**Specification for Archetypes for transforming rural UK land-use to high-carbon store, climate resilient, nature rich and economically productive systems – Part Two**

Tender Reference Number: IT-0923

**Specification of Requirements**

**Invitation to Tender for Archetypes for transforming rural UK land-use to high-carbon store, climate resilient, nature rich and economically productive systems – Part Two**

Tender Reference Number: IT-0923

Deadline for Tender Responses: 2nd October 2023

**Contents**

1. Introduction

2. Background and overall aim of the project

3. Project specification (including methodology)

4. Outputs Required

5. Ownership and Publication

6. Quality Assurance

7. Timetable

8. Challenges

9. Ethics

10. Working Arrangements

11. Required Skills

12. Consortium Bids

13. Budget

14. Evaluation of Tenders

**1 Introduction**

The Committee on Climate Change (CCC)[[1]](#footnote-1) is an independent, statutory body established under the 2008 Climate Change Act and is tasked with:

* Providing independent advice to Government on setting and meeting carbon budgets in line with the UK’s longer-term target to reduce greenhouse gas (GHG) emissions by at least 80% by 2050 compared with 1990 levels, and reporting to Parliament on the progress made.
* Providing independent advice to the Government on risks and opportunities to the UK from climate change, in part through the UK Climate Change Risk Assessment, and reporting to Parliament on progress in adapting to climate change.

To do this, we conduct independent analysis into climate change science, economics and policy, and engage with a wide range of organisations and individuals to share evidence and analysis. Our past reports are available from http://www.theccc.org.uk/publications/

# 2 Background and overall aim of this project

The CCC’s advice on the level of Sixth Carbon Budget[[2]](#footnote-2) (for the 2030s) was accepted by Government in 2021.[[3]](#footnote-3) Meeting the Sixth Carbon Budget and the longer-term Net Zero target by 2050 requires contribution from all sectors of the economy, including the agriculture and land use, land use change and forestry (LULUCF) sectors. This will require a transformation in how land is used in the UK, with some land converted from agricultural production for alternative lower-emission uses, such as afforestation, peatland restoration and bioenergy crops. How and where we transition agricultural land to these other land uses remains to be understood.

Transforming the UK’s land use is needed so that we can deliver other objectives, including for climate adaptation and nature recovery. The CCC’s third Independent Assessment of UK Climate Risk (CCRA3)[[4]](#footnote-4) identified priority risk areas as being critical for climate adaptation in the next two years, four of which relate to the natural environment and the use of land:

* Risks to natural carbon stores and sequestration from multiple hazards leading to increased emissions.
* Risks to soil health from increased flooding and drought
* Risks to crops, livestock and commercial trees from multiple hazards
* Risks to the viability and diversity of terrestrial and freshwater habitats and species from multiple hazards.

We need to understand effective action to change land use before further climate change impacts the land, which will enable land managers to protect and enhance the land’s ability to maintain ecosystem services delivery.

Our analysis has focused on estimating the impact of land-use change/management on carbon and GHG emissions at the national level (i.e. England and each of the devolved administrations (DAs)). In practice, the changes needed to mitigate and prepare for climate change vary depending on climatic, economic, social and environmental factors, at the farm, catchment and landscape level.

**The aim of this tender** **is to quantify the impact of a set of plausible land-use transitions (towards higher-carbon stores, resilient, productive and nature-rich state for a range of representative rural land use ‘archetypes’**[[5]](#footnote-5) **in England and the UK’s DAs[[6]](#footnote-6), then estimate climate risks to these land-use transitions under various degrees of warming**.[[7]](#footnote-7)

This project has been split into two parts:

* **Part one** of the Archetypes project was completed earlier this year, with 12 land archetypes shortlisted to represent current rural land use and land management in England and each of the DAs (see Annex 1). We commissioned the Centre of Ecology and Hydrology (CEH) to undertake the work; a full description of each baseline archetype and the criteria for their selection can be found on the CCC website.[[8]](#footnote-8)
* **Part two**, which is what we are tendering for here, will focus on quantifying the carbon, environmental and food production impacts of plausible future land-use transitions for each of the 12 archetypes identified under Part one and understanding their climate risks. The land transitions should focus on changes in land use and management that aim to deliver as many of the following co-benefits as possible:
	+ Increased carbon sequestration and GHG emissions reductions,
	+ Sustainable domestic food production,
	+ Supporting nature recovery,
	+ Improving climate resilience.

In some cases, there may be trade-offs, which should be identified. We would like you to assess the climate risks to the effectiveness of the respective land-use transitions with various degrees of warming potential.[[9]](#footnote-9)

# 3 Project specification (including methodology)

To fulfil Part 2 (above), we have listed four tasks that must be completed via this tender, with the 5th being optional:

1. Quantify a baseline of GHG emissions and a range of other environmental metrics for 2021, 2035 and 20506 for each of the 12 land-use archetypes that have been identified by CEH under Part one above.
2. Develop plausible future land-use transition pathways for the above 12 baseline archetypes and quantify effects of the above climate resilience, food production and environmental metrics for 2035 and 2050.6
3. Quantify climate risks9 and uncertainties using the above climate, food production and environmental metrics in land-use transitions from tasks 1-2.
4. Valuation of costs and benefits for moving from baseline to transition archetypes.
5. Optional. Extend the analysis of land use and extent to the remaining UK rural area outside of the 12 archetypes from Task 1.

Given the range of expertise that would be needed to deliver this project, we would welcome a consortium bid.

***Task 1: Quantify a baseline in emissions, food production and other environmental metrics for 2021, 2035 and 20506 for each of the 12 land-use archetypes***

Under Part One, CEH provided a baseline description of each land archetype, which include land area coverage, location, and how the land is used and managed. CEH also included baseline 2021 emissions estimates for the agricultural and land use, land-use change and forestry (LULUCF) sectors for each archetype using Local Authority data from the Department for Energy Security and Net Zero.[[10]](#footnote-10) These estimates are aligned to the latest methodology set out in the GHG agriculture and LULUCF Inventories 1990-2021.[[11]](#footnote-11)

For Task 1 in this project, you will need to quantify the GHG emissions estimates (agriculture and land use) and a range of other environmental metrics for each archetype for 2021, 2035 and 20506, based on a continuation of current land use and management and current trends (e.g. in agri-environment policy and productivity improvements). We assume no projected change in climate. The metrics will allow us to compare how land use and the accompanying outputs change in 2035 and 20506 for each archetype following the transition (in Task 2) relative to the baseline:

* **Each archetype should be mapped to a land-use category (or categories) used in the current UK LULUCF GHG Inventory** (Grassland, Cropland, Forest Land, Settlements and Other Land). Current and future GHG emissions and carbon content changes should be calculated consistent with the current GHG methodology. There will be some land-use transitions under Task 2 (below) that could also be considered, such as natural regeneration of trees that are not currently captured in the GHG Inventory (see Annex 2d).
* **Identify a set of key metrics to quantitatively describe each archetype**. The metrics should include, at a minimum, carbon content and flux, non-CO2 emissions building on the work done by CEH under Part One, biodiversity metrics aligned to those used to determine the proposed statutory targets under the Environment Act, food production metrics, and metrics of climate resilience (see Annex 3). We would like you to propose the range of metrics which you could evaluate as part of the bid document, with the final set to be agreed with the CCC at the project inception meeting.
* **Quantify the key metrics for each archetype for 2021[[12]](#footnote-12), 2035 and 20506**. Where possible, uncertainty ranges should be given. For key properties that are not possible to quantify, a qualitative assessment or expert judgement should be included. Quantifying the metrics should be done robustly and transparently, drawing on published estimates elsewhere in the literature (e.g. Government statistical sources) and with references provided.
* **Consider metrics where actions within the archetype improve resilience outside that area** e.g. alleviating flooding downstream of an upland hill farm by restoring peat on the land.

***Task 2: Develop plausible future land-use transition pathways for the above 12 baseline archetypes and quantify effects of the above climate and environmental metrics for 2035 and 20506.***

For each archetype quantified in Task 1,apply a set of land-use change and land management ‘measures’ that will deliver increased carbon sequestration, GHG emissions reductions, and contribute to climate resilience[[13]](#footnote-13) and increased nature recovery. In some cases, there may be trade-offs, including with food production[[14]](#footnote-14), which should be identified and quantified where possible.

* **As a starter, the type of land use and land management ‘measures’ should be consistent with those in the CCC’s Sixth Carbon Budget analysis and the Third Climate Change Risk Assessment** (see Annex 2). For transitions that maintain agricultural production, there are a suite of low-carbon farming practices that could be implemented to reduce nitrous oxide and methane from managing soils, livestock, and livestock wastes and manures, in addition to energy use.
* In addition to the Sixth Carbon Budget measures, consider other measures that can help deliver the 25 Year Environment goals (e.g. agroecological farming measures, sustainable intensification of agriculture, natural regeneration for biodiversity and habitat restoration) where there is robust evidence and data to support their inclusion; and wider trends in land diversification, such as hosting solar/wind farms.[[15]](#footnote-15) For some baseline archetypes, it may be possible to apply more than one future land use transition.[[16]](#footnote-16) A menu of potential changes that could be applied to each archetype should be developed and agreed with the CCC early in the project.
* **The impact of the transition should be quantified using the same metrics set out in Task 1**. This will identify benefits for carbon, biodiversity and climate resilience, together with potential trade-offs e.g. food production. Your bid should give some indication of what outputs you are able to quantify and, where you are unable to, what qualitative assessment you propose to use.
* **The transitional outputs should be generated for 2035 and 20506**, allowing for comparison against the baseline outputs generated in Task 1. The precise periods will be confirmed with the winning contractor at the kick-off meeting. As with Task 1, we assume no projected change in climate.

Evidence to support transitional outcomes is likely to come from a range of sources, using both quantitative and qualitative evidence. In the bid, you should set out your approach to synthesising the evidence. For example, you could apply a hierarchy of evidence ranging from data specific to the UK to that in a global context. In final outputs, where evidence is unavailable or unknown, this should be highlighted, and future work suggested on how to meet such evidence needs.

***Task 3: Consider and quantify climate risk impacts and uncertainties drawing on the climate and environmental metrics in land-use transitions from tasks 1-2.***

We assume no projected change in climate under Tasks 1 and 2. Under Task 3, assess the climate risks and uncertainties in the ability of the land-use change and land management ‘measures’ to deliver climate and environmental outcomes (identified in Tasks 1 and 2) in the face of projected climate change.17 Figure 1 outlines suggested steps to deliver this task. This task will help us understand how future climate risk could impact carbon budget pathways and environmental goals for the land use and agriculture sectors.

The impacts of various degrees of climate change[[17]](#footnote-17) between 2021, 2035 and 20506 on Task 1 metrics should be evaluated using projected changes from the most up-to-date projections for future UK weather and climate (UKCP18), considering uncertainty within these projections. Guidance on the specific UKCP18 ensemble members that should be used within the analysis will be provided by the CCC and/or the Met Office.

* **Quantify effects of projected climate change17 on the climate and environmental metrics (used in Tasks 1-2)**. You should use the CCRA3 assessment of risk for ‘N5 - Risks and opportunities for natural carbon stores, carbon sequestration and GHG emissions from changing climatic conditions, including temperature change and water scarcity’[[18]](#footnote-18) and relevant additional evidence to help with this task. If time/budgets are limited, you should prioritise the carbon metrics. You should attempt to quantify these effects (e.g. changes in abatement potential of CB6 measures due to climate change) but a range or qualitative approach is acceptable where evidence is highly uncertain.
* **Consider how climate risks and associated impacts may vary both temporally**[[19]](#footnote-19) **and spatially**[[20]](#footnote-20)
* **Identify possible approaches to mitigate climate risk of climate and environmental outcomes.** This could include adjusting scale of delivery, spatial or temporal targeting of delivery, and/or adjusting the land management assumption within a measure (e.g. alterations to species mix or addressing water supply).

Figure 1. A summary of the steps required under Task 3



***Task 4. Valuation of costs and benefits for moving from baseline to transition archetypes***

For each archetype, assess the costs and benefits of the transition. You will have access to the monetised costs and benefits model that Vivid Economics produced for the CCC in 2020,[[21]](#footnote-21) but costs and benefits may need to be updated to reflect changes in prices and inflation, for example.

This task will help identify: 1) the costs/benefits of each transition and 2) the differing income streams that the transition could deliver beyond agricultural production, both in terms of new market opportunities (e.g. harvesting of energy crops) and public funding for the delivery of public goods (e,g. under the Environmental Land Management scheme or similar schemes in the DAs).

Specifically, we require the consultant to:

* **Quantify the market costs and benefits of each baseline archetype set out in Task 1 for 2021, 2035 and 20506**. This is likely to capture, for instance, income from agricultural production (e.g. arable crops, bioenergy crops and livestock).
* **Quantify the investment needs of the transitions** by determining the benefit to cost ratio and calculating any shortfall in funding needed.
* **Quantify the direct market impacts from the uptake of measures** set out in Annex 2 (e.g. forestry, bioenergy crops, peatlands, solar panels) covering costs of woodland creation, bioenergy crops on farms and peatland restoration; and benefits where products from these have a market value (e.g. harvested biomass material, agricultural production, renewable energy).

Beyond the delivery of market goods, each transition may deliver a range of non-market benefits for the environment (e.g water/air quality, biodiversity) that you may want to consider quantifying or assessing. You should also consider what approach to use for the Devolved Administrations where the equivalent public funding schemes are less developed.

The precise elements of this task will be finalised at the start of the project with the winning contractor (e.g. whether to consider both social and private costs and benefits), but you should set out in your bid what you consider to be feasible given the budget and timeline. In your application, you will need to demonstrate your understanding and expertise of accounting for the economic costs and benefits of agriculture and land use, so the bid should include the methodology to be used for this analysis, which could include a worked-up example.

***Optional Task 5. Extend the analysis of land use and extent to the remaining UK rural area outside of the 12 archetypes from Task 1.***

The current list of 12 archetypes cover approximately 50% of the UK land area that is not used for settlement.[[22]](#footnote-22) We would like consultants to investigate the potential to extend the coverage of land area, location, and how the land is used and managed to the remaining UK rural areas outside of the 12 archetypes from Task 1. A priority for this extension to the additional 50% of UK land-cover (after accounting for urban environments) is to enable a baseline description of the current make up of UK land-use to be presented spatially and will support broader research in CCRA4 into urgent risks from climate change across the UK. We are open to proportionate proposals in this task for what elements of the analysis could be extended beyond the coverage of the existing archetypes consistent with the budget and timescales identified.

# Key deliverables and activities

* A report (of approximately 60-100 pages) setting out the methodology and findings of Tasks 1-4 and 5, if applicable.
* Quantification of outputs, qualitative assessment of outputs, judgements/ assumptions/ limitations involved, and identification of evidence gaps and priorities for future work.
* GIS layers of spatial data in an open source format - either shapefile (.shp) or geodatabase (.gdb) , with the exact format to be agreed early in the project.
* Transparent Excel spreadsheets with comprehensive quantification for each archetype for all metrics with sources fully documented:
	+ Baseline 2021, 2035 and 20506 results for Task 1.
	+ Results for 2035 and 20506 for Task 2.
	+ Results from 2030-2080 for Task 3 under various degrees of climate change.
	+ Inputs (prices, costs) and outputs (e.g. income) for Task 4.
* Presentation of the interim and final results to the CCC and other interested parties.

# Timetable

The proposed timetable for the project is set out in the below table. In addition to the formal reporting points, the CCC would expect to have weekly scheduled discussions to ensure the work is progressing as expected. We would expect the large majority of the work (and therefore budget) to be completed within this financial year.

|  |
| --- |
| **Deliverables, activities, and timetable** |
| **Date** | **Action/Deliverable** |
| 13 September 2023 | Engagement call where interested parties can ask clarifying questions on the tender |
| 2 October | Deadline for responses to ITT |
| 11 October | Interviews with potential suppliers  |
| w/c 16 October | Kick-off meeting  |
| Early January 2024 | 1st Interim results meeting (present draft results for Tasks 1 and 2) |
| February 2024 | 2nd Interim results meeting (present draft results for Tasks 3 and 4) |
| March 2024 | Meeting to present and discuss first draft of final report to get feedback from the CCC for final editing of report |
| End June 2024 | Circulate write-up of final report and delivery of the spreadsheet  |

# Ownership and Publication

The key deliverables will be handed over to the CCC, who may choose to publish these as supporting evidence on their website. Spreadsheets should be open access and unrestricted, to enable full QA of results and assumptions. The spreadsheet will be the property of the CCC.

# Quality Assurance

All tasks must be quality assured and documented. Contractors should:

* Include a quality assurance (QA) plan that they will apply to all of the tasks.
* Specify who will take lead responsibility for ensuring quality assurance and ensure that this responsibility rests with an individual not directly involved in the research and analysis.
* Provide QA log to demonstrate the QA undertaken, including who undertook the QA and the scope, type and level of QA that has been undertaken (e.g. a log entry only stating ‘the data was checked’ will not be sufficient).
* Sign-off for the quality assurance must be done by someone of sufficient seniority within the contractor organisation to be able take responsibility for the work done. Acceptance of the work by the CCC will take this into consideration. The CCC reserves the right to refuse to sign off outputs which do not meet the required standard specified in this invitation to tender.
* The successful bidder will be responsible for any work supplied by sub-contractors and should therefore provide assurance that all work in the contract is undertaken in accordance with the quality assurance expectation agreed at the beginning of the project.
* The consultant must demonstrate their ability to produce deliverables of quality, in particular following best practice regarding economic analysis and presentation of results.

To this end, the CCC expects that:

* The analysis must be delivered in a simple, transparent Excel spreadsheet(s). All assumptions and figures etc should be adequately referenced, and include any supporting workings. This spreadsheet(s) will be the property of the CCC.
* Analysis should appropriately reflect uncertainty, where applicable by specifying ranges on uncertain outputs. Where appropriate, a sensitivity analysis of key parameters should be conducted.

# Challenges

Your bid should set out any challenges in meeting the specifications of this project and to the timeline set out above. The uncertainties and gaps in knowledge, inputs, data etc, to meet our specification, and how you intend to address this in the time required.

# Ethics (amend to suit or delete if not applicable)

All applicants will need to identify and propose arrangements for initial scrutiny and on-going monitoring of ethical issues. The appropriate handling of ethical issues is part of the tender assessment exercise and proposals will be evaluated on this as part of the ‘addressing challenges and risks’ criterion.

We expect contractors to adhere to the following GSR Principals:

1. Sound application and conduct of social research methods and appropriate dissemination and utilisation of findings
2. Participation based on valid consent
3. Enabling participation
4. Avoidance of personal harm
5. Non-disclosure of identity and personal information

# Working Arrangements

The successful contractor will be expected to identify one named point of contract through whom all enquiries can be filtered. A CCC project manager will be assigned to the project and will be the central point of contact.

# Skills and experience

 CCC would like you to demonstrate that you have the experience and capabilities to undertake the project. Your tender response should include a summary of each proposed team members experience and capabilities.

 Contractors should propose named members of the project team, and include the tasks and responsibilities of each team member. This should be clearly linked to the work programme, indicating the grade/ seniority of staff and number of days allocated to specific tasks.

Contractors should identify the individual(s) who will be responsible for managing the project.

# Consortium Bids

In the case of a consortium tender, only one submission covering all of the partners is required but consortia are advised to make clear the proposed role that each partner will play in performing the contract as per the requirements of the technical specification. We expect the bidder to indicate who in the consortium will be the lead contact for this project, and the organisation and governance associated with the consortia.

Contractors must provide details as to how they will manage any sub-contractors and what percentage of the tendered activity (in terms of monetary value) will be sub-contracted.

If a consortium is not proposing to form a corporate entity, full details of alternative proposed arrangements should be provided. However, please note CCC reserves the right to require a successful consortium to form a single legal entity in accordance with Regulation 28 of the Public Contracts Regulations 2006.

CCC recognises that arrangements in relation to consortia may (within limits) be subject to future change. Potential Providers should therefore respond in the light of the arrangements as currently envisaged. Potential Providers are reminded that any future proposed change in relation to consortia must be notified to CCC so that it can make a further assessment by applying the selection criteria to the new information provided.

# Budget

The overall budget for this project is up to £120,000 (including VAT). We welcome suggestions from consultants around what is feasible within the available timescales and budget. The project should draw on existing literature/data rather than primary research. We are looking for consultants’ expertise and experience to help us use and interpret this literature/data.

Contractors should provide a full and detailed breakdown of costs (including options where appropriate). This should include staff (and day rate) allocated to specific tasks.

Cost will be a criterion against which bids which will be assessed.

Payments will be linked to delivery of key milestones. The indicative milestones and phasing of payments can be adjusted and agreed with the contractor and Project Manager. Please advise in your tender response how this breakdown reflects your usual payment processes:

In submitting full tenders, contractors confirm in writing that the price offered will be held for a minimum of 60 calendar days from the date of submission. Any payment conditions applicable to the prime contractor must also be replicated with sub-contractors.

The Committee on Climate Change aims to pay all correctly submitted invoices as soon as possible with a target of 10 days from the date of receipt and within 30 days at the latest in line with standard terms and conditions of contract.

# Evaluation of Tenders

Contractors are invited to submit full tenders of no more than 35 pages, excluding declarations and CV’s. Tenders will be evaluated by at least three CCC staff.

CCC will select the bidder that scores highest against the criteria and weighting listed below, see the ITT for further information.

**EVALUATION CRITERIA AND SCORING METHODOLOGY**

|  |  |  |
| --- | --- | --- |
| Criterion | Description | Weighting  |
| 1 | RELEVANT EXPERIENCE / DEMONSTRATION OF CABABILITY | 20% |
| 2 | MANAGING YOUR RELATIONSHIP WITH THE CCC | 10% |
| 3 | QUALITY ASSURING THE SERVICES YOU PROVIDE | 10% |
| 5 | PROJECT TEAM AND MANAGEMENT– SKILLS AND KNOWLEDGE | 20% |
| 6 | METHOD, ABILITY AND TECHNICAL CAPACITY –  | 30% |
| 7 | RISK AND CHALLENGES | 10% |
|  |  | 100% |

**Scoring Method**

Tenders will be scored against each of the criteria above, according to the extent to which they meet the requirements of the tender. The meaning of each score is outlined in the table below.

The total score will be calculated by applying the weighting set against each criterion, outlined above; the maximum number of marks possible will be 100. Should any contractor score 1 in any of the criteria, they will be excluded from the tender competition.

|  |  |
| --- | --- |
| **Score** | **Description** |
| 1 | Not Satisfactory: Proposal contains significant shortcomings and does not meet the required standard |
| 2 | Partially Satisfactory: Proposal partially meets the required standard, with one or more moderate weaknesses or gaps  |
| 3 | Satisfactory: Proposal mostly meets the required standard, with one or more minor weaknesses or gaps. |
| 4 | Good: Proposal meets the required standard, with moderate levels of assurance |
| 5 | Excellent: Proposal fully meets the required standard with high levels of assurance |

**Scoring for Pricing Evaluation**

Price will be marked using proportionate pricing. Please see the example below.

Marking proportionate to the lowest price.

Price will be scored as set out below.

There will be a maximum of e.g. 20 marks

The lowest priced bid will receive the full 20 marks, all other bids will then be marked as set out below.

Proportionate Pricing scoring example

If 20% = 20 marks

|  |  |  |
| --- | --- | --- |
| Supplier | Price | Marks |
| 1 (lowest bid) | £50,000 | 20 |
| 2 | £60,000 | 50/60 \* 20 = 16.7 |
| 3 | £75,000 | 50/75 \* 20 = 13.3 |

**Structure of Tenders**

Contractors are strongly advised to structure their tender submissions to cover each of the criteria above and supply a price schedule specifying the daily rates (ex-VAT) you will charge for each level of your staff.

**Evaluation for Interviews, if held**

CCC reserves the right to award the contract based on applicants’ written evaluation only if one candidate emerges from the evaluation stage as significantly stronger than the others.

Should interviews go ahead, CCC will shortlist the top three suppliers with the highest marks from the written proposals. Interviews are provisionally expected to be held on the 11th October 2023. If this date changes, CCC will notify applicants.

The areas to be covered in the interview, and markings allocated to each topic area will be sent to the shortlisted supplier prior to interview.

Further details of interviews will be sent to successful applicants on selection.

**Feedback**

Feedback will be given in the unsuccessful letters or emails.

1. https://www.theccc.org.uk/ [↑](#footnote-ref-1)
2. https://www.theccc.org.uk/publication/sixth-carbon-budget/ [↑](#footnote-ref-2)
3. [Sixth Carbon Budget - Climate Change Committee (theccc.org.uk)](https://www.theccc.org.uk/publication/sixth-carbon-budget/) [↑](#footnote-ref-3)
4. [Independent Assessment of UK Climate Risk - Climate Change Committee (theccc.org.uk)](https://www.theccc.org.uk/publication/independent-assessment-of-uk-climate-risk/) [↑](#footnote-ref-4)
5. Archetypes represent a typical example of something, in this case land use and management at a farm or landscape level. [↑](#footnote-ref-5)
6. Exact years will be confirmed in the kick-off meeting, but likely to be 2021, 2030, 2050 and 2080 [↑](#footnote-ref-6)
7. Exact degrees of warming TBC but likely to be 1.5, 2, 2.5 and 3 $°$C [↑](#footnote-ref-7)
8. [*UK rural land use archetypes* (2023) Centre for Ecology and Hydrology](https://www.theccc.org.uk/publication/archetypes-representative-of-current-uk-rural-land-use-and-land-management-ukceh/) [↑](#footnote-ref-8)
9. e.g. 1.5, 2, 2.5 and 3 $°$C – exact temperature rises will be confirmed at the kick-off meeting [↑](#footnote-ref-9)
10. [*UK local authority and regional estimates of greenhouse gas emissions* (2023) Department for Energy Security and Net Zero.](https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2021) [↑](#footnote-ref-10)
11. [UK Greenhouse Gas Inventory, 1990 to 2021](https://uk-air.defra.gov.uk/assets/documents/reports/cat09/2304171441_ukghgi-90-21_Main_Issue1.pdf)  [↑](#footnote-ref-11)
12. This is the most recent year available for GHG emissions estimates from the UK agriculture and LULUCF GHG Inventories [↑](#footnote-ref-12)
13. Climate resilience here is defined as measures that will improve the resilience of nature, agriculture, forestry and other land-based sectors against the impacts of climate change. [↑](#footnote-ref-13)
14. For instance, an increase in the intensity of food production may allow land to be spared for nature restoration elsewhere but could lead to localised pollution. [↑](#footnote-ref-14)
15. Blue carbon measures lie outside the scope of this project. [↑](#footnote-ref-15)
16. For example, land use change via afforestation could follow a pathway that prioritises semi-natural woodland or conifer plantations, or a mix of the two. [↑](#footnote-ref-16)
17. Exact temperature rises will be confirmed at the kick-off meeting, but likely to be 1.5, 2, 2.5 and 3$°$C [↑](#footnote-ref-17)
18. <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA3-Chapter-3-FINAL.pdf> [↑](#footnote-ref-18)
19. e.g. near term – next decade, medium term – 2030 - 2050, and long term – 2050 - 2100 and beyond [↑](#footnote-ref-19)
20. e.g. consider if climate risk is consistent across the UK, or if more focussed in certain regions or land-use types [↑](#footnote-ref-20)
21. [Vivid Economics (2020) *Economic impacts of Net Zero land use scenarios.*](https://www.theccc.org.uk/wp-content/uploads/2020/01/Economic-impacts-of-Net-Zero-land-use-scenarios-Vivid-Economics.pdf) [↑](#footnote-ref-21)
22. Settlement covers housing, other urban development, and other infrastructure (roads, railways, windfarms, agricultural buildings etc). [↑](#footnote-ref-22)