

Closing the Climate Data Gap

Gaining clarity and confidence with climate evidence.

We believe climate action is slowed not by a lack of information, but by how that information is interpreted.

Closing the Climate Data Gap explores what gets lost between climate evidence and action, and offers three principles for using climate data more clearly: The ability to read statistics critically, the ability to reason with probabilities, the ability to prioritise at the right scale.

Published June 2026

Framing the problem

This project started with a set of ambitious questions: What is happening with scientific understanding in the climate action space? Where does interpretation break down? And what, if anything, can be done about it?

We started with two assumptions: that interpretations of climate science vary across contexts (business, policy, and daily decision-making) and that these variations shape how climate action is understood and implemented. To test and refine that problem statement, we interviewed 26 scientists, most of whom work in academia or research agencies, asking an open-ended question focused on challenges and errors encountered in the interpretation and use of climate science in practice. Participants were recruited through networks including the [European Climate Pact](#) and the [Open Letter to Party Leaders](#) community.

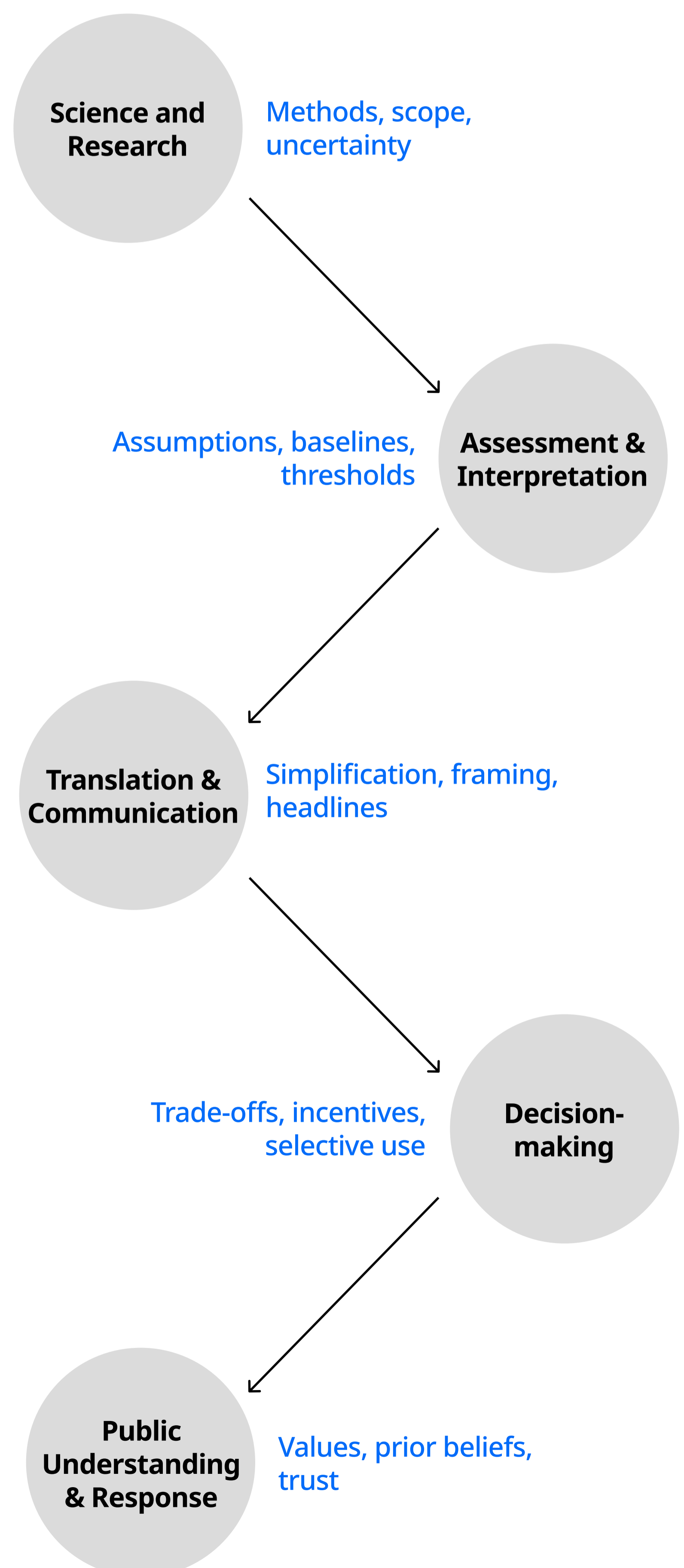
This allowed participants to surface a wide range of experiences, from misunderstandings and misinterpretations to issues of communication, incentives, and application. From the 145 examples they shared, we identified three key findings.

Methodology

Conversations were recorded with participants' consent and analysed thematically to find recurring patterns, points of convergence, and areas of divergence. Each of the 145 examples surfaced was coded into one of four categories (misunderstanding, lack of knowledge, misinformation, or disinformation) based on intent and mechanism. Where examples were borderline, they were coded according to the main mechanism by which the problem operates in practice, rather than by the intent behind its origin.

The findings are intended to provide directional insight rather than statistically representative results. Two limitations are worth noting. First, the sample reflects the perspectives of scientists working primarily within research and advisory contexts, with a minority working closer to media, politics, or public communications. As such, the sample might yield a distribution that is less accurate than that of scientists working primarily with the media. Second, disinformation by design tends to present itself as organic scepticism or genuine misunderstanding, which means it may be undercounted in a sample that relies on participants' own framing of what they observed. The 65% figure for misunderstanding should therefore be read as reflecting how scientists in research and advisory roles experience the challenge, rather than as a claim about the relative prevalence of each category across all contexts.

80%
of the world wants climate action.
So why do most decisions still fail these interests?



Key findings

Four related but distinct challenges shape climate action. Each requires a different set of interventions.

To better understand the barriers to effective climate action, we analysed the examples shared by scientists and identified four distinct types of challenges. While these are often conflated in practice, they differ in intent, underlying mechanism, and associated risks; and therefore require different responses.

The table summarises these categories, outlining how each type of problem manifests, the risks it poses, and the interventions it calls for:

Misunderstanding – 65% (94/145)

Intent

Neutral

Type of problem

Incorrect interpretation of correct information

Key risks

Confident but flawed decisions based on incorrect assumptions

Interventions

Clarification of concepts; reframing mental models; decision-support tools

Some people think that if you reduce emissions, the amount of carbon in the atmosphere comes down, but that's not the case; it stays there for decades or centuries

– Dr Richard Betts

Lack of knowledge – 26% (38/145)

Intent

Neutral

Type of problem

Absence of information

Key risks

Inaction or delayed action due to uncertainty or low confidence

Interventions

Awareness raising; accessible education; exposure to key concepts

They don't like to hear about the statistics. They just like to hear about what the impacts are... once I started to talk about (...) the 20-year average compared to this baseline period, it's already too technical
– An expert on climate risks and resilience

Misinformation – 4% (6/145)

Intent

Accidental

Type of problem

Incorrect sharing

Key risks

Decisions based on inaccurate external inputs

Interventions

Fact-checking; source verification; improved information quality

There is so much misinformation and misquoting of statistics on bioenergy, carbon capture and storage. The public perception is completely 180 degrees from the scientific reality

– Dr Astley Hastings

Disinformation – 5% (7/145)

Intent

Deliberate

Type of problem

Manipulation

Key risks

Distortion of decision-making and public perception

Interventions

Regulation; transparency; counter-narratives and accountability

The purpose of the hack [Climategate] in the first place, presumably, was to try and just spread discord and misinformation
– Dr Neil Jennings

The dominant barrier is interpretation, not access to information

Misunderstandings account for 65% of the examples in the dataset; a figure that holds consistently across scientific domains, professional contexts, and levels of expertise. The main challenge is not that people lack access to climate information. It is that they find it difficult to interpret what it means.

Misunderstandings appeared consistently in how evidence is read (e.g., averages and baselines), how uncertainty is interpreted (e.g., confidence intervals, scenarios, probability), and how impact is assessed (e.g., scale, relative importance, system effects).

Scientists are comfortable with viewing numbers flexibly, e.g., in terms of accuracy vs precision, uncertainty ranges, and probabilistic reasoning. Most non-specialists, however, interpret numbers as fixed and definitive, more akin to financial figures than to scientific estimates. As a result, the same data can lead to very different conclusions. A confidence interval becomes grounds for dismissing a finding. A range of scenarios becomes evidence of confusion. A probabilistic projection becomes an unreliable forecast.

If you tell a stakeholder that precipitation may increase by 20%, that information is not automatically useful. How can they act on this information? When we are talking about statistics, percentages or deviations from the mean, they are difficult to translate into practical decisions. What does it mean for your company, your operations or even for your family, for you personally.

– Dr Anastasia Lobanova

Misinterpreted data leads to decisions of misplaced priorities, delayed action, and misallocated resources. Interventions that are visible or convenient are prioritised over effectiveness. The cost of this is not abstract: it is measured in funding allocated to the wrong places, policies built on flawed assumptions, and risks that remain unidentified until they materialise.

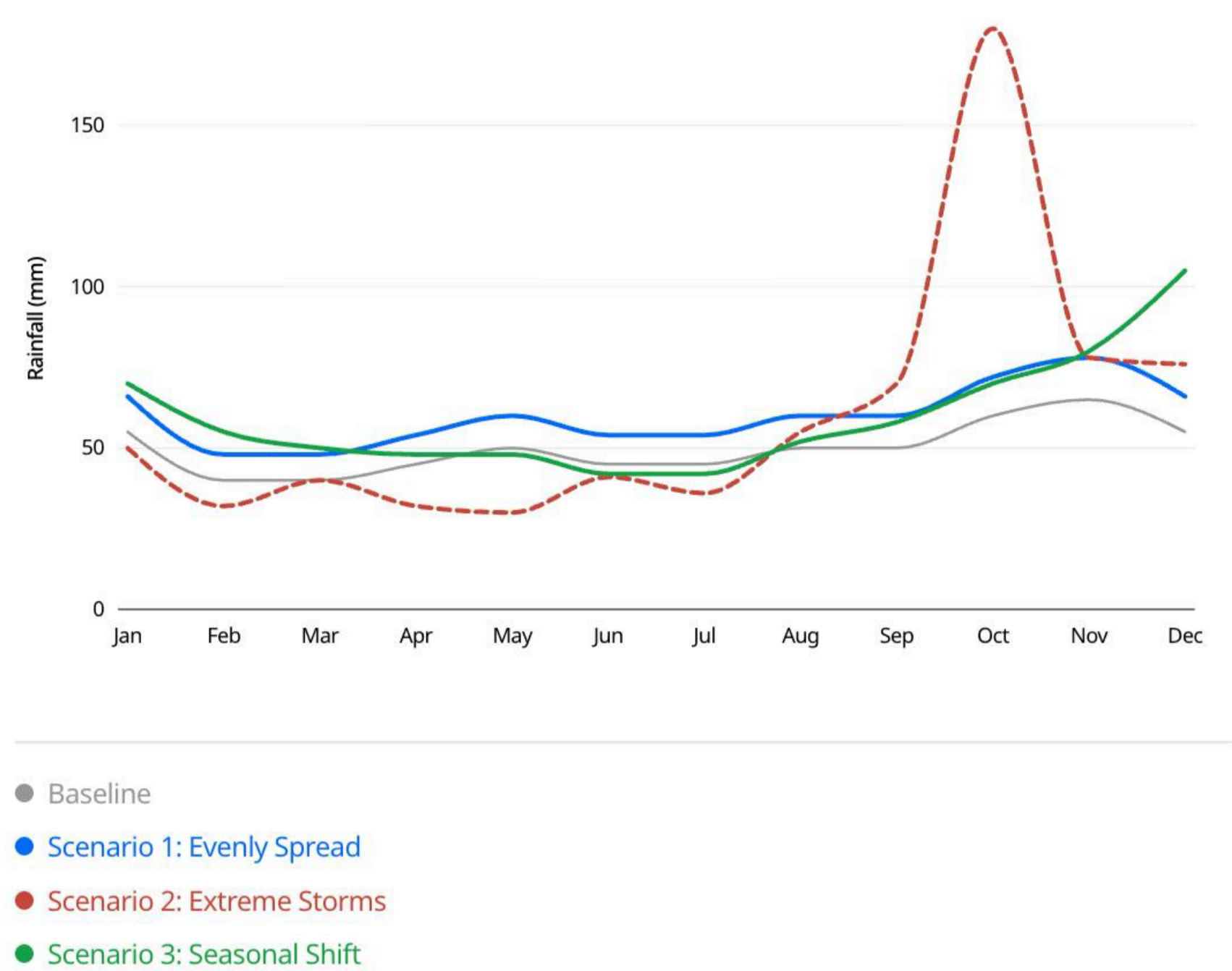
I wish that people would understand that global warming is not about phenomena that have never been there before. It's about the intensity, it's about the frequency, it's about the duration that is changing

– An expert on climate risks and resilience

Addressing these challenges requires strengthening how information is processed, not simply increasing its availability.

20% More Rain Per Year: Different Scenarios

The same total increase in rainfall can lead to very different outcomes depending on its distribution.



Misunderstandings compound as climate data moves through the system

Misunderstandings are not limited to a single group or level of expertise. They happen at every stage of the information journey: from analysis and advisory roles to communication, policy, and implementation.

At each stage, the same concepts (e.g., uncertainty, probability, scale) are reframed to meet different needs, bringing subtle shifts in meaning. These shifts do not remain isolated. They accumulate. An early misinterpretation, if uncorrected, can become the premise for the next decision. By the time a finding reaches the person acting on it, its meaning may have shifted substantially from the original version.

We spend ages discussing which number to focus on, and because I'm a statistician, I always want to emphasise the uncertainty on it. And then you do this beautifully nuanced press briefing and press release in which it stresses that this is only one number, only the midpoint of an interval, and that we think it's between this and this much more likely.

– Dr Clair Barnes

Sometimes it's mind-boggling to me when people say we should reduce emissions by 90% and deliver 10% through carbon dioxide removal by mid-century. Please tell me where you got that number from. (...) Taking the average and superimposing it (...). Prescribing what the entire world, every single actor, should do by 2050 is a very bad use of science.

– Dr Alaa Al Khourdajie

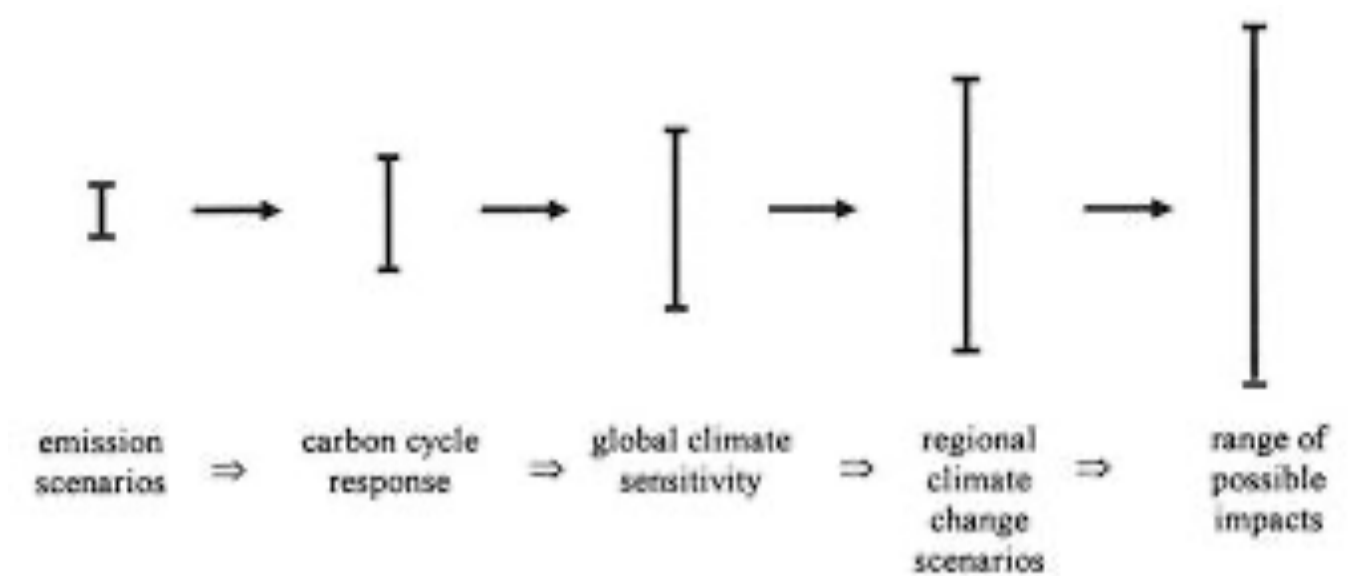
The following example illustrates how this compounding works in practice.

A regional model projects that precipitation will increase by 20% by 2040, with uncertainty across scenarios. Rainfall might arrive in a short period or be spread across the year. The information journey follows: the scientist states the complexity, the communicator publishes the “safer” scenario, the policymaker commissions a drainage review, the consultant designs for the average, and the contractor builds according to the design.

Ten years later, the city floods. Not because nobody had the information. Because at every stage, someone reasonably simplified it, and what was lost in each simplification was exactly what would have changed the decision.

A note on structural tension

The communication tools we rely on - headlines, single figures, direct attribution, and certainty - were designed for a world of straightforward causes and clear outcomes. Climate science describes something different: a world of ranges, margins, and probabilities, where what is likely matters more than what is certain, and where conditions shape conclusions. Closing that gap will require a different way of thinking about evidence itself.



The “Uncertainty Explosion”. Reproduced from Smith (2016), Investigating Uncertainty in Global Hydrology Modelling, University of Nottingham PhD thesis, under Creative Commons Attribution-NonCommercial. Figure modified after Jones (2000) and Schneider (1983).

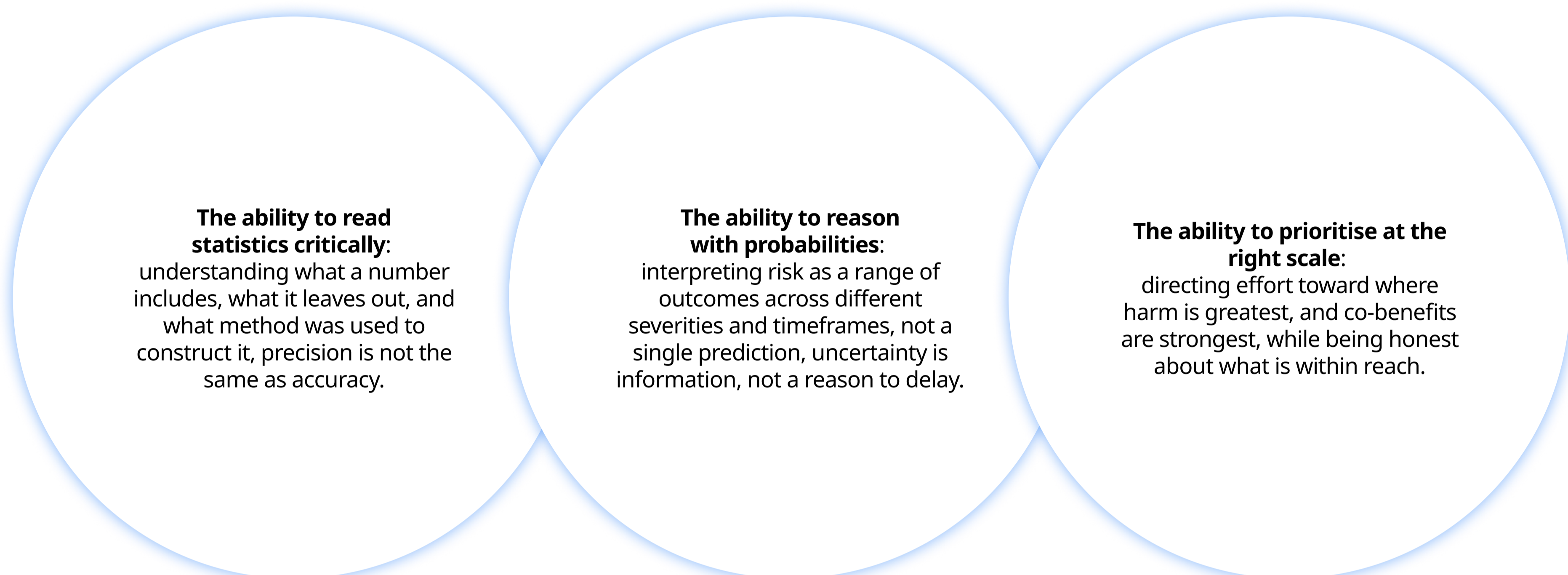


Urban flood debris jam in Catarroja after the October 2024 Valencia floods, Spain. Photo: Arnau Bayón, via the European Geosciences Union Hydrological Sciences blog, licensed under CC BY 4.0.

What this means in practice

The evidence points to a gap rooted in how we relate to evidence itself. Currently, the scientific thinking and culture aren't communicated alongside their content. New relationships with evidence need to be built: not through one-to-one explanation or ad hoc clarification, but through shared language that can travel across the information chain and hold its meaning at every stage.

Based on the research, three capabilities common to science are absent in the large majority of misunderstandings identified in our sample:

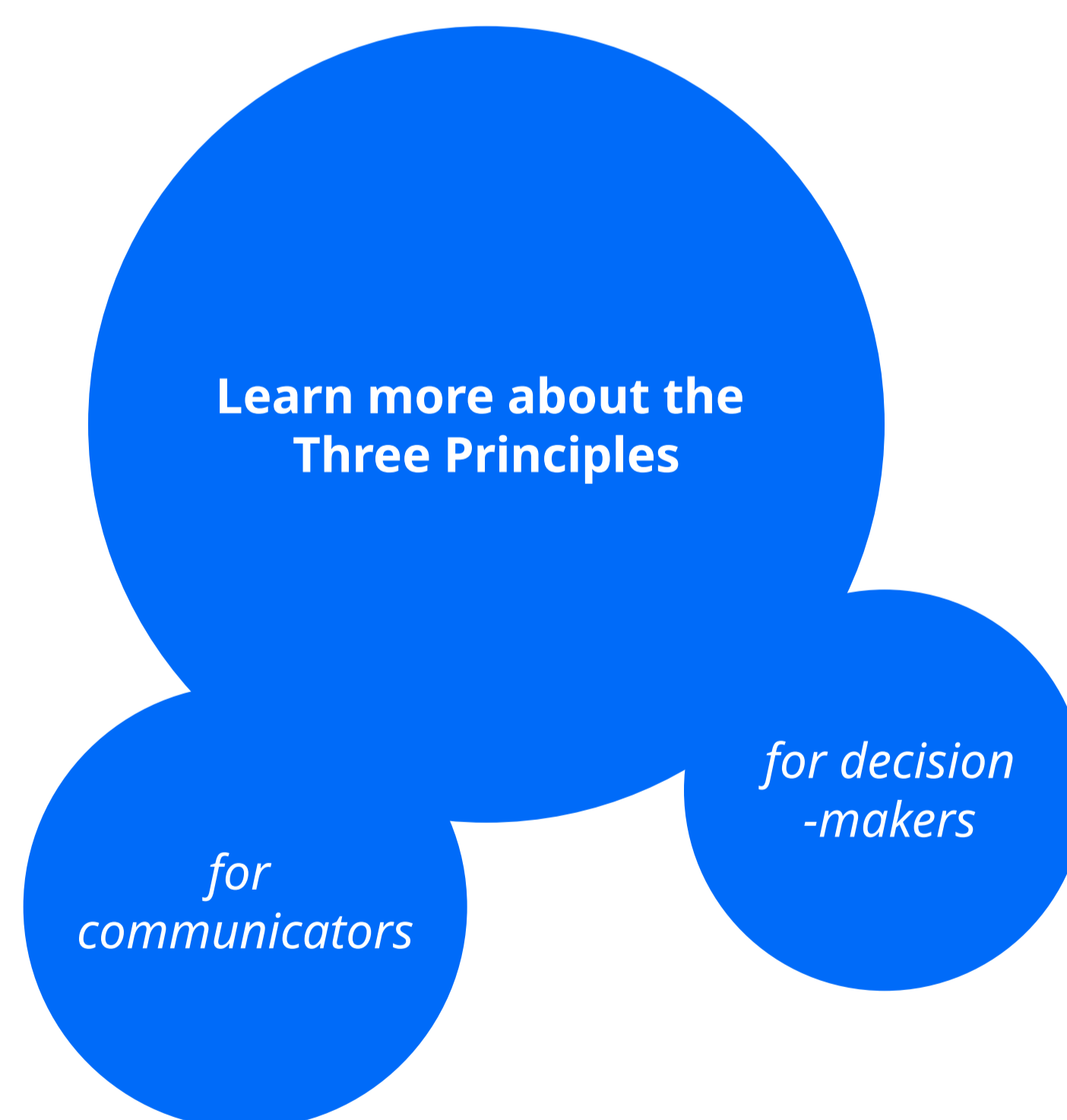


Together, these three capabilities form what we call science thinking: a practical methodology for working with climate evidence, applicable at every stage of the information chain. Two companion documents apply science thinking in practice.

- [*The Field Guide: Working with Climate Evidence*](#) is designed for decision-makers (policymakers, business leaders, and sustainability professionals) who send or receive climate information as part of their work.
- [*The Toolkit for Communicators: Translating Climate Science*](#) addresses the specific pressures of the translation role: working quickly, with incomplete information, and with a responsibility to an audience that will act on what they read.

We are at the beginning of this work, not the end. The framework is anchored in evidence; the tools are a first response to what that evidence implies. What is needed now is the resource to test whether they hold in practice, and partners willing to help build something genuinely useful, tested against the complexity of real decisions, and honest about what it can and cannot do.

We welcome challenge, collaboration, and conversation. If this research generates questions for your work, we would like to hear them.

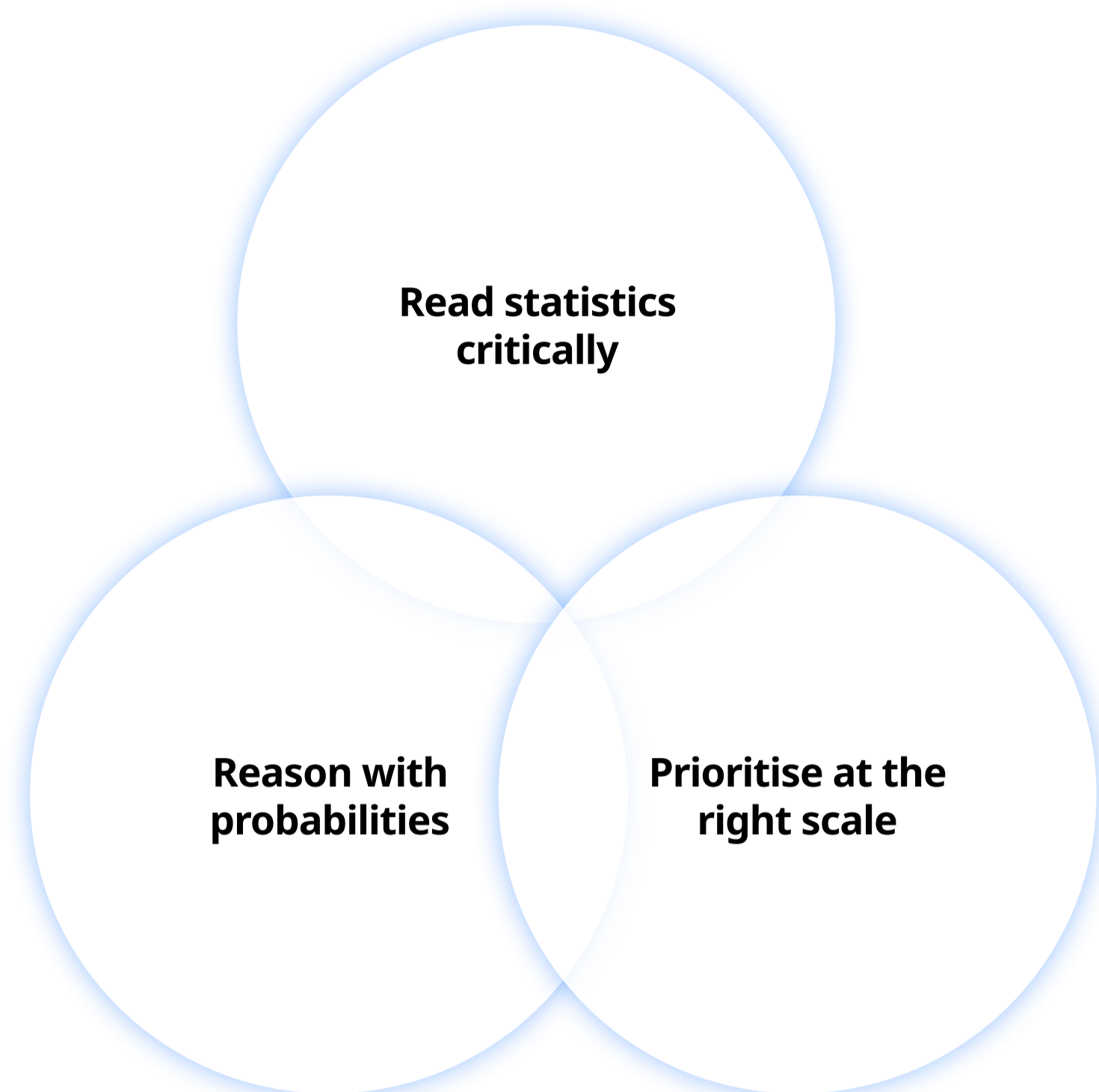


Closing the Climate Data Gap

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We believe climate evidence becomes more powerful when people can interpret it with clarity and confidence.

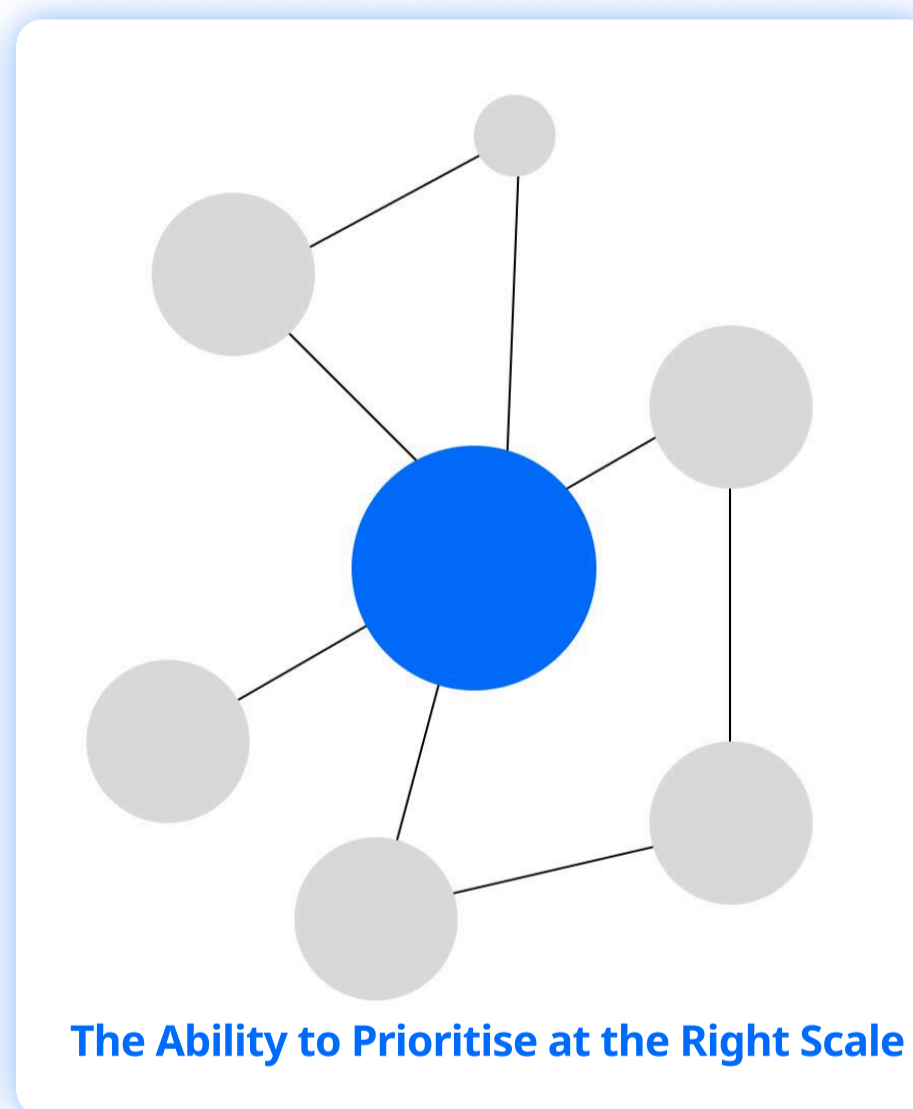
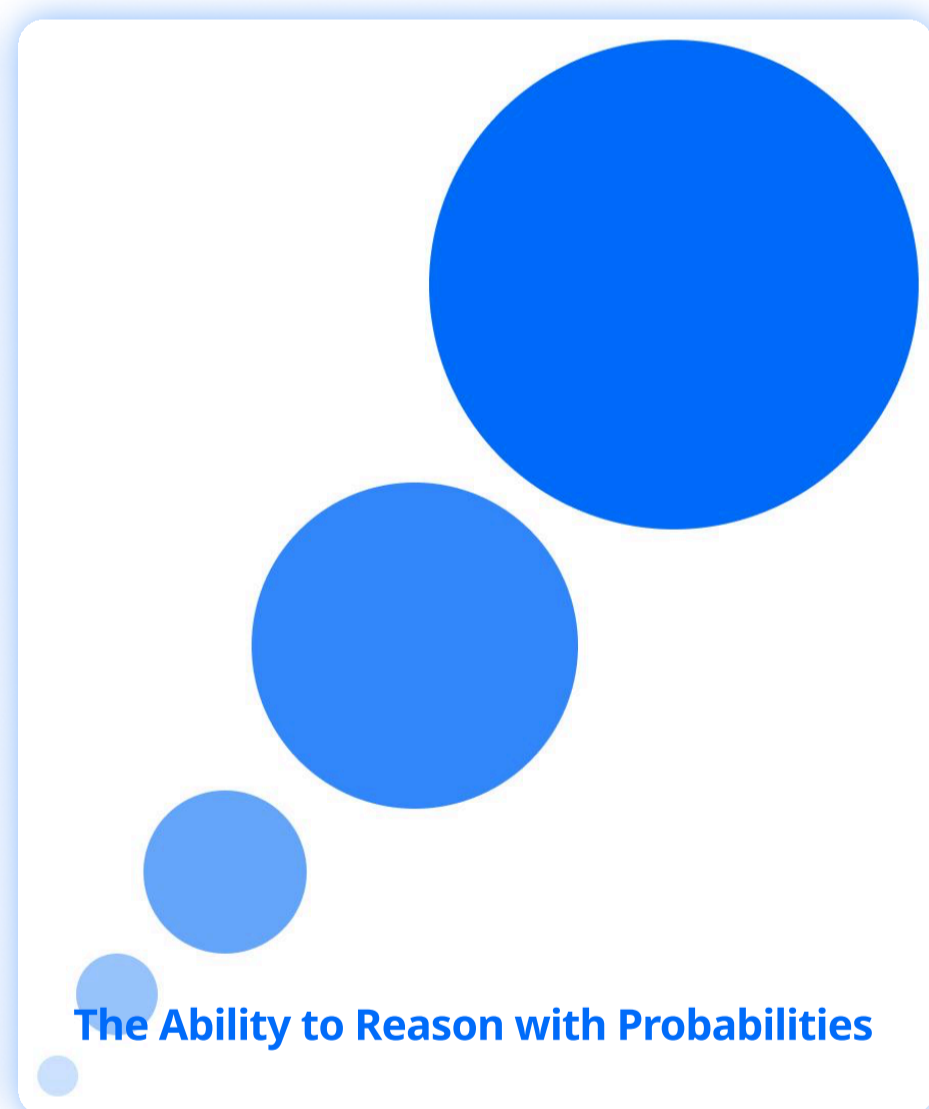
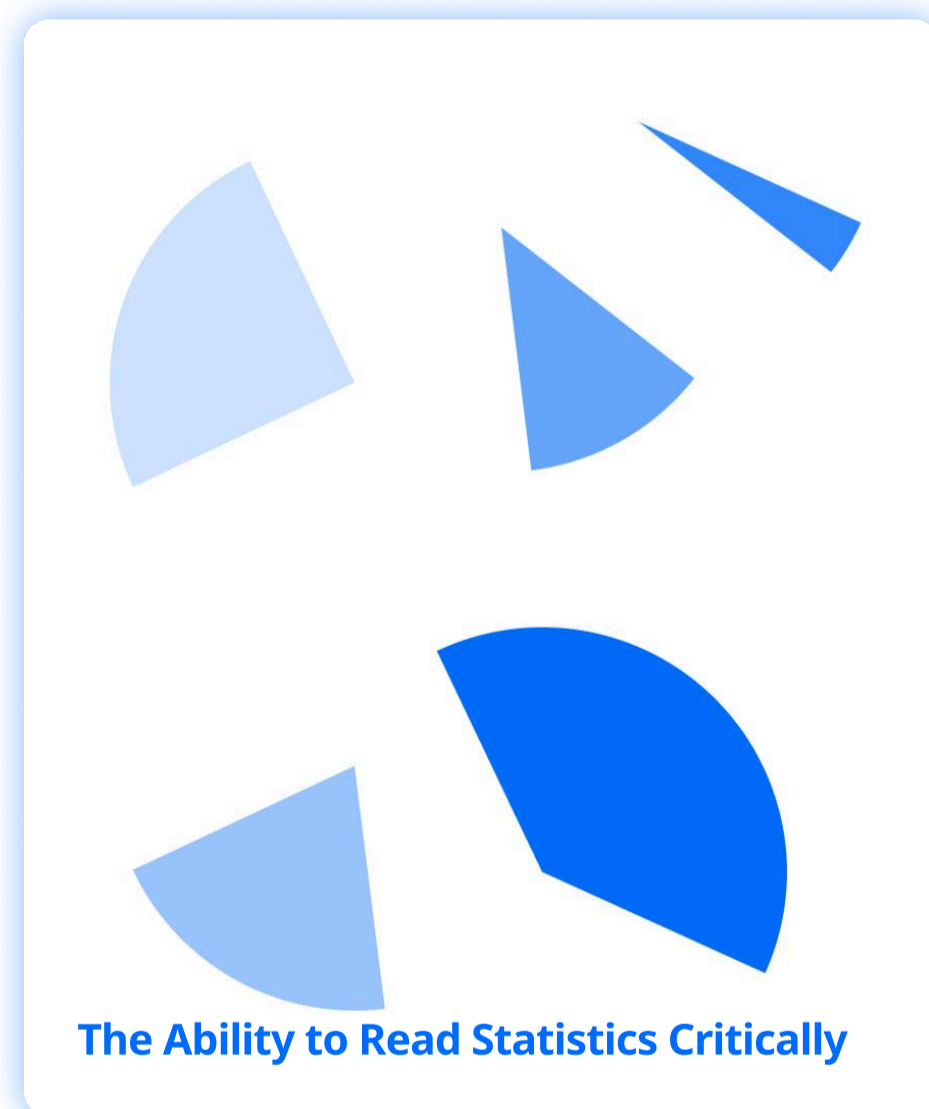
Science thinking offers a way to slow the loss of meaning between climate evidence and action, and introduces three principles for using climate data more clearly: the ability to read statistics critically, the ability to reason with probabilities, and the ability to prioritise at the right scale.



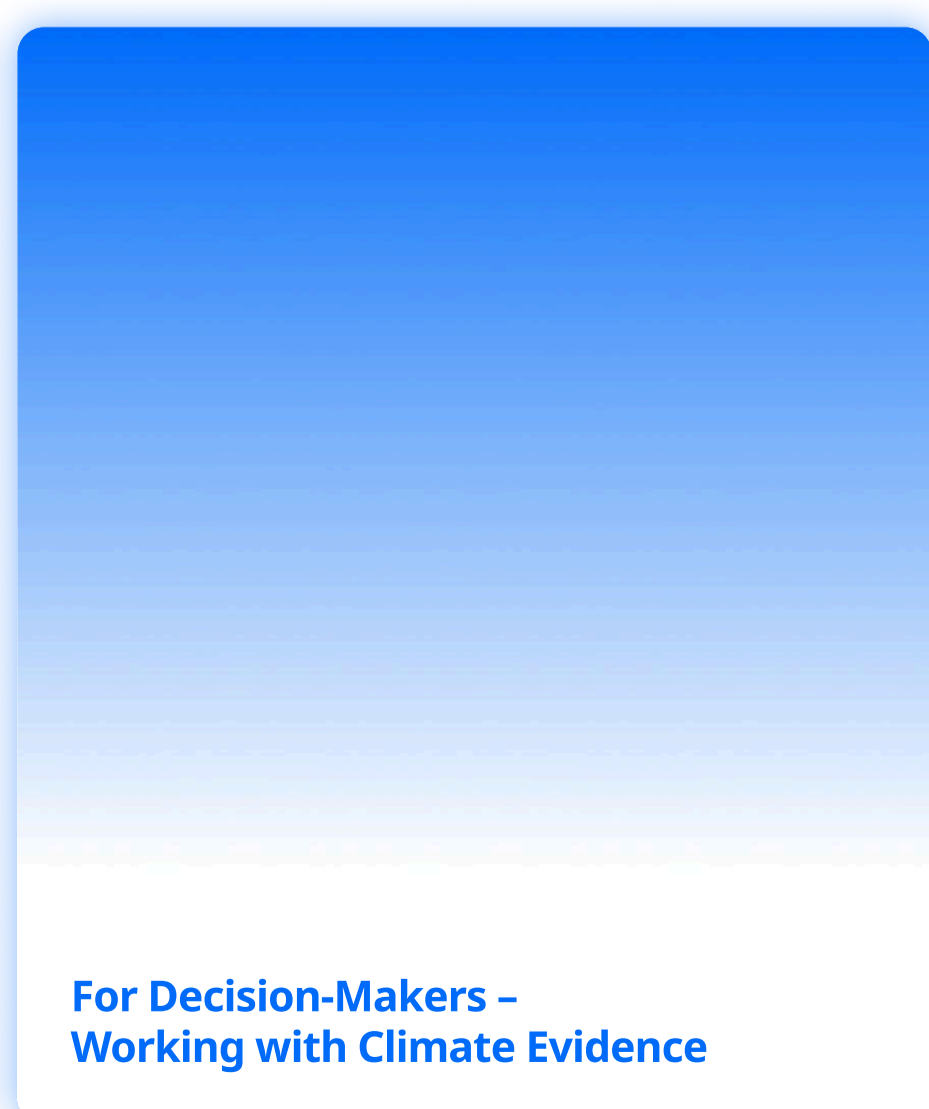
The 101s

These 101s introduce the three principles behind Closing the Climate Data Gap: how to read climate statistics critically, how to reason with risk and uncertainty, and how to prioritise action at the right scale.

They are written for anyone curious about climate evidence: whether you produce it, communicate it, interpret it, or act on it. Once you understand the principles, the toolkit and field guide show how to apply them in practice.



Applying the principles



The Ability to Read Statistics Critically

Numbers feel complete and authoritative. They are not. Every climate figure reflects choices about what to include, where to draw the scope, which starting point to use, and how to handle missing information. The first question to ask of any number is not what it says, but **what it covers**. If a company spends money on an activity, it incurs emissions associated with that activity. If significant impact areas are absent, everything built on that number is skewed from the start.

The difference between **accuracy and precision** matters here, and in climate data, they are rarely the same thing. A carbon footprint is calculated by multiplying an activity metric by a conversion factor, and conversion factors vary significantly in quality. An audited, product-specific factor is the most accurate. A database average is reasonable. A spend-based factor is the least reliable and should be treated as a starting point only. Understanding which method was used, and what the resulting error margin is tells you how much confidence to place in the figure and how much precision to claim from it.

When a number is presented as an improvement or reduction, the **comparison point** matters as much as the number itself. Is it compared against a specific baseline year, an industry average, or a previous methodology? If the comparison is not clearly stated, treat the claim with caution. A product with lower emissions per unit but a larger production run may show an improvement on one measure while total emissions increase. Always ask whether absolute emissions, not just relative ones, are moving in the right direction.

Finally, ask whose situation the number does not capture, and who benefits from what has been left out of scope. Data that appears neutral is quietly distributing responsibility. The most significant impact should never be the thing that is omitted.

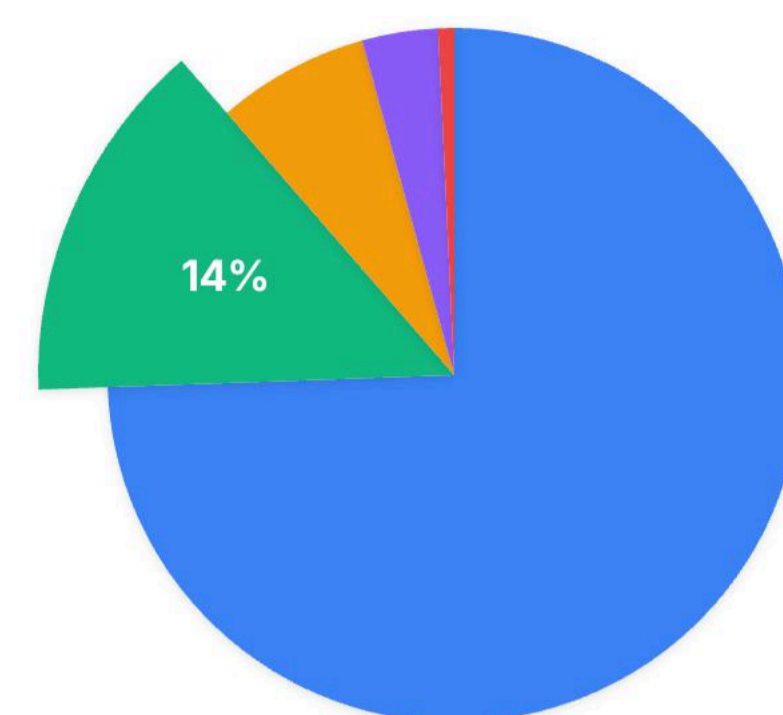
Further reading: *How Bad Are Bananas?*, Mike Berners-Lee.

How to Read Numbers, Tom Chivers and David Chivers.

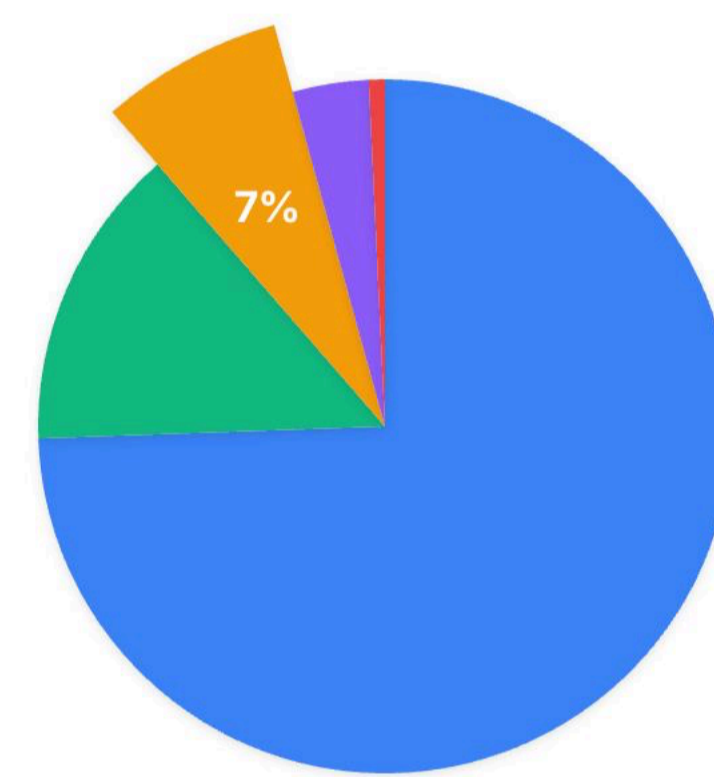
The Art of Statistics, David Spiegelhalter.

A Field Guide to Lies and Statistics, Daniel Levitin.

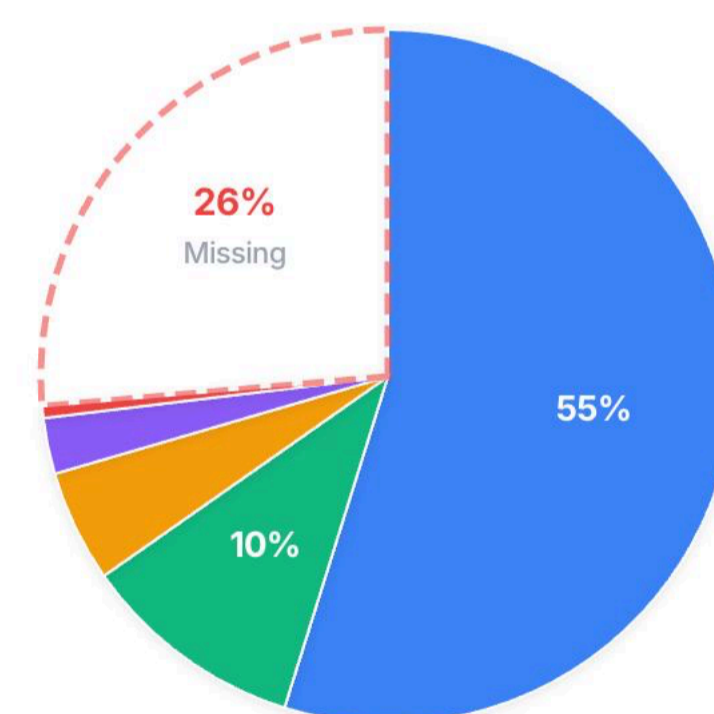
What's in the number?



What's in the number?



Adjusted Footprint: 7.65M tCO₂e



Imagine the carbon footprint of a company. It appears as a perfect circle, with a percentage breakdown that gives the impression of a complete view. But depending on what was measured and how, some emission areas may not be captured, and the percentages could be 5% or more higher or lower.

The Ability to Reason with Probabilities

Climate risk is not a single prediction. It is a range of possible futures, each with different likelihoods, severities, and timescales. The core problem is not missing information; it is that probabilistic information is read through every day, deterministic language. A range becomes a number. A scenario becomes a forecast.

Probability and severity are not the same thing. A low-probability outcome with severe consequences may warrant more attention than a likely one with manageable impact. How a risk arrives matters as much as whether it arrives: 20% more precipitation spread across a year means adjusted drainage standards. Concentrated in two days, the risks echoes the devastating Valencia floods from 2024.

Most risk figures in the media are global relative averages. Local impacts will often be considerably higher or lower. Always ask whether a figure is global or regional, [relative or absolute](#), and whether it applies to the context in which you are making decisions.

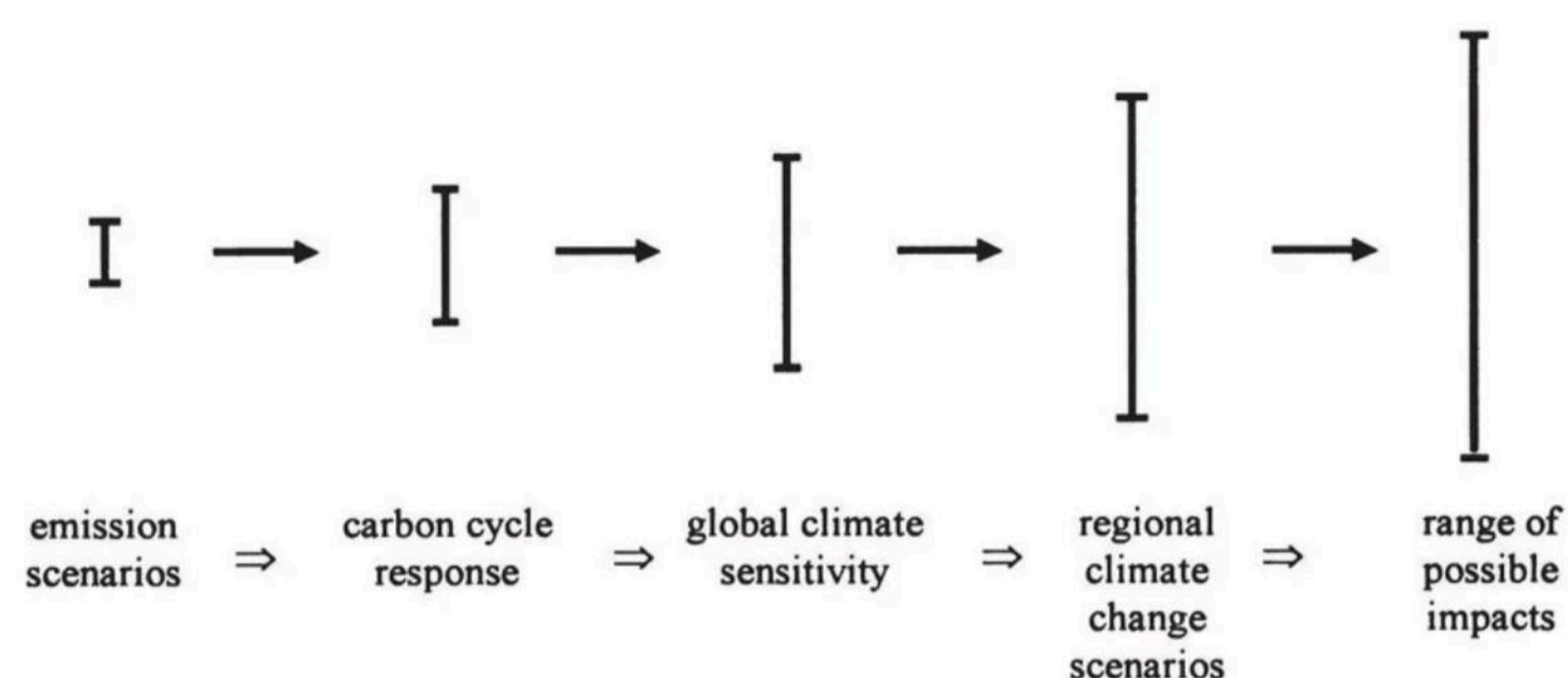
When data uses terms like "likely" or "moderate confidence," these have [precise scientific meanings](#) (see right figure). "Likely" means at least a two-in-three chance, not roughly probable. Ask for the numerical range behind confidence language rather than accepting the words at face value.

Further reading: [Risk Savvy](#), Gerd Gigerenzer. [The Art of Uncertainty](#), David Spiegelhalter. [Everything is Predictable](#), Tom Chivers.

Note on scientific confidence language

Source: Uncertainties Guidance Note, IPCC AR5

Term	Scientific meaning
Virtually certain	99–100% probability
Extremely likely	95–100% probability
Very likely	90–100% probability
Likely	66–100% probability
About as likely as not	33–66% probability
Unlikely	0–33% probability
Extremely unlikely	0–5% probability



The "Uncertainty Explosion". Reproduced from Smith (2016), *Investigating Uncertainty in Global Hydrology Modelling*, University of Nottingham PhD thesis, under Creative Commons Attribution-NonCommercial. Figure modified after Jones (2000) and Schneider (1983).

The Ability to Prioritise at the Right Scale

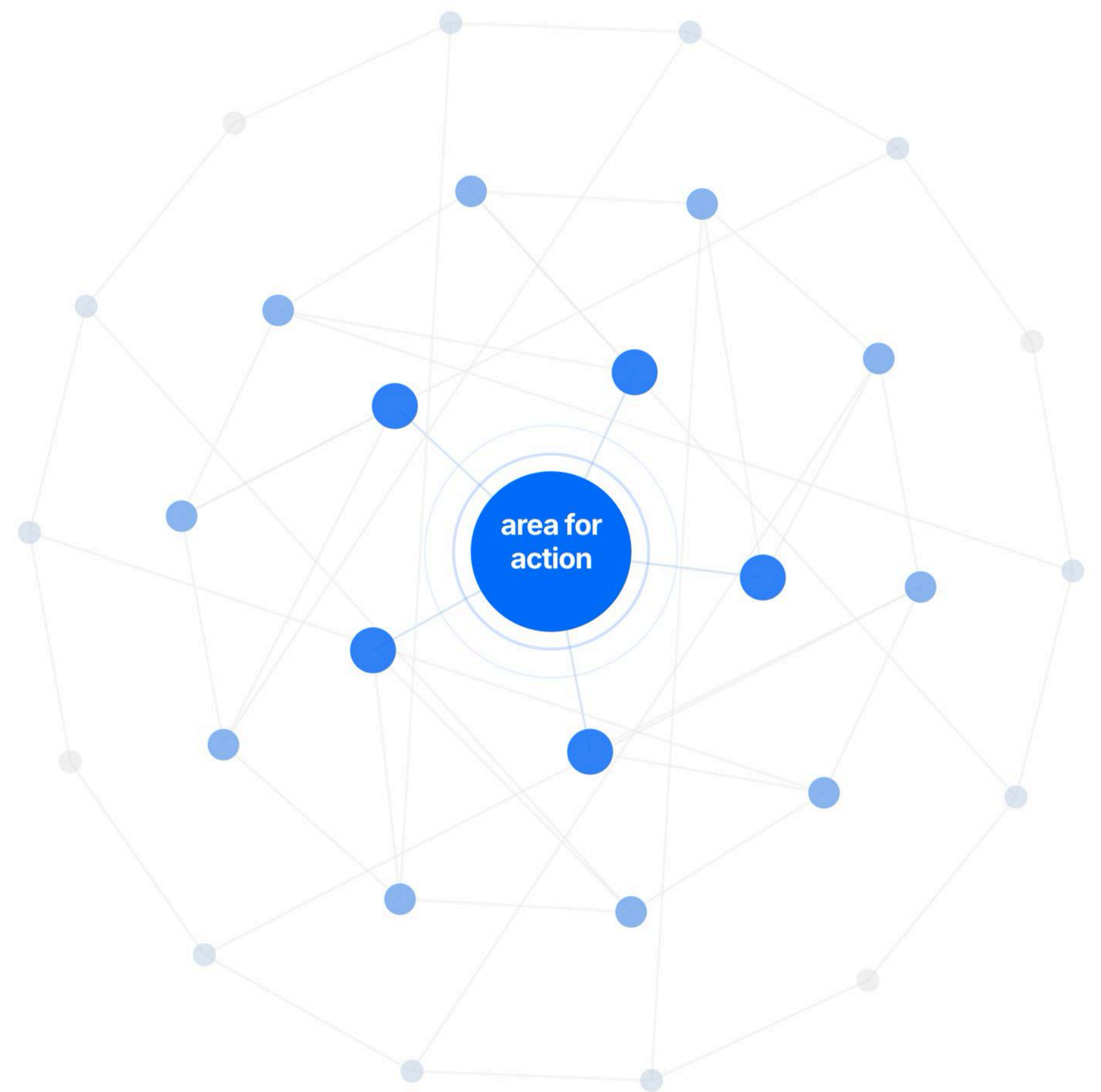
Effort consistently flows toward actions that are visible or convenient rather than those that address the largest sources of harm. The discipline of scale and magnitude thinking is to anchor on where harm is greatest, while being honest about what is within reach. Starting where **impact and feasibility** overlap is not a compromise. It is often where momentum begins.

Once focus areas are identified, ask what the action's impact would actually be, including **co-benefits, unintended consequences, and its impact on the wider system**. Cost savings, resilience gains, and health benefits are not compromises. They are how durable climate action gets funded and sustained. It is rare for organisations to act on climate benefit alone.

Some actions **compound** over time, one change enables another, and structural shifts create new conditions for further progress. Others plateau quickly. When the problem feels overwhelming, the most useful question is not "what can I do?" but "what first step opens up the next one?"

Finally, the person asked to change behaviour is often not the one with the greatest power to reduce harm at scale. Asking who **controls the main levers and who bears the cost** is part of ensuring effort is directed where it can actually make a difference.

Further reading: *Tiny Habits*, BJ Fogg.
Thinking in Systems: A Primer, Donella Meadows.



For Communicators: Translating Climate Evidence

The Toolkit for Communicators applies science thinking to the work of translating climate evidence for others. It helps communicators check that numbers are framed clearly, uncertainty is explained accurately, and action is presented at the right scale; so that climate information remains useful as it moves from source to audience.

Throughout, equity considerations are marked with a ♦. A communicator's framing choices determine whose experience is visible and whose is not. These prompts are not supplementary; they are part of getting the story right.

The questions below will help you ensure the principles are applied when communicating a piece of climate evidence. Before you publish, ask:

What does this number actually include?

Numbers feel complete. They are not. Before publishing, check what yours is, and is not, capturing.

- **What does this figure cover, and what is left out?** If a company spends money on an activity, it incurs a degree of emissions associated with that activity. Ask your source what the scope includes and what it does not.
- **How was this figure calculated, and what does it mean about action?** An audited, product-specific figure carries more confidence than a database average or a spend-based estimate. The method should travel with the number.
- **If this measure claims some change in status (i.e., improvement, reduction, etc), what is it compared against: same scope, same methodology?** Are absolute emissions moving in the right direction, not just relative ones? If the comparison is not clearly stated, treat the claim with caution.
- **Am I presenting a constructed number as a neutral fact?** All climate data reflects methodological choices. Noting those choices, even briefly, is more accurate than presenting the figure as self-evident.
- ♦ **Whose situation does this data not capture, and who benefits from what has been left out of scope?** If the finding is global, it may obscure very different local or regional realities.

What does the uncertainty actually mean?

Unseen certainty is not a weakness in the data. It is information. Before publishing, check that yours travels with it.

- **Have I turned a range into a single figure?** If so, can I restore even a brief sense of the range, "between X and Y" rather than "X", without losing the reader?
- **Have I used a confidence term the way my source used it, or the way my readers will read it?** See the reference table below. "Likely" in scientific usage means at least a two-in-three chance. In everyday language, it conveys a softer tone.
- **Is this figure global or local, relative or absolute?** Most figures in the media are global relative averages. Local impacts will often be considerably higher or lower. If your audience is specific, ask your source what the finding means in their context.
- **Have I accounted for the timeframe, including delayed and cumulative impacts?** A risk that builds gradually over decades or accumulates below the threshold of visibility requires different coverage than an immediate event. Both deserve to be named.
- ♦ **Have I named who is most exposed to this risk, and whether they have the power and resources to respond?** Exposure and agency are frequently separated in climate reporting. Naming both is more accurate and more useful.

Does my coverage help readers understand what to do?

Accurate reporting of what the science says does not automatically help an audience understand what it means for them. Before publishing, check that yours does.

- **Have I helped readers distinguish between actions that address the problem's scale and those that do not?** If your piece covers individual behaviour, have you contextualised it in relation to structural change? Reporting on reusable cups without noting that household consumption is a fraction of industrial emissions shapes what readers think matters.
- **Have I included co-benefits (cost savings, resilience gains, health or social benefits) that help readers see why action is viable, not just necessary?** Coverage that only names the cost of acting, without naming what is gained by doing so, leaves readers without a full picture.
- **Have I been honest about what is within reach and about the ideal response?** Coverage that only describes optimal solutions without acknowledging real constraints can make the gap feel unbridgeable. Naming what is feasible now and what enables the next step is more useful than a portrait of the perfect.
- **Have I shown where the power to act actually sits?** The most significant levers are usually held by institutions, governments, and industries, not individuals. Naming who has the power to act, and who is being asked to absorb the cost of inaction, is more accurate and more useful than implying the reader is the primary agent of change.
- ◆ **Have I named who is most affected by this finding, and whether that group has the power to respond?** A flood risk story that names the hazard but not who bears it, or a mitigation story that names the solution but not who pays for it, is an incomplete picture.

One thing this reference cannot replace

Checking whether your source is reliable. Before applying this toolkit, the journalism fundamentals stand as the first line of defence against misrepresentation, deliberate or otherwise.

Confirm that the research went through peer review, that the institution has no undisclosed conflict of interest, and that the finding has not been extracted from a larger report in a way that changes its meaning.

For Decision-Makers: Working with Climate Evidence

The Field Guide for Decision-Makers applies science thinking to the work of acting on climate evidence. It helps decision-makers check that numbers are interpreted clearly, uncertainty is understood accurately, and action is prioritised at the right scale, so that climate information remains useful as it moves from evidence to decision.

It is structured around two practical moments: before you send evidence, analysis or recommendations, and before you act on what you have received.

Before you send

Apply this before sharing climate data, analysis, or recommendations. The goal is not to add caveats; it is to make sure what you send can be understood and acted on correctly.

If you cannot answer a prompt, flag the gap before sending rather than leaving the recipient to discover it.

PRINCIPLE 1 Critical thinking and statistics	PRINCIPLE 2 Risks and probabilities	PRINCIPLE 3 Prioritisation, scale, and magnitude
Numbers feel complete. They are not.	Uncertainty is not a weakness in the data. It is information.	The key points: where harm is greatest, what is within reach, and where impact and feasibility overlap.
Have I stated which activities, geographies, or time periods are included in this data, and where key gaps or emissions are missing?	Have I communicated a range of outcomes, not just a central figure, and noted how impact differs if risk arrives in concentrated, severe bursts?	Have I indicated which findings point toward high-impact actions and which harm is greatest while being honest about what is within reach?
Have I stated how this figure was calculated and what its error margin is? Am I presenting it with more precision than the method supports?	Have I explained what terms like “likely” or “moderate confidence” mean in numerical terms, not just in everyday language?	Have I identified co-benefits, cost savings, resilience, health or social benefits that make the case for action more durable?
If I am presenting a reduction or improvement claim, what is it compared to: last year, same scope, same methodology? Are absolute emissions moving in the right direction, not just relative ones?	Have I checked whether this is a global or local figure, relative or absolute, and clarified its relevance to my audience’s context?	Have I distinguished how this action unfolds over time and shown that the transition matches the urgency of the problem?
Have I combined figures with logic or contextual knowledge and noted where the two tell different stories?	Have I checked whether this assessment accounts for who is affected, how resilient they are, and their capacity to respond, not just the probability of the hazard itself?	Have I considered whether this action shifts harm elsewhere or makes it harder to change course later?
	Have I presented scenarios that include severe but plausible outcomes alongside the most likely one?	
Have I been transparent about whose activities are outside the scope of this data, and who benefits from that exclusion?	Have I identified who is most exposed to this risk, and whether the burden falls on those least able to carry it?	Have I been clear about who has the power to act on this, and who bears the cost if they do not?

Before you act

Apply this when receiving climate data, risk assessments, or recommendations. These are not questions to challenge the evidence; they are questions to understand it well enough to act on it correctly.

If you cannot get a satisfactory answer to a prompt, treat that as a gap in the information you have been given, and factor it into how much weight you place on the findings.

PRINCIPLE 1 Critical thinking and statistics	PRINCIPLE 2 Risks and probabilities	PRINCIPLE 3 Prioritisation, scale, and magnitude
Before acting on a figure, understand clearly what the finding does and does not cover.	Uncertainty does not mean the finding is unreliable. Ask what the range of outcomes is and the probability of each.	Before deciding what to do, check that actions address the largest sources of harm and are proportionate.
What does this data cover, and are any significant impact areas absent or underrepresented?	Is this a single figure or a range, and does it account for different ways the risk may arrive (gradually or in concentrated bursts)?	Which actions address the largest sources of harm, and where do impact and feasibility overlap as a starting point?
How was this figure calculated, and what is its error margin? Does the precision claimed reflect the method used?	When this data uses terms like “likely” or “high confidence,” what do those terms mean in numerical terms, not their everyday meanings?	Are there co-benefits, unintended consequences, or opportunities in the system (cost savings, resilience, health or operational gains) that strengthen the case for acting now?
If this is a reduction or improvement claim, what is it compared against: same scope, same methodology, and are absolute emissions moving in the right direction?	Does this assessment account for who is affected, how resilient they are, and what capacity exists to respond, or does it focus only on the probability of the hazard?	Do the proposed actions build on each other over time, and does the timeline match the urgency of the problem?
What local or contextual knowledge would I need to interpret this responsibly, and do I have it?	Are these projections based on global averages or on conditions relevant to my setting: geography, sector, and context?	Does this action reduce harm overall, or does it shift elsewhere or make it harder to change course later?
	What is the most severe plausible outcome alongside the most likely one, and is the proposed response adequate for both?	
Whose activities fall outside this scope, and who benefits from that exclusion?	Who is most exposed to this risk, and do they have power and resources to respond? Is the burden fair on those least able to carry it?	Who has the power to implement this, and who bears the cost if action is delayed?

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About

Closing the Climate Data Gap is a project by [Climate and Cities](#), a collective of designers and researchers exploring how climate evidence is understood, communicated and used in practice.

The project was led by:

Rebecca Lardeur, Creative Director
Léa Silvestrucci, Artistic Director
Alex Taylor, Website

Contact

For questions about the project, collaborations, or speaking opportunities, please contact us at hi@climateandcities.com. You can also sign up to our [newsletter](#) for future updates.

Acknowledgements

This work was developed with the support of an advisory committee whose expertise spans climate science, climate finance, policy, cultural strategy, design, communications, anthropology and product development.

The advisory committee included Emily Lines, Naveed Chaudhry, Alexandra Deschamps-Sonsino, Peter Oakley, Max Gadney and Sian Bird.

We are grateful for their challenge and guidance throughout. We would also like to thank Sepideh Noohi, Joana Correia, Carina Gormley and Martha Dillon for their support and advice as the project developed.

Our deepest thanks to the scientists and academics who gave their time to this project. Their insights shaped the research, principles and tools that emerged from it.