About the Survey

The NGFS launched its first climate scenario feedback survey to learn from users' experiences, following the publication of the third vintage of the NGFS scenarios in September 2022.

Key facts of the NGFS Survey on Climate Scenarios

- It was carried out online in **February 2023**
- It was **publicly accessible**, and collected feedback from 213 scenario users and interested stakeholders globally
- Its key findings will guide the **NGFS scenario development work plan** going forward to help ensure that the NGFS scenarios remain relevant and comprehensive for a continuously growing user base

Overview of survey content

Section 1. Overview of respondents

- Geographical and sectoral coverage
- Prior knowledge and experience on climate scenario analysis

Section 2. Use of the NGFS scenarios by respondents

- Overview of respondents' climate scenario analysis exercises
- Modelling approaches using the NGFS scenarios
- Comparison with climate scenarios other than NGFS

Section 3. User priorities and respondents' suggestions for improvement

- Key obstacles faced by respondents using the NGFS scenarios
- User priorities and identified areas with potential for improvement of the NGFS scenarios
- The supporting materials and usability of NGFS scenarios

Overview of key findings

Section 1. Overview of respondents

- The survey collected **213 responses from 57 countries**. It reached **both the public and private sectors**, with the majority of responses coming from financial institutions, central banks and consulting firms.
- Respondents self-assessed themselves as **more experienced with NGFS scenarios** compared to alternative scenarios, although they are also familiar with other sources.

Section 2. Use of the NGFS scenarios by respondents

- NGFS scenarios have become a key ingredient to identify climate risks globally: **over 70% of respondents from both the private and public sector** use them, mostly to better understand the impacts of climate risks and to build internal capacity.
- Almost all respondents consider the NGFS scenarios as a **true public good**.
- The NGFS framework is also positively evaluated compared to other climate scenarios, especially for the combination of **transition, physical and macroeconomic** modelling and the **number and relevance of output variables.**
- Key areas for technical improvement are the **magnitude of transition risk** and **sectoral granularity.**

Section 3. User priorities and respondents' suggestions for improvement

- Respondents using NGFS scenarios would benefit from: better **understanding** the modelling framework and output, more **guidance** on how to use the scenarios for concrete applications, and **accessing** and **identifying** key output variables.
- While respondents **positively value existing support material**, there is broad agreement on the **need for more user guidance and accessible documentation** on NGFS scenarios to improve users' experience.
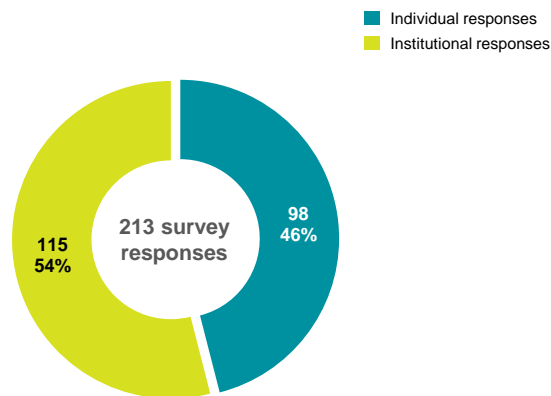
Overview of respondents

How many survey responses were collected and where do they come from?

The survey collected a total of **213 responses**, 54% in an institutional capacity and 46% in an individual capacity
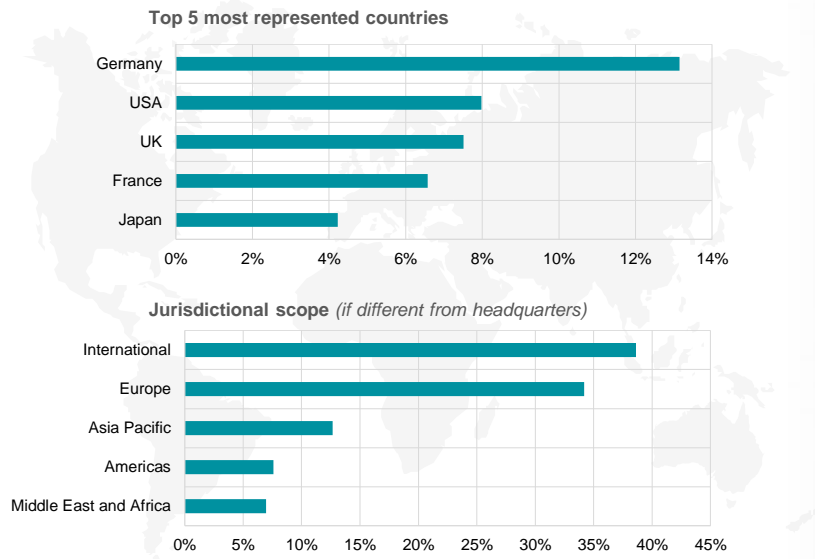
Responses came from **57 countries from all jurisdictions**, with Germany and International/European scope being the most represented

Share of total responses

Geographical coverage, share of responses

Breakdown by types of responses

- Individual responses
- Institutional responses

213 survey responses

98 46%

115 54%

Top 5 most represented countries

Germany	
USA	
UK	
France	
Japan	

0% 2% 4% 6% 8% 10% 12% 14%

Jurisdictional scope *(if different from headquarters)*

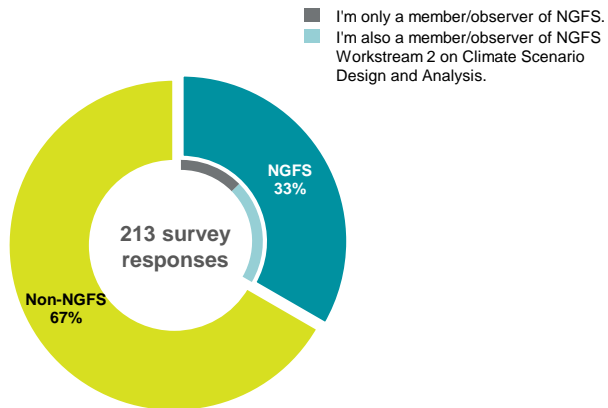|	
International	
Europe	
Asia Pacific	
Americas	
Middle East and Africa	

0% 5% 10% 15% 20% 25% 30% 35% 40% 45%

Source: NGFS (2023). Notes: Respondents were asked to indicate the jurisdictional scope of their organisation, if different from their headquarters location.

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What type of institutions do the responses come from?

The **majority of responses came from non-central banks**, and about one third from NGFS members

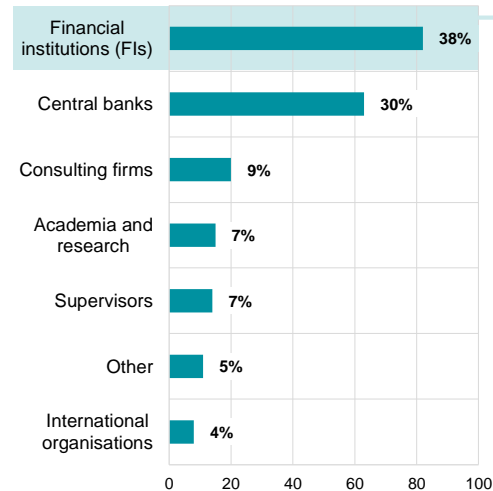Total number of responses, and share of total respondents

Relation to the NGFS

■ I'm only a member/observer of NGFS.
■ I'm also a member/observer of NGFS Workstream 2 on Climate Scenario Design and Analysis.

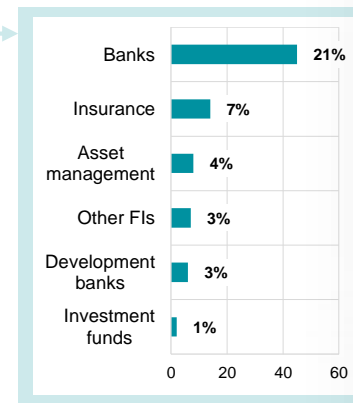**213 survey responses**

NGFS 33%

Non-NGFS 67%

The survey reached **both the private and public sectors**, with the majority of responses coming from **financial institutions, central banks, and consulting firms**

Total number of responses, and share of total respondents

Breakdown by types of institutions

Financial institutions (FIs)	38%
Central banks	30%
Consulting firms	9%
Academia and research	7%
Supervisors	7%
Other	5%
International organisations	4%

Breakdown by financial institutions

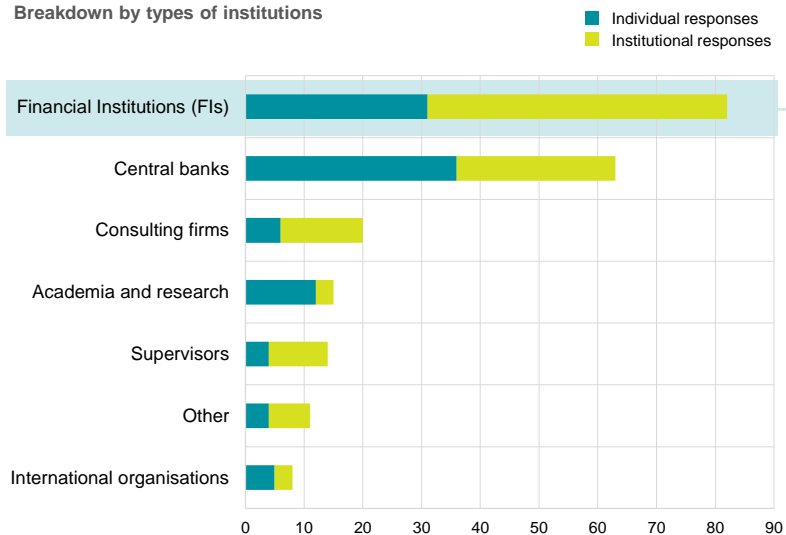|	
Banks	21%
Insurance	7%
Asset management	4%
Other FIs	3%
Development banks	3%
Investment funds	1%

Source: NGFS (2023). Notes: Institutions categorised as "Other" include civil society organisations, NGOs, technology companies, training centres, and firms from the automotive sector. "Other FIs" are other financial institutions such as rating or export credit agencies.

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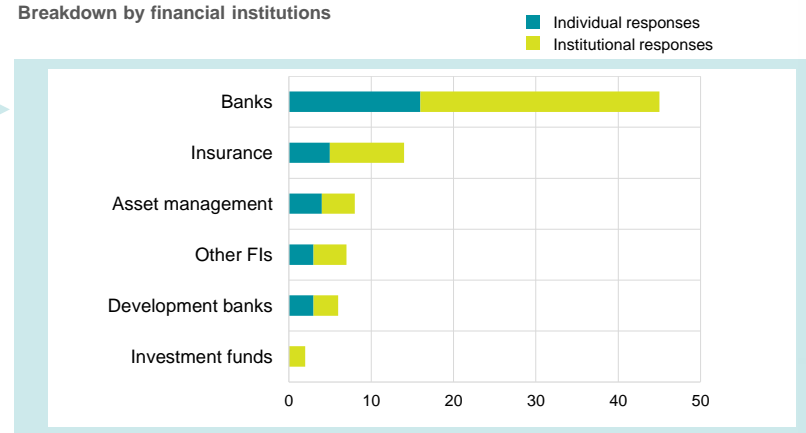# What types of responses were collected from the institutions?

The survey collected the majority of **institutional responses from financial institutions, consulting firms, and supervisors**; while most respondents from **central banks, academia and research responded on an individual basis**

Total number of responses, breakdown by institutional and individual responses

Breakdown by types of institutions

Legend:
- ■ Individual responses
- ■ Institutional responses

Categories (top to bottom):
- Financial Institutions (FIs)
- Central banks
- Consulting firms
- Academia and research
- Supervisors
- Other
- International organisations

X-axis: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90

Breakdown by financial institutions

Legend:
- ■ Individual responses
- ■ Institutional responses

Categories (top to bottom):
- Banks
- Insurance
- Asset management
- Other FIs
- Development banks
- Investment funds

X-axis: 0, 10, 20, 30, 40, 50

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How familiar are respondents with climate scenario analysis?

Most respondents are either already at an **advanced stage of their climate scenario analysis**, or **gaining experience**; while the rest are still at an early stage

Share of total responses

**Prior experience
with climate scenario analysis**
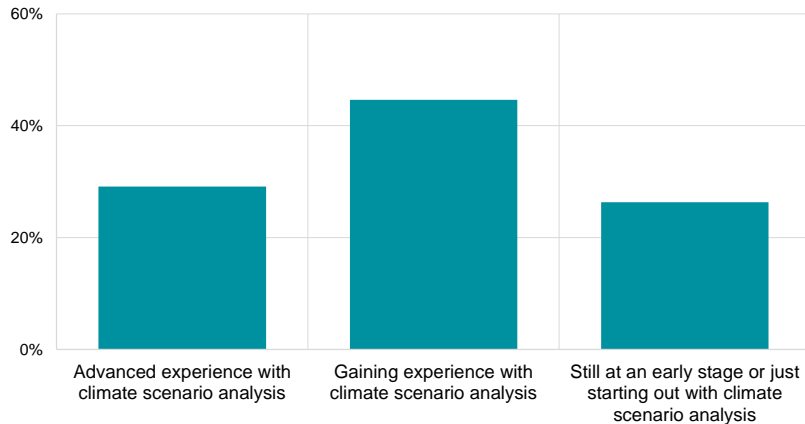
Although respondents are **familiar with a wide range of climate scenarios**, in comparison they **self-assess having more prior experience with NGFS scenarios**

Share of total responses

**Prior experience
with climate scenarios**

- ■ NGFS scenarios
- ■ IEA scenarios
- ■ IPCC representative of referenced scenarios (other than NGFS ones)


Source: NGFS (2023)

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2
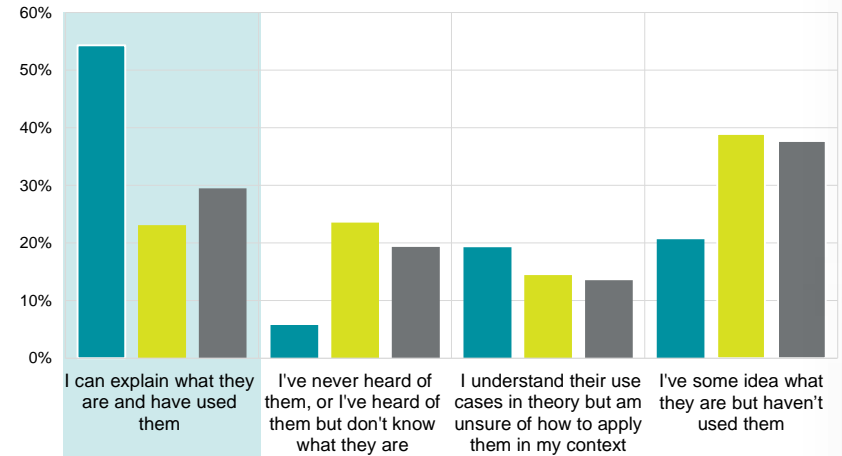
Use of the NGFS scenarios

Why do respondents conduct climate scenario analysis?

Respondents use climate scenario analysis primarily to assess **how climate risks could affect their organisation, individual financial institutions, or financial stability**

Share of total survey respondents, multiple options possible

Main objectives of climate scenario analysis exercises
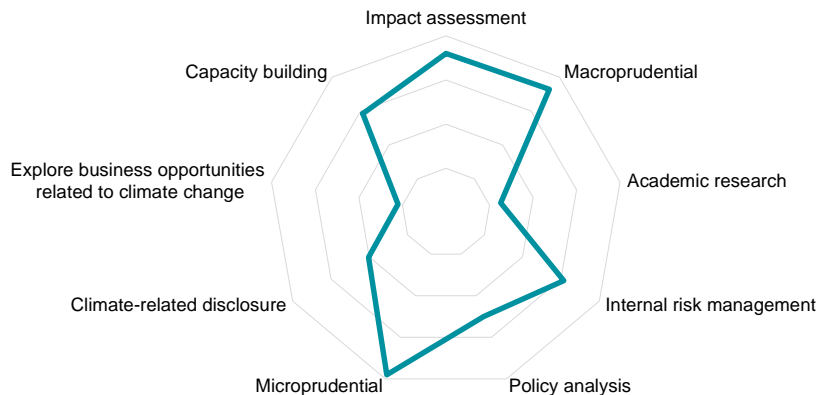
Institutions may have different primary objectives in their exercises in line with their mandates, but **capacity building stands out as one of the key secondary objectives for all**

Share of total survey respondents, multiple options possible

Breakdown by types of institutions
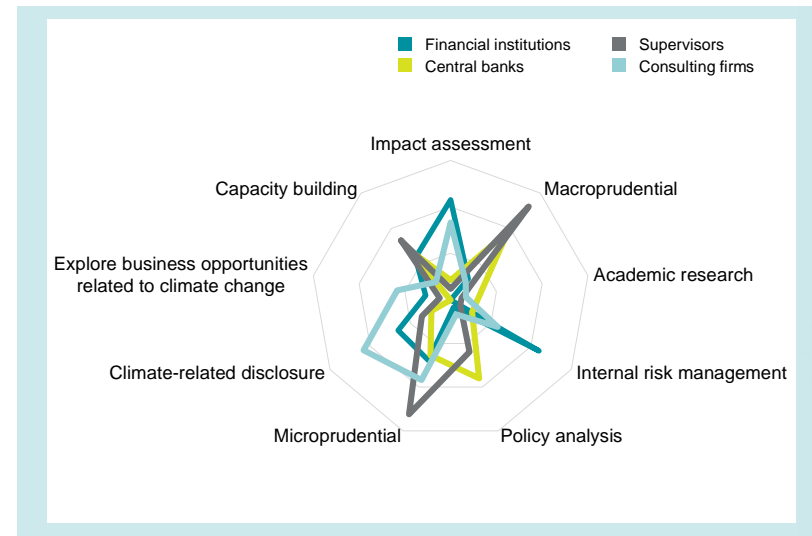
Source: NGFS (2023). Notes: In case of multiple purposes, the order of importance has been calculated using the proxy rankings indicated by the respondents. The radar chart on the right shows the relationship between variables represented on axes starting from the same point. It is important to note that the small sample size is a limitation for the evaluation of survey results and may make it difficult to determine the accuracy of granular breakdowns of survey results.

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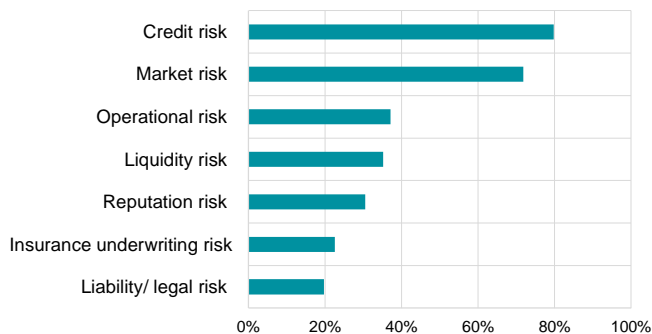Network for Greening the Financial System

What type of risks do respondents assess and why?

Most respondents assess **both transition and physical climate-related risks**, and their potential effects through key financial risks, mainly credit and market risk
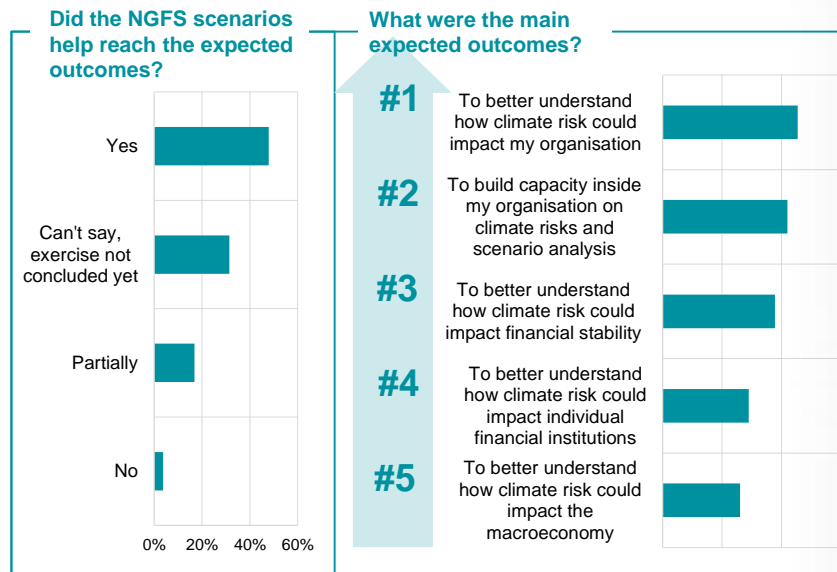
Share of total survey respondents

Scope of climate risks assessed

■ Both transition and physical risks
■ Only transition risk
■ Only physical risk

| 71% | 20% | 9% |

Types of risks assessed *(multiple options possible)*

Most respondents state the **NGFS scenarios helped them achieve their expected outcomes**: a **better understanding** of the impacts of climate risks and **capacity building** on climate risks and scenario analysis

Share of total survey responses, multiple options possible

Did the NGFS scenarios help reach the expected outcomes?

What were the main expected outcomes?

#1 To better understand how climate risk could impact my organisation

#2 To build capacity inside my organisation on climate risks and scenario analysis

#3 To better understand how climate risk could impact financial stability

#4 To better understand how climate risk could impact individual financial institutions

#5 To better understand how climate risk could impact the macroeconomy

Source: NGFS (2023). Notes: In case of multiple purposes, the order of importance has been calculated using the proxy rankings indicated by the respondents.

What levels of analysis and with which NGFS scenario variables?

More than half of the respondents conduct analysis at **either sectoral or counterparty level**; financial institutions seem to focus mainly on mixed counterparty-sector analysis, consulting firms on sector-level analysis. The different levels of analysis for supervisors (counterparty) and central banks (macroeconomic) reflect their different mandates and available data

Granularity of analysis
(share of total survey respondents)
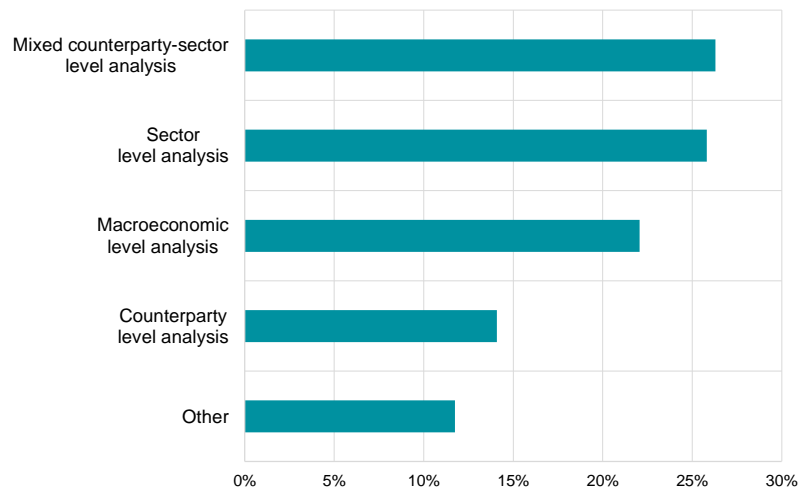
Breakdown by types of institutions
(share of subgroup respondents)

Legend: ■ Financial institutions ■ Central banks ■ Supervisors ■ Consulting firms
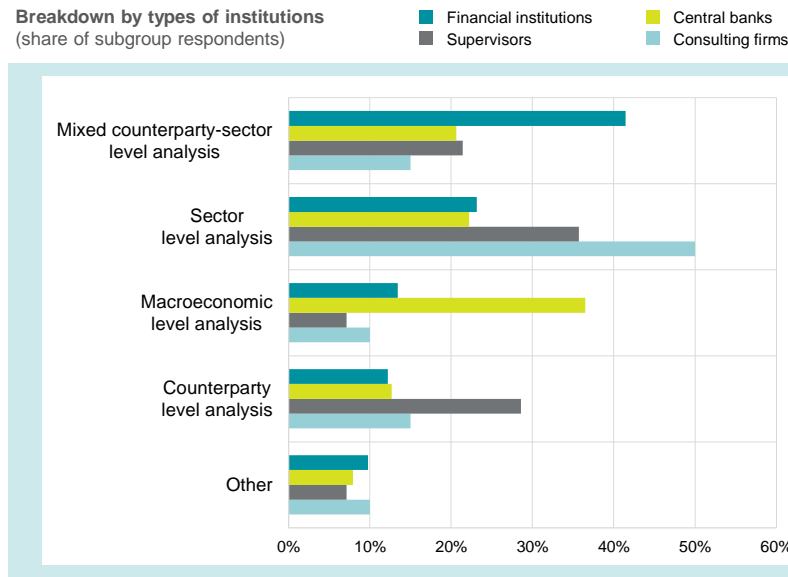
Source: NGFS (2023). Notes: In terms of granularity of analysis, some respondents selected "Other", indicating that they combine several levels of analysis. It is important to note that the small sample size is a limitation for the evaluation of survey results and may make it difficult to determine the accuracy of granular breakdowns of survey results.

Which climate scenarios are respondents using?

72% of respondents use the NGFS scenarios in their analyses, 22% have not yet used any climate scenarios, or were undecided, and 6% used exclusively other non-NGFS scenarios
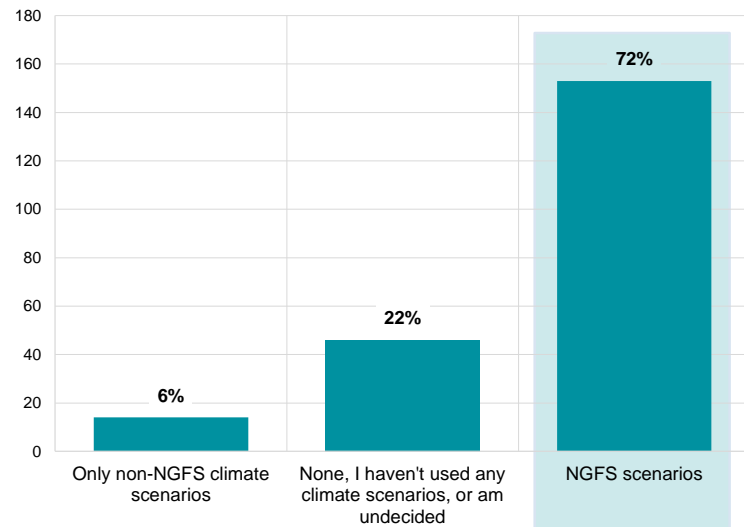
Of the respondents using NGFS scenarios, **about half rely solely on the results of the NGFS scenarios**, and the **other half adapt variables or add new ones** for the purposes of their analysis.

Share of total respondents

Share of respondents using NGFS scenarios

Overview of climate scenarios used

Bar chart with values: Only non-NGFS climate scenarios: 6%; None, I haven't used any climate scenarios, or am undecided: 22%; NGFS scenarios: 72%

Do you **adapt variables** of the NGFS scenario output?

No 52% / Yes 48%
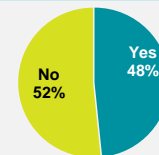
Do you **add new variables** to the NGFS scenario output?

No 58% / Yes 42%
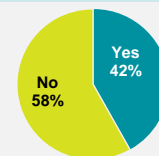
Why adapt or add variables?

- To increase **sectoral granularity** of macro-financial output,
- To increase the output set with further **macroeconomic and market variables**, or
- To increase the **geographical coverage/granularity**

Source: NGFS (2023)

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Which NGFS scenarios do respondents use?

NGFS scenarios framework
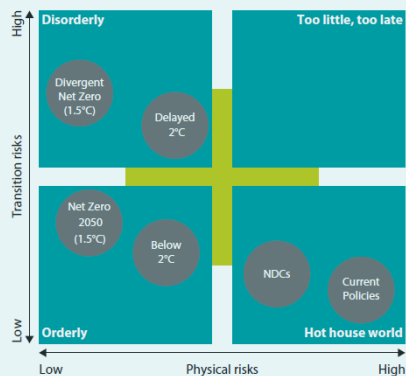
Positioning of scenarios is approximate, based on an assessment of physical and transition risks out to 2100.

Of the six NGFS scenarios, the most commonly used by respondents are **Net Zero 2050**, **Delayed Transition**, and **Current Policies**

Share of respondents using NGFS scenarios, multiple options possible

Overview of NGFS scenarios used

Hot house world	Current Policies — 69%
	NDCs — 38%
Orderly	Below 2°C — 47%
	Net Zero 2050 — 80%
Disorderly	Delayed Transition — 74%
	Divergent Net Zero — 35%
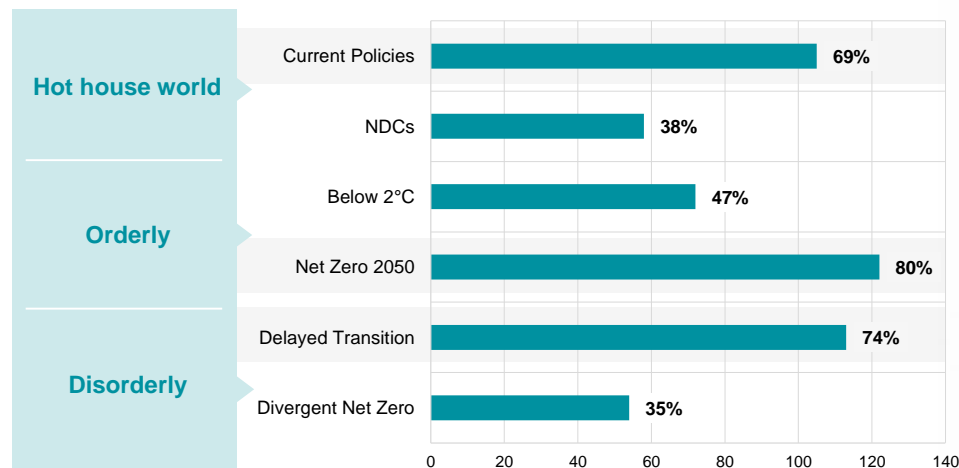
Source: NGFS (2023). Notes: See here the latest release of the NGFS scenarios (Phase III), published by the NGFS in September 2022.

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Which models and NGFS scenario variables are respondents using?

Almost half of the respondents using NGFS scenarios rely on multiple models, with the REMIND-MAgPIE model being the most widely used

Most respondents consider **transition variables** and **macro-financial variables** to be the most relevant NGFS scenario output variables for their exercise

Share of respondents using NGFS scenarios

Share of respondents using NGFS scenarios, multiple options possible

Overview of modelling approaches

- I rely on multiple models of the NGFS framework
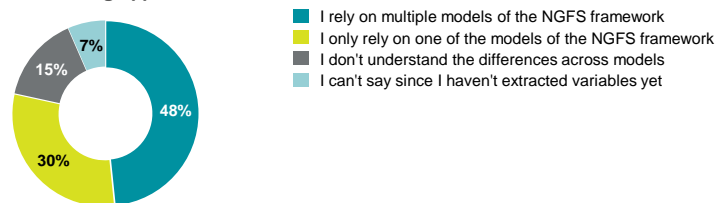- I only rely on one of the models of the NGFS framework
- I don't understand the differences across models
- I can't say since I haven't extracted variables yet

48%
30%
15%
7%

Variables of NGFS scenario output selected as most relevant

Transition variables provided by IAMs

Macro-financial variables provided by the NiGEM model

Climate variables

0%   20%   40%   60%   80%

Overview of models used
(multiple options possible)

- I rely on multiple models of the NGFS framework
- I only rely on one of the models of the NGFS framework

REMIND-MAgPIE model

NiGEM model

GCAM model

MESSAGEix-GLOBIOM model

0% 10% 20% 30% 40% 50% 60% 70% 80% 90%

Source: NGFS (2023)

Do respondents using NGFS scenarios also use non-NGFS climate scenarios?

Among the 72% using NGFS scenarios, **57% rely solely on NGFS scenarios, while 15% also use other non-NGFS climate scenarios** for their climate scenario analyses

Share of total respondents

Most consulting firms tend to combine NGFS and non-NGFS scenarios for their exercises, while most financial institutions and central banks rely solely on NGFS scenarios

Share of total respondents

Overview of climate scenarios used

72% uses NGFS scenarios

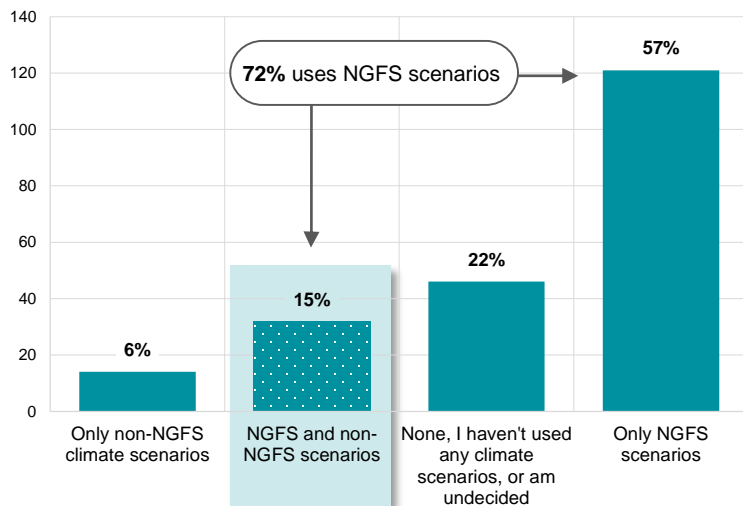| Category	Value
Only non-NGFS climate scenarios	6%
NGFS and non-NGFS scenarios	15%
None, I haven't used any climate scenarios, or am undecided	22%
Only NGFS scenarios	57%

Overview of climate scenarios used by respondents, breakdown by types of institutions

- ■ Financial institutions
- ■ Central banks
- ■ Consulting firms
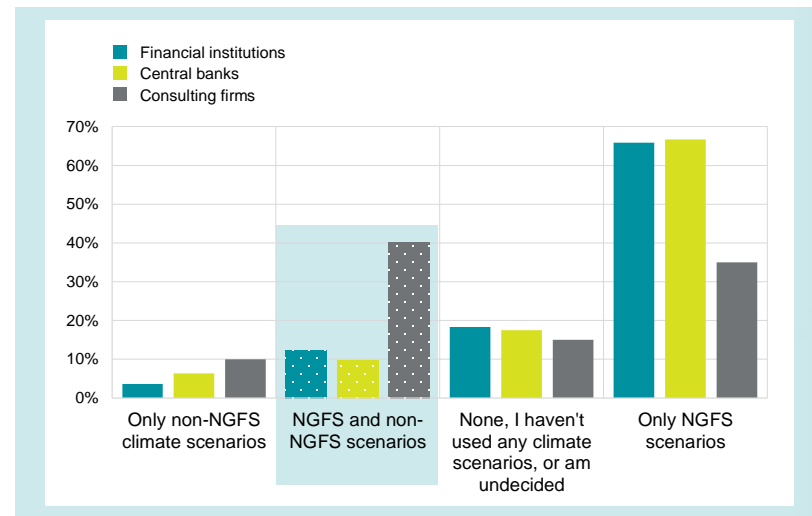
Source: NGFS (2023). Notes: It is important to note that the small sample size is a limitation for the evaluation of survey results and may make it difficult to determine the accuracy of granular breakdowns of survey results.

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Why do respondents (also) use non-NGFS climate scenarios?

Comparison and benchmarking purposes, an insufficient level of granularity, or the lack of some output variables are very influential factors that lead respondents using NGFS scenarios to also use other climate scenarios

Overview of top 5 influential factors leading respondents who use NGFS scenarios to also use other non-NGFS climate scenari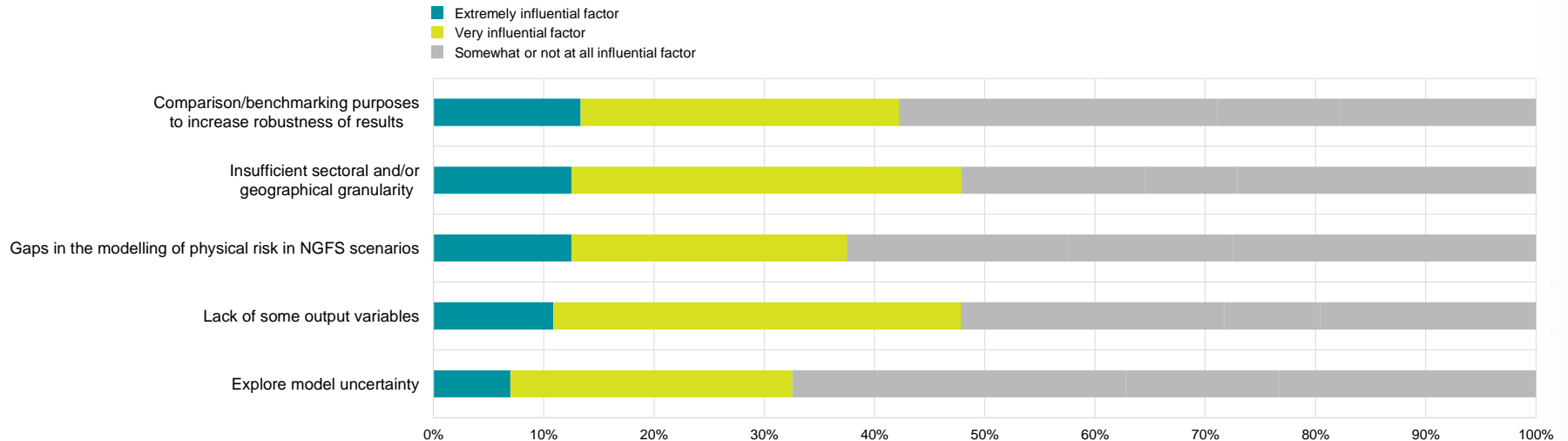os, ranked by their level of influence (share of respondents using NGFS and non-NGFS scenarios, multiple options possible)

Legend:
- Extremely influential factor
- Very influential factor
- Somewhat or not at all influential factor

Categories (y-axis):
- Comparison/benchmarking purposes to increase robustness of results
- Insufficient sectoral and/or geographical granularity
- Gaps in the modelling of physical risk in NGFS scenarios
- Lack of some output variables
- Explore model uncertainty

x-axis: 0% to 100%

Source: NGFS (2023)

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How do respondents compare NGFS scenarios with other scenarios? (1/2)

Respondents using non-NGFS scenarios were asked to compare NGFS scenarios across 11 different categories.
The results show overall quite **heterogeneous views**, possibly reflecting **the broad user base and their heterogeneous needs**

Overview of respondents' benchmarking of NGFS scenarios with other climate scenarios (share of respondents using non-NGFS scenarios, either exclusively or with NGFS scenarios)

Source: NGFS (2023)

How do respondents compare NGFS scenarios with other scenarios? (2/2)

Macroeconomic modelling and the number and relevance of output variables are confirmed as key strengths of the NGFS scenarios, while the **magnitude of transition risks and sectoral granularity** are identified as key areas for improvement.

Overview of respondents' benchmarking of NGFS scenarios with other climate scenarios (share of respondents using non-NGFS scenarios, either exclusively or with NGFS scenarios)
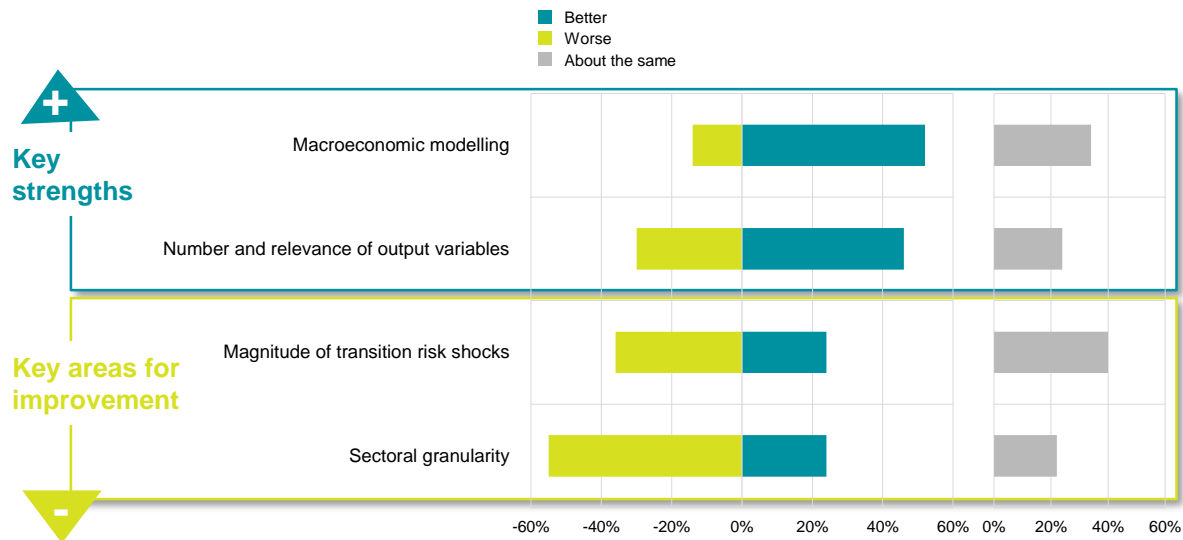
Respondents…

… **confirm some unique features of the NGFS scenarios as key strengths**, such as the macroeconomic modelling and the number and relevance of output variables.

… **identify key areas for improvement of the NGFS scenarios**, such as the magnitude of transition shocks and the level of sectoral granularity.

Source: NGFS (2023)

3

User priorities and suggestions for improvement

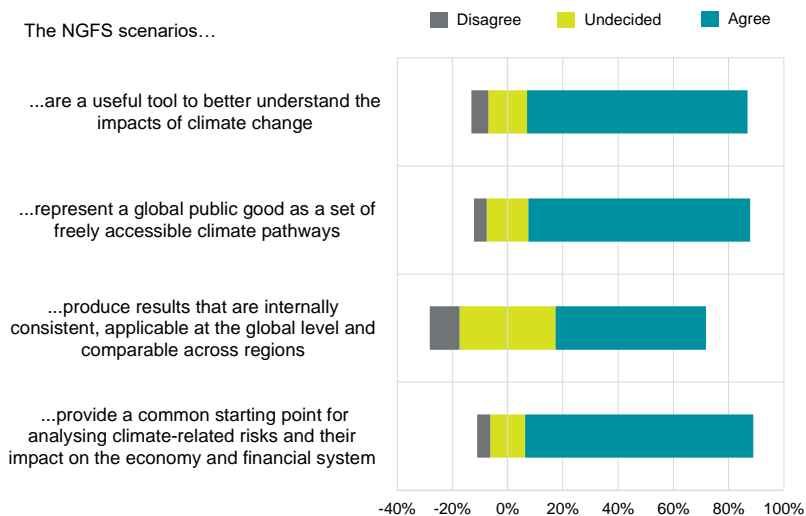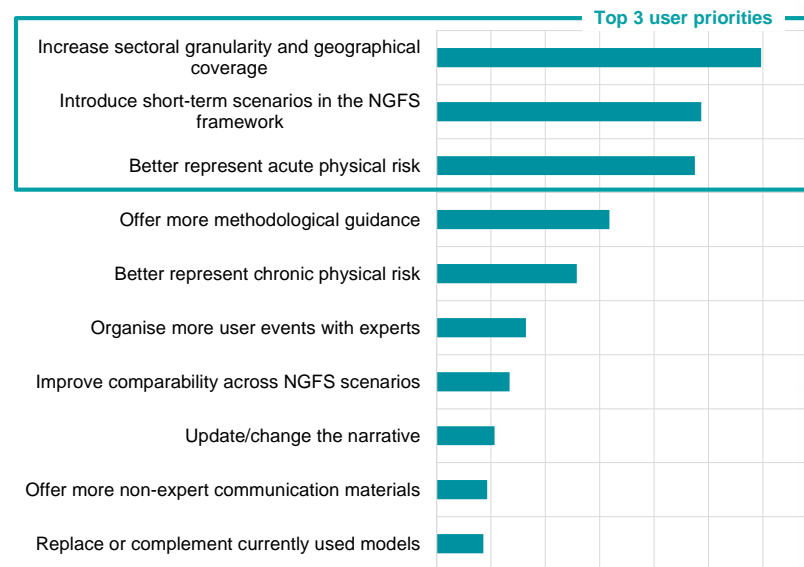# What are respondents' priorities for improving NGFS scenarios?

Most respondents broadly agreed on the features of the NGFS scenarios that make them a unique tool for assessing climate risks, although some doubted whether the results were internally consistent, globally applicable and comparable across regions

Scaling by total survey respondents

The NGFS scenarios…
■ Disagree ■ Undecided ■ Agree

…are a useful tool to better understand the impacts of climate change

…represent a global public good as a set of freely accessible climate pathways

…produce results that are internally consistent, applicable at the global level and comparable across regions

…provide a common starting point for analysing climate-related risks and their impact on the economy and financial system

-40% -20% 0% 20% 40% 60% 80% 100%

Respondents identified 3 clear priorities for improving the NGFS scenarios: **increasing sectoral granularity and geographical coverage, introducing short-term scenarios and better representing acute physical risk**.

Ranking by total survey respondents, multiple options possible

Top 3 user priorities

- Increase sectoral granularity and geographical coverage
- Introduce short-term scenarios in the NGFS framework
- Better represent acute physical risk

- Offer more methodological guidance
- Better represent chronic physical risk
- Organise more user events with experts
- Improve comparability across NGFS scenarios
- Update/change the narrative
- Offer more non-expert communication materials
- Replace or complement currently used models

Source: NGFS (2023). Notes: The "undecided" categories in the left chart also include N/A responses. The order of importance of users' priorities in the graph on the right has been calculated using the approximate rankings indicated by the respondents.

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What are the key obstacles respondents face when using NGFS scenarios?

Understanding the underlying model assumptions and levels of uncertainty is the most common obstacle respondents face when using NGFS scenarios. Translating scenario results into financial risk metrics is also a major challenge

Ranking by all respondents using NGFS scenarios

Main areas of challenges identified when using NGFS scenarios

Key obstacles ranked by respondents

■ Top 1 key obstacle   ■ Top 2 key obstacle   ■ Top 3 key obstacle
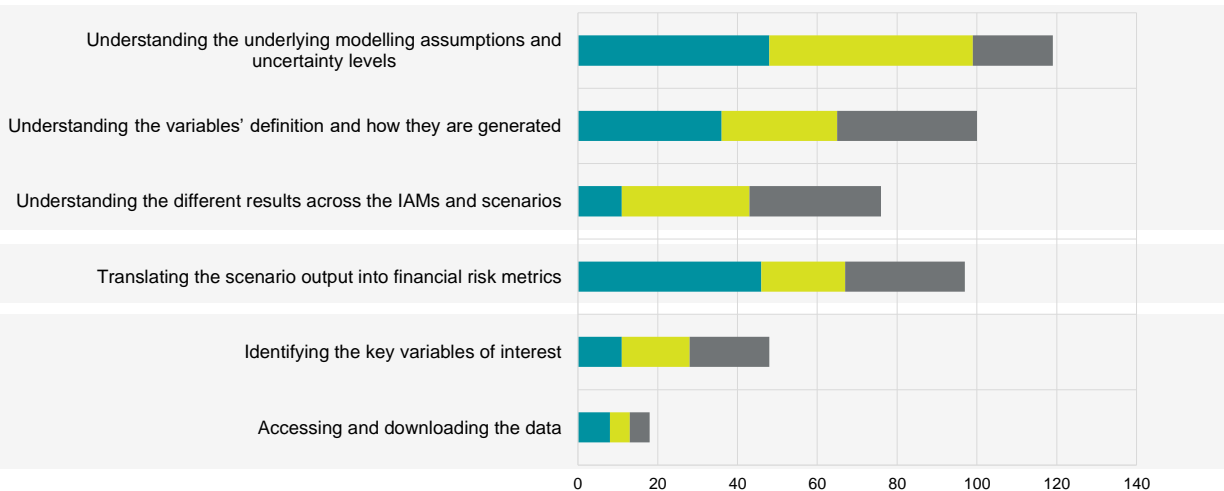
! Understanding
Finding clear **documentation** on NGFS scenario framework, models and output

! Applying
Finding **guidance** on applications of NGFS scenarios

! Accessing
Accessing the relevant **data** and identifying **key output variables**

Source: NGFS (2023). Notes: The order of importance of obstacles in the graph on the left has been calculated using the approximate rankings indicated by the respondents.

How can the NGFS scenarios be improved?

Respondents identify **5 main areas with potential for improvement** and indicate their **key priorities as users** that would improve their experience when using NGFS scenarios in their analysis

Areas for improvement

User priorities

#1 Understanding scenario narratives
1. Considering **further possible impacts** of climate change and/or climate mitigation policies
2. Clearer **description of scenarios** and their **assumptions**
3. Exploring **further scenarios**

#2 Applications
1. Difficulty in translating climate scenarios into **risk metrics**
2. Difficulty in applying long-term scenarios to **short-term (internal) risk management tools**
3. Difficulty in interpreting **outcomes** of climate scenario analysis

#3 Web accessibility
1. Making **data/information easier accessible**
2. Improving **data output format**
3. Solving **technical issues**

#4 Data and output variables
1. More **macro-financial output variables**
2. Interpretation of **transition risk output variables**
3. Unclear **starting point for variables**

#5 Model assumptions
1. Integrating **physical risks** in the transition pathways at the modelling level
2. **Initial shocks** too benign for some of the NGFS scenarios
3. Divergent scenarios might have **greater non-linearities**

Source: NGFS (2023). Notes: The order of importance of areas for improvement in the above chart has been calculated using the approximate rankings indicated by the respondents
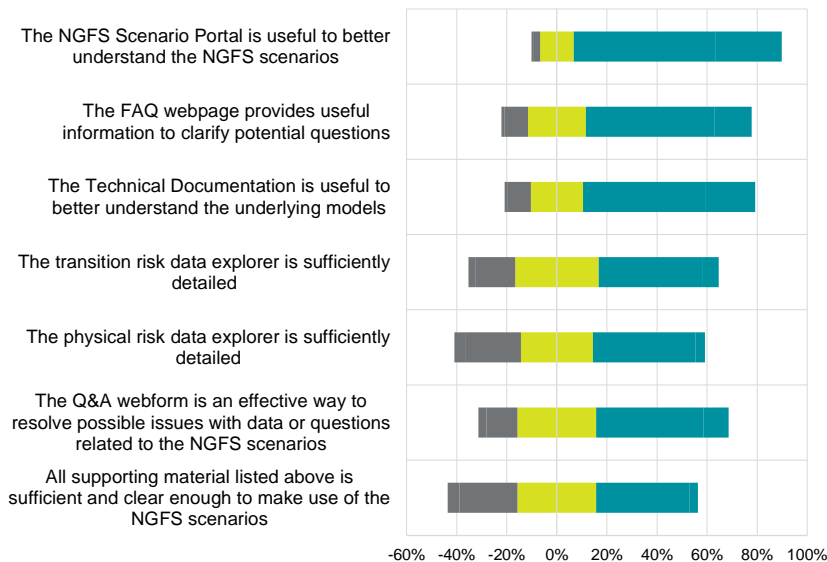
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How do respondents evaluate the existing materials for scenario usability?

Public feedback on existing material is overall positive, yet most of the respondents agree on the **need for more user guidance and accessible documentation** on NGFS scenarios to enhance their user experience

Share of total survey responses

Legend: ■ Disagree ■ Undecided ■ Agree

Chart categories (top to bottom):
- The NGFS Scenario Portal is useful to better understand the NGFS scenarios
- The FAQ webpage provides useful information to clarify potential questions
- The Technical Documentation is useful to better understand the underlying models
- The transition risk data explorer is sufficiently detailed
- The physical risk data explorer is sufficiently detailed
- The Q&A webform is an effective way to resolve possible issues with data or questions related to the NGFS scenarios
- All supporting material listed above is sufficient and clear enough to make use of the NGFS scenarios

X-axis: -60% -40% -20% 0% 20% 40% 60% 80% 100%

Key suggestions for improving the usability of NGFS scenarios

More transparent technical documentation
Clear description of the scenario framework and modelling approach to shed light on key assumptions and inter-model and –scenario comparisons of key variables.

Improving accessibility and usability of output data
More user-friendly and visual information for non-experts, and facilitating web access and download of scenario output data in appropriate files.

More user guidance and outreach
More interaction between users and experts to openly discuss questions on how to apply NGFS scenarios.

Capacity building in climate risk and scenario analysis as an emerging strategic priority

Source: NGFS (2023). Notes: Key suggestions on scenario usability were collected through open-ended questions.

Development pipeline

What are the next objectives for the NGFS scenarios?

Key objectives for the next release of the NGFS scenarios (Phase IV) are to improve the **design** of the NGFS scenarios and promote their **wide use** by a broad range of stakeholders.

Technical objectives

Improve scenarios

- Increase **sectoral granularity** and **geographical coverage**, especially in emerging economies
- Manage the trade off between **usability and complexity** of scenarios

Update scenarios

- Introduce **short-term scenarios** that could be best used for scenario analysis and stress-tests
- Better represent acute **physical risk**
- **Update** based on latest data and models

Strategic objectives

Make the NGFS scenarios a common standard

- Improve **usability** and limit complexity of the scenarios ("off-the-shelf")
- Improve **transparency** and provide users with **methodological guidance**
- **Broaden the user base** of scenarios (beyond central banks/supervisors to also private institutions, academics), and **increase range** of applications of NGFS scenarios

How is the work currently organised?

The NGFS has developed a multi-year work program centred around five strategic priorities, and **five different sub-streams** have been created to ensure the strategic and technical objectives will be reached.

Sub-stream 1: Scenario narrative and updates

Expand and update scenarios and underlying models, e.g., including recent policy actions, limiting CDR availability and including energy sector ramifications of the Russian war in Ukraine

Sub-stream 2: Short-term scenarios

Develop a conceptual framework for short-term scenarios, including narratives, shocks and modelling frameworks that cater to needs of climate stress tests, followed by its analytical implementation

Sub-stream 3: Physical risk

Expand and refine approach for acute risk impact, refine macroeconomic damage function, potentially close the loop between physical risk and transition scenarios

Sub-stream 4: Sectoral granularity

Provide sector-level macro-financial output

Sub-stream 5: Communication and engagement

Develop communication strategy, collect users' feedbacks, disseminate scenarios and organise outreaches

NGFS
Central Banks and Supervisors
Network for Greening the Financial System