

The British Academy

# The role of innovation in artificial intelligence for place-sensitive environmental policy and practice

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# Abstract

Artificial Intelligence (AI) is predicted to reshape the economy and governance landscape in the United Kingdom (UK), with projections suggesting a £400 billion contribution to GDP by 2030. Amidst this momentum, the UK Government has published its AI Opportunities Action Plan, outlining a national strategy for technological leadership. However, as policy and investment accelerate, questions are emerging on the environmental cost of AI and its potential role in supporting nature recovery and place-based regeneration. This paper examines these issues, offering an assessment of how AI intersects with nature recovery goals. Two UK-based case studies are included (the Royal Horticultural Society and Ambios Ltd) and they collectively demonstrate how AI can be configured to work with, rather than against, local knowledge, community values and outcomes for nature recovery. They also highlight key tensions, particularly around the balance between individual agency and AI-enabled decision-making. The cases suggest that AI must not be seen as a silver bullet, but as a strategic enabler that requires deliberate, place-sensitive integration. The central message for policymakers is the importance of proactively embedding environmental objectives into the UK's AI agenda, ensuring that environmental governance and nature recovery activities keep pace with the speed of technological innovation.

**Keywords:** Artificial intelligence; Nature recovery; Place-sensitivity; Policy; Governance; Local knowledge; Public value

# Artificial intelligence and emerging public policy in the United Kingdom

AI is rapidly becoming one of the defining technologies of the 21st century, and is increasingly reshaping economies, governance systems and social infrastructures at a global scale.<sup>1</sup> In the UK, the government have designated AI as a cornerstone of long-term growth, with the development and use of these technologies projected to contribute an estimated £400 billion to the UK economy by 2030.<sup>2</sup> This ambition is backed by plans for substantial investment in research and digital infrastructure, placing the UK in strategic pursuit of global leadership in AI capability.

These developments are attracting significant attention on how and in what ways AI shapes the UK's economic future,<sup>3,4</sup> including data presented by the Department for Science, Innovation and Technology<sup>5</sup> which indicates that AI could be responsible for a 3.88% uplift in real GDP growth by 2035. However, amongst economic analyses, very little attention has been placed on the opportunities, limitations and risks AI innovations may hold for other national objectives, such as nature recovery and place-based regeneration. Considering this, place-sensitive nature recovery is the focus of this report, drawing attention to how AI is already intersecting with nature recovery and why more deliberate integration of environmental objectives into the UK's AI agenda is now both timely and necessary.

This report expands the scope of AI discourse beyond economic growth and productivity. Doing so enables AI to be considered as a potential enabler of environmental stewardship in ways that are responsive to the ecological and social particularities of place. Rather than treating nature recovery as tangential to AI development, it needs to be understood as a critical proving ground for how technological innovation can enhance public value. As the analysis below illustrates, charting a path forward will require new modes of governance, design and civic engagement that can navigate the tensions between national ambitions for economic transformation and the realities of local environmental action.

The UK government has now published its '[AI Opportunities Action Plan](#)', which is a 50-point plan to position the UK at the forefront of AI development and adoption.<sup>6</sup> The plan comprises three sections, they are:

## 1. Invest in the foundations of AI

The government aims to stimulate investment in and the growth of digital infrastructures, especially through initiatives such as AI Growth Zones.<sup>7</sup>

## 2. Push hard on cross-economy AI adoption

Public sector bodies will be supported to trial and adopt AI technologies at scale, particularly where they can improve service delivery and operational efficiency.

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1 Makridakis, S. (2017) 'The forthcoming Artificial Intelligence (AI) revolution: Its impact on society and firms', *Futures*, 90, pp. 46–60.

2 Department for Science, Innovation and Technology (2025a) Prime Minister sets out blueprint to turbocharge AI. United Kingdom Government.

3 The British Academy and The Royal Society (2018) The impact of artificial intelligence on work: An evidence synthesis on implications for individuals, communities, and societies. The British Academy and The Royal Society.

4 Google (2024) Unlocking the UK's AI potential. UK public policy, Google.

5 Department for Science, Innovation and Technology (2025b) The wider economic impacts of emerging technologies in the UK. United Kingdom Government.

6 Clifford, M. (2025) AI opportunities action plan. United Kingdom Government.

7 Department for Science, Innovation and Technology (2025) AI Growth Zones: Open for applications. United Kingdom Government.

### **3. Position the UK to be an AI maker, not an AI taker**

To secure long-term strategic advantage, it is planned that the UK will build homegrown expertise in core areas of frontier AI development, ensuring it remains competitive in a rapidly evolving global market.

In the month after the publication of the opportunities action plan, the government announced it had already received over £14 billion in investment.<sup>8</sup> The government also published a response to the 50-point plan,<sup>9</sup> with the Prime Minister taking all recommendations forward and outlining plans to implement them in 2025, 2026 and 2027. Ultimately, this is a fast moving policy space, reflecting Clifford's<sup>10</sup> suggestion that the government will need to swiftly commit to investments in the construction of technical infrastructures and that these commitments will require new models of public-private cooperation that are designed to extend the benefits of AI across sectors and communities.

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8 Department for Science, Innovation and Technology (2025) Government fires starting gun on AI Growth Zones to turbocharge Plan for Change. United Kingdom Government.

9 Department for Science, Innovation and Technology (2025) AI opportunities action plan government response. United Kingdom Government.

10 Clifford, M. (2025) AI opportunities action plan. United Kingdom Government.

# Artificial intelligence and the environment

With the policy context outlined above, attention is now placed on both the known environmental costs of AI and some of the emerging environmental benefits of using AI, especially as these relate to nature recovery. This follows Sandbrook's analysis that the use of AI for environmental action and protection risks generating a sense of techno-optimism which can cloud the need to act here and now.<sup>11</sup> To explore further, some of the environmental costs of AI are outlined, with this intended to offer a sense of balance to some of the more positive outcomes for nature that AI can provide. The case studies follow this section, exploring where AI is currently being used within the Royal Horticultural Society (RHS) and Ambios Ltd.

## The environmental costs of artificial intelligence

Current economic assessments and AI growth strategies in the UK do not consider the present and future environmental implications of these technologies. This omission is increasingly difficult to justify given growing evidence that the production, training and use of AI can impose significant climate and ecological costs. It is, therefore, important to assess how AI innovation fits within the UK's broader environmental commitments, including Net Zero targets, the 30-by-30 biodiversity pledge, and national goals for nature recovery. Doing so will help us understand the impacts of technological progress and to identify ways ahead which ensure this does not come at the expense of long-term environmental safeguarding and improvement.

Emerging research underscores this need. For example, a study from the Massachusetts Institute of Technology highlights how the environmental impact of generative AI includes rising carbon emissions and the potential acceleration of nature degradation.<sup>12</sup> One approach to address carbon output and the requirement for more energy is to broaden the use of renewables. But this is not without controversy. For example, solar power has been identified as an important feature of the UK's future energy mix, with solar farms often installed on low productivity agricultural land. This is a topic of great contention for local communities<sup>13</sup> and was recently debated in the commons.<sup>14</sup> Interestingly, new AI data centres will be constructed in areas that are directly proximal to available energy and water resources. As solar farms are often located in rural areas, data centres are likely to expand into these regions, with potential consequences for biodiversity and local communities. Further research is needed to understand these impacts. That said, Solar Energy UK have highlighted that planned solar expansion to 2035 will utilise less space than the UK's golf courses.<sup>15</sup> Ultimately, these examples indicate a growing tension between local communities, food and energy security, and the coming demand for energy intensive AI infrastructures such as data centres.

11 Sandbrook, C. (2025). Beyond the hype: navigating the conservation implications of artificial intelligence. *Conservation Letters*, 18(1), e13076. Available at: <https://doi.org/10.1111/conl.13076>

12 Bashir, N., Donti, P., Cuff, J., Sroka, S., Ilic, M., Sze, V. et al. (2024) The climate and sustainability implications of generative AI. Massachusetts Institute of Technology. Available at: <https://doi.org/10.21428/e4baecd9.9070dfe7> (Accessed: 29 May 2025).

13 CPRE, The Countryside Charity (2024) Solar farm refused: A win for the community and the Green Belt at Aldenham. Available at: <https://www.cpreherts.org.uk/news/solar-farm-refused-a-win-for-the-community-and-the-green-belt-at-aldenham/> (Accessed: 7 July 2025).

14 House of Commons (2025) Solar Farms: Agricultural Land. Available at <https://hansard.parliament.uk/Commons/2025-01-28/debates/E3BE7351-C53C-4D00-BB41-D1C5D63EA844/SolarFarmsAgriculturalLand> (Accessed 7 July 2025).

15 Solar Energy UK (2024) Factsheet: Solar farms and agricultural land. Available at: <https://solarenergyuk.org/wp-content/uploads/2024/06/FactSheet-Solar-Farms-and-Agricultural-Land-2024.pdf> (Accessed 7 July 2025).

Chat-GPT has received the most readily available estimates on carbon output, with an estimated 1.59 grams of CO<sub>2</sub>e emitted per page view<sup>16</sup> and over 1 billion queries every day.<sup>17</sup> Based on these figures, it can be estimated that the platform has an annual CO<sub>2</sub>e output of over 580,000 tonnes, or the same output as over 131,000 people living in the UK.<sup>18</sup> Alongside carbon<sup>19</sup>, it has also been noted that the manufacture of technological hardware can use natural resources at a weight ratio of 1:400 (e.g. a 1 kilogram device will require 400 kilograms of raw materials). AI data centres also require significant amounts of water for cooling<sup>20</sup>, with estimates that the demand for AI will result in an additional 4.4 to 6.6 million cubic metres of water being withdrawn globally in 2027;<sup>21</sup> more than the whole country of Denmark withdraw<sup>22</sup> annually. According to the National Engineering Policy Centre,<sup>23</sup> this projected shortfall is expected to place substantial pressure on the UK's water security, with potentially serious consequences for both people and nature. For example, London, which accounts for 77.3% of the UK's data centre market,<sup>24</sup> is one of seven UK regions forecast to face severe water stress by 2030.<sup>25</sup> This highlights the need to assess how increased water withdrawal from AI infrastructures will affect the availability of water in the capital.

Whilst the AI opportunities action plan starts by outlining the need for AI growth to be 'sufficient, secure and sustainable', there are little tangible suggestions beyond mitigating the adverse environmental consequences of these innovations. That said, there is a new AI energy Council,<sup>26</sup> which will advise 'on improving energy efficiency and sustainability in AI and data centre infrastructure, such as the use of water' (para 2.). Chan et al.<sup>27</sup> have also highlighted the potential of a twin energy and AI transition for the UK, suggesting that innovation in both areas should occur concurrently to ensure the long-term security of the nation's energy systems and natural environments. There are ways ahead, but both policy and industry are moving exceptionally quickly, and attention needs to be placed on ensuring that environmental safeguards keep pace with the speed of technological development.

Ultimately, the above is a snapshot of some of the known environmental consequences of AI innovation and there can be no doubt that we are in a state of data deficiency concerning these issues. The next section now turns to some of the benefits AI is already having for nature, with the RHS and Ambios Ltd case studies utilised to offer a place-sensitive lens on how AI innovation in the UK is already taking shape in this field.

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- 16 KnownHost (2024) Carbon footprint of AI tools. Available at: <https://www.knownhost.com/blog/carbon-footprint-of-ai-tools/> (Accessed: 29 May 2025).
- 17 Singh, S. (2025) ChatGPT statistics 2025 – DAU & MAU data (worldwide). Available at: <https://www.demandsage.com/chatgpt-statistics/> (Accessed: 29 May 2025).
- 18 Our World in Data (2025) United Kingdom: CO2 country profile. Available at: <https://ourworldindata.org/co2/country/united-kingdom> (Accessed: 29 May 2025).
- 19 Justice and Paix (2019) Les fausses promesses du numérique: Environnement, éducation, santé, travail. Etude. Commission Justice et Paix francophone de Belgique: Brussels.
- 20 Li, P., Yang, J., Islam, M.A. and Ren, S. (2023) Making AI less "thirsty": Uncovering and addressing the secret water footprint of AI models, arXiv Preprint, pp. 1-10. <https://doi.org/10.48550/arXiv.2304.03271>.
- 21 National Engineering Policy Centre (2025) Engineering responsible AI: Foundations for environmentally sustainable AI. Available at: <https://nepc.raeng.org.uk/media/2aggau2j/foundations-for-sustainable-ai-nepc-report.pdf> (Accessed: 30 May 2025).
- 22 Taylor, P. (2025) Leading countries by number of data centers as of March 2025. Available at: <https://www.statista.com/statistics/1228433/data-centers-worldwide-by-country/> (Accessed: 29 May 2025).
- 23 Kingfisher (2023) Seven regions in England will face severe water stress by 2030 as Brits significantly underestimate their daily water usage. <https://www.kingfisher.com/media/news/2023/seven-regions-in-england-will-face-severe-water-stress-by-2030-a#> (Accessed: 30 May 2025).
- 24 Taylor, P. (2025) Leading countries by number of data centers as of March 2025. Available at: <https://www.statista.com/statistics/1228433/data-centers-worldwide-by-country/> (Accessed: 29 May 2025).
- 25 Kingfisher (2023) Seven regions in England will face severe water stress by 2030 as Brits significantly underestimate their daily water usage. <https://www.kingfisher.com/media/news/2023/seven-regions-in-england-will-face-severe-water-stress-by-2030-a#> (Accessed: 30 May 2025).
- 26 Department for Science, Innovation and Technology (2025f) AI energy council to ensure UK's energy infrastructure ready for AI revolution. Available at: <https://www.gov.uk/government/news/ai-energy-council-to-ensure-uks-energy-infrastructure-ready-for-ai-revolution> (Accessed: 29 May 2025).
- 27 Chan, K., West, D., Teo, M., Brown, H., Westgarth, T. and Smith, T. (2024) Greening AI: A policy agenda for the artificial intelligence and energy revolutions. Available at: <https://institute.global/insights/climate-and-energy/greening-ai-a-policy-agenda-for-the-artificial-intelligence-and-energy-revolutions> (Accessed: 29 May 2025).

## Emerging environmental benefits of artificial intelligence

The recent uptake of AI is prompting scientists and conservationists to consider how these new technologies may enhance how our natural environments are monitored and protected, as well as developing previously unavailable mechanisms for predicting both climate and biodiversity futures. Indeed, previous efforts to protect nature have frequently been limited by persistent challenges, chief among them being the scarcity of timely, high-quality climate and biodiversity data, and the considerable time required to process and interpret the information that does exist. As the United Nations<sup>28</sup> suggests in an outline of how AI can enhance how environmental challenges are understood, '[w]e can't manage what we don't measure' (Para. 1). This broadly reflects how AI is currently being positioned within climate and nature efforts: as a tool that can offer real-time, planet-wide insights into ecosystem changes, identifying emerging environmental pressures and supporting more targeted and timely interventions.

Pollock et al.<sup>29</sup> pick up on the role AI may have in fixing this data gap, first highlighting that nearly all targets in the Kunming–Montréal Global Biodiversity Framework<sup>30</sup> are missing important and up-to-date data. They then highlight seven key areas where AI can help fill gaps in knowledge about biodiversity, including evolutionary relationships and shortfalls in genetic data, and species interaction data with focus on the nature of species abundance and distribution.<sup>28</sup>

Ultimately, AI is being seen as a tool for increasing the 'speed, scale and effectiveness of data collection and processing' in ways which support more informed policy development and decision making across a range of spatial scales<sup>31</sup>. Indeed, a recent independent review for the Department for Environment, Food and Rural Affairs (Defra) by Corry<sup>32</sup> highlighted that regulators are using out-of-date analogue systems which both weaken how environments are monitored, and which make Defra's 'service to customers slow to the point of failure'. It is recommended that a swift digital transformation takes place across government, ensuring that AI, satellite and sensing technologies may be utilised to the greatest effect.<sup>33</sup>

With the scale of organisations entering this space growing, two case studies have been selected to offer a more in-depth examination of how AI innovations are relating to nature recovery in the UK. The cases begin with the RHS and then moves to Ambios Ltd.

28 United Nations (2022a) How artificial intelligence is helping tackle environmental challenges. Available at: <https://www.unep.org/news-and-stories/story/how-artificial-intelligence-helping-tackle-environmental-challenges> (Accessed: 29 May 2025).

29 Pollock, L.J., Kitzes, J., Beery, S., Gaynor, K.M., Jarzyna, M.A., Mao Aodha, O. et al. (2025) Harnessing artificial intelligence to fill global shortfalls in biodiversity knowledge, *Nature Reviews Biodiversity*, pp. 1–17. <https://doi.org/10.1038/s44358-025-00022-3>.

30 United Nations (2022b) Kunming-Montreal global biodiversity framework. Available at: <https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf> (Accessed: 29 May 2025).

31 Pollock, L.J., Kitzes, J., Beery, S., Gaynor, K.M., Jarzyna, M.A., Mao Aodha, O. et al. (2025) Harnessing artificial intelligence to fill global shortfalls in biodiversity knowledge, *Nature Reviews Biodiversity*, pp. 1–17. <https://doi.org/10.1038/s44358-025-00022-3>.

32 Corry, D. (2025) Delivering economic growth and nature recovery: An independent review of Defra's regulatory landscape. Available at: <https://assets.publishing.service.gov.uk/media/6825c05cb2527e8de9b014cd/dan-corry-review-defra-regulatory-landscape.pdf> (Accessed: 29 May 2025).

33 Delahay, R.J., Sherman, D., Soyalan, B. and Gaston, K.J. (2023) 'Biodiversity in residential gardens: A review of the evidence base', *Biodiversity and Conservation*, 32(13), pp. 4155–4179.

# Case studies

## Case study one: The Royal Horticultural Society's development and use of Artificial Intelligence

The RHS are using AI across three fronts, and this section explores each in detail. The case is set against the recognition that gardens are often overlooked for their importance in supporting local biodiversity<sup>33</sup> and that they scarcely feature in national environmental policy.<sup>34</sup>

### Plants for Purpose

The RHS's Plants for Purpose initiative is a five-year programme (2025–2030) using AI to identify cultivated plants that can deliver environmental benefits, and which are able to adapt to future climate scenarios. In collaboration with the University of Nottingham, the project is applying deep learning to botanical data. These data come from the RHS Herbarium, the UK's largest collection of plants with over 93,000 dried specimens that have been digitised. These digital images and associated metadata (leaf shape, surface texture, provenance, etc.) will be fed into an AI model trained with convolutional neural networks to learn patterns in the plants. For example, one of these trained networks might learn to detect leaf hairs and rough surfaces, traits that have previously correlated with high pollutant capture.<sup>35</sup> Outputs from the AI will then be cross-checked by RHS botanists and horticultural scientists, providing a ground truthing exercise where the AI outputs are verified before inclusion in the database.

To facilitate the vast data storage required to undertake this work, the RHS is utilising a combination of Azure Data Lake and SQL databases that will store the plant catalogue and image library. These cloud-based infrastructures will allow scalable training of the deep-learning models on the hundreds of thousands of images. Once fully operational, it is expected that the system will be able to process and categorise new cultivars in seconds, which will accelerate what would otherwise be a highly manual, time-intensive process. The potential for nature recovery is significant, as this process speeds up how data are analysed, producing faster and more accurate actions for nature at the local level. These validated data will also feed directly into other RHS platforms (see ChatBotanist below). Through this process, plants will carry clearly labelled environmental functions, such as 'pollution-filtering', 'heat-resilient' or 'pollinator friendly', to support gardeners, planners and developers in making informed, nature-focused choices at a variety of horticultural scales.

### ChatBotanist

The RHS's ChatBotanist is a generative AI-enabled tool designed to make expert horticultural advice more accessible and biodiversity-focused at the individual gardener level. Developed in partnership with digital transformation firm Publicis Sapient, the tool was launched in beta to RHS's 630,000 members in autumn 2023. It builds on a five-year corpus of RHS horticultural advice and publications, which have been trained into a generative AI algorithm that enables real-time, personalised responses to a wide range of gardening queries. Collectively, it is estimated that the algorithm contains 200 human years' worth of gardening advice. Here's an example of a conversation the author had with ChatBotanist:

**Gardener:** I live in Devon and have a small south facing garden. One area is in deep shade, generated by a large hedge. The border in front is highly acidic and I would like to develop some plants that will thrive in these conditions, whilst also being good habitat for moths. What should I do?

33 Delahay, R.J., Sherman, D., Soyalan, B. and Gaston, K.J. (2023) 'Biodiversity in residential gardens: A review of the evidence base', *Biodiversity and Conservation*, 32(13), pp. 4155–4179.

34 Royal Horticultural Society (2023) Royal Horticultural Society – Written evidence. Available at: <https://committees.parliament.uk/writtenevidence/120053/pdf/> (Accessed: 29 May 2025).

35 Chen, L., Liu, C., Zhang, L., Zou, R. and Zhang, Z. (2017) 'Variation in tree species ability to capture and retain airborne fine particulate matter (PM<sub>2.5</sub>)', *Scientific Reports*, 7(1), p. 3206.

**ChatBotanist:** For your deep shade area with acidic soil, consider planting shade-loving species such as Hellebores, Foxgloves, and Pulmonaria, which can thrive in these conditions. Additionally, plants like Brunnera macrophylla and certain ferns can provide good habitat for moths. Mixing in a variety of these plants will create a vibrant and supportive environment for wildlife in your garden.

After planting a small number of common Foxgloves (*Digitalis purpurea*), a Lesser Yellow Underwing (*Noctua comes*) caterpillar was discovered. Although further analysis is required at a greater scale, this perhaps demonstrates the effectiveness of ChatBotanist in delivering hyper-local outcomes for nature.

As a form of AI that can sit in a gardener's pocket, the tool can help support local nature recovery by embedding advice on biodiversity and sustainable planting into everyday horticultural decisions. As already mentioned, these responses are informed not just by RHS science, but also by initiatives such as Plants for Purpose, which is feeding its AI-derived plant trait data directly into ChatBotanist's knowledge bank. To date, over 5 million requests have been made in the app, meaning that ChatBotanist is already providing an important AI-driven mechanism for furnishing the UK's gardeners with knowledge which can help them be frontline agents for local nature recovery.

### The Avnade Intelligent Garden

Launched at the RHS Chelsea Flower Show 2025, the [Avnade Intelligent Garden](#) showcased how AI can become a central supportive tool in enhancing local urban biodiversity. Co-designed by Tom Massey and Je Ahn, in collaboration with the RHS and Avnade, the garden is a fully operational prototype for how AI can be utilised to monitor and support complex natural systems in real time. At its core, the garden is powered by a network of remote probe sensors that sit within the trunk of 12 tree species.<sup>36</sup> This is set against the context that 30% of urban trees die in their first year<sup>37</sup> and that the health of newly planted trees is not monitored in cities such as London.<sup>38</sup> The sensors collect data from each tree on multiple variables, including sap flow, growth, air quality, soil conditions and weather patterns. The AI also enables other metrics to be included, such as live meteorological data from the Met Office, to get a full and comprehensive view of what is happening to each tree and the environment around it.

These inputs are continuously streamed to a Microsoft Azure-based platform, where AI models trained to be an expert on each tree then process the data using machine learning to detect current status and predict current and future care needs. For example, the analysis enables the system to anticipate water stress or nutrient depletion and will trigger alerts or automated interventions via a connected app interface. This interface is publicly available and enables individual users to assess the condition of the garden. Interestingly, the AI also allows users to speak directly to each tree, enabling a dialogue between each species and the horticulturalist. Here's an example from the Avnade website<sup>39</sup>:

**Horticulturalist:** I notice that your soil moisture is too high, what's wrong?

**Tree species (*Zanthoxylum simulans*):** My soil moisture level is currently at 43%, which is considered high for my needs. Ideally, it should be between 15% and 35%. This high moisture might indicate that my roots are not receiving enough oxygen, which can be harmful. It's important to monitor drainage and ensure the soil isn't waterlogged.

36 Microsoft (2025) Now, thanks to AI, we really can 'talk' to the trees. Available at: <https://ukstories.microsoft.com/features/now-thanks-to-ai-we-really-can-talk-to-the-trees/> (Accessed: 29 May 2025).

37 Avnade. (2025a) About the garden. Available at: <https://intelligentgarden.avnade.com/about-the-garden> (Accessed: 29 May 2025).

38 Mayor of London (2024) Health of planted trees. Available at: <https://www.london.gov.uk/who-we-are/what-london-assembly-does/questions-mayor/find-an-answer/health-planted-trees> (Accessed: 29 May 2025).

39 Avnade. (2025b) The Avnade Intelligent Garden: Explore the garden through our sensors and see how the garden came to life. Available at: <https://intelligentgarden.avnade.com/> (Accessed: 29 May 2025).

This dialogue demonstrates how AI enables the tree to inform the horticulturalist about an unseen soil moisture issue, suggesting ways that can help ensure the tree gets what it needs.

The author visited the garden at the Chelsea Flower Show in May 2025, offering a glimpse at a future where intelligent systems underpin how nature can be monitored in non-invasive ways, and which help facilitate nature recovery in urban environments. In conversation with Tom Massey (one of the designers), it was interesting to hear how the garden has been met with a degree of scepticism by some gardeners, mostly centred on arguments that technologies should not be integrated with spaces for nature. This also emerged in case study two (see AI buddy below) and indicates an emerging philosophical and cultural tension between technology advancements and traditional approaches in nature recovery. Ultimately, the garden won a Gold medal and the Best Construction award at Chelsea, highlighting its quality. Despite this, Monty Don (host of Gardeners' World), suggested that 'it remains to be seen how much technology is going to help or possibly even hinder our lives in the garden. Although I have to confess, the more hands on it is, the better I like it'<sup>40</sup>, demonstrating some of the emerging tensions between technology incorporation and gardening practice.

## Case study two: Ambios Ltd's development and use of artificial intelligence

Ambios is a not-for-profit organisation based on 130-acres of farmland on the Sharpham Estate in South Devon. They provide a suite of mostly residential training programmes on nature recovery, developing practical skills for students so that they may pursue careers in this area. Recently, Ambios have been exploring the use of AI in their nature recovery training programmes, demonstrating emerging relationships between nature recovery, workforce and technologies.

### Future Landscape Visualisation Tool

Ambios' [Future Landscape Visualisation Tool](#) is an AI-enabled platform designed to help landowners, farmers and conservationists envision how their land could look under large-scale nature recovery. Funded by [Rewilding Britain](#), the tool integrates high-resolution drone imagery from any given site and utilises AI algorithms to generate realistic visual scenarios of the landscape under an array of future land uses. The project flies a drone with a high-resolution camera over target sites within the Dart Valley, capturing panoramic images of fields and river corridors. These flights produce a record of imagery which then serve as the raw data for the visualisation tool. These images are often stitched or processed into georeferenced mosaics (using photogrammetry techniques) to create seamless aerial maps. Depending on what is asked for, the AI can then apply different models of nature recovery to the images, highlighting what the land might look like, for example, as a wood pasture, riparian wetland or wildlife corridor. The resulting visualisations provide stakeholders with a time-lapse view into the future of their landscape, illustrating what nature recovery might look like over any given time frame in a matter of minutes.

As Ambios director Simon Roper explained, the visualisation tool has immediate appeal for landowners and managers as it facilitates the broadening of thinking about what is possible in any given landscape. It was also suggested that the tool will allow stakeholders to see what they might otherwise struggle to imagine, which can be especially powerful when considering long-term ecological change that unfolds beyond typical funding or management cycles. The AI being utilised by Ambios is enabling this to be delivered to key stakeholders in ways which can translate what are often complex ecological scenarios into accessible formats. However, it is noted that the AI algorithm is currently not modelled on scientific data and utilises an open-source generative AI model which produces the landscape visualisations without input from specialist information. It has therefore been necessary for the AI output to be interpreted alongside specialist ecological knowledge from the Ambios team, ensuring that any future land use decisions are supported by necessary ecological evidence and practice.

As an early-stage but scalable proof-of-concept for AI innovation in the nature recovery space, Ambios' visualisation platform is highlighting a new method of engaging land owners and managers. Much like ChatBotanist or the Avande Intelligent Garden (above), this AI tool is not acting as a replacement for local knowledge or wider ecological expertise, it serves as an amplifier of imagination and collaboration in ways which can help facilitate nature recovery.

### **AI Buddy**

Ambios' AI Buddy is an AI-enabled voice recognition tool designed to streamline the process of assessing practical examinations in land-based vocational training. Funded by the Ufi VocTech Trust, the project forms part of early-stage innovations in adult vocational education, with Ambios specifically exploring how the technology can support their nature recovery training programmes. The AI Buddy tool replaces time-consuming written assessments by capturing field-based, spoken interactions between trainers and trainees. These conversations, recorded via a mobile device during real-world examinations, are automatically transcribed and analysed by the AI to map spoken evidence against a formal competency framework, such as those used in Level 2 and 3 vocational qualifications.

The tool is specifically designed for remote, outdoor use. Assessors can simply press 'record' on a phone or tablet while engaging with learners during activities such as habitat surveys or hedge laying. The AI then uses natural language processing to scan transcripts for key terminology and processes that align with the pre-uploaded assessment criteria. If a trainee demonstrates a required skill through their spoken interaction, the tool automatically logs this, generating a digital record that can be used as evidence towards formal certification. This means that the trainer is less engaged with physically recording the examination with pen and paper and can engage more directly with the trainees' actions, engaging with them in ways that can facilitate a degree of co-creation and support to further enhance the assessment process.

The author visited Ambios in May 2025 for an AI Buddy product development day and joined a trainee and trainer doing an assessment at a camera trap site, which gave way to a situated example of how the technology works, as well as some emerging challenges:

1. The trainer initiated the AI Buddy recording, with the device then left recording on a clipboard.
2. The trainee and the assessor both explored the positioning and settings of the camera and discussed collaboratively how best to optimise for wildlife detection, whilst also referring to the assessment specification to make sure all components were being met.
3. Their efforts were rewarded when they spotted a captured image of a badger, prompting a shared moment of celebration.
4. After the assessment had finished, the assessor and trainee spoke directly into the recording device, using key words to ensure that the AI algorithm would detect the correct use of language.
5. On uploading the recording for assessment, there was a delay due to the large file size and limited mobile connectivity, which affected the immediacy of the AI-generated feedback.

Interestingly, as with the Avande Intelligent Garden, some participants expressed scepticism about the use of AI in training and assessment. A few trainees opted out of the AI development session altogether, preferring more conventional, in-person assessment methods rather than AI-assisted alternatives. This is a significant finding across both cases and points towards a cultural underpinning that resists AI in the nature recovery space. It appears that some people who work (or who want to work) in nature recovery do so to engage with people and the environment without the distraction or barrier of technologies. Alongside this sense of resistance, given that the AI will only pick up voices, it may be that the AI Buddy narrows the availability of assessment formats, restricting opportunities to demonstrate knowledge in non-verbal ways.

These challenges aside, by embedding AI into on-site assessments, Ambios is demonstrating how machine learning can support practical land-based education. Rather than asking learners

and assessors to divert time into paperwork, the AI Buddy enables greater interaction with peers, educators and nature. This is especially important for observers who explained that across a large estate and a dynamic learning environment, the use of AI can significantly reduce administrative overheads and increase the number of candidates who may be assessed in a given day. Much like the Future Landscape Visualisation Tool, AI here is not replacing human judgment but supporting an agile and scalable model of skills recognition. This is developing a range of questions, including the willingness of candidates to be assessed by an AI tool and whether rural connectivity limits the speed and usability of the technology.

# Artificial intelligence and place-sensitive nature recovery

This paper highlights the speed with which policy and innovation are materialising in relation to AI. This increase in attention means that those involved in both environmental policy and practice need to rapidly assess how nature recovery, as well as broader efforts to enhance climate and ecosystem protection, fit within emerging technological innovations. This will need to include understanding the opportunities AI offers for monitoring, modelling and decision-making, as well as critically evaluating how these technologies align with the cultural and ethical dimensions of human relationships with nature. For example, Ambios trainees explained that they wanted to work in nature recovery to escape the fast-paced, technological nature of society. However, given the scale of projected economic growth, there does exist a timely opportunity for nature recovery to secure a meaningful role in this space in ways which can shape innovation and future funding from the outset. The work already underway with the RHS and Ambios is highlighting some of these innovations and setting the trajectory for future work.

Collectively, the case studies lay a foundation for evaluating the place-sensitivity of AI applications in nature recovery. Although big data and algorithms can seem detached from local realities, the evidence suggests these technologies can be configured to amplify on-the-ground knowledge and action. The Avande Intelligent Garden offers a case in point: its AI network translates real-time physiological signals into practical guidance at the hyper-local level, enabling gardeners and local stakeholders to respond to an environment's changing micro-climate minute by minute. However, as Alsaleh<sup>41</sup> suggests, technology is inseparable from the cultures that shape and sustain it, and effective AI innovation in nature recovery must remain sensitive to the philosophies and cultures that often attract people to this field. This means designing AI tools that respect and support community knowledge and which fully account for ethical considerations such as the environmental cost of these technologies.

Three key areas emerge for policy makers to consider:

1. It will be important to prioritise AI innovations that enhance human knowledge and actions. AI should be a companion for those engaging in nature recovery, not a replacement. The case studies offer initial insights into how the blending of human knowledge and AI assistance can look.
2. The environmental costs of using AI for nature recovery will not be insignificant, it will be necessary to ensure that these costs are outweighed by the benefits of using these technologies. For example, a standardised metric could be constructed which can quantify the carbon, water and natural resource cost of each new AI product. Transparency will also be highly important here.
3. Policy and product design will need to be shaped with the view to engaging AI-sceptical communities in the nature recovery space, particularly in areas where more traditional methods remain highly valued. Co-production methodologies may be especially helpful here.

Linked to all three points is the resistance to AI described across both cases, which calls for pause for thought on how nature recovery organisations and communities are included at all stages of the AI innovation process. To support this, both government and industry may need to invest in education and capacity-building to improve AI literacy across the environmental sector. In parallel, a robust governance framework could be essential to ensure that AI innovation advances, rather than undermines, internationally agreed biodiversity and climate goals.

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41 Alsaleh, A. (2024). The impact of technological advancement on culture and society. *Scientific Reports*, 14(1), p.32140. <https://doi.org/10.1038/s41598-024-83995-z>

The key message for policymakers is that AI should not be viewed as a silver bullet for either the climate crisis or nature recovery. Instead, these technologies should be viewed as strategic enablers which must be thoughtfully embedded within any given ecological and social system. Effective integration in these spaces will depend on transparency and meaningful alignment with both local and ecological knowledge. Ultimately, AI could hold the potential to further enhance how national nature recovery ambitions can be place sensitive, but this can only be realised if its development is contextually rooted in the communities it seeks to interact with. In this sense, the future of nature recovery will be shaped not just by AI innovation, but by the integrity of these systems and how they are received and sustained by the people who live and work with them.

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