CFRF CLIMATE FINANCIAL RISK FORUM

TECHNICAL REPORT:

UK FINANCIAL SECTOR SURVEY ON PRACTICES AND INFORMATION USE FOR ADAPTING TO PHYSICAL CLIMATE RISKS

October 2024

Prepared for: The CFRF Adaptation Working Group

By: Dr. Sam Grainger (University of Leeds), Prof. Jason Lowe (Met Office/University of Leeds), Prof. Suraje Dessai (University of Leeds), Dr. Andrea Taylor (University of Leeds)

Met Office

UNIVERSITY OF LEEDS

Contents

Summary for policy paper

The survey conducted among financial institutions participating in the Climate Financial Risk Forum (CFRF) aimed to explore the complexities and practices surrounding adaptation to physical climate risks. Initially, respondents classified their organisation's main area of activity within the financial industry, revealing a diverse representation ranging from public asset management to corporate banking and insurance. Motivations for climate adaptation varied, with compliance mandates (e.g. Task Force on Climate-related Financial Disclosures "TNFD") and potential financial loss from physical climate impacts emerging as primary drivers. Notably, respondents demonstrated a nuanced approach to decision making timelines, emphasising medium-term planning for strategic activities and longer horizons for risk management strategies.

In the section on information and tools for adaptation to physical climate risk, respondents indicated a diverse array of information currently being used for decision making on adaptation. Among the 16 respondents to the question, 13 reported employing third-party scenarios and 12 reported using climate impact information to inform their adaptation strategies. Metrics from third-party data providers, as well as asset location information, were also extensively used, each by 11 respondents. Surveyed organisations predominantly use information for risk assessment and management, alongside informing investments, scenario analysis, adaptation planning, advocating for green strategies and making infrastructure investments. Moreover, respondents emphasised the importance of trusted sources, cost-effectiveness and applicability when selecting information sources. They revealed that they rely on various sources for adaptation-related information, including external third-party providers, academic research institutions, government agencies such as the Department for Environment, Food and Rural Affairs and Environment Agency (Defra), and even local grassroots-level sources like community-based environmental groups and city councils. Respondents highlighted obstacles to use such as data availability, quality, and interoperability, compounded by resource constraints and legal considerations. Despite these hurdles, there was a clear appetite for additional information types, particularly corporate and government plans, to enrich decision-making processes.

The last section of the survey illuminated the varied ways weather and climate hazards impact organisations and how information is currently used among respondents. Surveyed organisations are currently impacted by and expect a wide range of weather and climate hazards to impact their activities and investments. These include a warmer, wetter, windier, and drier climate, along with hazards such as sea-level rise, coastal erosion, flooding, extreme heat, wildfires, heavy rainfall events, floods, high winds, and drought. Climate projections emerged as the most frequently utilised type of information, followed closely by inter-annual/decadal predictions and seasonal forecasts. Respondents utilising climate projection information employ diverse metrics such as multidimensional flood risk indices, Wet Bulb Globe Temperature, and Marsh McLennan Flood Risk Index, alongside various return periods and damage functions. They consider a broad spectrum of future emissions scenarios, including those from the Network for Greening the Financial System and the Intergovernmental Panel on Climate Change, to capture uncertainty in climate responses. Some also take into account national and regional UK-specific scenarios. Additionally, organisations

integrate climate impact information alongside hazard data, incorporating projected crop yield changes, flood depth and damage functions, and aggregated physical impacts for listed equity and corporate debt.

Sources of weather and climate hazard information vary, with primary sources including the public sector providers, European Centre for Medium-Range Weather Forecasts/Copernicus Climate Change Service, the Intergovernmental Panel on Climate Change, the Network for Greening the Financial System and commercial providers. These types of information are instrumental in informing decisions related to probability and impact analysis, risk pricing, and engagement with companies.

However, respondents highlighted challenges in information processing, update frequency, and perceived information quality, underscoring the need for improvements in these areas. They emphasised cost, ease of access, trust in the source, coverage, applicability, and the frequency of updates as crucial factors influencing their decision-making when sourcing weather and climate hazard information. Additionally, there was notable demand for enhanced real-time local authority-level data, comprehensive guidance on understanding climate risk, and educational resources for the asset management community, signalling a desire for further support in navigating the complexities of climate adaptation.

Implications for financial institutions

Based on the results of the survey, several implications for information users in the financial sector emerge.

Firstly, there is a clear need for enhanced accessibility and reliability of climate-related information to support informed decision-making processes. This includes addressing challenges related to data availability, quality, interoperability, and frequency of updates.

Secondly, there is a growing demand for tailored guidance and educational resources to assist information users in understanding and navigating the complexities of climate adaptation. This includes providing support for interpreting and applying climate-related information effectively within the context of financial decision-making.

Overall, by addressing these implications, information users can potentially enhance their resilience to physical climate risks and contribute to more sustainable and resilient financial systems.

1. Introduction and methodology

1.1 Aim

Using an online survey, this study aimed to investigate the challenges faced by financial institutions engaged in the Climate Financial Risk Forum (CFRF) adaptation working group. It focused on their selection and use of information for adaptation to physical climate risk, as well as understanding current practices in this domain.

1.2 Sample recruitment

Survey respondents were recruited from a representative subset of financial institutions actively participating in the CFRF adaptation working group, jointly convened by the Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA). The questionnaire was further distributed to other similar organisations.

1.3 Survey design and implementation

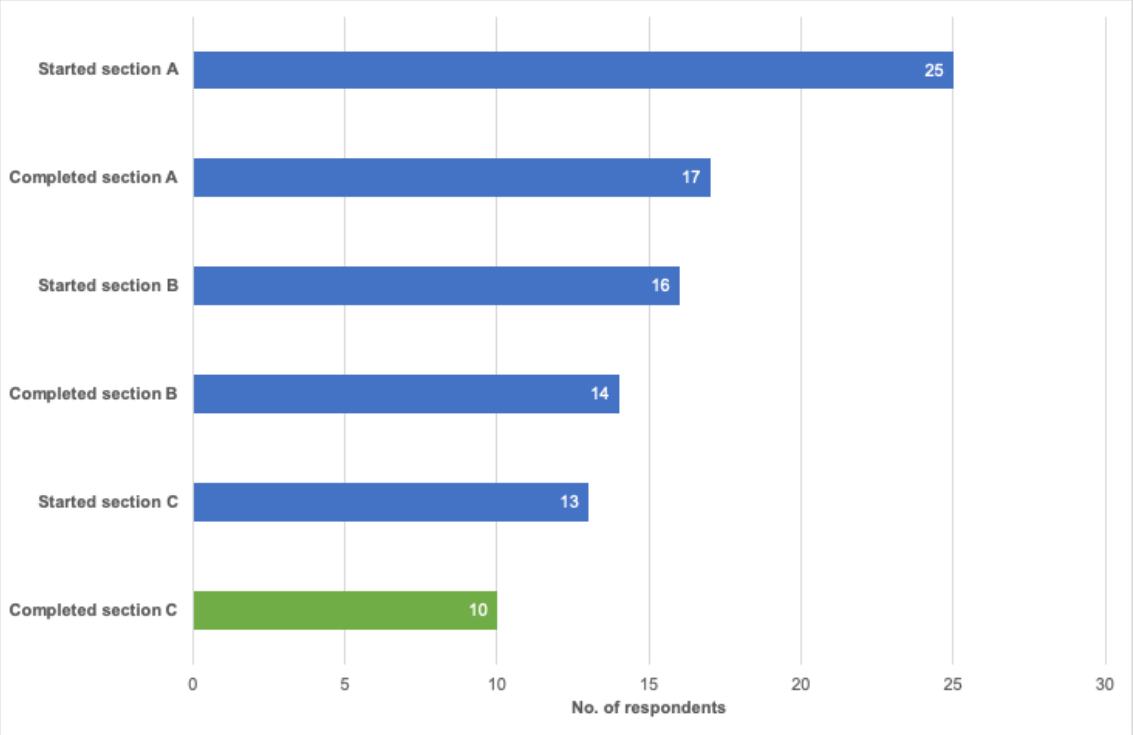
The survey was conducted using Qualtrics, an online platform for survey design and implementation. The questions were carefully crafted to gather detailed insights into respondents' organisational backgrounds, their perspectives on risk and adaptation, and their use of information for adapting to physical climate risks. The survey protocol is detailed in **Annex 1**. The design process incorporated feedback from the co-chairs of the CFRF adaptation working group and was informed by insights drawn from previous surveys targeting users of climate information.

2. Results

2.1 Respondents

Between January 2024 and the end of March 2024, a total of 25 people started our survey, with 17 completing section A, 14 completing section B, and 10 completing section C, which marked the completion of the entire survey. **Figure 1** shows the variability in response rates across the different sections, and this is important to bear in mind as we report the findings. When we received more than one response from the same IP address, the earlier, less complete response was discounted. We also discounted from our analysis any responses that gave consent but didn't answer any questions. The respondents to this survey represent a difficult-to-reach expert group, so even for sections of the survey with only 10 people completing it, there is useful information to report. However, we note the need to be careful with statistical inferences based on small sample sizes.

Figure 1: Number of respondents who started and completed sections A[1], B[2], and C[3] of the survey. Section C completions indicate completion of the entire survey (green bar).



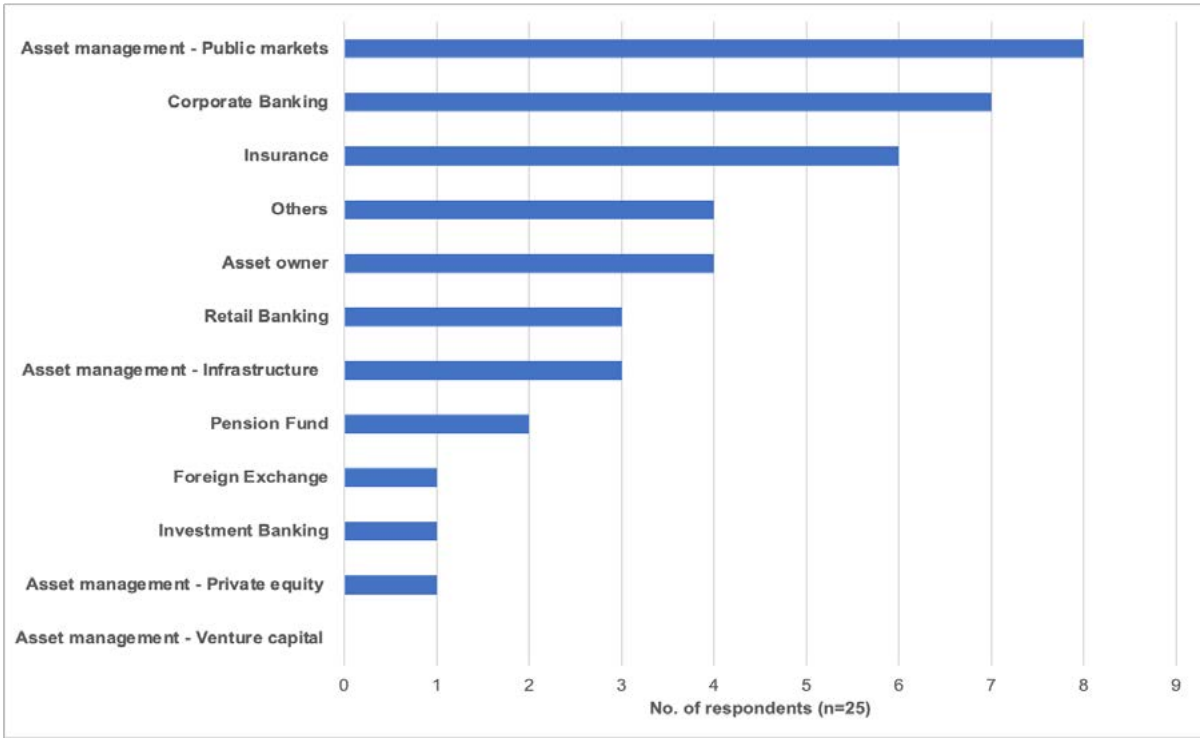
[1] Section A topic – Organisational background and views on risk and adaptation.
[2] Section B topic – Information and tools for adaptation to physical climate risk.
[3] Section C topic – Weather and/or climate hazard information.

2.2 Survey section A: Organisational background and views on risk and adaptation

Classification of organisation's main area(s) of activity within the financial sector

The survey asked respondents (n=25) to classify their organisation's main area(s) of activity within the financial sector, with six selecting more than one classification. Respondents from public asset management, corporate banking, and insurance had the highest representation, while retail banking, investment banking, pension fund, foreign exchange and other asset management types had lower representation (**Figure 2**). Four respondents selected "Others," with two classifying their organisation's main areas of activity as Professional Services and another as Investment Technology.

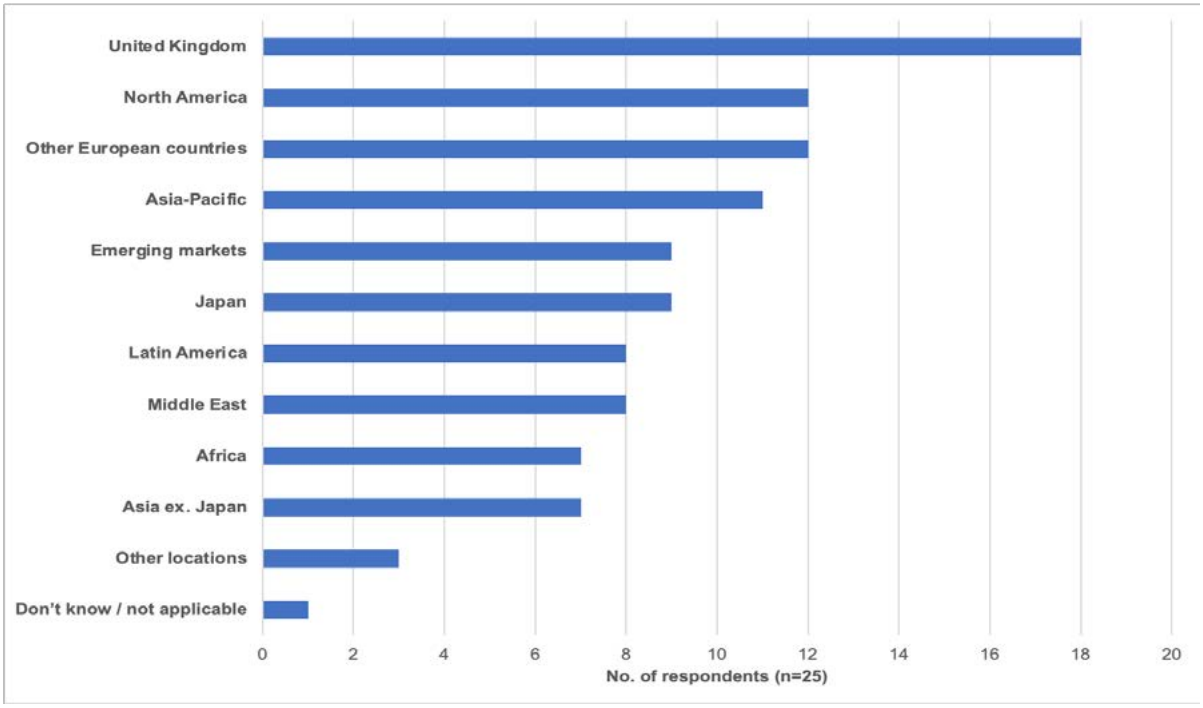
Figure 2: Distribution of respondents across different sub-sectors within the financial sector (six respondents selected >1 option).



Location of assets or business activities

The survey asked respondents (n=25) to indicate the locations of their organisation's assets or business activities, with 12 selecting more than one. One respondent selected "don't know/not applicable," which precluded them from selecting other options. The findings reveal that the UK was the most selected location, chosen by 18 respondents (**Figure 3**). This is not surprising, given that the survey was conducted in the UK with organisations that have a UK presence. Following the UK, North America and other European countries were also prominent locations among respondents.

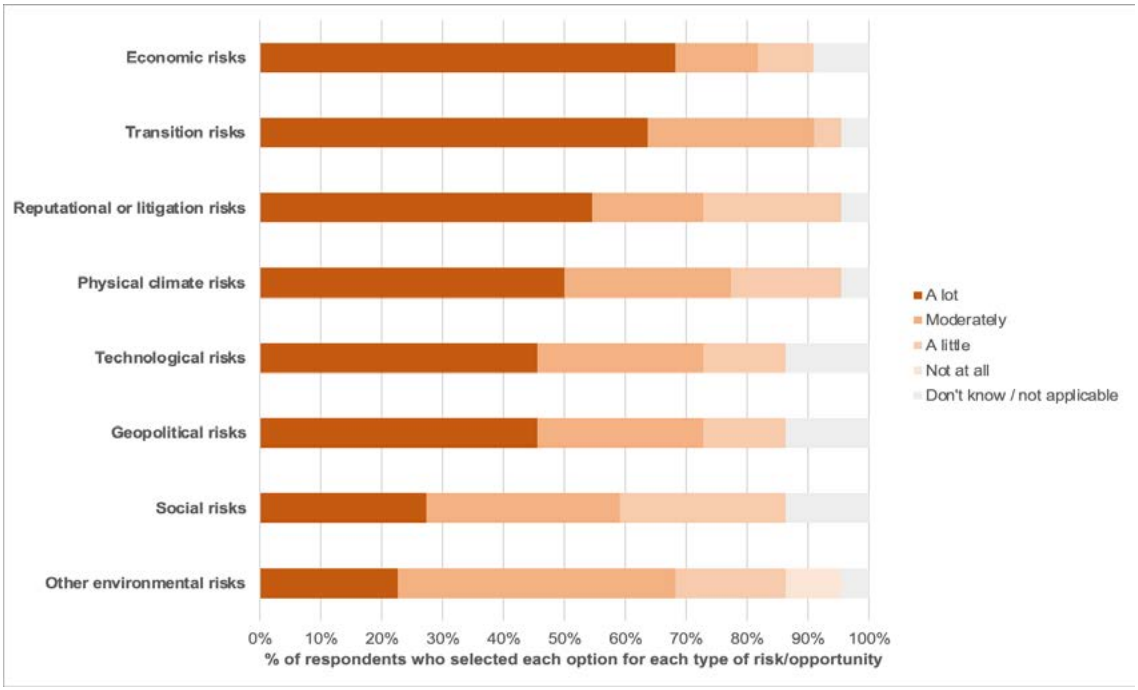
Figure 3: Distribution of respondents across different locations of assets or activities (12 respondents selected >1 option).



Consideration of risks and opportunities in the next five years

The survey asked respondents (n=22) to what extent their organisation is considering a range of risks and opportunities in the next five years, with response options ranging from "A lot" to "Not at all". Findings suggest that economic and transition risks and opportunities are prioritised over reputational and physical climate risks, followed by technological and geopolitical risks to a slightly lesser degree (**Figure 4**). Social and other environmental risks and opportunities appear to be less considered compared to other categories.

Figure 4: Extent organisations are considering different risks and opportunities in the next five years (n=22).



Drivers for considering adaptation to physical climate risk

When the survey asked respondents (n=16) about their organisation's motivation for considering climate adaptation through an open question, four key themes emerged, with some respondents notably citing multiple drivers. Compliance with external mandates, including regulations, standards, and frameworks such as the Task Force on Climate-related Financial Disclosures (TCFD), was the most frequently cited driver, noted by nine respondents. Eight respondents expressed concern about the financial risks posed by the 'locked-in' physical impacts of climate change to their organisation and the economy more broadly. Five respondents mentioned reputational and market risks and opportunities, emphasising the importance of addressing physical and social risks affecting their customers.

Importance of timescales for decision making on adaptation

The survey asked respondents (n=17) about the timescales important for various types of decision-making on adaptation, with the option to select multiple timescales. Notably, between four and seven respondents selected "don't know/not applicable" for each specific type of decision-making, precluding them from selecting a timescale. This highlights the complexity and potentially variable relevance of these decision-making types across various organisational contexts. **Table 1** illustrates the number of respondents selecting each timescale, with the total number of respondents who chose a timescale for the specified type of decision-making indicated in brackets next to each category.

The findings reveal a nuanced approach to planning timescales across various organisational decision-making processes, with respondents typically planning between one month and five years ahead. In terms of business strategy development, nine out of 11 respondents reported the six months to two years timescale as important. Similarly, for product development and identifying business opportunities, eight out of 10 and nine out of 11 respondents respectively found this timescale crucial. For the two to five years timescale, risk management had the highest share of respondents, with 11 out of 13 emphasising its importance. This was followed by business strategy development and identifying business opportunities, with eight out of 10 and nine out of 11 respondents respectively highlighting its significance. These findings underscore a strong emphasis on medium-term planning for these activities.

In contrast, respondents emphasised the importance of longer timescales for risk management, with most highlighting the five to 10 years and 10 to 30 years ranges as crucial for effectively mitigating risks. For shorter timescales, client engagement had the highest share of respondents, with most selecting periods of less than a month to six months, indicating a focus on more immediate planning needs. Meanwhile, risk pricing displayed a more balanced approach across timescales, with a majority of the 10 respondents finding timescales between six months to 10 years most relevant. The number of respondents highlighting the importance of more than 30 years in the future tended to be low for many business processes, though it was still significant enough to be important for product development and risk management.

Table 1: Importance of Timescales for Decision Making on Adaptation.

Types of decision making on adaptation	Less than a month	Between 1 month and 6 months	Between 6 months and 2 years	Between 2 and 5 years	Between 5 and 10 years	Between 10 and 30 years	More than 30 years	Don't know/ not applicable
Risk management (n=13)	2	5	4	11	9	7	3	4
Business strategy development (n=11)	2	2	9	8	2	2	1	6
Client engagement (n=11)	6	8	6	7	3	1	1	6
Product development (n=10)	2	7	8	8	3	2	2	7
Identifying business opportunities (n=11)	4	6	9	9	4	2	0	6
Risk Pricing (n=10)	3	5	7	7	6	4	1	7
Horizon scanning (n=12)	1	5	8	9	6	4	0	5
Disclosures (n=11)	2	6	8	7	5	3	0	6

Legend	>80%*	70-79%*	60-69%*	<60%*

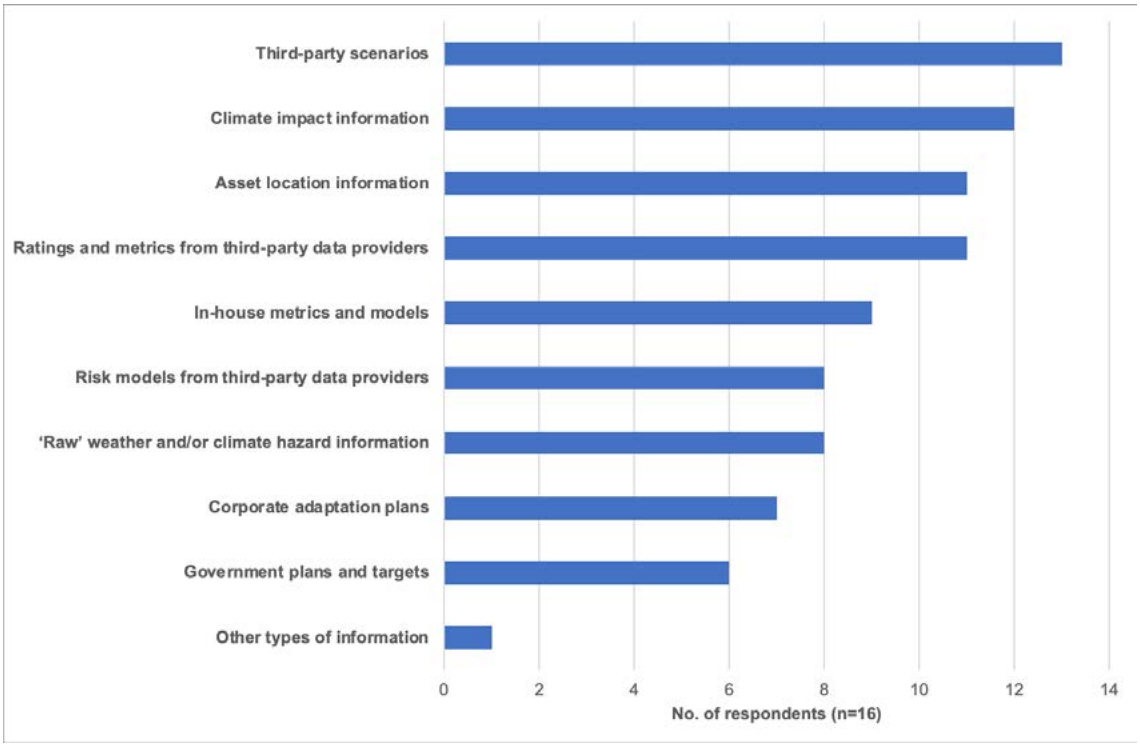
* Relative to the total number of respondents who chose a timescale for the specified type of decision-making process (in brackets in the table). Multiple selections were possible.

2.3 Section B: Information and tools for adaptation to physical climate risk

Types of information currently used for decision making on adaptation

The survey asked respondents (n=16) whether their organisation currently uses various types of information for decision-making on adaptation to physical climate risks, with 14 selecting more than one. Findings demonstrate a diverse array of information being utilised, with 13 respondents employing third-party scenarios and 12 using climate impact information (**Figure 5**). Ratings and metrics from third-party data providers, as well as asset location information, are also extensively used, each by 11 respondents. Other sources, such as 'raw' weather and climate hazard information, risk models, in-house metrics and models, and government plans and targets, as well as corporate adaptation plans, are utilised to a lesser extent.

Figure 5: Types of information currently used for decision making on adaptation (14 respondents selected >1 option).



Information sources

The survey asked respondents (n=12) who supplied their organisation with adaptation-related information through an open question. The responses indicate a diverse range of sources for adaptation-related information among the participants. While some organisations rely heavily on external third-party providers like Morgan Stanley Capital International and Moody's Risk Management Solutions, others emphasise a more comprehensive approach, sourcing information from various entities. These include

academic research institutions, open sources, EU data service Copernicus, environmental NGOs, government agencies such as the Department for Environment, Food and Rural Affairs and Environment Agency, and even local grassroots-level sources like community-based environmental groups and city councils. Additionally, some participants utilise internal resources and proprietary models for obtaining relevant information.

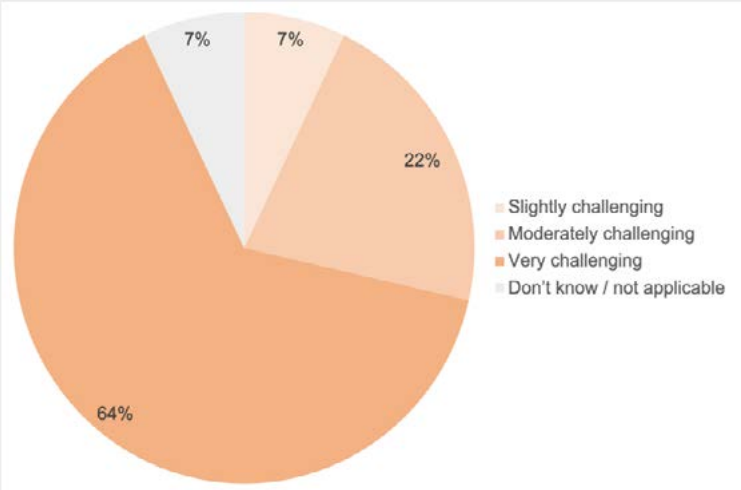
Purpose of using information in organisations

The survey asked respondents (n=12) an open-ended question about the purposes for which their organisation uses the information, specifically focusing on the types of information they reported using in the previous question. Findings indicate that organisations most commonly apply the information for risk characterisation, assessment, and management. Other notable uses included informing investments, scenario analysis, informing adaptation plans, understanding historical flood events, evaluating new business ventures, advocating for green investment strategies, and making infrastructure investments. Further applications encompass horizon scanning, Environmental, Social, and Governance (ESG) integration, TCFD reporting, and managing catastrophe bonds. Many respondents provided identical answers for each type of information, making it difficult to discern distinct usage trends. However, it was noted that strategy development frequently involved the use of third-party data, corporate adaptation plans, and government plans.

Extent of difficulty in accessing and using adaptation-related information

The survey asked respondents (n=14) about the level of difficulty they encounter in accessing and using adaptation-related information. The findings reveal that nine respondents (64%) perceive it as very challenging, three (21%) find it moderately challenging, one (7%) sees it as slightly challenging, and one selected “don't know/not applicable” (**Figure 6**).

Figure 6: Perceived extent of difficulty in accessing and using adaptation-related Information.



Major Challenges in Accessing and Using Adaptation-Related Information

Accessing and utilising adaptation-related information poses significant challenges for financial organisations. When asked an open-ended question on this topic, respondents (n=11) highlighted several common obstacles:

- **Data Availability and Accessibility:** Comprehensive and up-to-date data may be scattered across various sources or inaccessible due to proprietary restrictions or lack of digitisation.
- **Data Quality:** Ensuring accuracy and reliability[4] is crucial, as data from different sources can vary in quality. Rigorous validation and cross-referencing are necessary to address inconsistencies or gaps.
- **Interoperability of Data:** Integrating and analysing data from different sources is challenging due to varied formats and standards, hindering the ability to gain a cohesive view of the situation.
- **Complexity of Data Interpretation:** Understanding complex environmental data requires specialised expertise, presenting a barrier to effective interpretation.
- **Rapidly Changing Information:** The dynamic nature of climate and environmental factors means data can quickly become outdated, necessitating frequent updates.
- **Legal and Privacy Considerations:** Legal aspects such as privacy, consent, and intellectual property rights must be considered when accessing and using data.
- **Resource Constraints:** Effective data collection, management, and analysis require substantial resources, posing challenges for organisations with limited resources.
- **Scalability and Generalisation:** Tailoring strategies to local conditions while maintaining a broader perspective is challenging.
- **Integration into Decision-Making Processes:** Effectively integrating information into decision-making processes requires understanding and expertise.

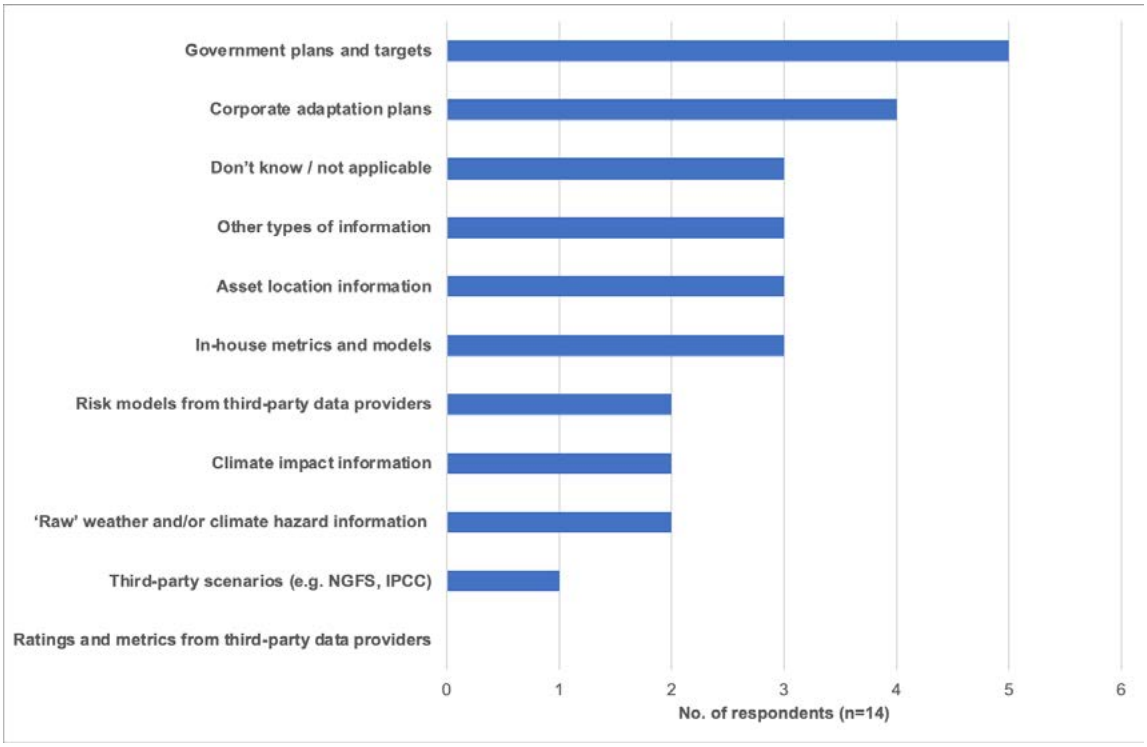
Respondents also expressed concerns about the clarity of the messages being conveyed, uncertainty about their exact needs, and their inability to evaluate the methodologies used to produce the information or models they use.

Interest in information types not currently used for decision making on adaptation

The survey asked respondents (n=14) to identify types of information they are not currently using but would find useful for informing their decision-making on adaptation, with seven selecting more than one. Three respondents selected “don't know/not applicable”, which precluded them from selecting multiple options. Government plans/targets and corporate adaptation plans were the most sought-after, attracting interest from five and four respondents, respectively (**Figure 7**). Additionally, three respondents each showed interest in in-house metrics/models and asset location information. The same number expressed interest in “other types”, specifically mentioning exposure mapping, comprehensive real-time local authority-level data, flood maps and defence data, flood performance certificates, commercial building information, high-resolution climate modelling, and insights into how assets contribute to value creation.

[4] We define reliability as a general indicator of quality and consistency, rather than as a specific verification measure.

Figure 7: Interest in information types not currently used for decision making on adaptation (seven respondents selected >1 option).

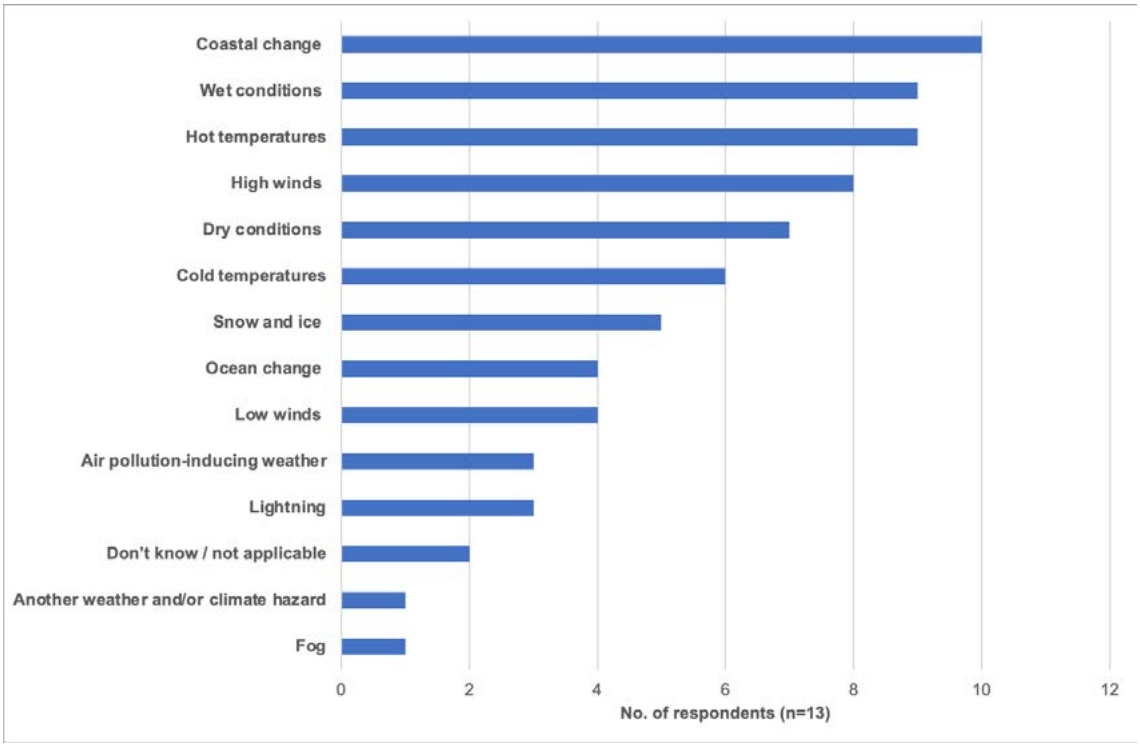


2.4 Section C: Weather and/or climate hazard information

Types of Weather and Climate Hazards Impacting or Expected to Impact Organisational Activities and Investments

The survey asked respondents (n=13) about the types of weather and/or climate hazards that have or are expected to impact their organisation's activities or investments, with seven selecting more than one. Two respondents selected "don't know/not applicable", which precluded them from selecting any hazards. Coastal change (specifically sea-level rise and coastal flooding and erosion) emerged as the most impactful or potentially impactful hazard, identified by 10 respondents, followed by hot temperatures (specifically extreme heat, a warmer climate, and wildfires) and wet conditions (specifically heavy rainfall, floods, and a wetter climate) identified by nine respondents each (**Figure 8**). Additionally, high winds (specifically severe storms and a windier climate) are impacting or expected to impact eight respondents, while a drier climate and droughts are impacting or expected to impact seven of the organisations.

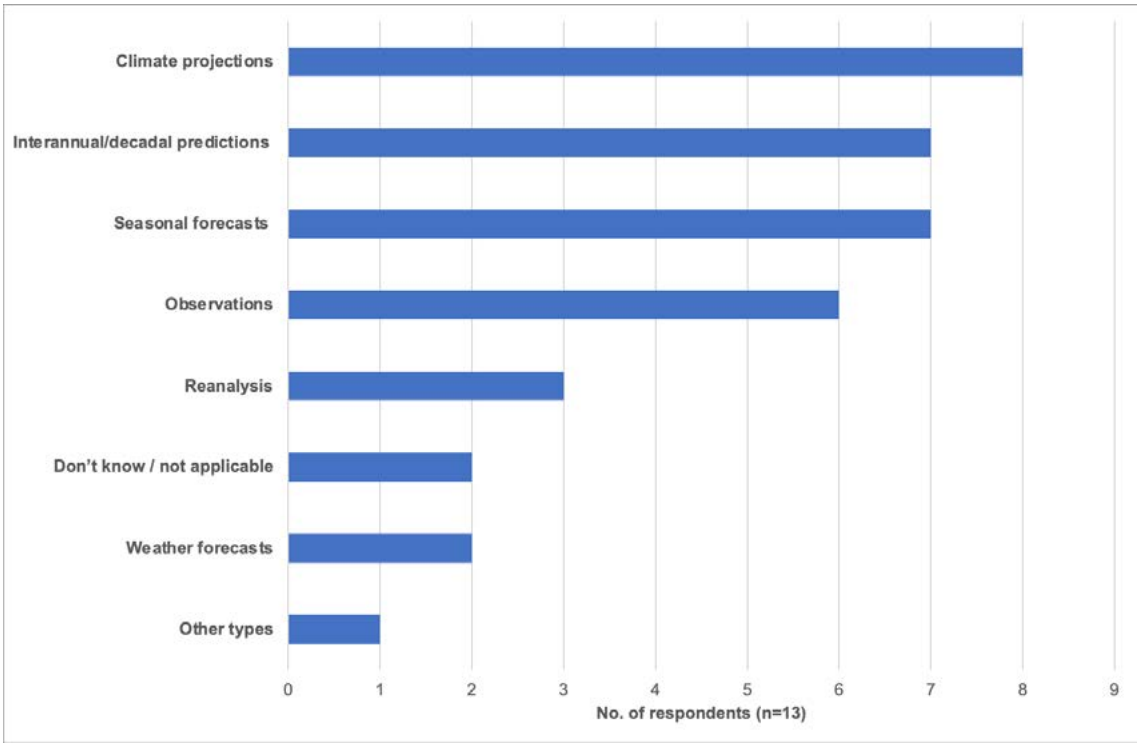
Figure 8: Types of weather and climate hazards impacting or expected to impact organisational activities and investments (seven respondents selected >1 option).



Weather and climate hazard information use

The survey asked respondents (n=13) about the types of weather and/or climate hazard information used by their organisations, with seven selecting more than one. Two respondents selected "don't know/not applicable", which precluded them from selecting any type of information. Climate projections emerge as the most used type of information, chosen by eight respondents (**Figure 9**). Seasonal forecasts and interannual/decadal predictions follow closely behind, each selected by seven respondents. Observations from historical weather stations and satellites are utilised by six respondents, providing valuable insights into past weather patterns. To a lesser extent, reanalysis data are utilised by three respondents, while weather forecasts are utilised by two respondents.

Figure 9: Weather and/or climate hazard information use (seven respondents selected >1 option).



Use of climate projection metrics

The survey asked respondents using climate projection information (n=8) an open-ended question about the metrics they use. One of the organisations surveyed explores multidimensional flood risk indices that integrate factors like frequency, intensity, vulnerability, and exposure to assess flood risks comprehensively. Specific metrics mentioned by respondents include the Wet Bulb Globe Temperature (WBGT), Marsh McLennan Flood Risk Index, and Value at Risk. Additionally, other organisations report using various return periods and corresponding damage functions, while others utilise data and models from entities such as the US Weather Service.

Future emissions scenarios

The survey asked the same respondents (n=8) an open-ended question about the future emissions scenarios they currently consider. The most reported scenarios were the Network for Greening the Financial System (NGFS) scenarios and Intergovernmental Panel on Climate Change (IPCC) scenarios, including Representative Concentration Pathways (RCPs) and Shared Socioeconomic Pathways (SSPs). They indicated that they use a wide range of scenarios to capture uncertainty in climate responses. One respondent also considers national and regional scenarios specific to the UK.

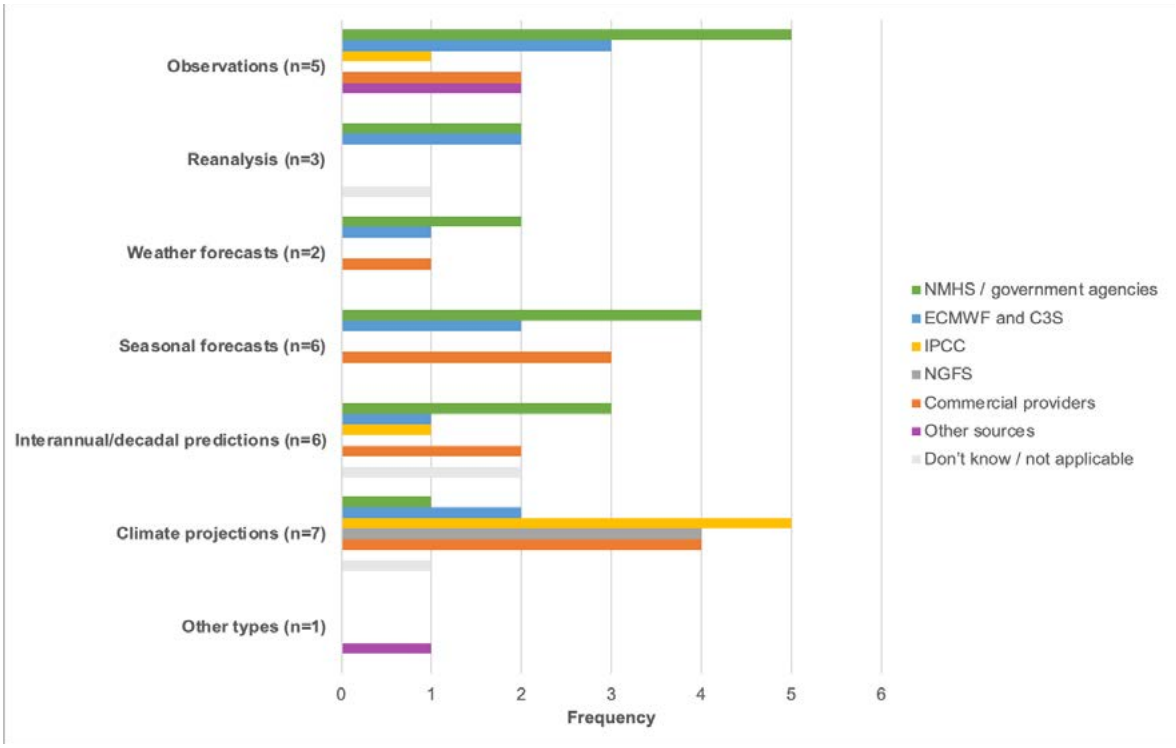
Use of climate impact information

The survey asked respondents (n=11) if they utilise climate impact information alongside hazard data, and specifically through an open question, what types of information they use. Nine respondents confirmed they employ various types, including projected crop yield changes, flood depth and damage functions, and aggregated physical impacts for listed equity and corporate debt. Additionally, they incorporate data concerning future flood and drought events.

Hazard information sources

The survey asked respondents (n=9) about their sources of weather and/or climate hazard information, with most selecting more than one. Some respondents selected "don't know/not applicable", which precluded them from selecting any source. All five users of observational data reported obtaining their data from National Meteorological and Hydrological Services or government agencies, with three respondents specifically citing the ECMWF and Copernicus Climate Change Service (C3S) (**Figure 10**). Additionally, some users of observational data mentioned commercial providers like Weather Peril, Twinn, and Moody's RMS for climate projections. Among the users of seasonal forecasts and interannual/decadal predictions, four out of six and three out of six, respectively, reported using National Meteorological and Hydrological Services or government agencies as their sources. Five out of seven users of climate projections identified the IPCC as their primary source, with four of these respondents also obtaining information from the NGFS and commercial providers. It is important to acknowledge that some users of commercial providers may be indirectly using data from authoritative sources such as the IPCC or NGFS, although this may not be reflected in their responses. The sample sizes for reanalysis, weather forecasts, and other types of weather or climate information were too small to attribute a trend (n < 3).

Figure 10: Hazard information sources (Most respondents selected >1 option).



Factors Influencing Decision in Sourcing Weather and Climate Hazard Information

Respondents (n=8) provided qualitative insights into the factors guiding their decisions when sourcing, selecting, or utilising weather and/or climate hazard information. The responses revealed a variety of considerations, with several common themes emerging:

- **Cost:** Several respondents emphasised cost as a significant factor in their decision-making process. For instance, one respondent mentioned that cost plays a crucial role, as they must choose between paying for 'pre-cooked' third-party metrics or using free but complex raw scientific data.
- **Ease of Access:** Several respondents emphasised the importance of accessing information conveniently. One respondent noted the ease of accessing and applying 'pre-cooked' third-party metrics compared to the complexities of handling raw scientific data, which is freely available but challenging to process.
- **Trusted Source:** Trust in the source of information was another common theme. Respondents stressed the need for reliability and credibility in the data they use. For instance, one respondent mentioned the importance of agreeing with the methodology used, indicating the significance of trusting the source of the information.
- **Coverage and Applicability:** Coverage and applicability were cited as crucial factors in the decision-making process. Some respondents mentioned the importance of information that adequately covers their needs and is applicable to their specific contexts. For example, one respondent highlighted the importance of coverage and applicability for their portfolio.
- **Frequency of Updates:** Respondents also underscored the importance of timely updates in their decision-making process.

Information processing

The survey asked respondents (n=9) whether they process the information they use in-house or externally, with the option to select both. Seven reported processing the information in-house, one indicated it is processed externally before they receive it, and another reported both in-house and external processing.

Respondents employ diverse processing methods on the information they use, including bias correction, the application of organisation-specific scenarios, and aggregation to various levels such as asset or regional. These techniques are employed to ensure relevance and accuracy for their specific applications and use cases.

Information update frequency

The survey asked respondents (n=8) an open-ended question about the frequency of updating the information they utilise. Their responses varied, with three respondents indicating annual cycles, and one reporting monthly updates. Additionally, there was a shared aspiration for increased update frequency, exemplified by one respondent's preference for bi-annual updates.

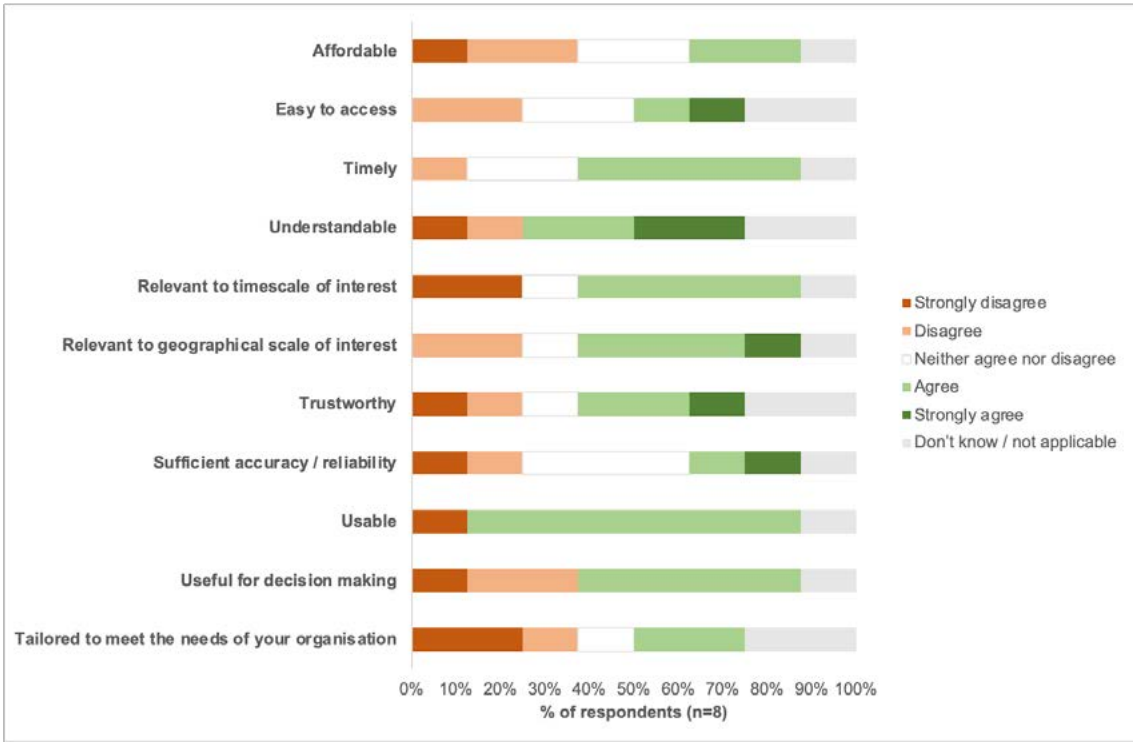
Perception of information quality

Respondents (n=8) were queried about the alignment of the hazard information they utilise with various quality criteria. While six respondents (75%) found the information usable, opinions varied regarding factors such as understandability, accessibility, affordability, usefulness, accuracy, reliability, trustworthiness, geographical relevance, and tailoring to organisational needs (**Figure 11**).

Several respondents provided additional insights into various criteria. One respondent

criticised the long-term perspective of third-party data, deeming it inadequate for assessing shorter-term investment risks, and expressed concerns about its reliability, citing occasional errors and a lack of oversight for company-specific information. Despite this, they noted the industry's reliance on similar third-party data, indicating a level of trust. Another respondent highlighted challenges in aggregating physical risk-related data for company-level assessments, especially in large portfolios, due to limited data availability and uncertainty. Additionally, respondents consistently emphasised the need for higher spatial and temporal resolution, alongside frequently unavailable metrics. Another respondent pinpointed the primary issue as the quality and applicability of available data, citing a lack of tools for understanding risk beyond long-term heat mapping, which hampers investment decision-making and contributes to industry paralysis.

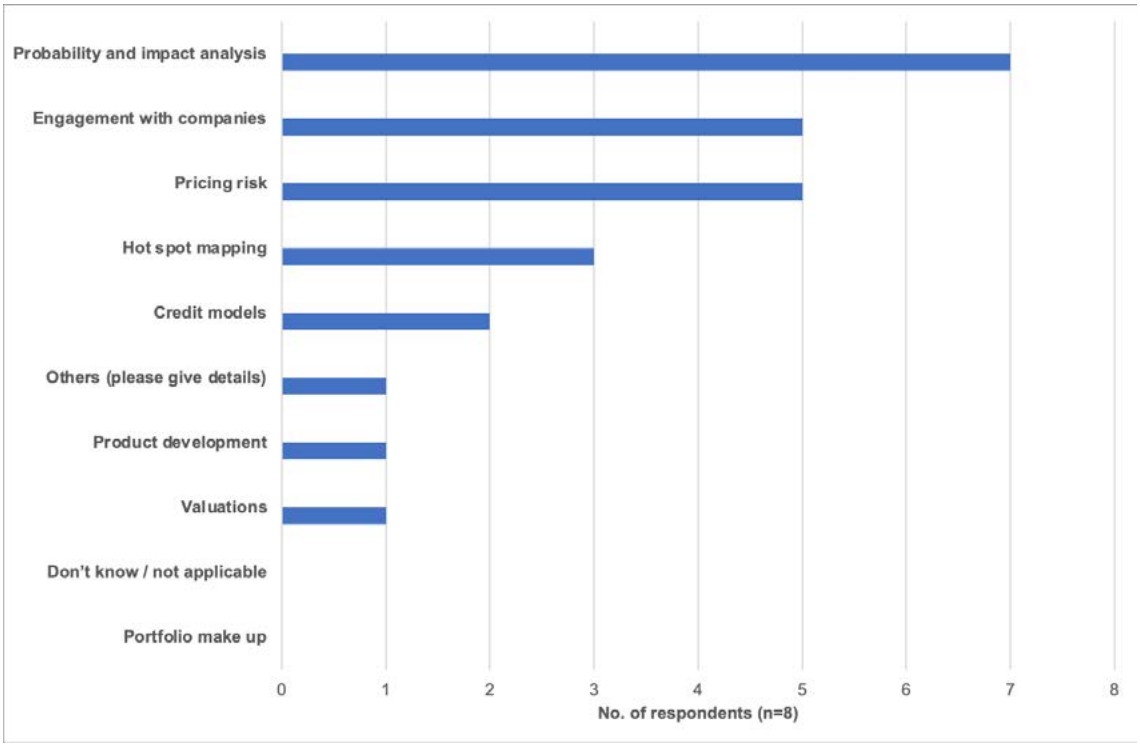
Figure 11: Perception of information quality.



Application of Weather and Climate Hazard Information in Adaptation Decision-Making

The survey asked respondents (n=8) how they apply the hazard information they use to decision making, with seven selecting more than one application. The weather and/or climate hazard information used by respondents is primarily applied to decision-making on adaptation through probability and impact analysis, pricing risk, and engagement with companies, as reported by seven respondents, five respondents, and five respondents, respectively (**Figure 12**). Credit models and hot spot mapping are less commonly used, mentioned by two respondents and three respondents, respectively.

Figure 12: Application of Weather and Climate Hazard Information in Adaptation Decision-Making (seven respondents selected >1 option).



Additional Information and Guidance Needs

We also asked respondents if there were any other types of information or guidance they would find useful for climate hazard management. Key themes based on seven responses include:

- Demand for enhanced real-time local authority-level data, particularly flood maps and hazard impact assessments.
- Need for comprehensive guidance on understanding non-linearities and interactions in climate physical risk, as well as utilising raw climate data effectively for risk assessment.
- Challenge of assessing systemic risks posed by climate change, especially for organisations primarily dealing with publicly listed stocks, and seeking strategies to understand the materiality of stranded asset risk in sector-agnostic investments.
- Call for guidance and educational resources to effectively utilise climate data and educate the asset management community on associated risks.

3. Limitations and future work

Given the variability in response rates across different questions, we must acknowledge that the results from Sections B and C might not fully represent the entire sector. This variability underlines the need for caution in generalising findings from these sections.

To further refine our understanding, future efforts could include conducting interviews with representatives from four organisations surveyed, each representing one of the main sub-sectors identified in this sample: Banking, Insurance, Asset Management, and Other. These interviews would aim to discern patterns in the types of information used and how these relate to information sources, factors considered, and challenges faced in selecting and using this information. Additionally, we are currently conducting a survey with information providers. We plan to compare the findings from this survey with those from the previous survey to identify potential tensions or disconnects between the providers and users of information in the financial sector.

ANNEX 1: Survey Protocol

Climate Financial Risk Forum survey on information use for adaptation to physical climate risk

INFORMATION SHEET FOR RESPONDENTS

Introduction

You have been invited to participate in a survey to better understand and address the challenges faced by financial institutions when using and selecting information for adaptation to physical climate risk and current practice in this area. This survey targets a representative subset of financial institutions participating in the Climate Financial Risk Forum (CFRF) jointly convened by the Prudential Regulation Authority and Financial Conduct Authority.

The survey protocol is split into three sections. Section A focuses on organisational background and views on risk and adaptation, section B on information for adaptation to physical climate risk and section C aims to explore in more detail the weather and climate information you use or would like.

We recommend completing this survey on a computer rather than a mobile phone, if possible, for optimal experience and ease of navigation.

What are the questions about?

This survey is interested in your adaptation-related decision making, what information you use, how you select this information and any unmet needs you may have.

Why are we asking these questions?

The results from this survey will help inform CFRF guidance on selection of datasets and scenarios for assessing physical risk and considering adaptation.

How long will it take to complete?

It will take you approximately 10 to 20 minutes to complete.

What will we do with your data?

No personally identifiable data will be collected, and your responses will be anonymised. We believe there are no known risks associated with this research study; however, as with any online related activity the risk of a breach is always possible. To the best of our ability your participation in this study will remain confidential, and only anonymised data will be reported and published.

You have the option at the beginning of the survey to provide the name of your organisation. This information will be stored securely and separately from your survey responses, and not be shared beyond the research team.

Thank you for taking the time to read through this information.

Contact for further information.
Research Fellow: Dr Sam Grainger, School of Earth and Environment, University of Leeds, UK. (S.Grainger@leeds.ac.uk)

Principal Investigator: Prof Jason A. Lowe, Met Office and Priestley Centre for Climate Future, University of Leeds, UK. (Jason.Lowe@metoffice.gov.uk)

This survey is conducted by the Met Office, University of Leeds and University of Oxford and is funded by NERC and the Met Office.

- Please tick the box below if you would like to participate in the survey. If you do not want to participate in the survey, close the browser tab to exit.

What is the name of your organisation? *(optional)*

PROTOCOL

Section A: Organisational background and views on risk and adaptation

1. How would you classify your organisation's main area(s) of activity within the financial sector? *(Multiple options may be selected)*

a. Insurance
b. Asset management – Public markets
c. Asset management – Venture capital
d. Asset management – Private equity
e. Asset management – Infrastructure
f. Asset owner
g. Retail Banking
h. Corporate Banking
i. Investment Banking
j. Pension Fund
k. Foreign Exchange
l. Others *(please give details)*

2. Where are the assets you're investing in or your business activities located? *(Multiple options may be selected)*	
a. United Kingdom	
b. Other European countries	
c. Middle East	
d. North America	
e. Latin America	
f. Japan	
g. Asia ex-Japan	
h. Asia-Pacific	
i. Emerging markets includes e.g. Brazil, Russia	
j. Africa	
k. Others *(please give details)*	

i. Don't know/not applicable	

3. Thinking about the next 5 years, to what extent is your organisation considering the following risks and/or opportunities? *(Tick one per row)*[5]

Risk	Not at all	A little	Moderately	A lot	Don't know/ Not applicable
Climate-related					
Physical climate (e.g., extreme weather events, changing agricultural seasons)					
Transition (e.g., Net Zero targets)					
Reputational or litigation					
Non-climate related					
Other environmental (e.g., ecosystem collapse, resource scarcity, non-climatic natural disasters)					
Economic (e.g., growth, inflation, supply chain)					
Social (e.g., living costs, migration, labour market, pandemics)					
Geopolitical (e.g., trade agreements, international cooperation, interstate conflict)					
Technological (e.g., cyber insecurity, AI opportunities)					

[5] Note: If you aren't sure you can select "don't know/not applicable".

4. What is driving your organisation to consider adaptation to physical climate risk (e.g. TCFD, other standards)?

5. Which timescale/scales are important for your organisation for the following types of decision making on adaptation? *(Multiple options may be selected)*[6]

		Between					
	Less than a month	1 month and 6 months	6 months and 2 years	2 and 5 years	5 and 10 years	10 and 30 years	More than 30 years	Don't know/ not applicable
Risk								
management (including stress testing and scenario analysis)								
Business strategy development								
Client engagement								
Product development								
Identifying business opportunities								
Risk Pricing								
Horizon scanning								
Disclosures								

6. Beyond those given in the previous question, does your organisation engage in any other types of decision-making on adaptation?

a. Yes

b. No

c. Don't know/not applicable

[6] Note: If you aren't sure you can select "don't know/not applicable".

7. Please describe these additional types of decision making on adaptation in the 'Other' boxes below.

a. Other 1 *(please give details below)*

b. Other 2 *(please give details below)*

c. Other 3 *(please give details below)*

d. Other 4 *(please give details below)*

e. Other 5 *(please give details below)*

8. For each type described, indicate which timescale/scales are important for your organisation? *(Multiple options in each row may be selected)*[7]

		Between						
	Less than a month	1 month and 6 months	6 months and 2 years	2 and 5 years	5 and 10 years	10 and 30 years	More than 30 years	Don't know/ not applicable
Other 1								
Other 2								
Other 3								
Other 4								
Other 5								

[7] Note: If you aren't sure you can select "don't know/not applicable".

Section B: Organisational background and views on risk and adaptation

The following questions relate to information for adaptation to physical climate risk. The risk of impacts occurring depends on vulnerability and exposure as well as the severity and frequency of the climate-related hazards. More details on the weather and climate data will be included in a later section of the survey.

1. What types of information are your organisation currently using to inform its decision making on adaptation? *(Multiple options may be selected)*	
a. 'Raw' weather and/or climate hazard information (e.g. weather forecasts, climate projections)	
b. Climate impact information (e.g. flooding, crop yields, supply chain)	
c. Ratings and metrics from third-party data providers	
d. Risk models from third-party data providers (e.g. catastrophe risk models)	
e. In-house metrics and models	
f. Third-party scenarios (e.g. NGFS, IPCC)	
g. Corporate adaptation plans	
h. Asset location information	
i. Government plans and targets	
j. Other types of information *(please give details)*	

2. What is the information USED FOR in your organisation (e.g. horizon scanning, strategy development, informing adaptation plans and investments)

Show only types they use (see Q.B1) e.g. Climate impact information

e.g. Government plans and targets

3. Who supplies your organisation with adaptation-related information?

4. How challenging do you find accessing and using adaptation-related information?	
a. Not challenging	
b. Slightly challenging	
c. Moderately challenging	
d. Very challenging	
e. Don't know/not applicable	

If b,c,d selected in B4

5. What are the major challenges when accessing and using adaptation-related information?

6. What types of information would your organisation be INTERESTED IN USING (that it does not currently use) to inform its decision making on adaptation? *(Multiple options may be selected)*	
a. 'Raw' weather and/or climate hazard information (e.g. weather forecasts, climate projections)	
b. Climate impact information (e.g. flooding, crop yields, supply chain)	
c. Ratings and metrics from third-party data providers	
d. Risk models from third-party data providers (e.g. catastrophe risk models)	
e. In-house metrics and models	
f. Third-party scenarios (e.g. NGFS, IPCC)	
g. Corporate adaptation plans	
h. Asset location information	
i. Government plans and targets	
j. Others *(please give details)*	
k. Don't know/not applicable	

Section C: Weather and/or climate hazard information

The following questions aim to explore in more detail the weather and/or climate hazard information you use.

1. What type of weather and/or climate hazard have or are expected to impact your organisation's activities or investments? *(Multiple options may be selected)*	
a. Hot temperatures (e.g., extreme heat; wildfires)	
b. Cold temperatures (e.g. frost, cold spells/snaps)	
c. Wet conditions (e.g., heavy rainfall; floods)	
d. Dry conditions (e.g., drought)	
e. High winds (e.g., storms; tropical cyclones)	
f. Low winds (e.g. wind drought, less windy climate over time)	
g. Snow and ice (e.g., heavy snowfall; hail)	
h. Coastal change (e.g., sea-level rise; coastal flooding)	
i. Ocean change (e.g., marine heatwaves)	
j. Fog	
k. Lightning	
l. Air pollution-inducing weather	
m. Another weather and/or climate hazard *(please give details)*	
n. Don't know/not applicable	

If 'Hot temperatures' selected:

A. You have indicated that your activities or investments are affected by hot temperatures. Please indicate if your activities or investments are affected by the following? *(Multiple options may be selected)*	
i. Extreme high temperature events	
ii. Wildfires	
iii. Warmer climate over time	
iv. Another weather and/or climate hazard *(please give details)*	

If 'Cold temperatures' selected *(adapt from question above)*:

B. You have indicated that your activities or investments are affected by cold temperatures. Please indicate if your organisation is affected by the following? *(Multiple options may be selected)*	
i. Cold/snaps	
ii. Frost	
iii. Colder climate over time	
iv. Another weather and/or climate hazard *(please give details)*	

If 'Wet conditions' selected:

C. You have indicated that your activities or investments are affected by wet conditions. Please indicate if your organisation is affected by the following? *(Multiple options may be selected)*	
i. Heavy rainfall events	
ii. River floods	
iii. Surface water (torrential, flash) floods	
iv. Landslides (due to heavy rainfall)	
v. Wetter climate over time	
vi. Another weather and/or climate hazard *(please give details)*	

If 'Dry conditions' selected:

D. You have indicated that your activities or investments are affected by dry conditions. Please indicate if your organisation is affected by the following? *(Multiple options may be selected)*	
i. Droughts	
ii. Drier climate over time	
iii. Another weather and/or climate hazard *(please give details)*	

If 'High winds' ' selected:

E. You have indicated that your activities or investments are affected by high winds. Please indicate if your organisation is affected by the following? *(Multiple options may be selected)*	
i. Severe wind storms	
ii. Tropical cyclones	
iii. Sand and dust storms	
iv. Windier climate over time	
v Another weather and/or climate hazard *(please give details)*	

If 'Low winds' ' selected:

F. You have indicated that your activities or investments are affected by low winds. Please indicate if your organisation is affected by the following? *(Multiple options may be selected)*	
i. Wind drought	
ii. Less windy climate over time	
iii. Another weather and/or climate hazard *(please give details)*	

If 'Snow and ice' selected:

G. You have indicated that your activities or investments are affected by snow and ice. Please indicate if your organisation is affected by the following? *(Multiple options may be selected)*	
i. Heavy snowfall and ice storms	
ii. Hail	
iii. Ice sheet melt, lake melt, and river ice melt	
iv. Snow avalanches	
v. Freeze-thaw cycles	
vi. Another weather and/or climate hazard *(please give details)*	

If 'Coastal change' selected:

H. You have indicated that your activities or investments are affected by coastal change. Please indicate if your organisation is affected by the following? *(Multiple options may be selected)*	
i. Coastal floods	
ii. Coastal erosion	
iii. Sea-level rise	
iv. Another weather and/or climate hazard *(please give details)*	

If 'Ocean change' selected:

I. You have indicated that your activities or investments are affected by ocean change. Please indicate if your organisation is affected by the following? *(Multiple options may be selected)*	
i. Marine heatwaves	
ii. Marine cold waves	
iii. Warmer oceans over time	
iv. Colder oceans over time	
v. Changes in ocean chemistry	
vi. Another weather and/or climate hazard *(please give details)*	

2. What types of weather and/or climate hazard information do you use? *(Multiple options may be selected)*[8]	
a. Observations (Historical data from weather stations and/or satellites)	
b. Reanalysis (Historical data combining models and observations)	
c. Weather forecasts	
d. Seasonal forecasts (Expected climate outlook for the next season(s))	
e. Interannual/decadal predictions (Expected climate outlook for the next 1-10 years)	
f. Climate projections (Potential climate over the coming decades)	
g. Other types of weather and/or climate information *(please give details)*	
h. Don't know/not applicable (skip to C14)	

If 'climate projections' is selected in C2,

3. What metrics are you using (e.g. 100-year return period flood event)?

and

4. What future emissions scenarios do you currently consider, and why?

5. Do you currently use climate impact information (e.g. flooding, crop yields, supply chain)?	
a. Yes	
b. No	
c. Don't know/not applicable	

If 'Yes' is selected in C5

6. What types of climate impact information do you use?

7. Where does your organisation get weather and/or climate hazard information from (e.g. Bloomberg, Met Office)? *(Multiple options may be selected)*[8]

Types of Information	National Meteorological and Hydrological Services/ government agencies	ECMWF and Copernicus Climate Change Service (C3S)	Intergovernmental Panel on Climate Change (IPCC)	NGFS (Network for Greening the Financial System)	Commercial providers/ consultancies/model vendors	Your organisation's own data (e.g., Observations, forecasts)	Other sources	Don't know/not applicable
Show only types they use (see Q.C2)								

If there are other sources or you'd like to provide additional explanation, please give details.

8. What factors influence your decision when sourcing, choosing or using weather and/or climate hazard information (e.g. cost, only source available, ease of access, trusted source, type of post processing applied)?

9. Is the information you use processed in some way (e.g. aggregated to your region of choice)? *(Both a and b may be selected)*

a. Yes, processed prior to receiving

b. Yes, processed in house

c. No, not processed

d. Don't know/not applicable

If 'a' or 'b' is selected in C9

10. What type of processing is done on this information (e.g. aggregated to your region of choice, bias correction)?

[8] Note: If you aren't sure you can select "don't know/not applicable".

11. How often do you update the information you use?

12. To what extent would you consider the weather and/or climate hazard information you use to be: *(Please rate your level of agreement with the statements below)*

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Don't know/ not applicable
Affordable						
Easy to access						
Timely						
Understandable						
Relevant to timescale of interest						
Relevant to geographical scale of interest						
Trustworthy						
Sufficient accuracy /reliability						
Usable						
Useful for decision making						
Tailored to meet the needs of your organisation						
Please provide additional details or explanations for your answers.						

13. How is the weather and/or climate hazard information you use applied to your decision making on adaptation? *(Multiple options may be selected)*	
a. Probability and impact analysis	
b. Credit models	
c. Pricing risk	
d. Valuations	
e. Engagement with companies	
f. Hot spot mapping	
g. Portfolio make up	
h. Product development	
i. Others *(please give details)*	
j. Don't know/not applicable	

14. In addition to the weather and/or climate hazard information already mentioned, what other types of information or guidance would you find useful?