LAND USE for NET ZERO HUB

Land data and digital tools for Net Zero, nature and society

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Key findings

We categorise land data and digital tools into **five functions: data, portals, maps, calculators and reporting**. We structure our key findings by these functional categories. In the report we also compare tools by their **audience** and by the **decision unit** they focus on.

Data collected using public funds is mostly available for free to public sector organisations and researchers, but there could be substantial economic and environmental benefits to making land data freely available to the public, business and NGOs. Land Use Consultation responses provide strong evidence of potential public benefit to free public access to seven major land data sources:

- Land Registry ownership data
- Ordnance Survey maps
- Cranfield University's National Soil Map
- UKCEH's extensive data collection
- Royal Mail's Postcode Address File
- Local Environmental Records Centres' data and services
- Natural Environment Research Council Environmental Information Data Centre

These organisations do not readily disclose their revenue from data sales, but from what evidence we have been able collate in this report, we estimate revenues of £120 million to £200 million. Making these data services free would likely increase use, making hosting and maintenance even more important. There are potential economies of scale to centralising this data hosting and dissemination function. Removing paywalls may also simplify the administration required.

Data standards available for geospatial and environmental data are mature, but more widespread adoption in both the public and private sector would improve interoperability, innovation and user experience.

MAGIC is the industry standard mapping tool among many environmental professionals. When they ask for data to be made open access, they often phrase this as asking for a new layer on MAGIC. But users are frustrated and some argue the platform needs to be more useable and flexible. MAGIC's success uniting data from both government and third-party sources could make it a starting point for the one stop land data portal called for by many Land Use Consultation respondents.

Mapping tools and **calculators** serve different purposes for different audiences, so the current plethora of apps doesn't necessarily need rationalising. But government standards can allow them to interface with regulatory frameworks.

Reporting tools have been very successful at improving biodiversity data through apps like iRecord and iNaturalist. This success could be imitated in food and farming, e.g. through APIs for RPA reporting and Defra surveys. This could allow integration with widely used land planning software like **LandApp**, improving response rates by reducing repeat data entry by farmers. Forest Research's Forester app provides a Defra Group precedent, and AHDB's Farm Data Exchange programme has already developed promising ideas.

We count at least 18 different **portals** for accessing land data in Defra Group alone**.** Differently curated data shopfronts are fine, but hosting land data in one place – potentially including third party data – would make it easier to build innovative digital tools.

Introduction

A landscape of data and digital tools support the UK's environmental goals. Data about land is captured by all of us, every day: from the travel time data our satellite navigation sends to tech firms, to the property purchases we register, this season's bird sightings through our window. Digital tools increasingly play a role in land use and land management, from maps used by ramblers and rowers to planning tools used by foresters and farmers.

This report surveys the landscape of UK data and digital tools by analysing anonymised responses to a subset of relevant data and digital questions within Defra's 2025 Land Use Consultation, six additional interviews, and a range of contextualising secondary data sources. It was commissioned by Defra's Land Use Framework team via the Land Use for Net Zero, Nature and People Hub.

We present the report in six sections.

First we outline a way to **categorise** the wide variety of different land data and digital tools available. We argue that different approaches will be needed for tools with different functions and audiences.

We then propose a **theory of change**, reviewing the literature on the economic of public access to data as well as more specific studies about the role of data and digital tools in land use change.

We briefly introduce our **methods**, giving a recap on the Land Use Consultation, explaining how we analysed it, as well as our approach to interviews.

Our **findings** are split into two sections. The first part takes stock of current land data and digital tools in the UK, who owns them and which were most cited in responses to the Land Use Consultation. The second starts to scope out potential improvements stakeholders would like to see to UK land data and digital tools, informed particularly by our interviews.

We conclude with suggestions for **improvements** that Defra might like to consider, to enhance the contribution of land data and digital tools to the UK's environmental goals. This aims to serve as a preliminary long list, a starting point for considering potential policy options.

There have already been a range of government and independent reports with valuable insights into the reforms to UK land data that support environmental goals. The Geospatial Commission's 2023 report Finding Common Ground, this year's Corry Review of Defra's regulatory landscape, and the 1995 Defra review of Biological Recording in the United Kingdom are all important reference points. Recent independent reports with important reflections include Making Land Digital and the Electric Dreams report on the planning system. This report does not review all ground covered by previous reports.

Categorising land data and digital tools

We have identified fourteen existing reviews of land data and tools. Of these reviews, two stand out as most relevant to Defra policy today. The 2024 LUC report for JNCC is recent and is particularly focussed on environmental objectives. The 2014 NIAB study for Defra also stands out. It goes into depth on the tools used by farmers, has a large number of tools in scope and features interviews with 78 farmers and advisers.

Table 1: reviews of land data and digital tools

	Author	Funder	Year	Scope	Number of tools
A	Land Use Consultants	JNCC	2024	Decision support tools to optimise ecosystem services	13
B	NIAB et al	Defra	2014	Decision support tools for Integrated Farm Management	395

C	RSK ADAS	Defra	2023	Farm carbon audits	81
D	Zasada et al	EU	2017	Land decision support tools arising from EU-funded research	29
E	Huysegoms & Cappuyns	Research Flanders	2017	Decision support tools for remediating contaminated sites and groundwater	13
F	Grêt-Regamey et al	EU	2017	Decision support tools for ecosystem services	68
G	Griffiths et al	Academic	2001	UK species distribution data	N/A
H	Chandra Pandey et al	EU	2019	Earth observation data available for land use or cover	N/A
I	Hansen et al	Academic	2006	Benchmarking models assessing impact of use of organic treated waste on farms	3
J	Agarwal et al	USDA	2001	Land use change models used by researchers	19
K	Warwick - HRI	Defra	2008	Nutrient management decision support tools	64
L	Poggi et al	EU	2025	Land use decision support tools – very broad	48
M	Hognoni net al	Romania	2023	Citizen science apps	303
N	Skarlatidou et al	EU	2019	Citizen science apps user experience	3

Informed by these reviews and by the responses to Defra's Land Use Consultation, we propose three axes along which to compare land data and digital tools: function, audience and decision unit.

FUNCTION

This refers to what the tool itself does (rather than the environmental, social or economic objectives the tool seeks to support). We proposed five categories.

Data sources are the raw numbers giving information about land and the activities that happen there. We include any geospatial data, where observations can be linked to a particular place, but much of this may be indirectly geospatial, such as observations linked to a particular business that has a known location. Data sources have owners and these owners decide the terms of access.

Portals are the places people go to find data. They are often websites, but they also include physical archives, telephone enquiry services or paid advisors and specialists.

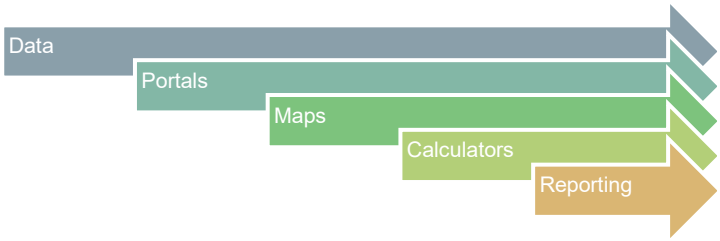
Maps visualise geospatial data. These are often generated with software like ArcGIS. Users might input an address, co-ordinates or search terms to navigate the interface, but do not give more substantial data input. Some maps indirectly include data portals by citing their sources.

Calculators take user input and transform it. Some calculators have mapping and visualisation functions too. Some calculators are descriptive, telling users, "if you do this, that happens". Users enter their plans, preferences and local information and the app returns consequences using some kind of simulation. Other calculators are prescriptive, telling users, "if you want that outcome, do this". The user enters objectives and

the app returns plan of actions to achieve that. Mathematically, these prescriptive calculators have an optimisation logic.

Reporting tools send user input, either raw or transformed, to a third party. These are most common in Citizen Science applications relating to species sightings.

Many digital tools include multiple functions. Data is foundational to all the other functions. Each successive function is more likely to include elements of the others.



AUDIENCE

The intended audience of a data source or digital tool is sometimes very specific and sometimes very broad. Land agents might review soil quality as a private survey for a prospective buyer, for example, the data only being exchanged between a handful of people. On the other hand, academic research projects might aim to collect environmental data for an open access repository, available to everyone.

Land managers such as **farmers**, **owners** and **developers** are a frequent audience for land data and digital tools given the need for certain information to make decisions on their land.. Farmers and developers have very different objectives and interests, so tools tend to be tailored to one group or the other.

Policy-makers and regulators also need to make challenging land decisions about how to weigh up competing objectives. Some interests and targets have tightly defined geographical jurisdictions, affecting the scales they need land data and tools to address.

Temporary land users such as walkers, Travellers, horse riders, birders and kayakers, navigate landscapes subdivided between many owners. Their activities often access a wider area than just one holding, so they need to gather information of a different scope to other audiences. All of us play this role, many of us every day – if only on our walk, cycle or drive to work, school or the shops.

Advisors, **consultants** and **researchers** are often the expert users or creators of land data and digital tools. They are paid for their specialist skills in gathering, understanding and manipulating land data. Much of their research and advice is used in the development and calibration of digital tools, even if they aren't directly involved in building apps themselves.

DECISION UNIT

Not all digital tools have a decision unit in mind, but calculators in particular usually seek to facilitate changes at a particular scale.

Farm-level tools are commonplace, seeking to inform how food is produced and whether some on-farm land is spared from production. 69% of UK land is used for agriculture (Defra, 2025a) so it is unsurprising that farmland is our focus for achieving environmental objectives. The scope of farm-level tools is within one single holding.

Within-holding tools also exist for other types of land, for example tools to support forest managers or builders with sites in development.

Landscape level tools tend to target more strategic decisions about what should happen where. These might be ecological decisions about managing water catchments or development decisions about optimal sites for urban expansion. These are tools for people making decisions that requires information about land they may

not currently own or control. Landowners may need to use these tools when their land is affected by the activities of neighbours, for example, or if their land is tenanted out to a range of managers. Tools for policymakers at local and national scales usually also fall in this category.

CATEGORISING EXISTING REVIEWS

We categorise the fourteen existing reviews we identified by function, audience, decision unit and territorial scope. The reviews tend heavily towards 'calculators' that take user input and transform it into assessments of outcomes or prescriptions. The audiences, decision units and territorial scopes of the tools in these reviews vary substantially.

The audience is particularly hard to identify as digital tools are often seeking to balance multiple competing objectives, perhaps even created by people hoping to convince others to give more priority to their favoured objective. Many reviews cover tools with various objectives. A number of reviews focus on tools broadly focussed on environmental objectives, which a wide range of different actors might support or deliver.

Table 2: functions, audiences, decision units and territorial scopes of existing reviews of land data and digital tools

	Function	Audience	Decision unit	Territory
A	Calculators	Various	Landscape	UK
B	Calculators	Farmers	Farm	UK
C	Calculators	Farmers	Farm	UK
D	Various	Various	Various	EU pre-Brexit
E	Calculator	Developers	Within-holding	EU pre-Brexit
F	Data sources	Environmental	Landscape	EU
G	Data sources	Environmental / research	Landscape	UK
H	Calculators	Environmental / research	Landscape	World
I	Calculators	Farmers	Farm	World
J	Calculators	Research	Landscape	World
K	Calculators	Farmers	Farm	UK
L	Calculators	Various	Various	EU post-Brexit
M	Reporting	Environmental	Landscape	World
N	Reporting	Environmental	Landscape	World

The existing reviews leave many corners of the land use data and digital tool landscape unexplored. For example, portals for accessing data and maps for visualising data do not appear to have been well reviewed, although this could also result from our failure to properly account for the different language used in academic sub-fields. Reporting and data sources for farmer and developer audiences appear understudied too. We make a point to focus on these gaps in our analysis of the responses to Defra's Land Use Consultation, but we do not carry out the systematic review that would be necessary to properly understand how much work is to be done.

Table 3: systematic reviews of existing land use data and digital tools, categorised by function and audience. Boxes coloured green correspond to existing reviews, boxes left blank correspond to function-audience pairs for which we have been unable to find reviews.

	Farmer land managers	Developer land managers	Environmental land managers	Research
Data sources			F, G	G
Portals				
Visuals, maps				
Calculators	B, C, I, K	E, I	A, H, L	H, J
Reporting			M, N	M, N

Theory of change: how do digital and data tools affect land use decisions?

THE ROLE OF DATA IN THE ECONOMY

Data and information underpin every action we take. As a resource, it is peculiar in being nonrival: one person's use of data doesn't diminish another person's ability to use it. This means there are potentially large economic gains from data being more widely used across an economy, as well as incentives for private actors to hoard data for their own benefit (Falck and Koenen, 2020; Jones and Tonetti, 2020). These gains are amplified by network effects. Making data free doesn't just save users money, it transforms the way it can be used: suddenly it can become a common reference point, interoperable, a common language through which people make plans together.

Digitalisation has vastly accelerated the proliferation of data gathering, and in turn the market value of data assets. Even ten years ago, a Cebr report estimated the value to the UK economy of 'big data' and the Internet of Things at £46 billion, 2% of GDP (Hogan et al., 2016). Falck and Koenen (2020) remind us that in 2008, the four most valuable companies in the world were oil companies, but by 2018 the seven most valuable companies were all internet and technology companies..

Economists emphasise the potential negative consequences of *information asymmetry*, where a seller has much greater information than the buyer. George Akerlof (1970) described the risk of a "market for lemons", using the example of used car sales. Sellers know the quality of their vehicle, but buyers cannot easily differentiate the good from the bad. This means buyers can only offer an average price, rather than offering a premium for quality used cars. Sellers of high-quality cars are more likely to leave the market leaving only the low-quality goods – the 'lemons'. Information asymmetry prevents otherwise beneficial, welfare-enhancing transactions from taking place.

This could apply in agriculture in the case of soil health. A farmer knows exactly how well they have cared for their soil, how meticulously they have planted their herbals leys, but a potential buyer does not. Sellers who have taken good care of their land may thus struggle to see the effort they have put in reflected in their sale price. This erodes their incentive to put in effort in the first place. The situation could be even worse for tenant farmers, whose contracts with landowners may not offer suitable reward for their good stewardship. Economists describe this as a problem of incomplete contracts (Aghion and Holden, 2011).

DATA TO SUPPORT ENVIRONMENTAL TARGETS

Gathering environmental data has been a central action to protect the environment in the modern era, from Gilbert White's pioneering 18th century natural history (Holt, 2020) to the Mauna Loa CO2 observations that evidence humans' impact on the climate (Gupta et al., 2025). But this quantitative, pen-and-paper understanding of the environment coexists with older traditions of environmental knowledge creation, from Indigenous environmental understanding in the Americas (Kimmerer, 2020) to the situated, tacit knowledge of farming families in the British Isles (Evans, 1966).

The relationship between situated practitioner knowledge and data gathered by scientists, government officials or other 'outsiders' is a central challenge in mobilising data to support environmental goals. People – particularly rural people, farmers, rangers, people that spend most of their day outside – remember decades of valuable observations of their natural environment. These ground truths deserve scientific consideration: land workers know the land at a finer scale and with a longer time series than any satellite. In the case of farmers and land managers, these people are also the incumbent land holders whose collaboration is essential to delivering environmental goals. New data is essential to changing how land is managed, but farmers are often unwilling to take it into account if introduced in a way that does not respect and complement their own situated knowledge (Rose et al., 2018).

Data and digital tools can support meeting the UK's environmental targets in many ways. Data gathering measures what actions lead to which outcomes, allowing practitioners to learn effective strategies. Robust, consistent data allows environmental quality to be 'priced in' to the market, making green finance and natural

capital markets possible. Data-sharing through digital tools can build consensus, trust, motivation and buy-in towards new courses of action. Digital tools can reduce duplication of efforts by change-makers. They can translate macro scale targets to the micro scale, giving landowners and managers a clearer idea what actions they need to take. When necessary, data is also essential for transparency and accountability.

Environmental organisations, both public and private, have tended to be broadly supportive of digital tools. The range of citizen science apps used for biodiversity monitoring are great examples of this (Hognogi et al., 2023; Skarlatidou et al., 2019). Research workshops with Scottish public bodies responsible for protecting the natural environment identified the design principles they considered essential for digital decision support tools to be able to support environmental goals (Hewitt et al., 2017):

- Free at the point of use
- Works on mobile phones and tablets
- Maps to visualise information
- Outcomes focussed
- Possible for developers and end users to extend the software e.g. through APIs
- Possibility of advancing scientific knowledge
- Actively maintained, ideally through large, open user community

Farmers, on the other hand, vary in their willingness to accept guidance from digital tools. Researchers from Harper Adams University carried out 78 interviews with farmers and advisors on their use of decision support tools (Rose et al., 2018). They argue that farmers find advice from decision support tools placeless and faceless, and are less likely to act on it than on advice from a peer or trusted advisor. They highlight co-design of tools between agronomists and farmers as one method that had brought about trusted digital tools. They emphasise the value farmers place on their own situated knowledge of the land they work.

The researchers highlight eight characteristics of digital tools that affected whether farmers were likely to use them (Rose et al., 2016):

- Performance expectancy – does it benefit the business?
- Ease of use. It has to be quick and easy to look at.
- Peer recommendation was a key determinant of uptake.
- Trust, e.g. has a business with a vested interest funded the tools' development?
- Cost. Even very small costs are a barrier.
- Habit as a barrier to changing practices.
- Relevance, tailored to your situation.
- Use as a tool supporting conversations between farmers and advisors.

They highlighted four varying characteristics of farms and farmers that affected whether they used digital tools:

- Age. Younger farmers significantly more likely to use digital tools.
- Size of farm. Larger farms more likely to use digital tools.
- Farm type. Arable farms more likely to have an office environment. This is perhaps less important now so many tools are available as mobile apps.
- IT education supports use of digital tools.

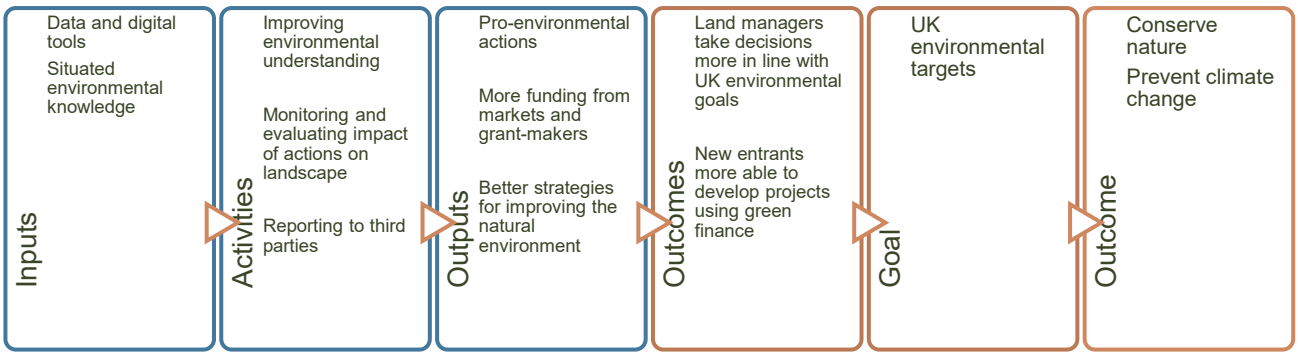
Finally they highlighted triggers that led farmers to begin using decision support tools:

- Compliance with legal or supply chain requirements.
- Marketing, promotion and awareness, often campaigns by suppliers or trial periods.
- Manufacturer presentations.

Co-production of decision support systems is one proven route for building digital tools with stronger buy in from farmers. Oliver et al (2012) present an example of a decision support tool co-designed with farmers in Taw Valley in Devon. They advocate co-production as a way of leveraging farmers' role as expert observers of their environment.

THEORY OF CHANGE

Using this brief review of academic research on the value and uptake of data and digital tools, we sketch out the below theory of change for the contribution of land data and digital tools to the UK's environmental goals. Data and digital tools can influence land outcomes both through markets and through non-market social and cultural processes. There is sometimes conflict between these two channels of change, and different actors value them differently. Policy interventions are required to strike a delicate balance, and target interventions carefully at the actors more likely to receive them well. Widening access to data is one of the interventions likely to accelerate change across both channels.



Methods

ANALYSING LAND USE CONSULTATION RESPONSES

We were granted access to anonymised responses to questions 17 to 20 of Defra's Land Use Consultation, which ran from 31st January 2025 to 25th April 2025 (Defra, 2025b). These questions focussed on land data and digital tools. A summary of responses to the consultation was published in March 2026, after this report was submitted to Defra.

Questions 17 and 18 asked about ways in which spatial data could be improved. Respondents could answer yes or no to a series of potential options for each question, giving a free text response for each as well as to an 'other' box. We have created breakdowns of responses to each of these questions by respondent type, comparing to the average response rate of each respondent type.

Question 19 asked about reform of the Agricultural Land Classification (ALC) system. Our initial reading of responses found broad agreement among respondents, so we treated responses as low priority for analysis, instead giving a short summary of suggestions raised.

Question 20 of the consultation asked respondents about making land data free or easier to access. The preamble mentioned Ordnance Survey and Land Registry as two data owners the government was considering reforming, before asking, "Which sources of spatial data should Government consider making free or easier to access, including via open licensing, to increase their potential benefit?" Three methods were used to analyse responses to this question: sentiment analysis, data source coding and case-by-case close reading of the more detailed responses.

We conducted two sentiment analyses of question 20. First, we categorised responses as to whether they gave a positive, neutral or negative view. In this initial analysis, relevance of the response was not considered. This means protest responses, expressing dissatisfaction with policy issues outside the scope of the question, were rated negative. Our initial reading of the responses highlighted Land Registry data as a key point of contention, so we did a second sentiment analysis specifically assessing whether respondents gave positive or negative views on opening up Land Registry data. The many respondents who did not mention Land Registry data were categorised with those who gave neutral or mixed views on opening up Land Registry data.

We coded responses by the types of data sources mentioned, to give a sense of which data sources respondents were most frequently interested in. This coding informed our close reading of the more detailed responses, which we have used to give insights on specific data sources.

INTERVIEWS

We designed a semi-structured interview programme to complement the consultation responses with user case studies. We conducted six interviews. Our initial long list of 32 potential interviewees included representative stakeholders from three categories:

- Landowners: including production-focussed farmers, estate owners, conservationists and natural capital investors.
- Informers and advisors, which could include commercial data providers.
- Planners and consultants, either from local authorities or private practitioners.

It was expected that interviewees' experience and knowledge of the digital tools and data would vary. To accommodate the range of experiences, interviews were semi-structured allow stakeholders to expand on their varied interactions and uses of land data and digital tools.

Each interview lasted between 45 and 60 minutes, incorporating questions relating to:

- Participant role and understanding of government targets with land use implications
- Current use of data and digital tools
- Building a rationale for intervention

- What improvements are needed to support government targets with land use implications?
- What would these improvements help achieve?
- Supporting points for intervention relating to process, impact and value for money.
- Who should deliver the intervention?
- Risks of inaction?

Our interview script is enclosed in annex 2. Interviews were carried out according to UWE Bristol's Research Ethics policies and procedures. Ethics approval was granted on 7th October 2025 (reference 14836624). All participants were provided with an information sheet, privacy notice and consent form as part of their invitation to take part. Informed consent was provided prior to the interview and was confirmed on the Microsoft Teams recording.

Findings: stocktake of land data and digital tools

142 data sources and digital tools were mentioned in responses to the Land Use Consultation and we included a further 5 from our interviews. We use these as our scope for a stocktake of UK land data and digital tools. We supplement our analysis of responses with further investigation of some of the most frequently mentioned data and digital tools.

FUNCTION

We identified one or more function for each tool mentioned. Data sources were most frequently mentioned by respondents, followed by data portals and visualisation tools. Only a few tools were mentioned that had calculation or reporting capabilities.

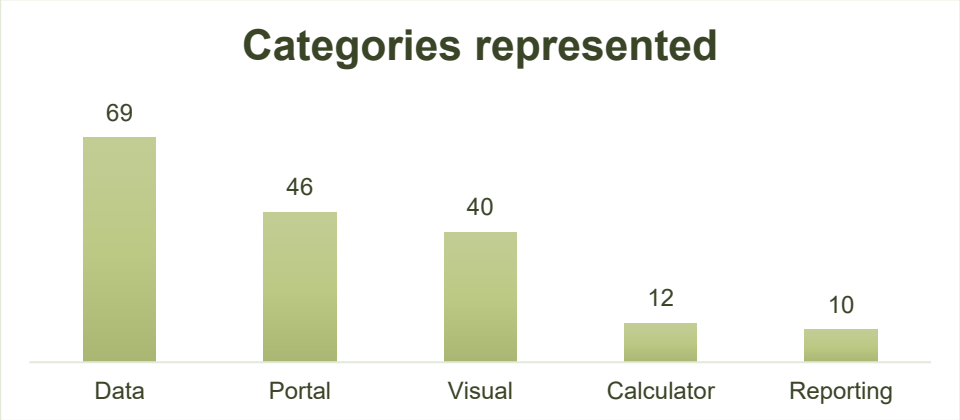


Figure 1: frequency of functional categories of land data and digital tool in the list of tools mentioned in responses to the Land Use Consultation. Tools can have more than one function, so total will be more than the total number of tools.

OWNERSHIP

84% of data sources and digital tools mentioned by respondents were owned and operated by non-profit or public bodies (figure 2). 68% were owned and operated by public bodies (including universities). This should not be taken as a reflection that for-profit land data and digital tools are not prevalent, but perhaps as a sign that for-profit tools struggle to get traction.

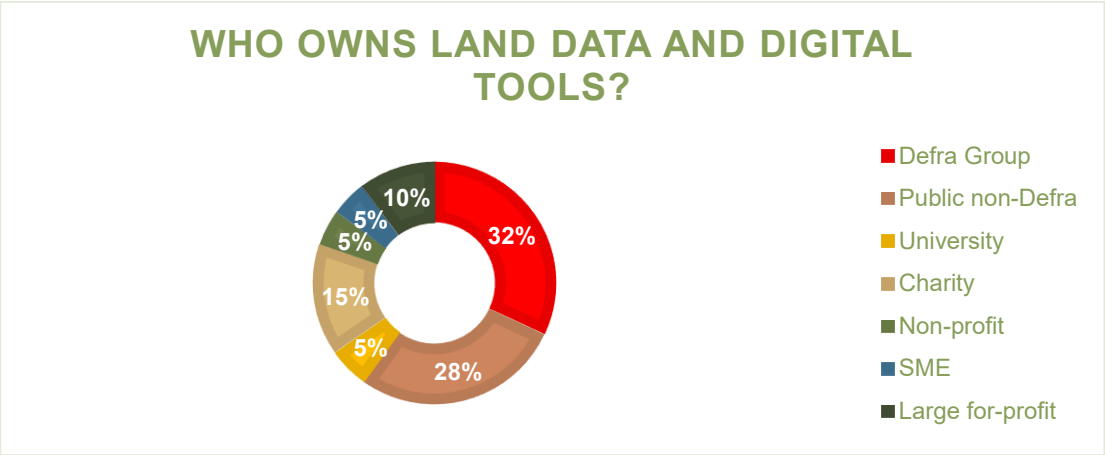


Figure 2

When looking at data sources alone (figure 3), public and non-profit owners were even more strongly represented. 79% of land data sources mentioned by respondents are owned by public bodies and universities. 88% are owned by public or non-profit bodies. Examples before Defra Group include MHCLG Land Use Change Statistics, Ordnance Survey maps and the wealth of data held by UK CEH.

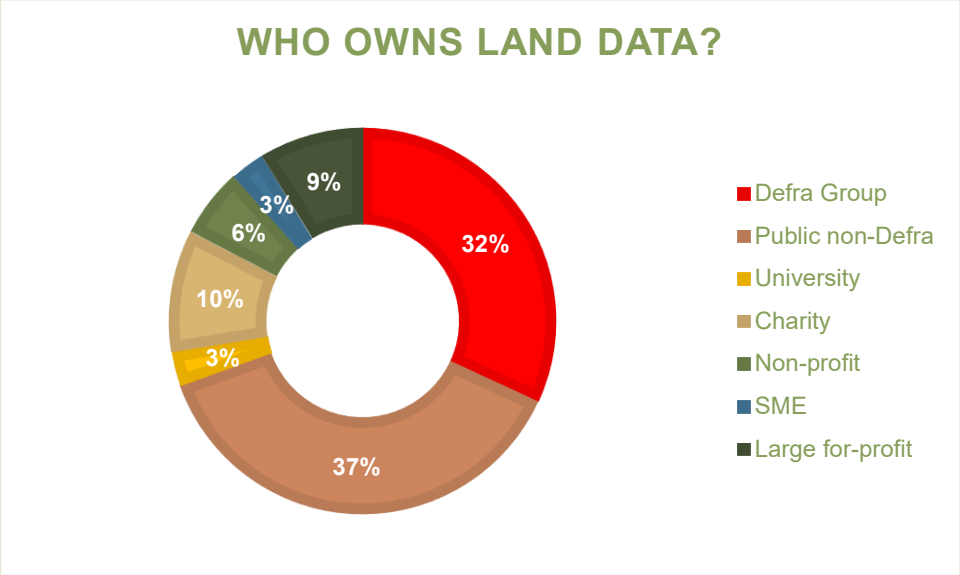


Figure 3

There is a proliferation of portals through which users can search for data. 17 of the 35 portals mentioned are owned and operated by bodies within Defra Group (figure 4). Only one operator of a data portal was mentioned that appears to be for-profit, an SME called ARCHII that provides archaeological data.

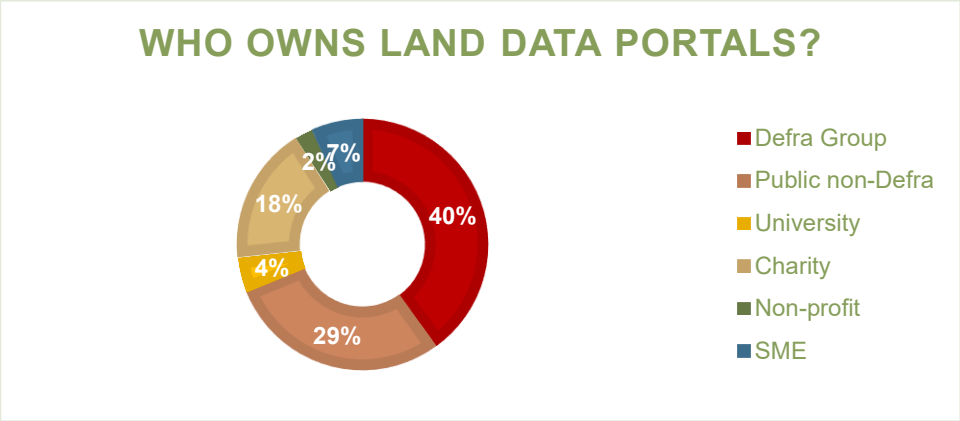


Figure 4

Private actors are much better represented among those owning and operating visualisation and mapping tools. 53% of land mapping and visualisation apps and websites are owned privately (figure 5). Large for-profit businesses play a more important role, making up 20% of the tools mentioned by respondents. ArcGIS software is a standout corporate actor, as it underpins a large number of the mapping tools offered by other organisations.

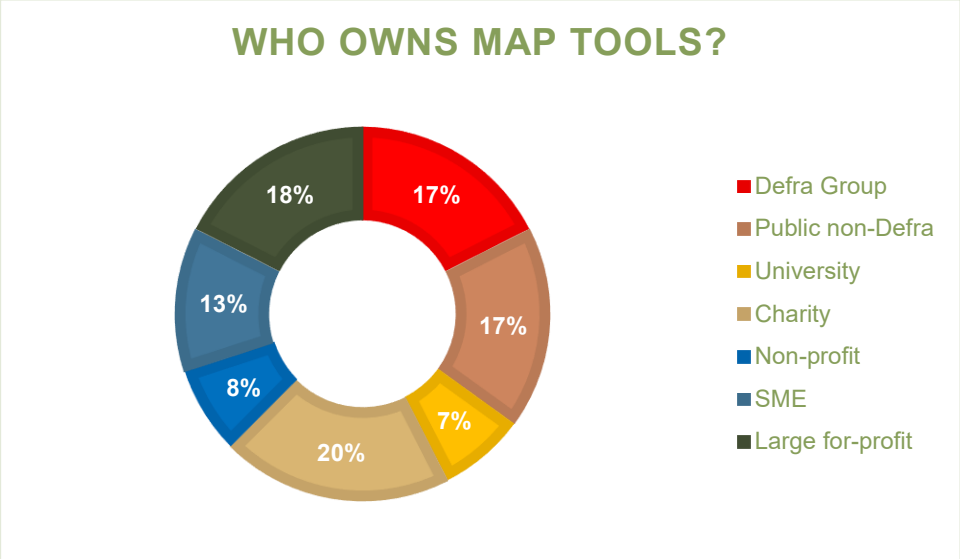


Figure 5

Similarly the private sector makes up a larger proportion of the small number of calculator tools and reporting tools mentioned in responses to the consultation and our interviews. Large for-profit companies own 4 of the 12 calculator tools mentioned by respondents (figure 6). These include HL Hutchinson Ltd's Omnia, John Deere's mapping system and Fathom/Swiss Re's Global Flood Cat.

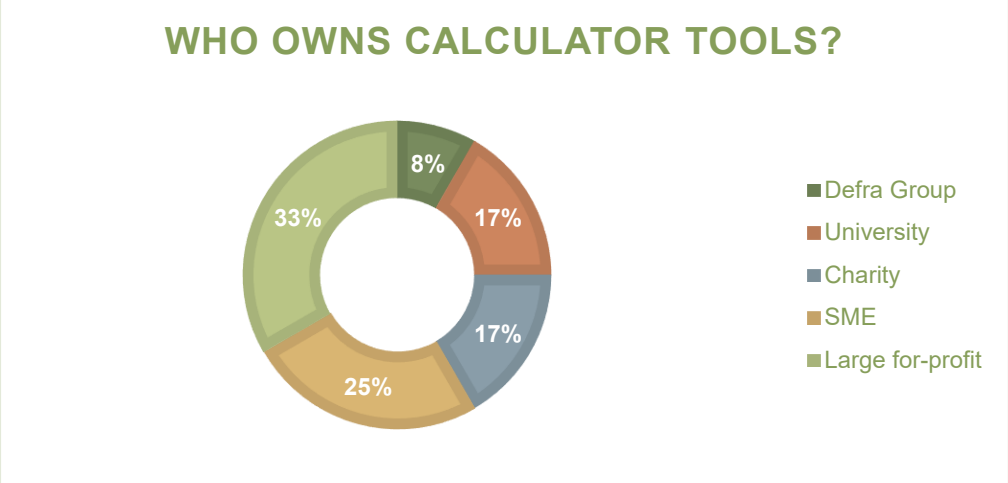


Figure 6

Reporting tools appear much more driven by the charity sector, sometimes operating in partnership with commercial actors. For example, in the case of the Foundation for Common Land's SFI Moorland Surveying App or the CaSTCo water monitoring co-operative involving the Rivers Trust and United Utilities (figure 7).

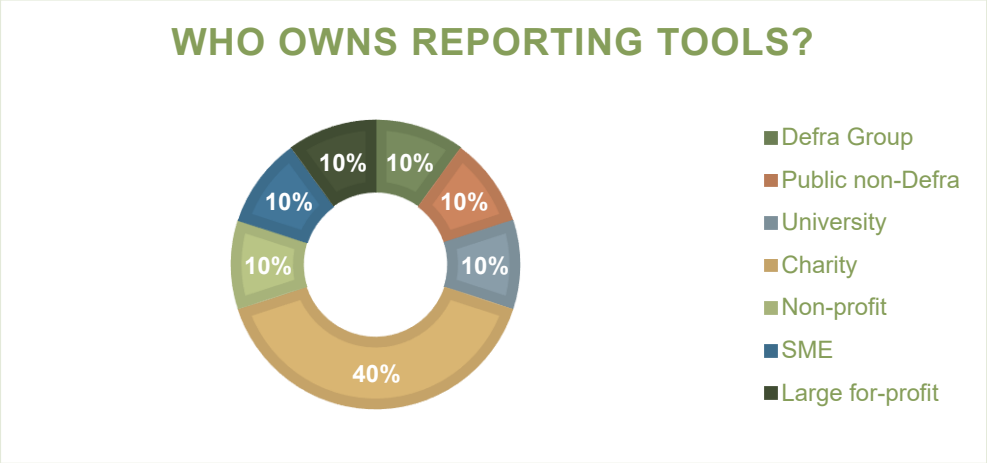


Figure 7

FREQUENTLY MENTIONED OWNERS

Natural England was the most frequently mentioned owner of land data and digital tools. They were mentioned more than 100 times by respondents to question 17, which addressed government data. The MAGIC map made up more than half of these mentions, with several mentions each also for ALC maps (unsurprising as they were mentioned in the consultation questions), the Priority Habitat Inventory, National Character Area profiles and the Green Infrastructure maps. MAGIC was by far the most mentioned tool across all the consultation responses, appearing 181 times across responses to questions 17-20.

LandApp was the standout privately owned digital tool, mentioned 30 times, more than all the other private sector apps put together.

Defra and **Land Registry** data and digital tools were mentioned between 20 and 30 times. Defra's Natural Capital Ecosystem Assessment programme and Local Nature Recovery Strategy data made up more than half of Defra mentions. INSPIRE IDs made up the majority of Land Registry mentions, no surprise given these were explicitly mentioned in the consultation questions.

Ordnance Survey and **Forestry Commission** data and digital tools were mentioned between 10 and 20 times. Ordnance Survey's MasterMap made up half of their mentions. Ordnance Survey was explicitly prompted in the consultation questions, so we would expect relatively more frequent mentions.

STANDOUT TOOLS

Several data sources and digital tools received repeated mentions despite no explicit prompting in questions.

MAGIC is a free online mapping tool owned and operated by Natural England. It was the most frequently mentioned digital tool or data source among respondents. It is clear that MAGIC is the industry standard tool for accessing and viewing UK environmental data. MAGIC visualises a wide range of data sets from Defra Group bodies but also from other public bodies, charities (e.g. RSPB) and even private businesses (e.g. EDF). Lots of respondents argued that MAGIC is out of date and needs further investment – but this only served to emphasise the extent to which it has become indispensable to environmental professionals. Quite a few respondents were surprised not to have seen MAGIC acknowledged in the consultation. There were lots of generic pleas for MAGIC to be modernised and made easier to use, as well as specific suggestions for improvements.

Table 4: a large proportion of consultation respondents see MAGIC as the one stop shop for land data. For many, land data being on MAGIC is synonymous with free public access to land data.

MAGIC mentions in consultation responses – a selection
“Please bring it into MAGIC/one map.”
“Central portal for all information to be created and maintained – MAGIC”
“MAGIC, surface water, flood risk and others are really useful”
“Combining MAGIC and the new maps would be helpful”
“Free use of high quality Ordnance Survey basemaps on geospatial tools such as MAGIC”
“Load applicant supplied Agricultural Land Classification survey plans and reports into MAGIC”
“MAGIC should have more layers. It should have Flood Zones on it for example. If climate related layers could be added that would be great. Please add any soil layers to it too.”
“MAGIC is good, but Scotland and Wales and Northern Ireland do their own thing.”
“MAGIC is a good resource.”
“Spatial data cannot currently show protected badger setts, bat roosts, or dormouse locations due to legal restrictions, preventing them from being publicly displayed. This means tools like Magic Maps are incomplete, failing to reflect critical ecological concerns.”
“Magic maps is a great platform with many levels that can be stacked or viewed independently”
“A development plan and environmental option plan on magic maps free to use.”
“Need a centralised data layer on Magic.gov.uk showing cross-LA boundary plan allocations to ensure joined-up planning at larger spatial scales.”
“Irreplaceable habitat layer on Magic with development impact buffers as per SSSI Impact Zones.”
“Magic Map is useful but it would be helpful to include more comprehensive data - for example, air quality.”

LandApp was the second most mentioned digital tool in consultation response. It is an app for land use planning owned and operated by a small business. At the time of writing, it claims to be used by over 22 000 UK land managers and landowners. It targets both farmers and ecologists. It has a free version as well as subscription tiers costing £15/month and its professional tier costs £30. These subscriptions offer collaboration tools and advertise functions for creating Sustainable Farming Incentive, Countryside Stewardship and Biodiversity Net Gain plans. Most respondents mention LandApp in a positive way, arguing for better integration with RPA systems and environment monitoring, but there are some dissenting voices.

Table 5

LandApp mentions in consultation responses – a selection
“The Landapp already has a wealth of farming data on it, as it is the number one mapping tool for farmers to use. A JV [joint venture] with them and the government would bring so much knowledge.”
“Ditch LandApp”
“Increasing numbers of farmers and land managers are starting to record carbon or nature baseline data for their land, particularly through LandApp (but also other tools). Mechanisms to encourage the sharing of this data with other users and local bodies such as Protected Landscapes would increase knowledge about existing assets and land use approaches, and could inform targeting and updating of other datasets, such as the Priority Habitat inventory.”

“Firstly, better integration is essential—linking systems like the Rural Payments Agency (RPA) with tools such as LandApp would streamline access and usability.”
“Land managers would benefit from subsided access to mapping and data software such as LandApp”
“Accept LandApp and other software submissions to schemes.”
“Use of a common platform, such as LandApp, for data submission, which is coherent with RPA systems.”
“We are concerned about the overuse by Defra of LandApp in particular as it promises much and delivers little benefit to the land manager. They do not need LandApp to be told where their best land is for different types of crops.”

Local Environmental Records Centres (LERCs) were mentioned around 100 times by respondents to the consultation. The Association for Local Environmental Records Centres lists 64 centres across the UK, each managed independently by charities or local authorities. Consultation respondents emphasised the wealth of information available at LERCs, but lamented that their indispensable resources costs too much money to access.

Table 6

Local Environmental Record Centres in consultation responses – specific mentions
“LERCs hold far more detailed species & habitat data than is held by central govt.”
“The Government should also fund Local Environmental Records Centres (LERCs) so that they can stop paywalling data and instead make it open and more useful to everyone. LERCs briefly received public funding in 2014-15 but this was abruptly halted.”
“We support the funding of the vital Local Environmental Records Centre (LERC): in the recent production of the draft Local Nature Recovery Strategy for Oxfordshire, data from TVERC (Thames Valley LERC) was crucial.”
“LERCs, if funded appropriately, could provide a local role for managing land use data access locally.”
“A national database hosting environmental data, integrated with datasets from LERCs, ELMS, NCEA, and other programs, would enhance spatial data management for land-use decisions.”
“Local Environmental Record Centres (LERCs) already exist as a repository of environmental and forestry data. These centres could be better supported to capture this information and provide a valuable resource, the foundation for which is already in place.”
“ERCCIS [Environmental Records Centre for Cornwall and the Isles of Scilly] charge £195 for a 1km data search in Cornwall, which they can generate via a quick button press. More existing data ought to be freely available to deliver optimum outcomes.”

Cranfield University make a range of soil data available on their **LandIS** website, along with other tools like **Soilscapes** and **Soil Alerts**. These were frequently mentioned by respondents. The key data source they own is the National Soil Map. Cranfield was mentioned dozens of times by consultation respondents who emphasised the vital importance of the soil data they hold, but also frustration at the costly licenses required.

Table 7

Cranfield soil data in consultation responses – selected mentions

“Critical for soil assessments, but inaccessible to most startups due to high licensing costs”
“Cranfield charge administration fee on top of the royalty charge creating a barrier to access and use.”
“The LandIS website, maintained by Cranfield University, provides valuable tools like ‘Soilscapes’ and ‘Soil Alerts’ for accessing soil information. These tools are essential for identifying soils that require special management to ensure successful environmental or engineering outcomes. However, it is vital that the underpinning soil data for England and Wales be made freely available, as is already the case in Scotland. The lack of data at a scale better than 1:250,000 impedes effective land-use planning and management.”
“A critical dataset that would benefit stakeholders including researchers, agriculture, industry, policy makers and eNGOs, is the National Soils Inventory. Though created in the 1970s using taxpayer money, this data has been held under licence behind a paywall by Cranfield University. Lack of public access to this dataset is an obstacle to the strategic decision-making and universal learning needed to protect and improve soils at field, national, and catchment level.”

NBN Atlas was also frequently mentioned. It is a mapping tool operated by the National Biodiversity Network Trust. The NBN Trust is a membership organisation, incorporated as a charity, dedicated to exchanging biodiversity information. The trust’s members include public bodies like the Environment Agency and Natural Resources Wales as well as charities and individuals. The NBN Atlas combines species records; habitat, climate and soil information; and geographical boundaries. It is open source, as is the data it displays. In part, NBN Atlas exist to unite some of the biodiversity information spread across LERCs and other bodies.

RESTRICTED ACCESS DATA IN FOCUS

There is tension between the broad benefits of making data available for free versus the temptation to commercialise publicly owned data to increase budgets. Responses to the Land Use Consultation suggest there could be strong environmental benefits to reversing this trend.

Seven data owners stood out as prime candidates for widening public access. Of these, Land Registry and Ordnance Survey were the only two data owners mentioned explicitly in the consultation questions. This section summarises the data commercialisation approaches of these seven data owners.

Land Registry data was extensively discussed by respondents. Land Registry’s 2024-25 Annual Report suggests earnings in the region of £30 million from data sales, around 7% of their £438 million in expenditure. Some Land Registry data is already free to the public, such as transactions data, polygons and the 1862 register. At present, users either have to pay £7 per title register or can access a corporate subscription for £20,000 or more. MHCLG Ministers wrote to the Land Registry in February 2025 asking them to tackle the cost of obtaining HMLR data.

Ordnance Survey was mentioned regularly in consultation responses, particularly their MasterMap product. Ordnance Survey is a company limited by guarantee, wholly owned by the government. The Public Sector Geospatial Agreement grants free access to its data to the public sector, and corporate users can get access to a generous free allowance of data credits. According to their annual report, £78 million of Ordnance Survey’s income came from data sales in 2023-24, just over half of its £143 million in expenditure.

Royal Mail’s Postcode Address File was also mentioned by respondents. This is the definitive file of UK address and their postcodes. It is available for free to the public sector, microbusinesses and to charities with a turnover under £10 million. Royal Mail do not publish information on their income from data sales, but their list of corporate licensees lists 10 corporate groups, each of whom pay £180,000. There are other free postcode datasets, such as ONS data linking postcodes to administrative boundaries.

The **UK Centre for Ecology and Hydrology (UKCEH)** is a charity undertaking environmental research. Its research is largely publicly funded and made available for free to researchers and non-commercial organisations. In 2024 it earned around £1.3 million from selling data out of its expenditure of £68 million.

Cranfield University sell the National Soil Map for £500 per 1000km^2. On top of this they charge minimum administration fees and royalties of £650 per data product. Some data is available for free on their data viewer. The most recent physical surveying that contributed to the National Soil Map took place in 2006. Cranfield describe the National Soil Map as the "principal data product we hold".

To Note: Between the submission of this report to Defra and its publication, Defra and Cranfield announced that the National Soil Map would be made available for free, along with all other data sources on the LandIS platform.

Local Environmental Record Centres are mostly operated on a cost-recovery basis by local authorities or wildlife trusts. Consultation respondents emphasised their vital importance to environmental projects but cited their paywalls as a barrier. A review of LERC charging schemes could be a useful follow up research project.

Natural Environment Research Council hosts much data arising from publicly funded research on its Environmental Information Data Centre. This data is available free to researchers and the public sector, but not to the public, private businesses or NGOs.

Findings: potential improvements to English land data and digital tools

CONSULTATION FINDINGS

Q17: What changes to how Government's spatial data is presented or shared could increase its value in decision making and make it more accessible?

Response rates to question 17 were low – no answer was ticked by more than 45% of respondents.

Consultation respondents expressed a need for modernisation and data integration with a central portal for data submission. 42% of consultation respondents reacted positively to updating existing government tools, apps, portals or websites. A need was expressed for the modernisation of apps like MAGIC, considered by some to be *'an essential planning tool used in assessing agricultural land for development or solar'* despite being considered out of date.

Respondents highlighted that there is a need for a wide range of different data sets to inform effective land-use decisions. However, locating relevant databases can be challenging and reporting methods can vary in terms of time periods and spatial resolutions. A small pool of respondents advocated for using geospatial indicators in particular INSPIRE IDs, UPRNs or What3Words, though some also highlighted that some landowners and managers already use established systems such as County Parish Holding (CPH) and new practices should be introduced with caution.

While data standardisation was broadly seen as positive, some suggested that oversimplification risks the data becoming ineffective. Consistency across spatial and land datasets was seen as beneficial by 38% of respondents, who considered it as a route to greater efficiency and accessibility. This was further supported with the creation of a common portal or map, which 45% of respondents agreed would be helpful to streamline processes, reduce duplication of records and minimise effort for stakeholders. It is acknowledged that such a task would be challenging, however there is a perception that other projects from organisations outside of land strategies and planning, including the Ministry of Defence (MOD) and private sector could be learned from. Despite acknowledging the private sector may be able to create a platform 'faster and better than government', only 26% supported the use of private sector tools. Rationale for reservations of private sector leadership included potential competing motivations and risk of reduced data quality and governance.

Simplified processes and a single portal are seen as a potential route for effective land-use planning and will facilitate better engagement. However, 31% agreed that there is a need for greater support and explanation of tools to improve accessibility and to help data interpretation. Skills training could be facilitated through CPD hours or additional guidance could be provided through wider quasi-autonomous bodies like AHDB.

Charts summarising responses to question 17 by respondent group are provided in annex 4.

Q18: What improvements could be made to how spatial data is captured, managed, or used to support land use decisions in the following sectors?

Question 18 was framed to consider how improved access to specific data might support different land stakeholder groups to arrive at effective decision-making. Survey responses did not demonstrate clear consensus, but themes relating to standardisation of data with support for its collection, improved accessibility and central collation were echoed within responses to question 18. Response rates to question 18 were also low – no answer was ticked by more than 36% of respondents.

35% agreed that improvements could be made to environmental survey data to support Development and Planning. Suggestions specifically referred to an agreed method for collating and sharing data would improve data accuracy and a single national database would make finding data easier and more accessible.

It is understood by a large group of respondents (36%) that data related to carbon and nature baselines could support farming, particularly in application to environmental payments schemes such as the Sustainable Farming Initiative (SFI). Local and volunteer collected data is one method for collating information and 36% of

respondents agreed that it could support Environment and Forestry, though there are mixed views on its importance and validity. Some considered citizen science *'essential'* to activities such as the Local Nature Recovery Strategies, whereas others believe peer reviewed science to be superior to citizen science initiatives. This could be fuelled by the fact that, despite their importance, Local Environmental Records Centres are perceived as underfunded, unverified and delivered with minimal resources. Some are calling for more funding to be allocated to facilitate the work and to capture additional environmental data through hedgerow surveys, bird watches, bat surveys and other initiatives.

Soil data was mentioned by different stakeholders who expressed the importance of its protection and restoration. It was highlighted that data collection and reporting for carbon capture in soils is inconsistent which creates ambiguity and risks differing interpretation. Respondents suggest that greater granularity is required for agricultural statistics to be useful. Data on crop types, horticulture, quantities and certifications would better evaluate local food resilience.

Land and route data for recreational and access rights is a potentially contentious issue. While a portion (31%) agreed that accessible data would better support recreation and access to land, there are reservations due to the potential risks, in particular biosecurity where poor practices can expose farms to diseases such as avian influenza. Respondents acknowledge benefits of access to data for both humans and nature, including the positive impacts on health and wellbeing, as well as being able to protect nature by highlighting sensitive areas and providing alternative routes.

32% of respondents agreed that improvements could be made to Government published land and agricultural statistics. Government data and tools are considered by some as integral to achieving net zero targets and environmental land management. But conversely data inaccuracies can contribute to inefficiencies and ineffective land use.

Q19: What improvements are needed to the quality, availability and accessibility of ALC data to support effective land use decisions?

There was consensus among survey respondents that the ALC required significant improvements. The dataset is currently viewed as being out of date having not been updated since 1988 and therefore inaccurate and incomplete for today's needs. Some call for a National Data Observatory to collate and maintain the data and to incorporate additional metrics that align with current targets. Better central collation of private surveys, including those conducted during the planning process, was suggested as a route to improve ALC databases, but other respondents highlighted the that private surveys by parties with vested interests can be inaccurate.

Q20: broad support for open data, with a few objections

88% of respondents to question 20 expressed a positive view of opening access to land data. Of 800 responses to question 20, 649 took a positive view of opening access to land data, 59 took a negative view and 31 were neutral.

There were several categories of respondents who were unanimous in expressing positive sentiments towards opening up data access: environmental consultants, energy developers and property developers. Local government and water management respondents were also near unanimous, with 90% positive and the remainder neutral. Researchers, educators and the many uncategorised respondents were 93% in favour of freer data access.

The majority of farmer respondents expressed positive sentiments about opening up access to land data, but they were the respondent category that expressed the most dissent, with around a third of them expressing negative views. These negative responses contained a mixture of on-topic responses relating to privacy concerns as well as some off-topic protest responses about other aspects of agriculture policy, such as changes to Inheritance Tax Relief. There was also some degree of dissent among respondents from woodland management and the food industry: 6 negative responses out of 34 responses from these sectors. Comments referenced privacy issues, Land Registry efficiency and registration issues.

Ownership data: diverse support for open access, a few farmers against

Two-thirds of responses were neutral towards freer access to Land Registry data. Of the responses with a clear view, the vast majority were favourable to the suggestion of widening access to Land Registry data, outnumbering those against by 10:1. This was the only category of data for which there were significant differences of opinion among respondents.

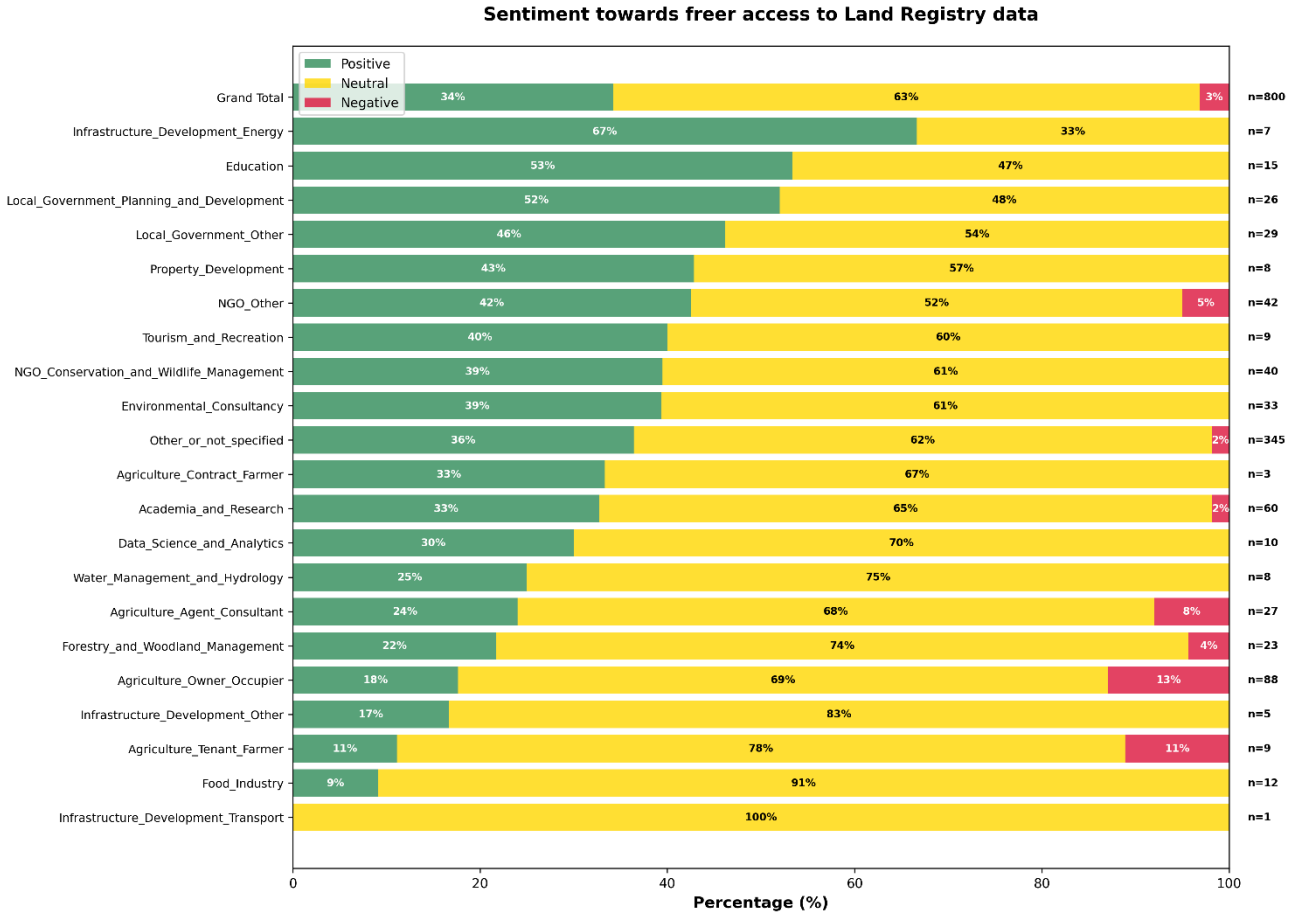


Figure 8

Farmer respondents were the most polarised, with 18 farmers taking a positive view of opening up Land Registry data and 12 farmers taking a negative view. All other categories of respondents were overwhelmingly supportive of opening up access to Land Registry data.

Comments about land ownership data made several different suggestions. Many advocated reducing or eliminating the fees to access Land Registry records. Several responses argued for ensuring registration of unregistered land. Another frequent request was for INSPIRE IDs or other polygons to be added to Land Registry data to allow interoperability with other geospatial data. A few responses shared their frustrations with the user experience of Land Registry system, with some expressing concern that widening access could worsen user experience if resources available to the Land Registry are not enough to support additional users.

Some respondents gave examples of how making Land Registry data easier to access would benefit them:

- **Conservation NGO**: it would help “piece together nature corridors” by helping landowners discover who their neighbours are.
- **Legal sector** respondent: it would “make pursuing community ownership - and community involvement in land use - much easier”. The respondent argued it would “empower local community groups to identify – and engage with – the owners of land highlighted on LNRS maps as opportunities for nature recovery”.
- **Local Government planning** department respondent: it would “reduce costs and speed up the project planning process”. It would also “assist in nature conservation activities” by allowing

"easier engagement with landowners in a positive way… especially where there are potential opportunities to secure environmental funding".

- Another **Local Government planning** respondent: it would help with site assembly and desk-based assessments of development feasibility.
- **Agriculture and horticulture sector respondent**: it "improves market efficiency", broadly in favour of opening up ownership data as long as there are "appropriate measures to balance access to information and privacy".

Respondents also made suggestions for compromises if it proves impossible to make the Land Registry completely free to access. Some suggested allowing free use by public sector and/or educational users. Others suggested making only property boundaries available, or just the landowner's name rather than the full Title Register.

Denmark and Ireland were suggested as two countries with different Land Registry arrangements that the UK could learn from. One respondent suggested learning from Companies House, who made it easier to access company records in the 2010s.

Many respondents acknowledged potential privacy concerns, including some of those arguing in favour of reducing barriers to accessing land ownership data. At present anyone can access any property record, but respondents expressed concerns that more widespread access to land ownership data may be exploited by criminals, or that it may breach GDPR. Some mitigations were suggested, such as requiring data users to provide their own name and address.

INTERVIEW FINDINGS

Semi-structured interviews were conducted to collate insights from stakeholders that are engaged with land ownership and management, advisory, policy and planning practice. Interviews were structured to first ascertain which data and tools are used across the land sector and to what extent they support environmental goals. Where participants are quoted or key points have been raised a coding system of L1-L6 is used to ensure anonymity.

Interviewees outlined limitations such as data accessibility and skills availability. They identify a need for data interpretation to convert evidence into action (L1-L6). Interventions and suggested improvements are consolidated into themes.

Land use planning relies on diverse and layered information sources

Interviewees reported that a comprehensive database of available land data would support evidence-based decision making. Tools such as Natural England's MAGIC Map, or commercially operated LandApp, provide a foundation for strategic planning and spatial analysis. In practice these platforms are enhanced with the preferred local GIS systems (L2, L4, L6) or using specialist datasets from providers like Barber, Glenigan, Acorn, CACI, UKCEH and LERC (L1). Systems such as these provide valuation or market data; social, economic and environmental metrics; and local intelligence, which can provide additional insights to produce tailored advice if time and budget allows (L1, L4). In the instance that data is unavailable, third parties who hold specific insights, are consulted for additional information, such as in the case of the Farmland Database (L1), which independently gathers farm sales and valuations to support ongoing estimations.

Social, economic and health metrics are an important factor in considering the local opportunities and successful community creation (L5). This type of data is stored by providers such as the UK Biobank but are not accessible to the private sector. More than one interview highlighted the need for better integration and consideration of the socioeconomic factors and the potential for wider health benefits such as air quality, green infrastructure and access to green spaces (L1, L4, L5).

This mix of sources outlined for data collection demonstrates the range of user needs and difference in data prioritisation that can influence decision-making. The tiered approach to data aggregation described by interviewees reflects the limitations encountered due to time and budget constraints.

Extensive but disconnected data impedes coherent land use planning

Interviewees were asked which government targets they were able to recall and how these influenced their work. Respondents each clearly defined their own priorities and described subsequent targets as add-ons to the goals of the organisation and its stakeholders (L1, L2). The interconnectedness of some of the targets such as environment, climate change and energy planning (L1,L4,L6) was recognised by some. For others, nature and climate and the potential risk are viewed as being fundamental to the conversations for clients, and existing frameworks, such as TNFDs LEAP approach, support with stakeholder engagement and decision making (L5).

It was highlighted that the availability of the data does not mirror the interdependent nature of the targets. Instead, the patchwork of tools used to produce a comprehensive picture of a selected parcel of land demonstrates the disconnect between the relevant land data sources. Data fragmentation is characterised in several ways, namely the lack of interoperability, maintenance issues and reporting inconsistencies. This experience was not shared by all interviewees, with one suggesting that working at a landscape scale ensured both a broader and deeper baseline knowledge of the opportunities and risks in decision-making (L6).

Models – particularly environmental models such as Omnia, Soil Exchange, Trinity Ag and the Sandy Model – are considered valuable and can contribute to a holistic land assessment. But each model uses a different system and they don't speak the same language (L1). Local and national data sets are seen as operating in siloes which creates challenges for stakeholders trying to provide local context. In some cases, such as brownfield sites, this is due to access difficulties with analogue records or being incorrectly referenced (L2, L4). In more complex cases stakeholders described critical data relating to protected nature sites and wildlife areas not being included in national data, risking it being overlooked in planning (L4). Others actively engage with the local LERC – one interviewee shared a service level agreement for ongoing access to environmental data (L6).

Reporting activities are undertaken through a combination of actors and for a range of purposes. Data can be produced for applications to the agri-environment schemes for farmers and their land managers; planning permission for developers; and LERC deposits by citizen science groups (L2, L3). Problems occur in relation to the how the data is both collected and stored making it difficult to use and interpret (L1).

Similarly ecological surveys conducted by developers and held by Local Planning Authorities, in addition to those conducted by private research groups, present inconsistencies in their reporting methods (L3, L4). Data sets produced through these channels can help to understand the context of the land, relating to infrastructure, land classification and environmental metrics. These are often not made publicly available, thereby obstructing continued learning and effective decision making through difficulties in usability and accessibility (L1,L3,L4). Some highlighted that despite 'their land' being used for research purposes, there are barriers to accessing the data collected (L3, L6), this was true for both wildlife surveys such as bat counting and SFI collected data.

To support holistic decision-making, the private sector is already creating products and tools that work to integrate data from different sources, plugging a gap in clients' needs (L1, L5). Consultancies provide this service to their clients, but this can require a resource investment with the expertise of different teams' coordination to amalgamate a rich tapestry of data (L5). Examples of this happening beyond the UK include Giraffe, a programme in New South Wales (Australia) collating and analyses mixed data sets both from government and private sources to offer a holistic picture of the potential outcome of development sites (L5).

Data abundance does not guarantee accessibility or interpretability

Stakeholders consistently reported significant skills gaps, ranging from basic computer literacy and technology access (L1, L3) to advanced competencies in data manipulation and interpretation. Although extensive and diverse datasets exist—adapted for multiple purposes—their usability remains constrained by these limitations. Interviewees emphasised that data manipulation and interpretation constitute specialist skill sets (L1, L2), without which it is difficult to evaluate land-use scenarios or identify viable management options.

Examples of advancements being made with data platforms such as Giraffe (L5), demonstrate that the need for a tool that supports data organisation. Time saved through collation and data screening can be repurposed to think more strategically about opportunities and socio-economic outcomes (L1, L5).

There was consensus among stakeholders that the data does not transfer into action and that there is a need for additional support to outline site specific options, navigate trade-offs and identify approaches that are complementary to the wider landscape. A number, particularly those that worked with farmers and landowners (L1, L3, L4), cautioned against an overreliance on digital communication and suggested analogue options such as print outs and an in-person advisor to aid decision making.

Interventions suggested by interviewees

Interviewees were asked to suggest interventions that would support strategic land-use decision making. These findings emphasise how better systems can streamline processes, enhance decision-making, and ensure fair access.

Data sources

Interviewees expressed greater trust in government stewardship of public resources, noting concerns about private-sector control due to potentially divergent motivations. Public datasets (e.g., ancient woodland inventory, protected sites) owned and managed by Defra Group are highly valued. Interventions should prioritise incentivising data inputs, to build a reasonable baseline and improve the availability and validity of data (L1, L2, L3). A publicly available data baseline is considered important for ensuring that any land decisions can be monitored and learned from (L1, L3, L4), ensuring that adaptations are effective and equitable. Interviewees emphasised the need for a robust baseline to evaluate how land-use changes affect environmental outcomes, including carbon capture and wildlife recovery. Despite this, caution was also advised in the ambition for perfection being a delay to action (L1, L6).

Extending access to data collected by researchers, consultant and public bodies would improve availability of monitoring and evaluation data. This would hold decision-makers and landowners accountable to approved plans while simultaneously ensuring that public money is being utilised for public good (L1). Beyond this, it is argued that open access to data can result in wider socio-economic benefits but that it also drives economic development by informing innovation for the economy (L5).

A standardisation of templates (L1, L4) through systemised processes has the potential to allow cross-referencing across different sites promoting better integration of programmes. For example, agri-environment scheme applications could be linked to LNRS data to identify relevant actions.

MHCLG is working with Local Planning Authorities (LPAs) to establish an agreed process for planning applications. This, in conjunction with digitisation efforts, is expected to enhance accuracy and validation for local data points, such as brownfield sites (L4). The exercise will reduce the resource previously needed (L2) with one pioneering LPA clearing the backlog of approx. 500 applications, by cutting incoming calls and decreasing the likelihood of duplication of efforts.

Portals

Data requirements are multi-layered and held within multiple sources. A single portal that consolidates the data mix and signposts to additional data sets would reduce search costs and improve discoverability (L1, L4). Technical fixes such as an API for collating different data sources would reduce uncertainty (L1) and would help to identify potential trade-offs (L3). The use of integrated data has the potential to encourage stakeholders to consider a broader set of implications attached to any land strategies. The utilisation of additional metrics could also demonstrate that there is opportunity for co-benefits in traditionally contradicting priorities such as the economic and environmental targets (L1).

Investment in Local Environmental Record Centres (LERCs) is viewed as crucial (L1, L4): their funding provides data and reinvests in local management, restoration, and ongoing data collection, strengthening on-the-ground knowledge. This need is further supported, by some, with privately organised service level agreements for ongoing data access (L6).

Maps

Incorporate the work of different long-term initiatives for improved strategic framing across priorities, geographies and temporal scales. The Local Nature Recovery Strategies (LNRS) are consolidating national

and local datasets into accessible maps of places important for nature; in parallel, the developing Strategic Spatial Energy Plan is expected to supply high-level infrastructure data. Combining these efforts can help offer shared learnings for strategic national, regional and local decision-making.

Landscape level change is suggested as an effective approach to decision making (L4, L6). Change at scale and a more intimate understanding of the landscape options are cited as reasons for efficient progress towards national targets. As well as the removal of a need for external data verification due to existing local knowledge and experience.

Calculators

Interviewees cautioned against over-reliance on digital methods and potential inaccessibility of different tools. A trusted advisor role is seen as essential to support farmers and landowners, who are traditionally less familiar with data availability and interpretation. Advisors translate complex evidence into usable guidance (L1, L3,L4). This role could be held by a local advisor or non-government body and could help ensure that site specific options are made visible to enable the 'effective delivery of public money for public goods' (L3).

The potential for AI to support this process through data cleansing and validation is viewed as an opportunity (L5), thereby saving resource efforts and duplication of work. In addition to this the prospects for AI to provide guidance and for decision making is considered to be a feasible route.

Reporting

To better support progressions on government targets, such as the Environmental Improvement Plan (EIP), a concerted effort to produce a single national baseline tool is proposed. It is anticipated that a baseline programme will normalise inputs and support comparable assessments across holdings and landscapes (L3). Biodiversity Net Gain (BNG) (L4), and its 30-year commitment should be leveraged to track whether nature recovery commitments are delivered over time and may help to identify which interventions are most effective in reaching the targets (L1). There was also consensus among individuals that improvements could be made to the delivery of monitoring and evaluation data to support shared knowledge and improved outcomes.

Improvements and interventions

This section translates the evidence gathered through the analysis of anonymised responses to a subset of data and digital-relevant questions in Defra's 2025 Land Use Consultation and stakeholder interviews into a set of potential improvements or policy interventions. It responds directly to the challenges identified earlier in the report that act as barriers to the effective use of the digital systems to support land use decisions: fragmented land data, uneven access, limited interoperability and skills gaps.

We open with a set of principles reflecting the diversity of user needs, institutional constraints, and delivery pathways across the land data and digital landscape. These also present opportunities that may not have been previously considered, such as the potential economic and democratic benefits of open access to data.

A long list of interventions is deliberately scoped as options for consideration, not final recommendations. These are intended to inform subsequent shortlisting, appraisal, and business case development by Defra and partner organisations.

PRINCIPLES, FUNCTION BY FUNCTION

Below we provide a condensed list of cross-cutting principles that emerged consistently from both the Land Use consultation responses and stakeholder interviews, particularly around trust, usability, standards, and the role of public stewardship. These principles begin to provide a lens through which any future intervention could be assessed.

Data sources

Data should be governed in a way that prioritises quality, longevity and ease of access and use by skilled data handlers. More data is better, as long as well archived and searchable. Metadata standards are vital for that. The 'FAIR' data principles (findable, accessible, interoperable and reusable) were widely cited by consultation respondents. A range of studies evidence the broad economic benefits of making data freely available (Falck and Koenen, 2020; Jones and Tonetti, 2020; Houghton 2011).

As a private good, data can be lucrative, but as a public good it can be transformative.

Portals

It makes no sense to have people look in multiple places for data. 'One stop shops' make it more likely people will find other useful data, if they are well catalogued. That said, different shop fronts will tempt different people in. There should be ways for different organisations to curate the front page of the same data 'lake'. If data portals have to be separate, they should prominently signpost to one another.

Maps and visualisation tools

Maps all serve different purposes and audiences. For example a forester needs different information to a food grower, and making all data available will make apps less useable. Proliferation isn't a problem, but certain standards should be upheld.

A one stop map is extremely useful for skilled professionals – MAGIC achieves this. It should retain this purpose, and other mapping tools should be allowed to be more focussed in purpose. By becoming the industry standard, MAGIC has been able to negotiate more data hosting agreements than other public portals. This success should be built on, perhaps transforming the backend of MAGIC into a one stop land data portal.

Calculators

Like maps, calculators all serve different purposes. This means there is risk of competing messages. There is also a risk from being too focussed: for example, farmers should also be presented with non-farming options, to evidence the potential benefits of diversifying their business model as well as navigating possible trade-offs. This supports existing models for multi-functional land use (FFCC, 2024) and promotes business model diversification.

Reporting

Compliance with government regulations and subsidies can be made much simpler if digital reporting tools are made available. Existing land calculator apps serve as a potential foundation for future reporting tools. This is where standards become really important. Perceptions of injustice can bring down vital regulations, so calculators backing regulations and subsidies must follow strict standards. Energy Performance Certificates for buildings is a good example of a long established existing public calculation and reporting standard that enables regulation of housing standards. BNG and SFI are two more recent examples.

If all farm carbon audits followed the same data ingress standards, farmers would be more readily able to compare the different calculators' opinions, some of which are based on real scientific uncertainty.

If standards are in place, reporting platforms can be varied and tailored, as is the case with the plethora of providers using HMRC APIs to submit tax returns. A wide range of different accounting software, each tailored to different user needs, can now interface with the tax system directly since the Making Tax Digital reforms.

All functions need trust

Data and digital tools do have potential to support improved environmental outcomes, but they are one small piece of the overall picture. The imposition of digitalisation is one of the ways mis-trust has spread between regulators and land managers, particularly farmers. There are often trade-offs between digital tools being useful for audiences of all levels of tech savviness, and accessibility to people intending to use land for different purposes. Tech education and support can help, but land labourers tend to be time poor. Incorporating technology into existing successful partnerships between advisors and land managers has been one way the benefits of digital tools have been brought to land managers who were otherwise sceptical. Examples of government intervention to provide in person advice include, the TB Advisory Service (TBAS). TBAS was introduced in 2017 as a free advisory service to further support the government target to be bovine Tuberculosis (bTB) free by 2038 (Defra, 2014). Launched in partnership with selected vets, the free in-person service highlighted bTB risk mitigation options to farmers in areas that are high risk. In 2021, the service reported having conducted 2,280 farm visits and providing advice to over 5,000 farmers (TBAS, 2021). This is one successful model, and there are other good examples of co-production (Oliver et al., 2012; Rose et al., 2018).

LONG LIST OF PROSPECTIVE INTERVENTIONS OPTIONS

A long list of prospective intervention options for government is provided for consideration. These range from relatively discrete actions, such as introducing APIs for reporting, to more systemic proposals, including consolidation of data portals, national baselining initiatives, and opening access to specific publicly funded datasets. Several options are complementary and could be pursued in parallel; others represent alternative approaches to the same underlying problem.

Across all options, a recurring theme is the trade-off between central coordination and local or sector-specific delivery. The evidence suggests that while users value a single, trusted national baseline and clear standards, they also rely on locally embedded knowledge, trusted advisors, and tailored tools. Effective intervention will therefore depend not only on technical design, but on governance, resourcing, and co-production with those who use and generate land data in practice.

Make publicly funded data open access

Negotiate with Land Registry, Ordnance Survey, Royal Mail, UKCEH, Cranfield University, LERCs and NERC to make all their data available to the public, business and non-profits. It is hard to estimate the cost of this as these organisations do not publish breakdowns of their revenue from data sales. Our rough estimate based on extrapolating from the limited published data on license costs and user numbers suggests that somewhere in the region of £120 million and £200 million of data sales revenues would be foregone per year. A full appraisal of potential costs and benefits would improve the case for further open access agreements.

Open access to this data would significantly reduce costs to land surveys essential to both conservation and development processes. Open access agreements must preserve the resources available to host and maintain data. Negotiating these agreements will involve institutional hurdles. Building trust with Local Environmental Records Centres may be a challenge given governments have previously offered and then removed funding. Data access agreements would likely become entangled in wider negotiations, for example with post-privatisation Royal Mail.

Build on the success of MAGIC

Modernise MAGIC. Capitalise on its data agreements to build a one stop land data portal.

Consolidate the 18 Defra Group data portals

This process could be centred around MAGIC, or around environment.data.gov.uk.

Standards and APIs for Defra data

Defra needs to role model interoperability with its own data if it hopes for other providers to follow suit. Standard variable names and data dictionaries would be a minimum. This would be a necessary starting point for standardised reporting APIs.

New scheme data should be consolidated

So far SFI and LNRS data has been presented separately to other agri-environment data. Defra should seek to integrate these new data generating programmes into existing surveys and systems.

Soil carbon baselining to be led from the centre through mandatory reporting

There is a wild west of soil carbon methodologies and metrics, in part reflecting true scientific uncertainty. Mandatory central reporting of soil sampling would help validate competing metrics and be the first step to building a national soil carbon baseline.

Review how to support, digitalise and co-ordinate Local Environmental Records Centres

LERCs are providing a vital service with little funding. The National Biodiversity Network in part exists to consolidate some of the locally held data. NBN would be a great partner for exploring how to better support, digitalise and co-ordinate LERCs. Stakeholders would benefit from exploring ways to reduce or remove paywalls and other barriers.

Improve the Agricultural Land Classification maps – potentially through mandatory reporting

Most consultees felt that ALC maps aren't fit for purpose. Gathering information from private surveys could help improve data. But there are commercial incentives that could bias data which need to be closely watched.

Pick geospatial standards and stick to them

This applies to boundaries like INSPIRE IDs, UPRNs, CPH numbers but also to metadata standards like AGI GEMINI.

Privacy – or perhaps nuisance – protections when opening up Land Registry ownership data

Anyone can find out who owns a particular house already, but the fee probably deters 'trawlers' with nefarious purposes. Sensible usage restrictions, for example giving users a record per hour limit unless they provide ID verification, could help prevent nuisance uses e.g. for spam mail.

Create APIs for land reporting to Defra

Many Defra forms should be able to use standard outputs through land planning apps already used by land managers. RPA RLE1 forms were cited by many respondents as a candidate. A digital version was implemented in 2024. An API akin to the Making Tax Digital system would be a great next step. Lowering the data entry required to respond to the June Survey, December Survey, Farm Business Survey, Farm Practices Survey and others could help improve declining response rates. AHDB's Farm Data Exchange programme presents one vision for this, where farms collate their data once and can use it to report to suppliers and assurers as well as government.

Fund the co-production of reporting apps between trusted advisors and land managers

Reporting apps should be the next frontier of digital land tools, and co-production between advisors and land managers seems to be one route to prevent protest response. Successful examples include the Foundation for Common Land's SFI Moorland app and various tools used by the Catchment Based Approach (CABA) partnership.

Collate planning system data – no more PDFs

Government already goes to great lengths to collate data distributed across Local Authorities' many planning portals, for example DESNZ's Renewable Energy Planning Database. There should be much more systematic effort to unify the backend of planning portals so that critical data like Environmental Impact Assessments is collated in standard formats, liberated from PDFs.

The digital tools backing the Clean Air Zones are a great example of a central government digital tool that can be flexibly used by Local Authorities according to their preferences. All being one system means that drivers enter their numberplate once to find out how to navigate all the different local Clear Air Zones. The National Parking Platform API is another good example of this approach. The introduction of a new 'Local' unit of the Government Digital Service bodes well for similarly effective approaches in future.

Host land data from private sources on public data portals – but with careful caveats about standards and data generation process

Establish a dedicated land data institution?

Various respondents argued for the creation of a new institution to improve land data. Many environmental NGOs argue for a National Environmental Observatory and Minette Batters argues for an Agri Information Hub. Existing institutions could serve as founding partners in such a project to avoid duplication,

Introduce a national ecological baseline

The lack of routine ecological surveys means that they can quickly become a blocker during the development process. As there is no baseline independent data, planning disputes can quickly become a survey war between developers and neighbours. More investment in an impartial ecological baseline might support quicker developer decisions by shortening the lead in time required for planning-facing ecological surveys and by reducing conflict in the planning system.

Annex 1: selected verbatim responses to question 20

Conservation/wildlife management NGO response

to have free land registry data would make it easier for landowners to find out who their neighbours were and work in a network or identify owners of gaps in corridors to piece together nature corridors. having free OS land data for landowners/managers could help in being able to see habitat corridors or linkages such as where woodland is/heathland etc. as mentioned before making local record centre records free to obtain would help also in decision making. many environmental projects i have worked on a large cost is taken in the obtaining and displaying suitably of data to aid decision making, if this were simplified and made cheaper more could be spent on actual interventions like more trees, an extra pond or two etc.

Agriculture owner occupier response

All of it, if you offer large datasets for free people will create incredible tools and visualisations also for free. Take Covid for an example, the number of outbreak trackers and visualisations people created and released for free shows the power of open data.

Agriculture owner occupier response

The Land Registry is easy to use to access Office Copy Entries and filed plans. Map search is a little more challenging. The space allowed for the map search is too small All land should be registered for openness and clarity. Google do a system where 'Mappers' can put verified information into Google Maps and this could work really well, abandoned properties, derelict land etc could all be reported on. This might increase the workload of the LR staff. Charges for access should be - Occasional (log in once a month) pay by use or annual pre-paid ticket for regular users. Obviously, Solicitor and Conveyancers must pay a professional fee every time.

Individual response from someone working in the legal sector

HM Land Registry (HMLR) records for ownership should be made available to the public free of charge and under the Open Government Licence. The HMLR should:

1. Drop fees for ‘views of the register’, which make it prohibitively expensive to uncover who owns land. If communities can establish who owns land in their locality, it makes pursuing community ownership - and community involvement in land use - much easier. It will also empower local community groups to identify – and engage with – the owners of land highlighted on LNRS maps as opportunities for nature recovery.

2. Make it possible to map land owned by corporate landowners. HMLR should be required to include INSPIRE IDs for each land parcel listed in the datasets of company land ownership that it publishes each month.

3. Direct all public bodies to publish maps of their landholdings. Publication of maps would help communities identify land that is underused or that could support a different range of land uses, and approach the owners for discussion.

Freedom of Information Act should be extended to cover large establishment landowners currently exempt from FOI requests, such as water companies, the Church Commissioners, and the Duchies of Cornwall and Lancaster.

Local government planning and development response

Availability of land ownership data and legal covenants pertaining to land would assist in the planning and development process, as it could reduce costs and speed up the project planning process. It would also assist in nature conservation activities, for example where land is considered to be a good candidate for management interventions, this would allow easier engagement with landowners in a positive way, to promote improved management especially where there are potential opportunities to secure environmental funding, or other potential economic benefits that could incentivise viable changes in land management practice.

Local government planning and development response

Landownership - Title data, which includes who owns the property. This is very useful data when looking into possible issues with site assembly. This helps when identifying future development capacity via desk-based studies. Similarly this data would assist identification of potential delivery opportunities. See also reference earlier to LERC record data which is licensed and not publicly available due to LERC funding structures, which could be beneficially addressed.

Agriculture and horticulture response

Land managers are more likely to make use of data from which they believe they can draw a benefit to their business. As such, we encourage the government to prioritise the widening of access to data that can support resilience and adaptation to climate pressures. Government should work with rural businesses to understand their data needs.

One point raised in this section of the consultation is the widening of access to the Land Registry. We are supportive of measure to widen access to market data, seeing that it improves market efficiency. However, we encourage the government to consider appropriate measures to balance access to information and privacy. Where the government wishes to support the efficient delivery of the land use transition, the purpose of widening access to Land Registry data should be market efficiency and better policy design, rather than secondary objectives.

The balance between access to information and privacy should be considered in general when looking at wider access to data. While access to information should be supported, disclosure that is not proportionate may cool interest in engaging with schemes and markets.

The existing limitations of the Land Registry – incomplete data and some patchy records – should also be acknowledged.

Farmers and land managers should have access to government data that are used to shape and deliver policy. They should also have equal access to the data used by regulatory agencies to monitor and delivery regulations.

A good example of wider data access is the Environment Agency's Agricultural Land Environmental Risk and Opportunity Tool (ALERT). The tool provides farmers, land managers and their advisers with access in a usable format – to those with appropriate training – to data and modelling in relation to run-off risk and pollution mitigation. It provides one route of access to datasets that are otherwise more difficult to use in practice.

The tool has two primary benefits. In itself, it is a helpful resource for farmers and land managers to plan their cropping and land management with run-off risk and soil damage in mind. It also provides a shared evidence base for both regulators and the regulated, by opening up to farmers and land managers the tools and data that the EA may also use for monitoring and targeting enforcement; this is a key part of the effective delivery of regulations.

We encourage DEFRA to expand this approach – indeed knowledge of ALERT – across its regulatory remit. Where regulators are using data to assess risk, monitor and target enforcement, this data should also be available in a usable format to those who are being regulated.

Similarly, farmers and land managers should have easier access to the data used within government systems. One example is land parcel mapping, land covers and other information held by the Rural Payment Agency. The use of this data by third party tools such as the LandApp has given farmers and land managers the choice of alternative mapping systems in preparing applications and then managing agreements.

Third party private initiatives, working with government, are able to deliver an improved service, as they are less constrained by government procurement inefficiencies and slow delivery.

Beyond widening access to existing data sets, the government should consider what data collection is targeted in the future. For farmers and land managers, improved holding-level information on soils and natural capital will be of value to decision making. The Soil Nutrient Health Scheme in Northern Ireland provides an

example of government support for the collection of data, and follow-up training and education. We have mentioned above the AHDB 170 farm project.

The government has a central role in setting data standards and identifying areas for further research.

Annex 2: Interview script

This is an opportunity for us to get a sense of your knowledge of and involvement with land use decision making.

1. Could you please introduce yourself and your position?

2. Which national targets affecting land use decision-making are you aware of? Which of these targets are a priority to you and the land [you own / you manage / you use]?

Current use of data and digital tools

3. Can you describe the current data and digital tools you, your team and your organisation use to support you in making land use decisions?

    a. [*If they provided a response to pre-interview data request:* are there any data and digital tools you, your team and your organisation use to support you land use decisions that you didn't mention in the documents you sent us by e-mail?]

    b. [*Optional follow-up:* how effective do you find these tools in supporting you to make informed strategic land decisions?]

4. Do you think existing data and digital tools are sufficient to meet land use targets?

Building the rationale for intervention

We would like to hear your suggested interventions for developing new data and digital tools.

5. What improvements would you like to see to data and digital tools to support the delivery of land use targets?

6. What would you be able to do if these improvements were made that can't already do?

[We will use these follow up questions on process, impact and value for money to pinpoint the rationale behind improvements suggested by interviewees. All optional, ask as appropriate.]

7. To what extent might the interventions:

    - *[Process]*
        - improve efficiency – save time, money or other resources?
        - remove uncertainties?
        - help you communicate with relevant authorities and stakeholders?

    - *[Impact towards targets]*
        - mean you can make a greater contribution to environment, food or planning goals?
        - Optimise land use decisions to make sure the right things happen in the right places? [If not understood: for example, to balance trade-offs between food production, climate targets, nature targets and housing targets?]
        - help you monitor and demonstrate effects of land use changes?
        - improve equity in land use changes?

    - *[Value for money]*
        - Would this improve your business viability or profitability?
        - Would you be willing to pay a contribution towards this? How much?
        - [*If interviewee is suggesting an improvement that they might have a role in delivering*: How much do you think this improvement would cost?]

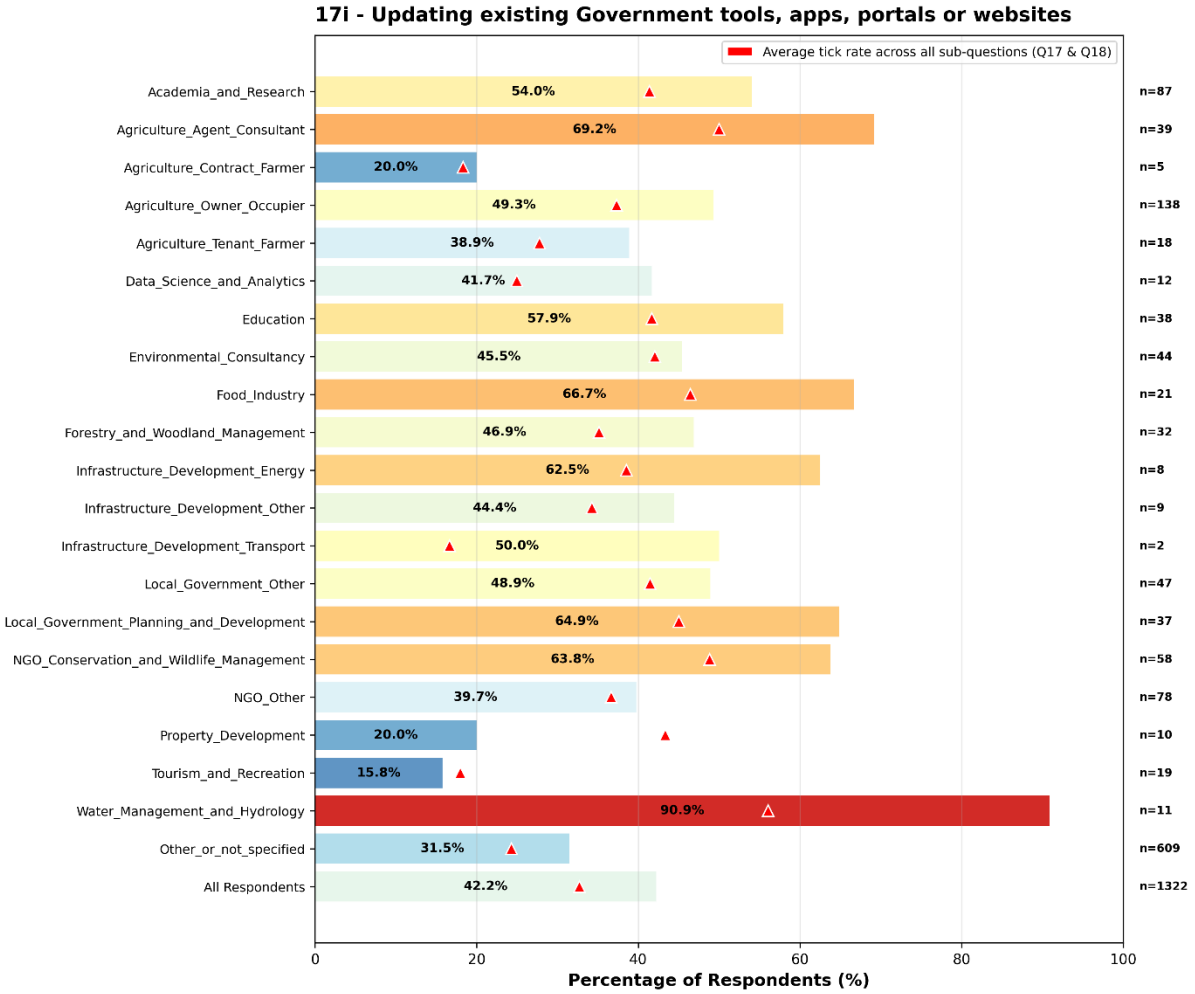
8. Would this be more effective if delivered by government or by a private body? Why?

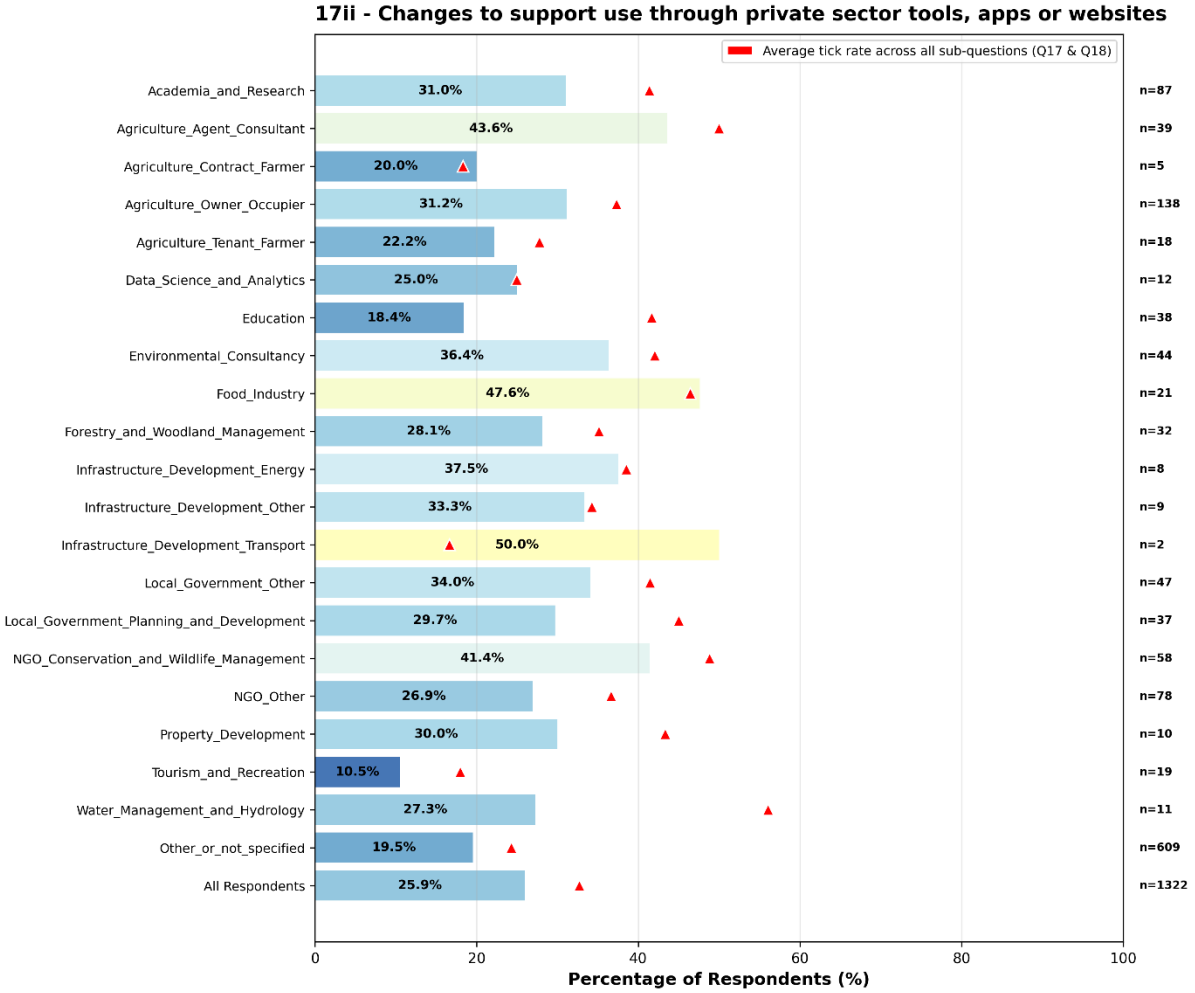
9. What are the risks of doing nothing to intervene [to improve land data and digital tools]?

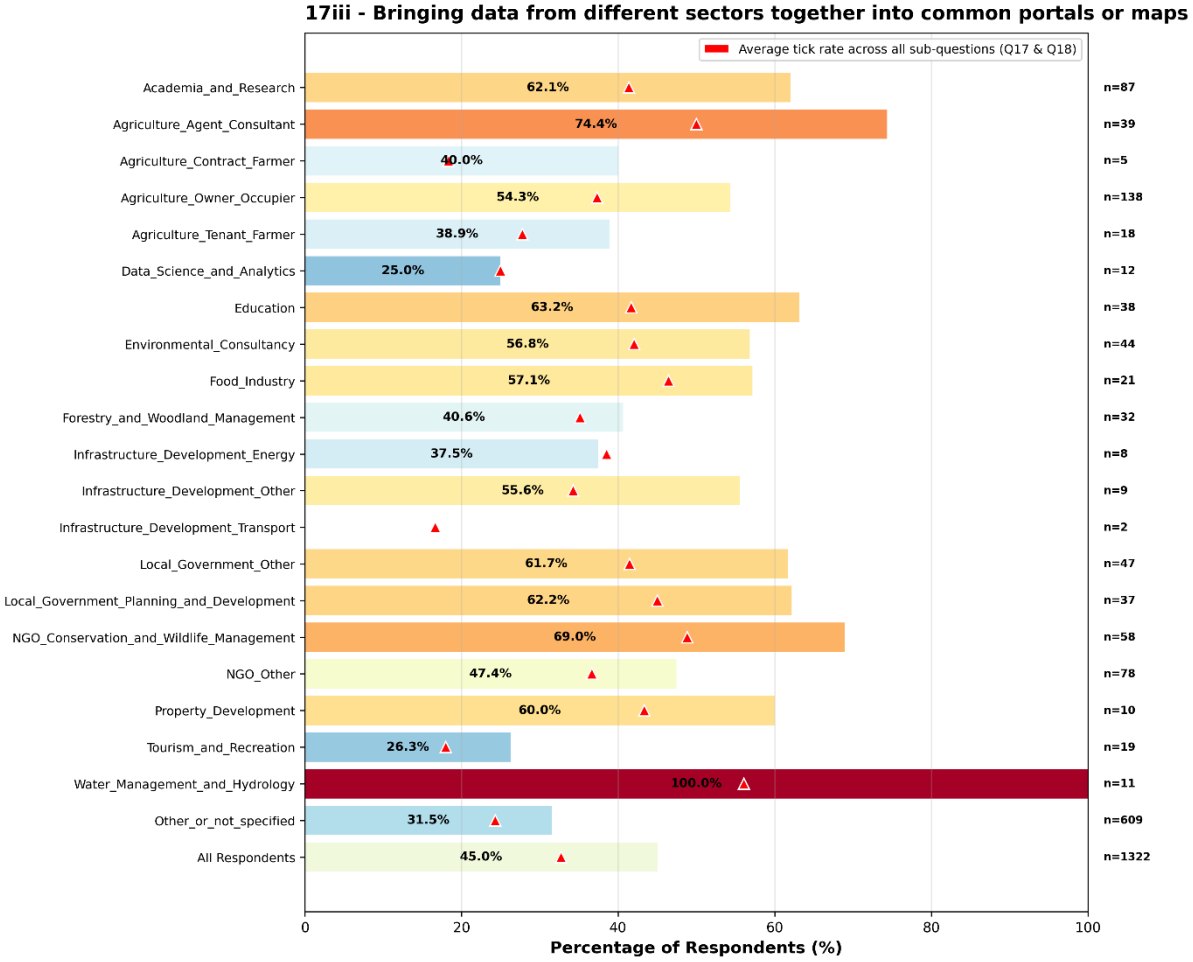
Annex 3: Acronyms & Abbreviations

ADAS	Agricultural Development and Advisory Service
AGI GEMINI	Association for Geographic Information – GEMINI (UK metadata standard)
AHDB	Agriculture and Horticulture Development Board
ALC	Agricultural Land Classification
ALERT	Agricultural Land Environmental Risk and Opportunity Tool
API	Application Programming Interface
BNG	Biodiversity Net Gain
CaBA	Catchment Based Approach
Cebr	Centre for Economics and Business Research
CPD	Continuing Professional Development
CPH	County Parish Holding
CS	Countryside Stewardship
DEFRA	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
DSIT	Department for Science, Innovation and Technology
EA	Environment Agency
EIP	Environmental Improvement Plan
EPC	Energy Performance Certificate
EU	European Union
FOI	Freedom of Information
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
GDS	Government Digital Service
GIS	Geographic Information System
HMLR	HM Land Registry
HMRC	HM Revenue & Customs
HRI	Horticulture Research International
INSPIRE IDs	Infrastructure for Spatial Information in the European Community identifiers
JNCC	Joint Nature Conservation Committee
LEAP	Locate–Evaluate–Assess–Prepare (TNFD approach)
LERC	Local Environmental Records Centre
LPA	Local Planning Authority
LUC	Land Use Consultants
MAGIC	Multi-Agency Geographic Information for the Countryside
MHCLG	Ministry of Housing, Communities and Local Government
MOD	Ministry of Defence
NBN	National Biodiversity Network
NCEA	Natural Capital and Ecosystem Assessment
NEO	National Environmental Observatory
NERC	Natural Environment Research Council
NIAB	National Institute of Agricultural Botany
OGL	Open Government Licence
OS	Ordnance Survey
PDF	Portable Document Format
RLE	Rural Land and Entitlements (RLE1) form
RPA	Rural Payments Agency
RSK	RSK Group (environmental consultancy)
SFI	Sustainable Farming Incentive
SLA	Service Level Agreement
SME	Small and Medium-sized Enterprise
TBAS	TB Advisory Service
UK	United Kingdom
UKCEH	UK Centre for Ecology & Hydrology
UKSO	UK Soil Observatory
UPRNs	Unique Property Reference Numbers
USDA	United States Department of Agriculture
What3Words	proprietary three-word geocoding system

Annex 4: responses to questions 17 and 18 by respondent group




17ii - Changes to support use through private sector tools, apps or websites
Average tick rate across all sub-questions (Q17 & Q18)
Academia_and_Research 31.0% n=87
Agriculture_Agent_Consultant 43.6% n=39
Agriculture_Contract_Farmer 20.0% n=5
Agriculture_Owner_Occupier 31.2% n=138
Agriculture_Tenant_Farmer 22.2% n=18
Data_Science_and_Analytics 25.0% n=12
Education 18.4% n=38
Environmental_Consultancy 36.4% n=44
Food_Industry 47.6% n=21
Forestry_and_Woodland_Management 28.1% n=32
Infrastructure_Development_Energy 37.5% n=8
Infrastructure_Development_Other 33.3% n=9
Infrastructure_Development_Transport 50.0% n=2
Local_Government_Other 34.0% n=47
Local_Government_Planning_and_Development 29.7% n=37
NGO_Conservation_and_Wildlife_Management 41.4% n=58
NGO_Other 26.9% n=78
Property_Development 30.0% n=10
Tourism_and_Recreation 10.5% n=19
Water_Management_and_Hydrology 27.3% n=11
Other_or_not_specified 19.5% n=609
All Respondents 25.9% n=1322
0
20
40
60
80
100
Percentage of Respondents (%)


17iii - Bringing data from different sectors together into common portals or maps
Average tick rate across all sub-questions (Q17 & Q18)
Academia_and_Research 62.1% n=87
Agriculture_Agent_Consultant 74.4% n=39
Agriculture_Contract_Farmer 40.0% n=5
Agriculture_Owner_Occupier 54.3% n=138
Agriculture_Tenant_Farmer 38.9% n=18
Data_Science_and_Analytics 25.0% n=12
Education 63.2% n=38
Environmental_Consultancy 56.8% n=44
Food_Industry 57.1% n=21
Forestry_and_Woodland_Management 40.6% n=32
Infrastructure_Development_Energy 37.5% n=8
Infrastructure_Development_Other 55.6% n=9
Infrastructure_Development_Transport n=2
Local_Government_Other 61.7% n=47
Local_Government_Planning_and_Development 62.2% n=37
NGO_Conservation_and_Wildlife_Management 69.0% n=58
NGO_Other 47.4% n=78
Property_Development 60.0% n=10
Tourism_and_Recreation 26.3% n=19
Water_Management_and_Hydrology 100.0% n=11
Other_or_not_specified 31.5% n=609
All Respondents 45.0% n=1322
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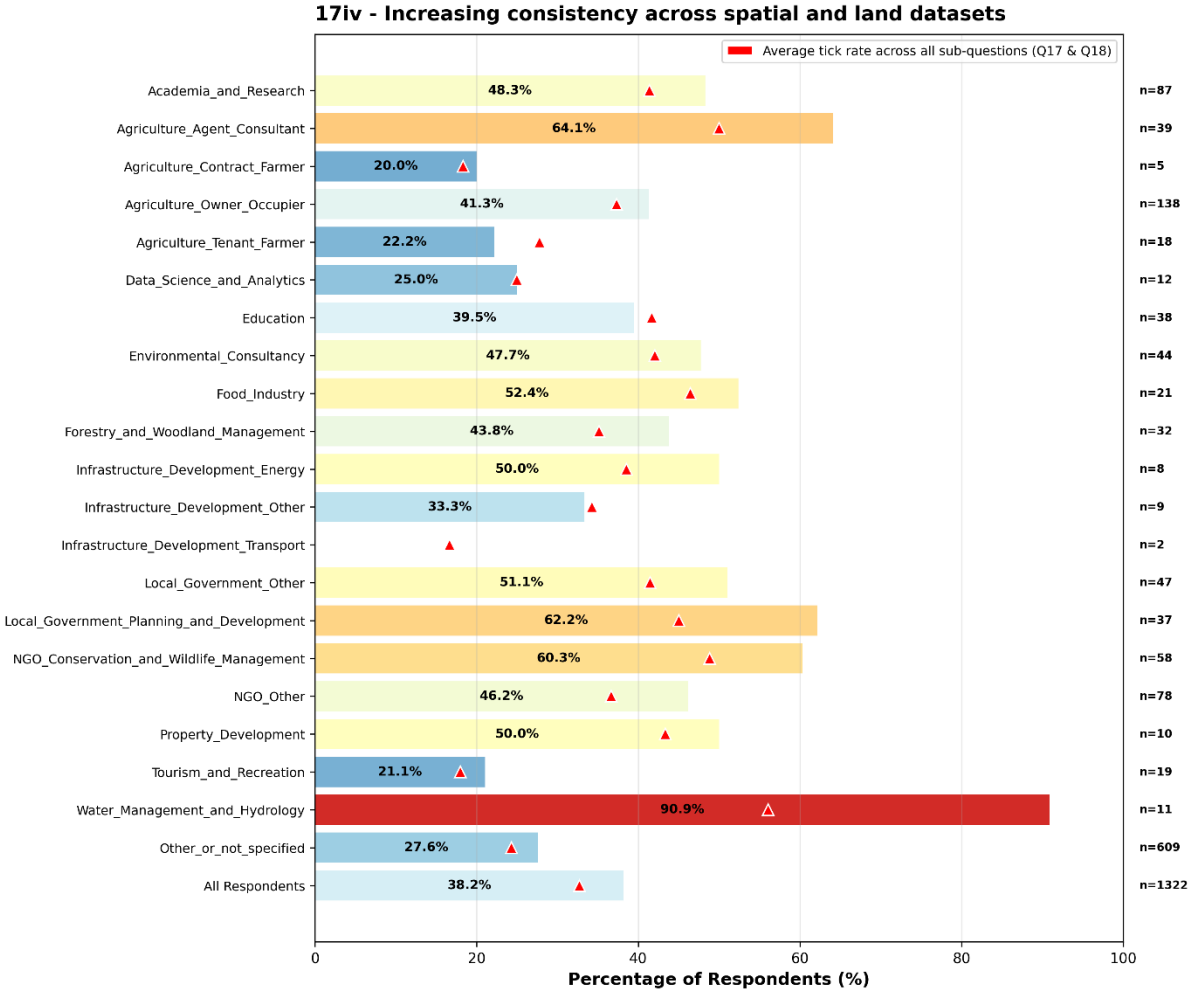
20
40
60
80
100
Percentage of Respondents (%)


17iv - Increasing consistency across spatial and land datasets
Average tick rate across all sub-questions (Q17 & Q18)
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Agriculture_Agent_Consultant
Agriculture_Contract_Farmer
Agriculture_Owner_Occupier
Agriculture_Tenant_Farmer
Data_Science_and_Analytics
Education
Environmental_Consultancy
Food_Industry
Forestry_and_Woodland_Management
Infrastructure_Development_Energy
Infrastructure_Development_Other
Infrastructure_Development_Transport
Local_Government_Other
Local_Government_Planning_and_Development
NGO_Conservation_and_Wildlife_Management
NGO_Other
Property_Development
Tourism_and_Recreation
Water_Management_and_Hydrology
Other_or_not_specified
All Respondents
48.3%
64.1%
20.0%
41.3%
22.2%
25.0%
39.5%
47.7%
52.4%
43.8%
50.0%
33.3%
51.1%
62.2%
60.3%
46.2%
50.0%
21.1%
90.9%
27.6%
38.2%
n=87
n=39
n=5
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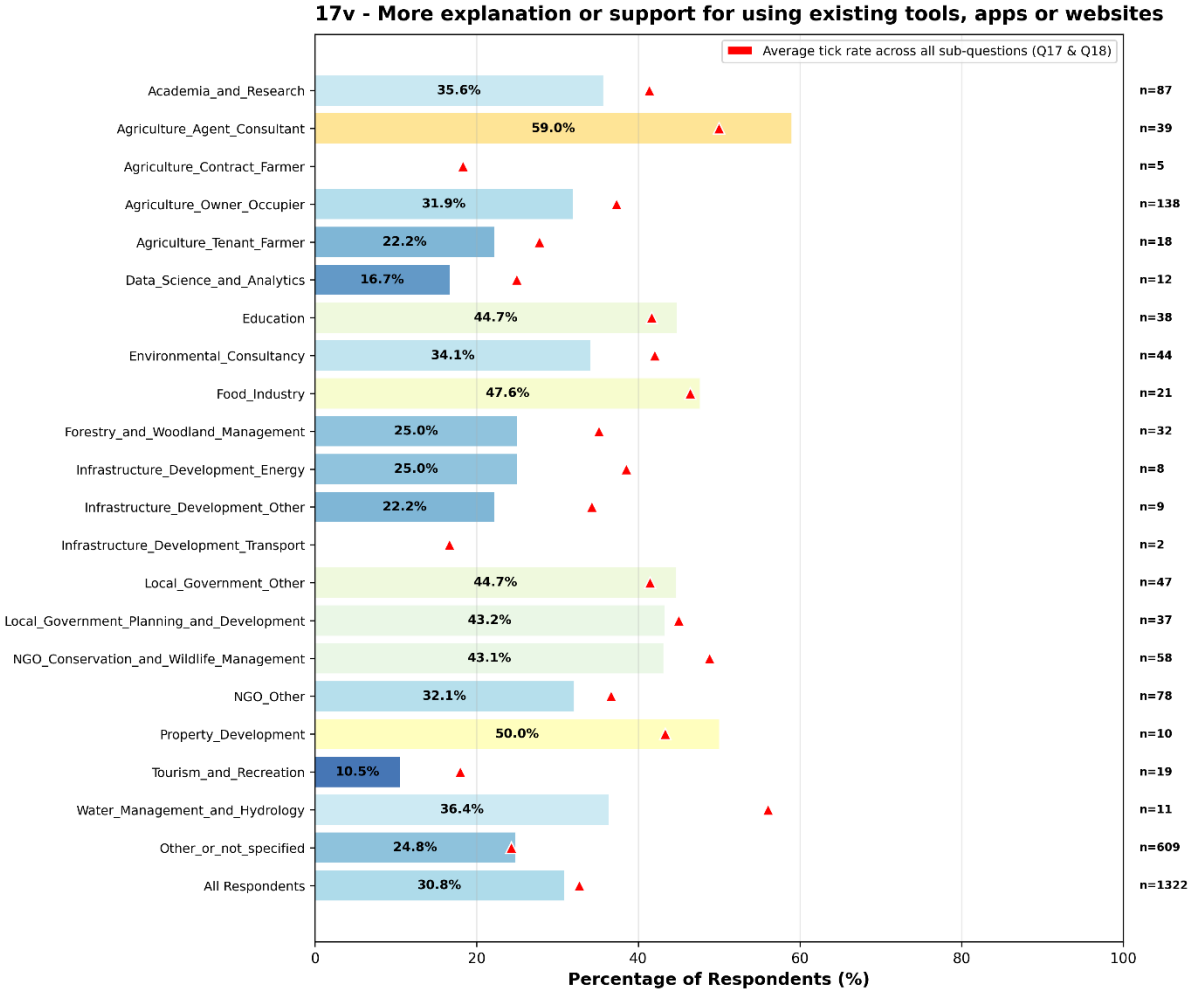
80
100
Percentage of Respondents (%)


17v - More explanation or support for using existing tools, apps or websites
Average tick rate across all sub-questions (Q17 & Q18)
Academia_and_Research
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Agriculture_Contract_Farmer
Agriculture_Owner_Occupier
Agriculture_Tenant_Farmer
Data_Science_and_Analytics
Education
Environmental_Consultancy
Food_Industry
Forestry_and_Woodland_Management
Infrastructure_Development_Energy
Infrastructure_Development_Other
Infrastructure_Development_Transport
Local_Government_Other
Local_Government_Planning_and_Development
NGO_Conservation_and_Wildlife_Management
NGO_Other
Property_Development
Tourism_and_Recreation
Water_Management_and_Hydrology
Other_or_not_specified
All Respondents
35.6%
59.0%
31.9%
22.2%
16.7%
44.7%
34.1%
47.6%
25.0%
25.0%
22.2%
44.7%
43.2%
43.1%
32.1%
50.0%
10.5%
36.4%
24.8%
30.8%
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40
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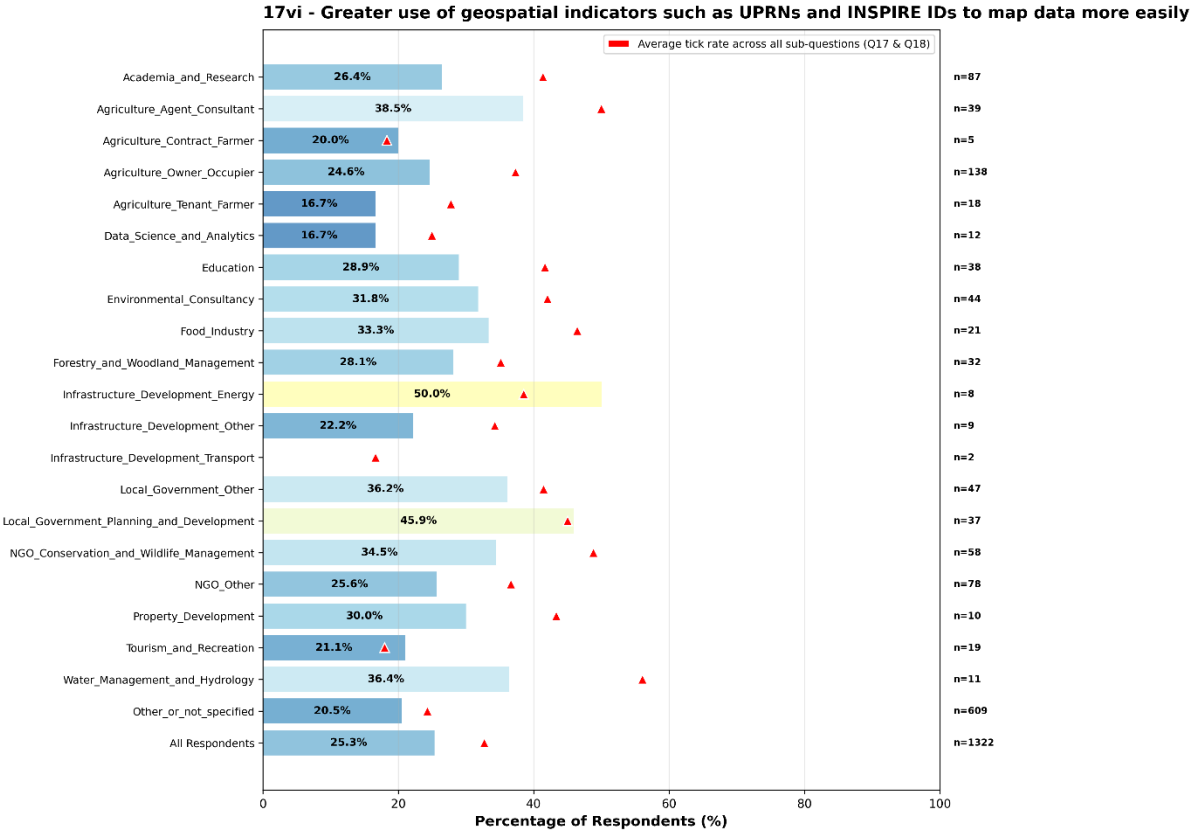
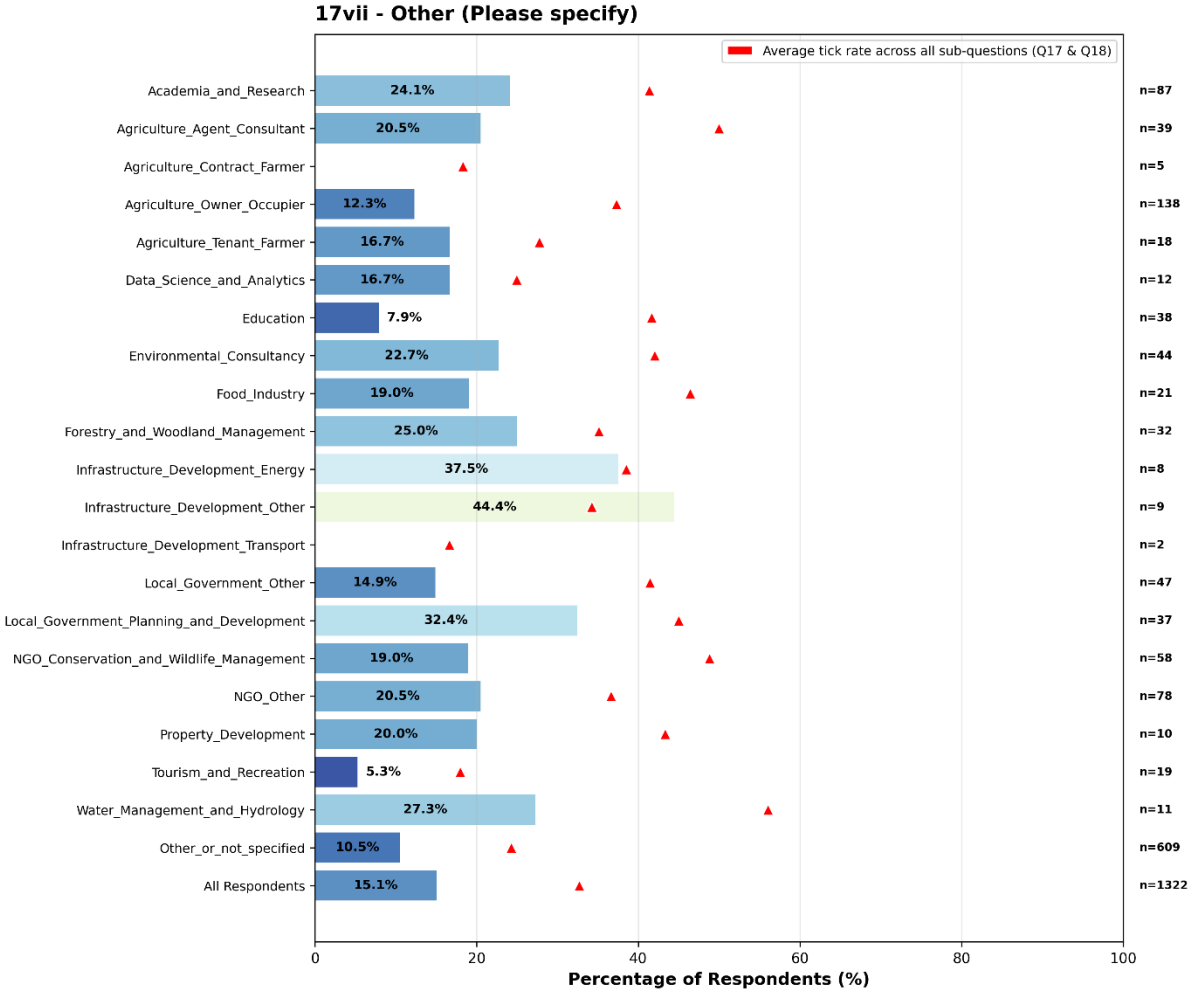
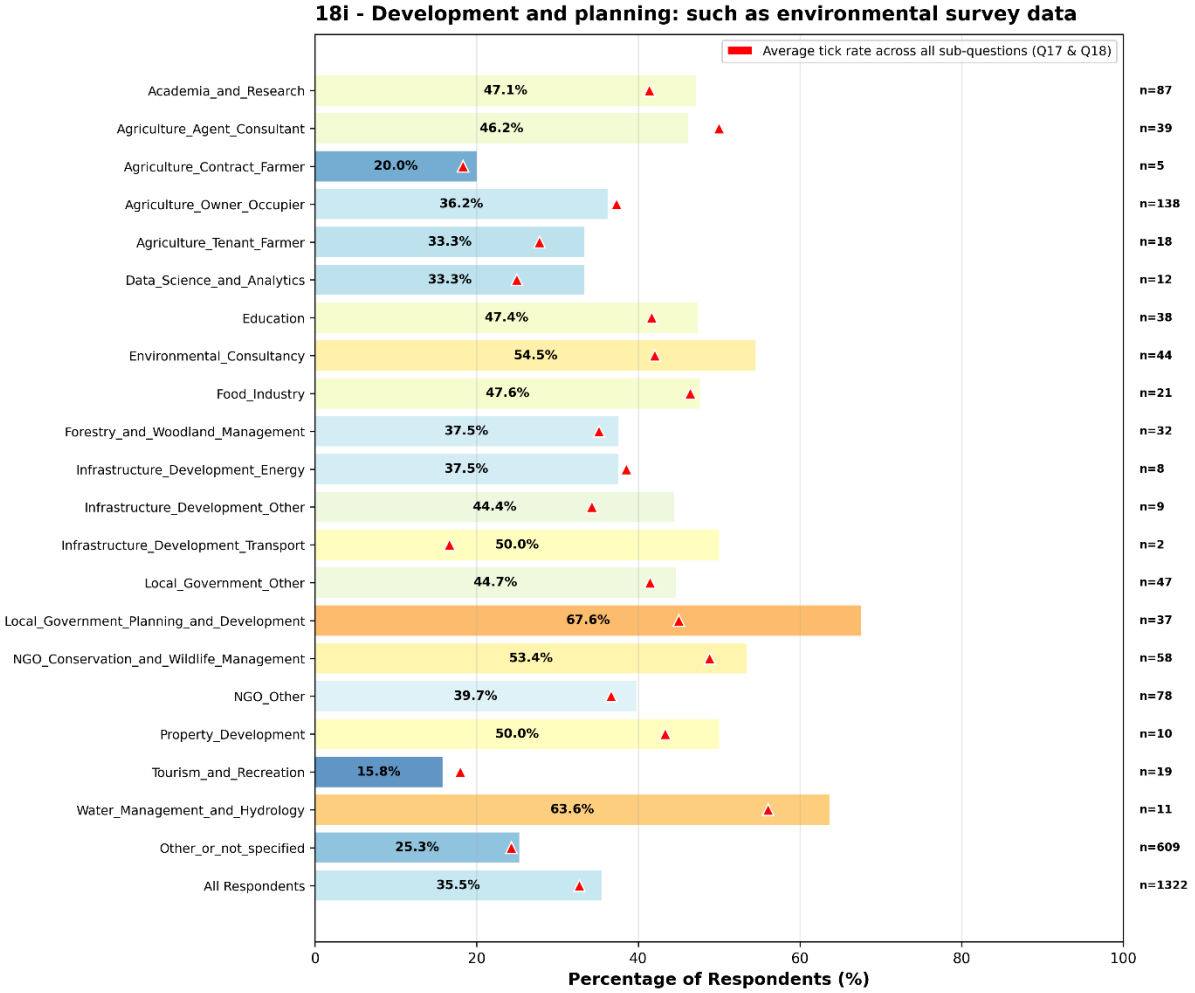
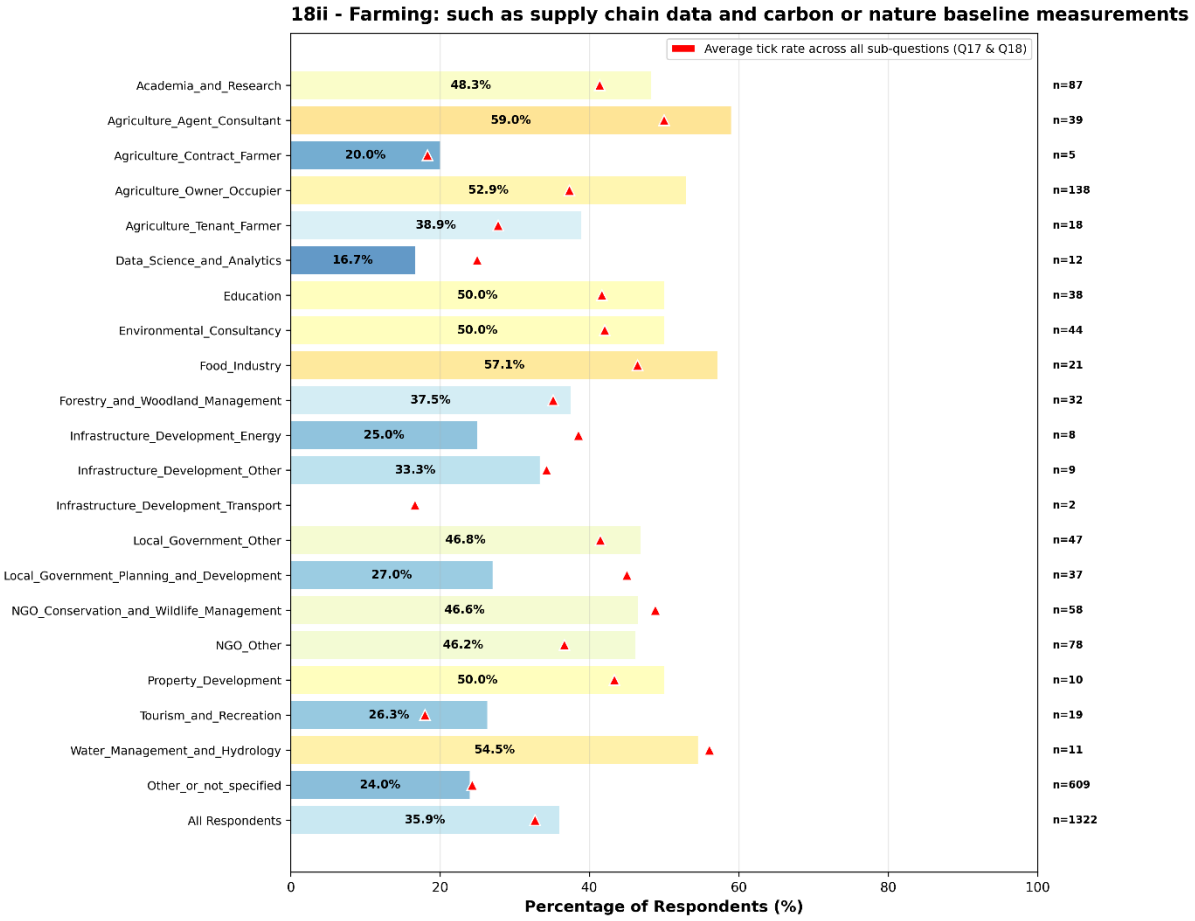
80
100
Percentage of Respondents (%)


17vi - Greater use of geospatial indicators such as UPRNs and INSPIRE IDs to map data more easily
Average tick rate across all sub-questions (Q17 & Q18)
Academia_and_Research 26.4% n=87
Agriculture_Agent_Consultant 38.5% n=39
Agriculture_Contract_Farmer 20.0% n=5
Agriculture_Owner_Occupier 24.6% n=138
Agriculture_Tenant_Farmer 16.7% n=18
Data_Science_and_Analytics 16.7% n=12
Education 28.9% n=38
Environmental_Consultancy 31.8% n=44
Food_Industry 33.3% n=21
Forestry_and_Woodland_Management 28.1% n=32
Infrastructure_Development_Energy 50.0% n=8
Infrastructure_Development_Other 22.2% n=9
Infrastructure_Development_Transport n=2
Local_Government_Other 36.2% n=47
Local_Government_Planning_and_Development 45.9% n=37
NGO_Conservation_and_Wildlife_Management 34.5% n=58
NGO_Other 25.6% n=78
Property_Development 30.0% n=10
Tourism_and_Recreation 21.1% n=19
Water_Management_and_Hydrology 36.4% n=11
Other_or_not_specified 20.5% n=609
All Respondents 25.3% n=1322
0
20
40
60
80
100
Percentage of Respondents (%)


17vii - Other (Please specify)
Average tick rate across all sub-questions (Q17 & Q18)
Academia_and_Research 24.1% n=87
Agriculture_Agent_Consultant 20.5% n=39
Agriculture_Contract_Farmer n=5
Agriculture_Owner_Occupier 12.3% n=138
Agriculture_Tenant_Farmer 16.7% n=18
Data_Science_and_Analytics 16.7% n=12
Education 7.9% n=38
Environmental_Consultancy 22.7% n=44
Food_Industry 19.0% n=21
Forestry_and_Woodland_Management 25.0% n=32
Infrastructure_Development_Energy 37.5% n=8
Infrastructure_Development_Other 44.4% n=9
Infrastructure_Development_Transport n=2
Local_Government_Other 14.9% n=47
Local_Government_Planning_and_Development 32.4% n=37
NGO_Conservation_and_Wildlife_Management 19.0% n=58
NGO_Other 20.5% n=78
Property_Development 20.0% n=10
Tourism_and_Recreation 5.3% n=19
Water_Management_and_Hydrology 27.3% n=11
Other_or_not_specified 10.5% n=609
All Respondents 15.1% n=1322
0
20
40
60
80
100
Percentage of Respondents (%)


18i - Development and planning: such as environmental survey data
Average tick rate across all sub-questions (Q17 & Q18)
Academia_and_Research 47.1% n=87
Agriculture_Agent_Consultant 46.2% n=39
Agriculture_Contract_Farmer 20.0% n=5
Agriculture_Owner_Occupier 36.2% n=138
Agriculture_Tenant_Farmer 33.3% n=18
Data_Science_and_Analytics 33.3% n=12
Education 47.4% n=38
Environmental_Consultancy 54.5% n=44
Food_Industry 47.6% n=21
Forestry_and_Woodland_Management 37.5% n=32
Infrastructure_Development_Energy 37.5% n=8
Infrastructure_Development_Other 44.4% n=9
Infrastructure_Development_Transport 50.0% n=2
Local_Government_Other 44.7% n=47
Local_Government_Planning_and_Development 67.6% n=37
NGO_Conservation_and_Wildlife_Management 53.4% n=58
NGO_Other 39.7% n=78
Property_Development 50.0% n=10
Tourism_and_Recreation 15.8% n=19
Water_Management_and_Hydrology 63.6% n=11
Other_or_not_specified 25.3% n=609
All Respondents 35.5% n=1322
0
20
40
60
80
100
Percentage of Respondents (%)


18ii - Farming: such as supply chain data and carbon or nature baseline measurements
Average tick rate across all sub-questions (Q17 & Q18)
Academia_and_Research 48.3% n=87
Agriculture_Agent_Consultant 59.0% n=39
Agriculture_Contract_Farmer 20.0% n=5
Agriculture_Owner_Occupier 52.9% n=138
Agriculture_Tenant_Farmer 38.9% n=18
Data_Science_and_Analytics 16.7% n=12
Education 50.0% n=38
Environmental_Consultancy 50.0% n=44
Food_Industry 57.1% n=21
Forestry_and_Woodland_Management 37.5% n=32
Infrastructure_Development_Energy 25.0% n=8
Infrastructure_Development_Other 33.3% n=9
Infrastructure_Development_Transport n=2
Local_Government_Other 46.8% n=47
Local_Government_Planning_and_Development 27.0% n=37
NGO_Conservation_and_Wildlife_Management 46.6% n=58
NGO_Other 46.2% n=78
Property_Development 50.0% n=10
Tourism_and_Recreation 26.3% n=19
Water_Management_and_Hydrology 54.5% n=11
Other_or_not_specified 24.0% n=609
All Respondents 35.9% n=1322
0
20
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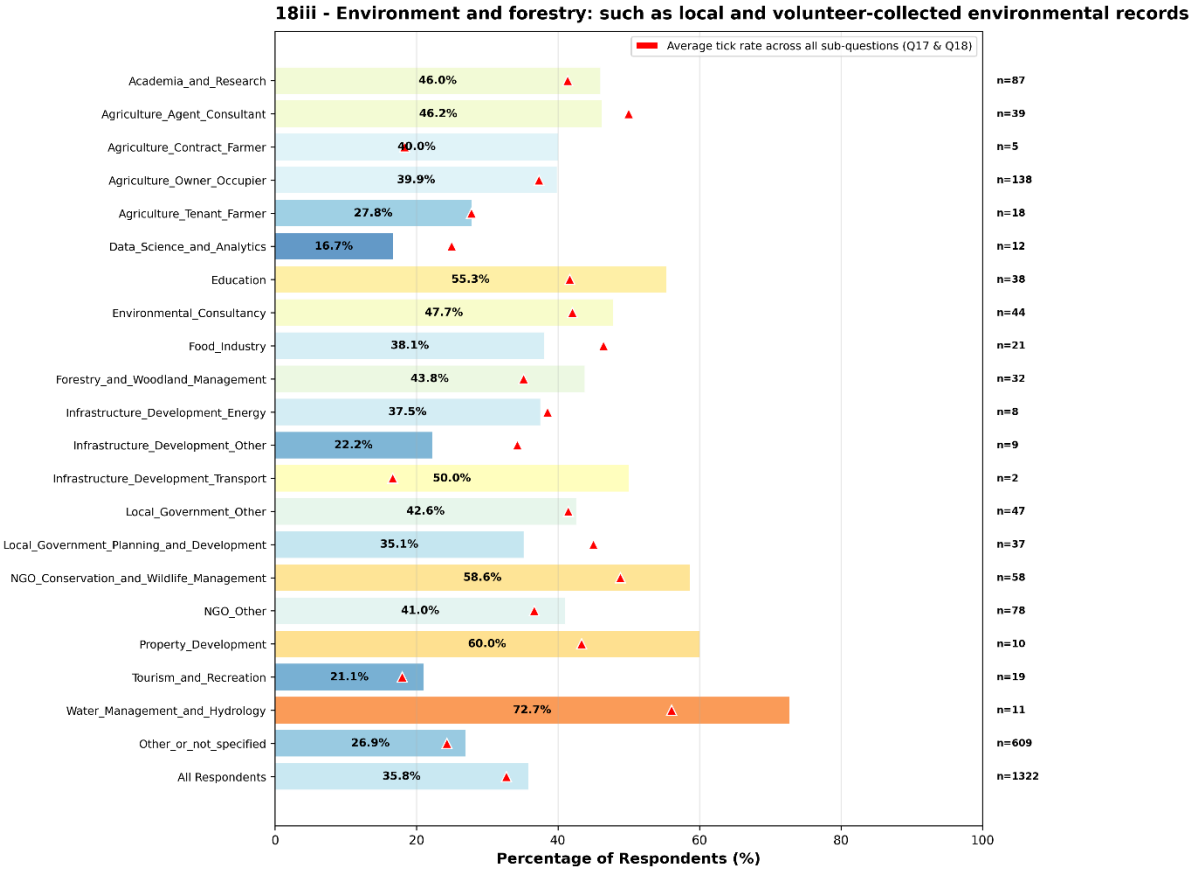
80
100
Percentage of Respondents (%)


18iii - Environment and forestry: such as local and volunteer-collected environmental records
Average tick rate across all sub-questions (Q17 & Q18)
Academia_and_Research 46.0% n=87
Agriculture_Agent_Consultant 46.2% n=39
Agriculture_Contract_Farmer 40.0% n=5
Agriculture_Owner_Occupier 39.9% n=138
Agriculture_Tenant_Farmer 27.8% n=18
Data_Science_and_Analytics 16.7% n=12
Education 55.3% n=38
Environmental_Consultancy 47.7% n=44
Food_Industry 38.1% n=21
Forestry_and_Woodland_Management 43.8% n=32
Infrastructure_Development_Energy 37.5% n=8
Infrastructure_Development_Other 22.2% n=9
Infrastructure_Development_Transport 50.0% n=2
Local_Government_Other 42.6% n=47
Local_Government_Planning_and_Development 35.1% n=37
NGO_Conservation_and_Wildlife_Management 58.6% n=58
NGO_Other 41.0% n=78
Property_Development 60.0% n=10
Tourism_and_Recreation 21.1% n=19
Water_Management_and_Hydrology 72.7% n=11
Other_or_not_specified 26.9% n=609
All Respondents 35.8% n=1322
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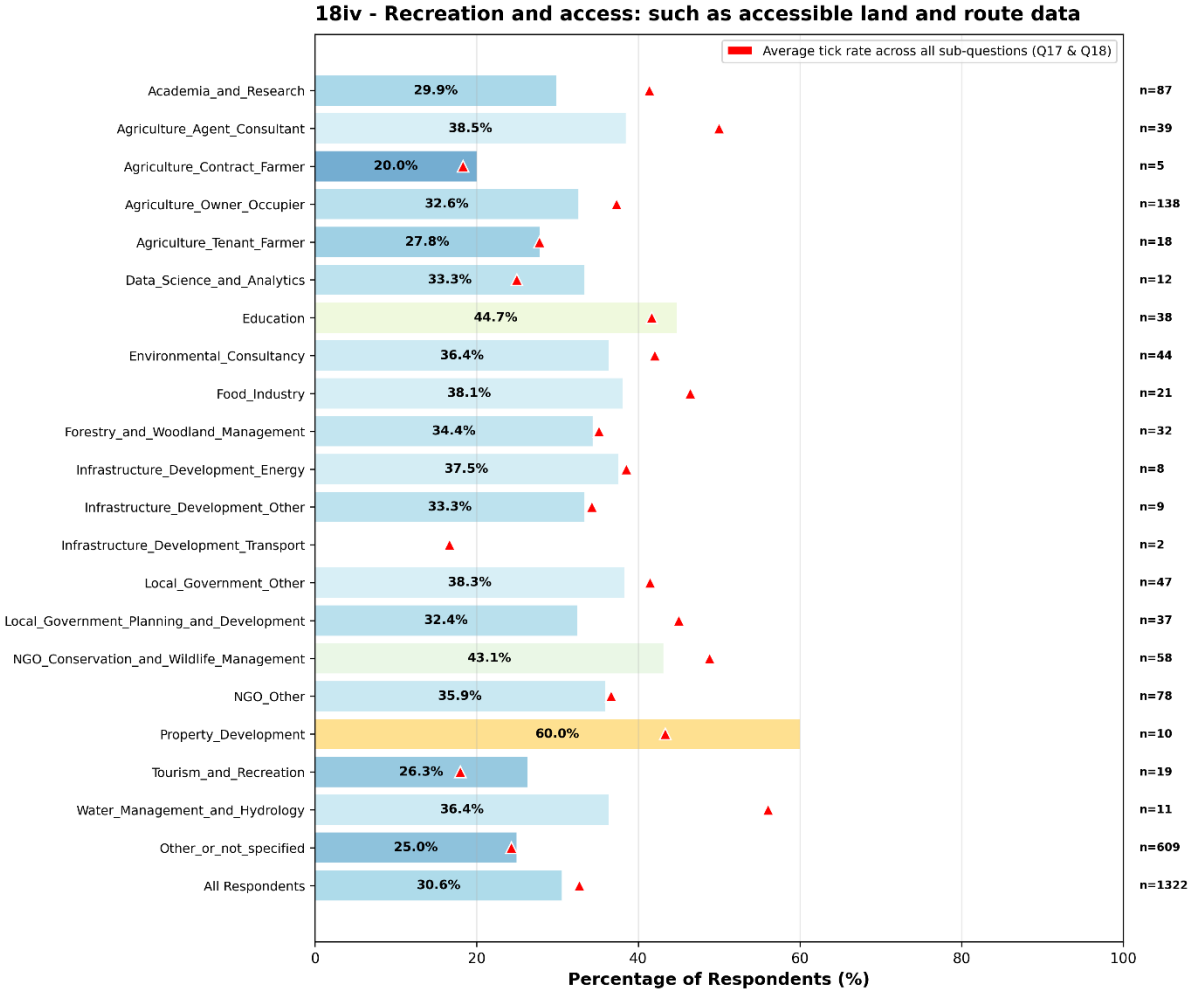
80
100
Percentage of Respondents (%)


18iv - Recreation and access: such as accessible land and route data
Average tick rate across all sub-questions (Q17 & Q18)
Academia_and_Research 29.9% n=87
Agriculture_Agent_Consultant 38.5% n=39
Agriculture_Contract_Farmer 20.0% n=5
Agriculture_Owner_Occupier 32.6% n=138
Agriculture_Tenant_Farmer 27.8% n=18
Data_Science_and_Analytics 33.3% n=12
Education 44.7% n=38
Environmental_Consultancy 36.4% n=44
Food_Industry 38.1% n=21
Forestry_and_Woodland_Management 34.4% n=32
Infrastructure_Development_Energy 37.5% n=8
Infrastructure_Development_Other 33.3% n=9
Infrastructure_Development_Transport n=2
Local_Government_Other 38.3% n=47
Local_Government_Planning_and_Development 32.4% n=37
NGO_Conservation_and_Wildlife_Management 43.1% n=58
NGO_Other 35.9% n=78
Property_Development 60.0% n=10
Tourism_and_Recreation 26.3% n=19
Water_Management_and_Hydrology 36.4% n=11
Other_or_not_specified 25.0% n=609
All Respondents 30.6% n=1322
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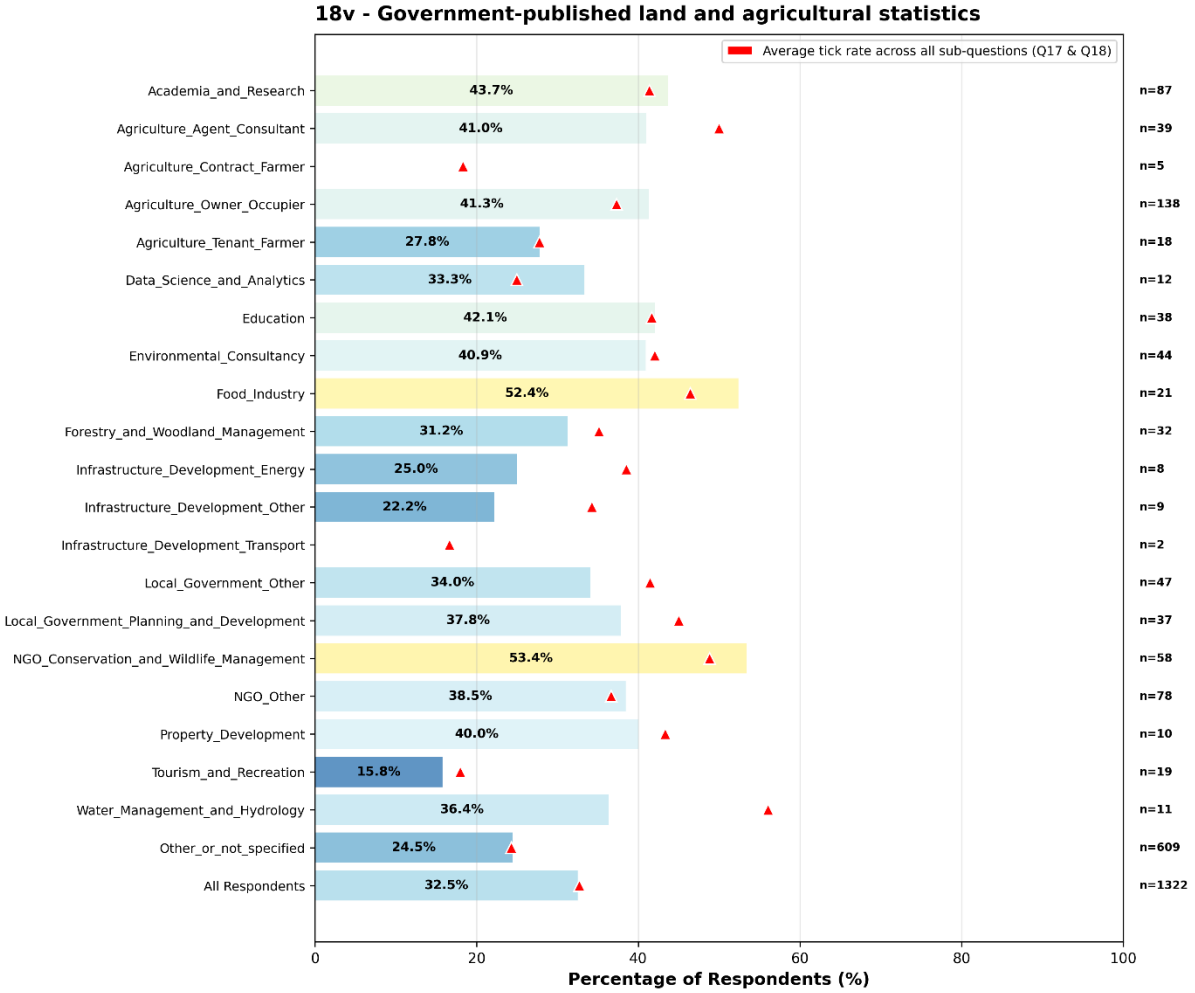
Percentage of Respondents (%)


18v - Government-published land and agricultural statistics
Average tick rate across all sub-questions (Q17 & Q18)
Academia_and_Research 43.7% n=87
Agriculture_Agent_Consultant 41.0% n=39
Agriculture_Contract_Farmer n=5
Agriculture_Owner_Occupier 41.3% n=138
Agriculture_Tenant_Farmer 27.8% n=18
Data_Science_and_Analytics 33.3% n=12
Education 42.1% n=38
Environmental_Consultancy 40.9% n=44
Food_Industry 52.4% n=21
Forestry_and_Woodland_Management 31.2% n=32
Infrastructure_Development_Energy 25.0% n=8
Infrastructure_Development_Other 22.2% n=9
Infrastructure_Development_Transport n=2
Local_Government_Other 34.0% n=47
Local_Government_Planning_and_Development 37.8% n=37
NGO_Conservation_and_Wildlife_Management 53.4% n=58
NGO_Other 38.5% n=78
Property_Development 40.0% n=10
Tourism_and_Recreation 15.8% n=19
Water_Management_and_Hydrology 36.4% n=11
Other_or_not_specified 24.5% n=609
All Respondents 32.5% n=1322
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40
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80
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Percentage of Respondents (%)

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