricultural workforce remains small relative to the wider economy, accounting for approximately **1.3 % of total UK employment**, with a disproportionate share of older workers and very limited youth participation. (Farming evidence – key statistics, DEFRA)

37% concerned about recruitment

Employer surveys indicate that around **37 % of agricultural and horticultural employers are seriously concerned about their ability to recruit and retain skilled staff** in the year ahead (Labour and skills in the horticulture and agriculture sectors in England, TIAH)



Rising costs strain UK farming

Ongoing geoeconomic confrontation threatens UK food security. **Fertiliser costs rose from £1.5bn to £2.0bn 2021-22; rises of 100% in electricity and 187% gas prices in 2022.** Post-EU exit labour restrictions compounded seasonal and specialist labour shortages (Food Security Report 2024, DEFRA)

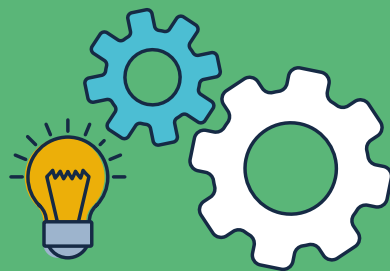
£14.5bn contribution

In 2024, agriculture contributed **£14.5bn** to the UK economy (*Farming evidence – key statistics, DEFRA*)



The government's Environmental Improvement Plan

The government's **Environmental Improvement Plan 2025** commits to building green skills in agriculture, land management and water, and funding land-based providers to deliver programmes, including T Levels and apprenticeships in agriculture, horticulture, land security, land management and forestry.



75% of employers have not provided formal management or leadership development

Despite training gaps, **nearly 75% of employers have not provided formal management or leadership development** over recent years (*Labour and skills in the horticulture and agriculture sectors in England, TIAH*)

4% of young people are currently employed in the sector

Youth engagement in food and farming remains low. Only about 4% of young people are currently employed in the sector – **yet up to 38% express openness to sector careers if pathways and perceptions improve**

(*Securing the future of our food, Harper Adams University*)



63% of farm businesses report difficulty filling specific roles

Around 63% of farm businesses report difficulty filling specific roles, and **roughly 39% of those vacancies remain unfilled** beyond one month (*Labour and skills in the horticulture and agriculture sectors in England, TIAH*)





The impact of new technology on land-based jobs and skills

Peter Dickinson, Institute for Employment Research, University of Warwick; Rosemary Collier and Richard Napier, Warwick Crop Centre, School of Life Sciences, University of Warwick

Technological innovation is reshaping agriculture and horticulture at an increasing pace, from precision farming and autonomous machinery to advanced data analytics and controlled-environment growing systems. These changes will impact significantly on the employment and skills needs in the sector. New job roles are evolving, and existing job roles will be changed and lost. The skill requirements of the sector will be transformed, as will how they will need to be delivered and developed in the workforce.

The drivers of innovation

The principal drivers of innovation are the ever-increasing powers of computation and data analysis, and farmers have access to more data on their operations than ever before. To make best use of this deluge of information, specialist services and new software capabilities will increasingly be needed to support decision-making. AI is at the heart of most innovations, integral yet hidden.

Whilst there is a strong sector interest in innovative solutions to farming challenges, adoption is held back by a lack of trust in new technologies coupled with challenging financial circumstances. The strongest driver of technology adoption is productivity, which takes the form of ever more detailed monitoring to identify and isolate the weakest links in the production chain. This feeds through to precision applications of farm inputs, improved genetic selections, and reduced waste of both effort and commodity. The immense volumes of data collected by sensors and other precision recording devices need advanced data handling skills and services.

AI and machine learning tools will hasten the rate of adoption by offering decision support, embedded in smartphone apps and IT service providers. On-farm decision making and specialist applications will be supported by increasing numbers of specialist contractors. However, even with AI and specialist support, farmers and growers need to train for innovation because, ultimately, they are the decision makers and risk carriers.

Directions for training

Much of the ongoing training needed for innovative technologies will be provided by the companies that supply them. Newer products will have more intuitive interfaces, easier support functions and faster troubleshooting features. But this will still require improved data handling skills, in particular, with awareness of data security, the value of data, and the importance of data integrity. The sector will need to draw in new employees with non-traditional farm skills, as well as engage in skills training to support new ways of working.

The study found a strong agreement across innovators that the effective introduction and implementation of new technology in the sector requires a solid foundation in agricultural science coupled with a thorough understanding of the farm's immediate circumstances. In addition to this, a range of new competencies will be required to install, operate, repair and maintain new technologies and manage new practices. This will create new highly skilled jobs, in many cases appended to current peri-farm gate occupations, such as agricultural engineering, agronomy, and animal welfare. Skilled people will need to be recruited from other sectors, but this will be in competition with the specialist skill requirements in all sectors. Provision of fast-track training in agriculture and horticulture will be required to help transitioners adjust. As many of the skills needed are at the interface between technology and farming, consideration is needed of how best to develop communities of practice, networks and mentoring. Communication and team working skills will be important for this.

The pace of technological development is outflanking the skill-sets of the workforce, presenting an unprecedented challenge to training providers. Whilst some provision in FE and HE is dynamic, the formal curricula of apprenticeships and T-levels are relatively slow and challenging to change. Also, there are relatively low levels of workforce skills training meaning that take-up of provision amongst the existing workforce is low. There is a critical need for a better mix of provision to support career development. Skills updating needs a combination of formal and non-formal training opportunities.

The future of land-based industries

As the introduction of new technology into the sector gathers pace, jobs are forecast to increase. These jobs will be in higher skilled and specialist careers. Automation designed to reduce repetitive and onerous jobs will reduce the need for low-skilled and seasonal workers.

The trend is towards the integration of technologies (e.g. robots and sensors) which will generate much data which at the moment is not being utilised, reducing the effectiveness of those technologies and their return on investment. This is not due to the new technologies but rather the effective utilisation of new technologies within the context of different agriculture and horticulture sectors and farming environments. This can only be improved by the development of the skills of people who work in the sector so that implementation combines the digital skills required of new technology with the human understanding of agriculture and horticulture.



The agriculture and horticulture sectors need to adopt new technologies to compete effectively in the global marketplace. This study looks forward at the innovation horizon in agriculture and horticulture and how it will impact on jobs and competencies. Previous work identifies both labour and skills shortages in the sector, a situation exacerbated by low training attainments. The current study shows that innovation, especially in digitalisation, is already changing farm businesses and it is anticipated that the pace of change will accelerate. We review how the provision of training is adapting, and how it needs to adapt further to support this important sector. The [research](#) was funded by The Institute for Agriculture and Horticulture, UK.

Peter Dickinson, University of Warwick

Shaping a resilient future: improving skills in the land-based economy

Daisy Hooper, Director of Policy, Research and External Relations, Lantra

The land-based and environment sector – agriculture, forestry, aquaculture, horticulture and environmental services – plays a far bigger role in the UK's resilience than is often recognised. These industries steward over 80% of the UK's land, underpin a much larger agri-food and nature-based value chain and are central to delivering national ambitions on food security, climate resilience, nature recovery and rural prosperity. Taken together, land-based sectors directly account for over 160,000 businesses, 625,000 jobs and £19bn in GVA.

Yet while expectations of what the sector must deliver are rising, the skills system that underpins this essential work has not kept pace with the scale or speed of change. Our recent research shows that workforce gaps are growing, routes into the sector are shifting, and many businesses struggle to access the skills needed to adopt new technologies, meet environmental requirements and operate modern, efficient production systems.

This matters far beyond the sector itself. Skills shortages in land-based industries are not just a workforce issue; they are a delivery risk. Significant public investment is flowing into agri-tech, net zero and nature recovery, yet far less attention is paid to whether the workforce has the skills to adopt, maintain and scale these innovations in practice. Technology without adoption skills has no market. Without support to evaluate, integrate and use new tools effectively, innovation risks under-delivering on its promise. If we want secure food supplies, effective climate action and resilient rural economies, we need people with the skills to deliver these outcomes on the ground.

At the same time, the workforce itself is under pressure. Much of future labour demand in land-based sectors is driven by replacement rather than expansion. But this should be seen as an opportunity, not a constraint. The scale of replacement demand over the next decade offers a rare chance to reshape skills, professional standards and capability across the sector. If that moment is missed, existing weaknesses risk being locked in for a generation.



The land-based sector is central to the UK's ambitions on food security, climate resilience and rural growth but its skills system hasn't kept pace with the scale of change. This research shows where skills gaps matter most and how a more joined-up, evidence-led approach could turn ambition into delivery.

Daisy Hooper, Lantra

So what would make the biggest difference?

1. Strengthen coordination across the skills system

A great deal of activity is already underway, on qualifications reform, careers outreach, employer engagement and sector-led initiatives, but it often happens in parallel rather than in partnership. A more coordinated approach would create clearer pathways for learners and more coherent signals for employers. A national land-based skills forum or taskforce could bring the right organisations together, align messaging and ensure qualifications, careers activity and funding decisions genuinely reflect sector needs.

2. Build a more joined-up approach to skills intelligence

Workforce data exists across the sector, but it is inconsistent, difficult to compare and rarely shared in ways that support long-term planning. A more coherent approach would bring together existing intelligence, from national datasets, sector surveys and employer insight, into a clearer picture of current and future labour needs. Regular horizon scanning would support better planning, particularly for UK-wide and mobile workforces.

3. Address data gaps in under-represented sub-sectors

Some of the roles most critical to national priorities, including environmental services, conservation and nature-based occupations, remain poorly represented in official datasets. Targeted research and clearer occupational definitions would help ensure these roles are visible in policy, investment and curriculum decisions.

Our research is a reminder that the sector already has the ambition, expertise and networks it needs, but the skills system around it has not kept pace. The challenge is not to create something entirely new, but to make the existing system work better: through clearer coordination, stronger evidence and a sharper understanding of how skills underpin delivery.

If we can make progress here, the land-based sector will be far better equipped to deliver what the UK cares

4. Understand what works in training delivery

There is innovation all over the sector, from local farm knowledge clubs to government-funded pilots, but there's surprisingly little evidence on which approaches are most effective. As a result, good ideas sometimes stay small, and it's hard to make the case for scaling up investment in skills. We need a more systematic approach to testing and evaluating training methods in our sector. That means building on existing evaluations (such as recent pilots for Scottish pre-apprenticeships in agriculture and new forestry training programmes) and committing to rigorous monitoring for all major projects. We need to be asking: what's the best way to engage time-pressed small rural business owners in training? How can digital learning be harnessed for people in remote rural locations? What role does mentoring or peer-to-peer learning play in adoption of new practices? If we can answer these questions we can focus resources on interventions that genuinely work, boosting outcomes for learners and employers alike.

5. Make the business case for training clearer

Finally, more needs to be done to demonstrate that skills development is not simply a cost, but an investment in productivity, resilience and innovation. Peer-validated evidence from real businesses, including demonstration farms and employer networks, is particularly powerful in shifting attitudes. Understanding how subsidised training influences take-up in our sector, especially for SMEs and new entrants, would help target funding where it unlocks the greatest value.

most about – secure and sustainable food, thriving rural places, and meaningful action on climate and nature.

Lantra's new research on improving skills in the land-based economy will be launching week commencing 18th May. The research will be available on [Lantra's website](#). Lantra will also share the announcement of the research being published on their social media channels too.



Harnessing potential: career aspirations of students studying equine courses

Catherine Lloyd, Vice Principal, Shuttleworth College (Bedford College Group)



The equine industry in England is hugely diverse due to the range of activities that horses are used for within the sector. These include sport, leisure, therapy, breeding and racing, which are supported by allied industries, such as feed and tack suppliers, farriers and veterinary care. The industry is a significant part of the economy, valued at £5bn and is the second largest rural employer.

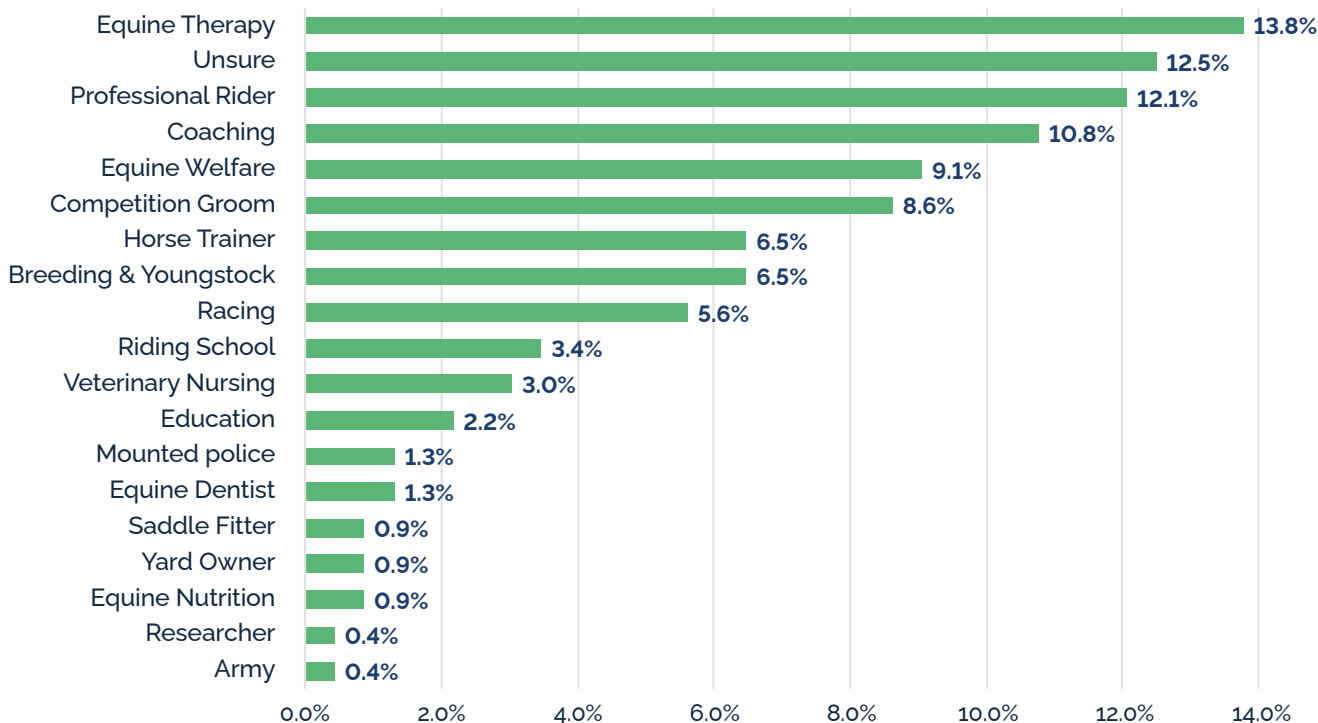
Rising operational costs and labour shortages are key challenges for the industry. A report by British Equestrian in 2023 identified that 44% of riding schools do not have sufficient paid staff and cite this lack of workforce as their biggest challenge to delivery. The British Horse Society reported in 2025 that since 2018 over 300 riding schools have closed, leading to an estimated 1.5 million fewer riding lessons available. Shortages of skilled workers in the racing industry have led to six racing-related roles including racing grooms, stallion handlers and stud grooms, being added to the Government's Immigration Salary List to permit employment from overseas in an effort to address the industry's estimated shortfall of around 2,500 workers.

A Racing and Thoroughbred Breeding Industry report in 2022 found that there was an annual vacancy rate of 15% of all permanent stud jobs. Sector surveys have shown an increase in the number of vacancies classified as hard-to fill, often attributing this to a lack of sufficiently skilled staff.

In 2025, a study was conducted to uncover the ambitions of the next generation of equine professionals. The research sought to answer questions at the heart of the industry by surveying 263 students enrolled in level three equine courses at land-based colleges across England. It asked them to explain what drew them to equine studies, which career paths they intended to pursue, and what barriers they fear they might face when entering the industry.

The subject area is highly gendered with 97% of respondents being female. Early exposure to horses, supported by hands-on experience, played a central role in shaping respondents' decisions to pursue equine studies. A striking 90% of all respondents had been involved with horses for five years or more, indicating that their interest typically began in childhood. The most

Equine course students' intended area of work

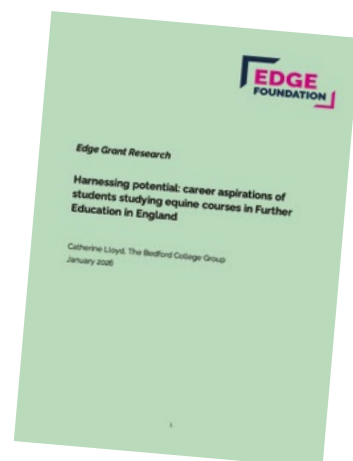


common experience reported was having lessons in a riding school which could be a cause for concern for employers if capacity in riding schools is reduced. In terms of career aspirations, shown in figure 1, equine therapy was the most popular choice with 13.8% aiming for a role in this sector. Whilst coaching attracted 10.8%, only a small number, 3.4%, specifically mentioned working in a riding school. The numbers hoping to work in racing were also low at 6% and 6.5% for working with breeding and youngstock.

Finding a suitable job in the industry was perceived as the biggest barrier to achieving their career aim. Indications from this study are that students' aspirations do not align with the current staffing shortages in the sector. Moving forward, it would be useful to identify whether it is a skills shortage, mismatch or gap which needs to be addressed. This information could be used to influence the content of the curriculum, alongside raising awareness of the employment opportunities available in the sector. Whilst education and training are part of the solution, it appears that access to horses through childhood is central to these students' aspiration. The closure of riding schools and resulting

decrease in opportunities to access horses could pose a further risk. Initiatives which enable young people to experience contact with horses appears to be an essential factor in attracting people to the industry. This study suggests that there is a need to align leisure, education and employment which encourages progression from an interest in horses into a career. This requires a long-term approach when considering strategies to develop the industry's future workforce.

Catherine's [full report](#) is available now.



Black Mountains College: a fair, sustainable and resilient future

Black Mountains College (BMC) is a unique educational institution dedicated to climate adaptation, located in the beautiful Bannau Brycheiniog National Park in Wales.

Its mission is to prepare society for the climate and ecological emergency by equipping learners with the skills, knowledge, and systems thinking needed to build a fair, sustainable and resilient future. The college explicitly aligns its approach with the Wellbeing of Future Generations (Wales) Act, ensuring that environmental, social, and economic sustainability shape all learning pathways. Its campus includes a farm and other nature-based learning sites, which form a living classroom where students learn directly from and within diverse landscapes.

The college offers further and higher education programmes as well as short courses, all with the mission to promote ecological action and resilience. One-year vocational courses cover primarily land-based areas, such as forestry, regenerative horticulture, regenerative farming, and woodland management, whilst the BA degree programme in Sustainable Futures deals with the politics and economics of transitioning away from harmful, unsustainable behaviour, in order to move to a sustainable-focused, well-being economy. All of the college's provision



is preparing students and society for the big changes which are unfolding in our environment by focusing on future skills and developing practices to ensure the sustainable management of all the natural resources that we rely on.

"BMC is different in that it is not necessarily responding to what current industry demands are, which can be harmful and short-termist, but instead focuses on responding to the real needs of our economy and environment" Ben Rawlence, Chief Executive at Black Mountains College explains. So that rather than focusing on destructive, traditional methods which are currently widespread within farming and forestry, BMC aims to develop the sustainability-minded skills of their students, who will be prepared to support the reform of industry where needed. Likewise, BMC is responding to an increasing demand from students who are keen to develop these land-based skills within an environmentally friendly context.

In terms of the degree programme, there's a lot of demand for sustainability skills for people who can understand climate, just transitions, alternative economics, and who understand and can apply systems theory change. The HE programme offers this whilst also developing students' practical skills and arts-based training in creativity and design thinking. The vocational FE courses provide a largely hands-on approach allowing students to practice



either in woodland, felling, tree planting, ground clearance or traditional woodworking. The on-site garden and farm give students the opportunity to spend around 50% of their time working directly on the land, with around 50% of the time in the classroom. Even at the higher education level, students typically spend around 20-30% of their time directly in nature applying their knowledge. All learning has a strong emphasis on enterprise and community projects, where students might create a new business, take part in circular community projects as well as other enterprise projects, enabling students to create real-world initiatives and strengthen local partnerships. These projects, along with receiving effective support from tutors, helps develop entrepreneurial mindsets and skills within

the student body. Students have progressed into roles such as independent horticulture practitioners, woodland managers, community food growers, and sustainability-focused self-employed entrepreneurs, contributing to local economies and wider ecological recovery.

By equipping learners with practical expertise and a systems-based understanding of climate transition, BMC supports the development of a future-focused rural workforce aligned with the needs of a sustainable and just society. Finally, all the further education programmes at BMC are fully funded, increasing access for learners of all ages wishing to retrain or upskill in green pathways.



ZSL's wild futures for all

Holly Bestley, Career and Youth Co-ordinator, ZSL

Despite an increased sector wide focus on diversity, inclusion and equitable practice, the environmental and conservation workforce remains one of the least diverse in the UK.

At ZSL – the international wildlife conservation charity – we are committed to helping change this while addressing the growing skills shortages across the sector. Ensuring that conservation careers are accessible to all is central to our mission, both in the UK and globally, as we work to equip the next generation with the skills conservation urgently needs.

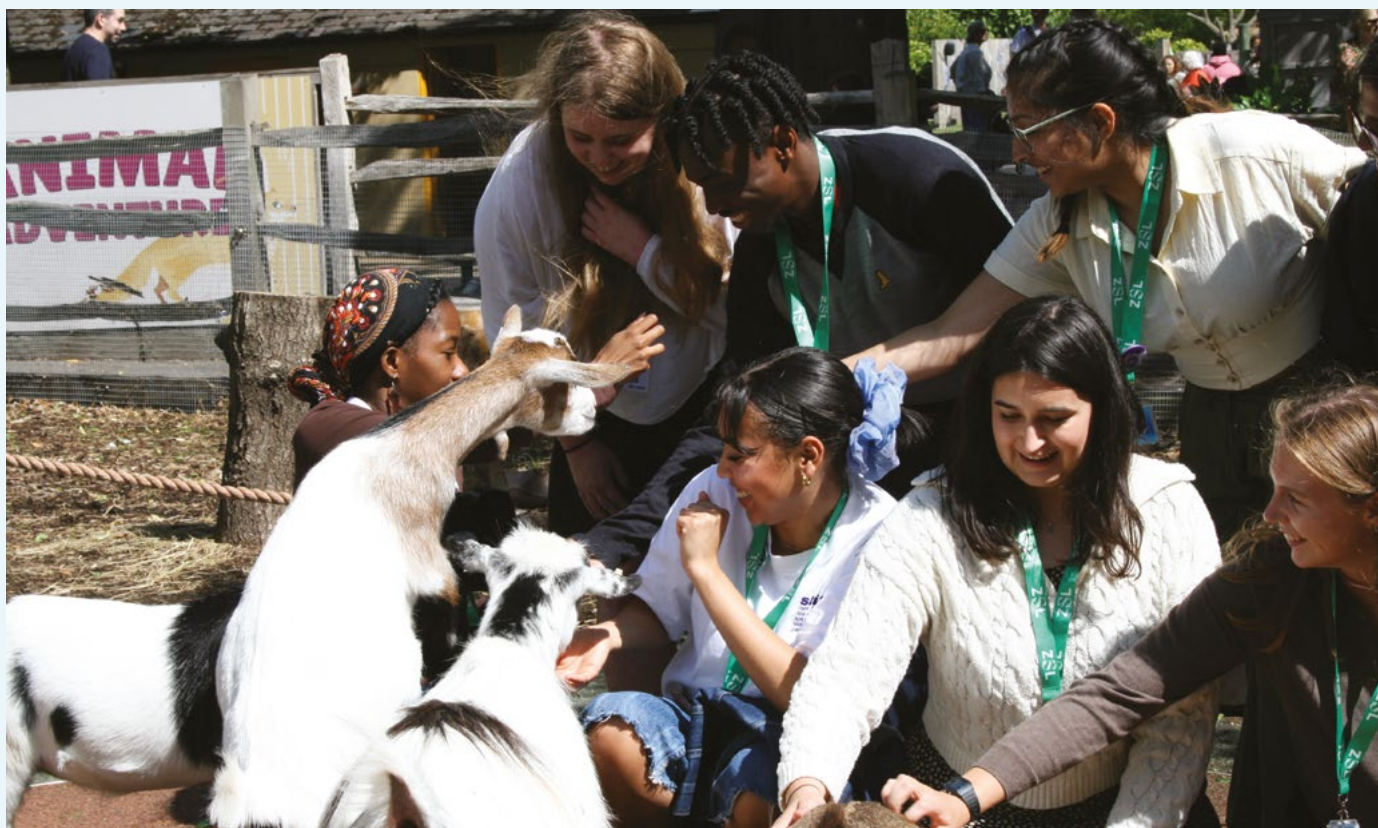
In 2024, ZSL's Youth Advisory Board researched the barriers young people face when entering the sector. Their findings continue to shape our careers programming. We take a targeted approach to supporting young people who are underrepresented in conservation: fostering a love of nature from early years, working with schools to showcase the breadth of roles available, and providing practical, accessible opportunities to build confidence, competence and sector specific skills.

Our free skills development courses and work placements offer meaningful experience, while our peer networks help early career conservationists feel supported. We also actively signpost routes into entry level roles, creating clearer and fairer pathways into the profession.

Conservation careers are far more varied than people assume. Alongside traditional fieldwork and animal care roles, expertise in project management, digital communication, community engagement, finance and coding is increasingly essential – skills often in short supply across the sector. Broader competencies such as critical thinking, communication, curiosity and problem solving are also gaps identified by employers, and we embed these throughout our programming.

Ultimately, all jobs have an environmental impact. For wildlife and people to thrive, every career will need to become a 'green job' – and ZSL aims to ensure young people from all backgrounds can be part of that future.

Skills development course at London Zoo





ZSL
LET'S WORK
FOR WILDLIFE
ZOO ACADEMY
STUDENT

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