



NOTE

Delivering on the G20 Sustainable Finance Roadmap

Enhancing Assessment of Climate Risks

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Summary

This 8-page note aids the Sustainable Finance community consider how to make progress with the risk-assessment challenges of the G20 Sustainable Finance Working Group's (SFWG) Roadmap. It describes how:

- Achieving the G20 Sustainable Finance goals depend on market participants being able to accurately assess physical climate risks, with those physical risks estimated at around 13% of GDP by latest NGFS research.
- Best-practice in accurate physical climate risk assessment involves assessment i) hazard ii) vulnerability and iii) exposure of investments to local weather risk.
- Weakness in factoring in vulnerability is one of the gaps in current risk-assessment. The vulnerability of an investment is significantly determined by local conditions that determine how weather risks translate into flood, drought, heat or fire. Localised data and methodologies on the relevant local conditions are frequently and increasingly available from various sources, yet data on these local conditions rarely appear in physical climate risk assessment.
- The SFWG's Roadmap Actions aim to meet the challenge of improving risk assessment by stimulating collective action by appropriate stakeholders, as described in Actions 7, 8, 11 and 12.
- To date, the set of stakeholders developing the methodologies and data most useful for assessing relevant local conditions, and hence localised vulnerability, have not been included within discussions improving climate-risk assessment, as their expertise is related to the state of the local natural environment, rather than sustainable finance and climate transition.
- As improving the vulnerability aspect of physical risk assessment must be a key step in the Roadmap's implementation, Annex 1 contains a practical suggestion for promoting the Roadmap's goals through future stakeholder exchange to improve use of available data and methodologies on local natural systems for assessing physical climate risk.
- Convening these discussions as part of implementation of the G20 SFWG's Roadmap offers the best chance to convene the relevant stakeholders, whose currently divergent interests and understandings have so far kept them apart. Explicit recognition of the vulnerability issue within the SFWG Roadmap implementation would be the right stimulus for convening, as intended by the Roadmap.

1 Implementing the G20 Sustainable Finance Roadmap on Climate-related Risk Assessment

1.1 SFWG Roadmap goals

The goals set out in the [SFWG Synthesis](#) report, agreed upon by G20 Finance Ministers and Central Bank Governors¹ and to be achieved by the steps in the [SFWG Roadmap](#), aim at:

- 1) scaling up investments which align with sustainability goals,
- 2) enhancing availability of quality and comparable sustainability data and
- 3) levelling up international financial institutions' role for delivering on the goals set out in the Paris Agreement and the 2030 Agenda.

One of the key issues to drive all 3 of these high-level policy goals is the **enhanced identification, assessment and management of climate-related financial risks**. The world's community of central banks and financial supervisors defines them as

“financial risks posed by the exposure of financial institutions to physical or transition risks caused by or related to climate change, for example, damage caused by extreme weather events or a decline in asset value in carbon-intensive sectors” (NGFS 2020, p. 9).

1.2 SFWG Actions to improve climate risk assessment

Therefore, several of the 'Actions' set out in the Focus Areas of the SFWG Roadmap aim to support financial institutions' or authorities' ability to **assess the exposure to climate-related financial risks**:

- Actions targeting the allocation of capital to address transition risks;
- Actions facilitating the assessment of physical risks;
- Actions on corporate sustainability reporting, sustainability data and wider sustainable finance-related themes further increase financial market participants' ability to successfully manage climate risks and finance the transition to a low-carbon economy.

Annex I contains further information on the relevant goals and activities.

Success of the SFWG's roadmap will be achieved by activities which stimulate and steer activities by international organisations and wider stakeholders to align around best-practices in the accurate assessment of these risks.

1.3 A higher granularity of physical risk assessment is needed

Newest [research on the modelling of climate physical and transition risks and their economic impacts](#) by the NGFS reveal the relative **higher significance of physical risks in comparison to transition risks**.

¹ See [second meeting communiqué, 7 April 2021](#).

In an [economy-wide climate stress test conducted in September 2021](#), the European Central Bank (ECB) finds that “impacts on banks in terms of losses would **mostly be driven by physical risk**” and exposed financial institutions represent “a major source of systemic risks” (p. 5, emphasis added).

Academic studies estimating physical climate risks [calculate loss values of up to 25% of GDP](#) until 2100, for a climate change pathway reflecting current national ambitions.

Estimations for **transition risks** largely depend on socioeconomic and technologic scenarios. Financial actors’ and systems’ exposures to **stranded assets**² have been estimated [frequently](#) and can amount to USD 20 trillion until 2050, or around 4% of global wealth in 2015, in the case of a disorderly transition (IRENA 2017).

Current climate risk assessment methodologies of private sector actors and financial supervisors are mostly estimations of GDP- or portfolio-level impacts, based on projections of future climate hazards and physical assets’ exposure to these weather-related hazardous trends and events.

To shape a **more efficient allocation of capital**, more **granular assessment** of climate damages on the investment- and asset-level is needed to allow capital market participants to make materially informed decisions.

2 Steps to improve the assessment of physical climate risk

2.1 Understanding the nature of physical climate risks

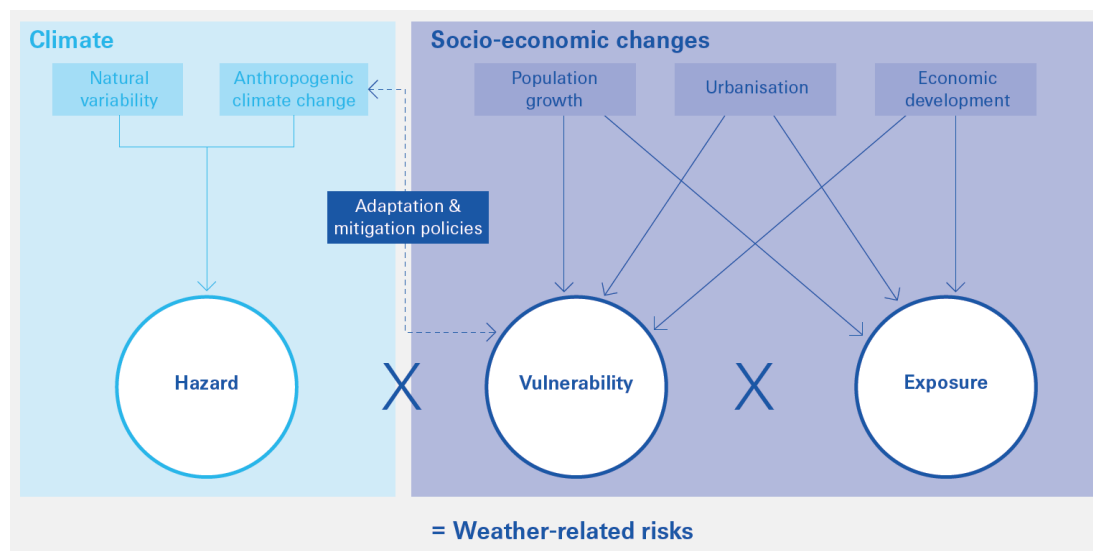
Methodologies for the granular assessment of physical climate risks have been developed - mainly by insurance companies who are the leading practitioners in the field.

Their experience in calculating the risks single companies, plants or assets face with regard to climate change, can be leveraged to better inform financial market participants’ decisions to decrease their exposure to companies facing large physical climate risks, and steer investments towards more climate resilient firms.

For the determination of physical climate risks, insurers look at the **three elements determining financial risks** (see Figure 1 below from Swiss Re): i) hazard, ii) vulnerability and iii) exposure:

- AXA, meanwhile, states that “Climate risk is a function of the physical hazard (the severity and frequency of events), exposure (the monetary value of insured asset(s)) and vulnerability (the susceptibility or damageability of the insured asset(s) to a given hazard intensity)” ([AXA 2021 Climate Report](#), p. 55).
- Similarly, the [newly published ISO Standard 14091](#) on “Adaptation to climate change – Guidelines on vulnerability, impacts and risk assessment”, a new international standard for climate risk assessment and adaptation, relies on a climate risk understanding that builds on hazard, exposure and vulnerability (ISO 14091:2021).

² Stranded assets can be defined as “the remaining book value of assets substituted before the end of their anticipated technical lifetime and without recovery of any remaining value to achieve 2050 decarbonisation targets” (IRENA 2017, p. 14).

Figure 1: Contributing factors of the three main components of weather-related risks

Source:

Swiss Re (2020), [Natural catastrophes in times of economic accumulation and climate change](#), p. 6.

2.2 The problem of vulnerability assessment

However, even for insurers, in these 3 areas, the most significantly problematic for assessment is 'vulnerability':

- AXA find that “**vulnerability is a key part of the risk equation whilst understudied as a solution to reduce risk in the context of climate change**” (p. 59, emphasis in original). Feeding Catastrophe (“Cat-“) Models with relevant data of climate observations, vulnerability and financial modules is key for insurers for risk pricing, business planning and capital management.
- Availability of **vulnerability data** hence needs to be regarded as **core necessity** to support the insurance industry to target the ‘protection gap’, especially when increases in premiums due to increased climate risks exceed GDP growth (AXA 2021, p. 55).
- Lack of research on vulnerabilities in climate risk assessments of insurers is also revealed in a study conducted by the UN’s Principles for Sustainable Insurance (PSI) in collaboration with more than 20 insurers on “[Insuring the climate transition](#)” of January 2021. Although it recognizes vulnerability as one of the three components of physical climate risks, it “**assumes vulnerability remains unchanged, constrained by the lack of a common view of the potential vulnerability changes related to climate change**” (p. 23, emphasis added).

This finding suggests a **strong demand for better assessment methodologies and data** on issues determining vulnerability, including the assessment of natural capital surrounding insured physical assets. This claim is also supported by European insurance regulators:

- The French Autorité de contrôle prudentiel et de résolution (ACPR) [conducted the first analysis of the French financial system](#), finding **claims on insurers are likely to rise five to six times by 2050**, driving up loss ratios and insurance premiums significantly.

- The European Insurance and Occupational Pensions Authority (EIOPA) [argues](#) that in the European Solvency II Directive “all aspects of [climate] risks” need to be factored in, pointing to the necessity “**to consider [an assets] exposure and its corresponding vulnerability**” (EIOPA 2021, p. 4f., emphasis added).
- Yet, meaningful data is a **major bottleneck** for vulnerability analyses. In an assessment conducted by the European Environment Agency (EEA) in 2017 ([Climate change, impacts and vulnerability in Europe 2016](#)), the EEA notes that “**the knowledge base regarding climate change impacts, vulnerability, risk and adaptation assessments in Europe could be enhanced**, e.g. [through] enhanced national and sectoral assessments and their reporting” (p. 13).

2.3 Improving vulnerability assessment

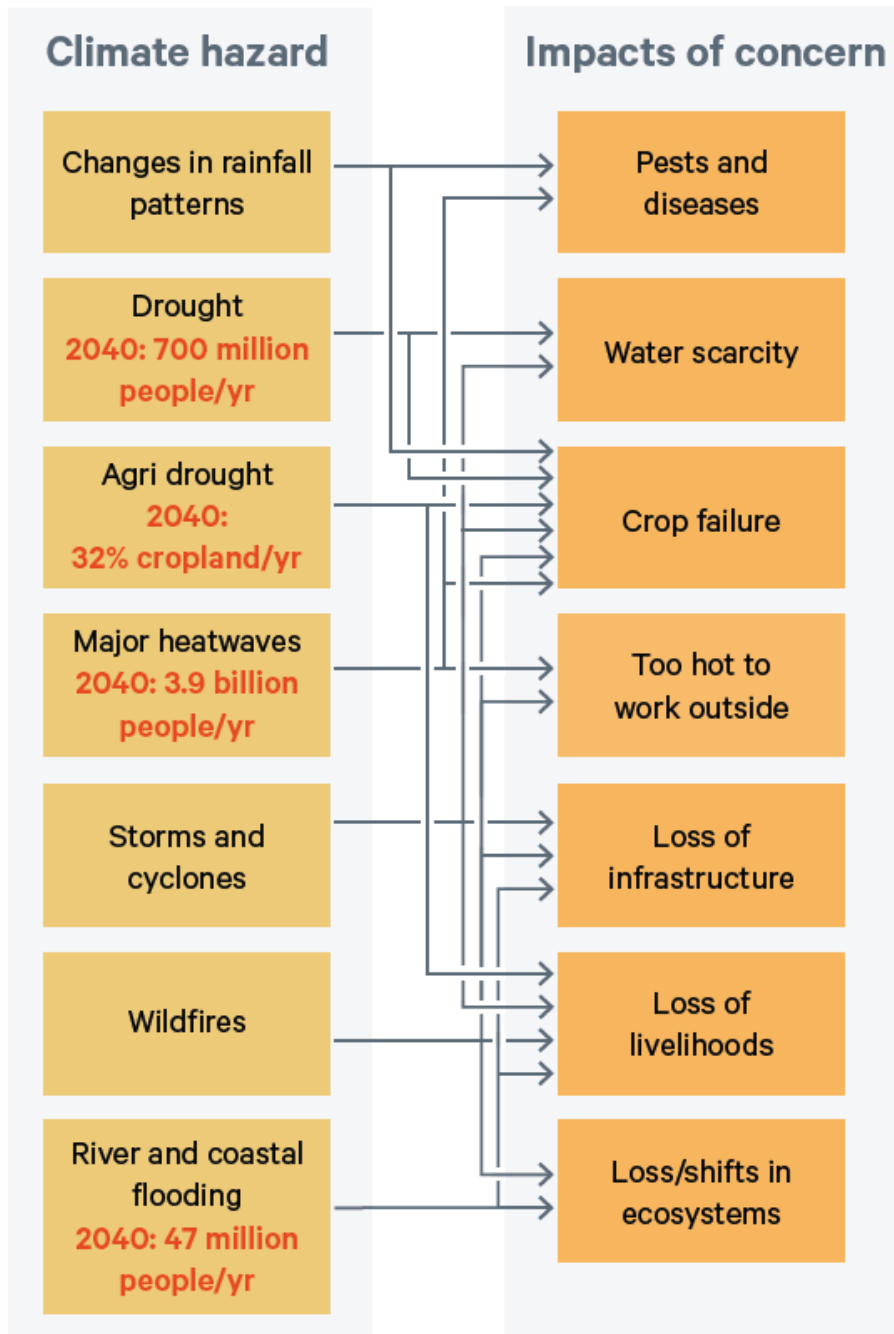
Understanding the drivers of vulnerability is therefore a first step in improving climate risk assessment practice in this area. The recent report of the Basel Committee on Banking Supervision of the Bank for International Settlement on “[Climate-related risk drivers and their transmission channels](#)” from April 2021 provides a useful definition of Climate Vulnerability:

“Vulnerability is the propensity or predisposition to be adversely affected. It encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. In the context of climate risk drivers, vulnerability refers to the level of damage which can be expected at different levels of intensity of a hazard. For example, when a storm surge hits an area with weak building regulations and few flood mitigation measures, it is more vulnerable to loss compared to an area that has strong flood control infrastructure and strong building regulations. Vulnerability assessments may include secondary impacts such as business interruption.” (BCBS 2021, p. iv)

The drivers of vulnerability are specific to the various physical hazards (e.g. floods, wind).

These specific drivers of vulnerability can be understood once the nature of the hazards and impacts are understood. These are illustrated by a UK-funded project conducted by Chatham House in the months before the Climate COP. Researchers provided a [mapping and analysis of the different risk channels](#) (Figure 2). The figure indicates the nature of “Climate hazards” which are then linked to the “Impacts of Concern”, which in turn affect assets or their operation, infrastructure or commodity markets.

Figure 2: Climate hazards and the interlinkages of their impacts



Source: Chatham House 2021, *Climate change risk assessment 2021*, Research Paper, p. 36. (An extract of a larger diagram)

Examples illustrate some of these impacts:

- **Flood risks:** According to [research conducted by the World Bank](#), 1.47 billion people around the world are facing flood risk, with devastating impacts for a third of them. Globally, 60 million people will be facing river flooding by 2100 every year, with particularly concentrated effects in South Asia ([Chatham House, Summary report](#)).
- **Water security:** By 2040, almost 700 million people will face hydrological droughts of at least half a year annually, almost a doubling of the historic average of 408 million people. Water stress, meaning the supply falling short of demand, will increase by at least 40% in many regions around the world by 2040, in comparison to historic baseline values ([Chatham House, Research paper](#), p. 29ff.).
- **Food security:** By 2050, 50% more food is needed to match global demand, while crop yields may decline by 30%. Severe droughts, as experienced in Central Europe in 2018 that reduced yields by 50%, will triple by 2040, in comparison to the historic baseline ([Chatham House, Summary report](#)).

2.4 Understanding the factors driving vulnerability

The nature of vulnerability (and so impact) can be illustrated by taking the examples above. Notably, many of these relate to the state of the local, natural environment where the hazard occurs:

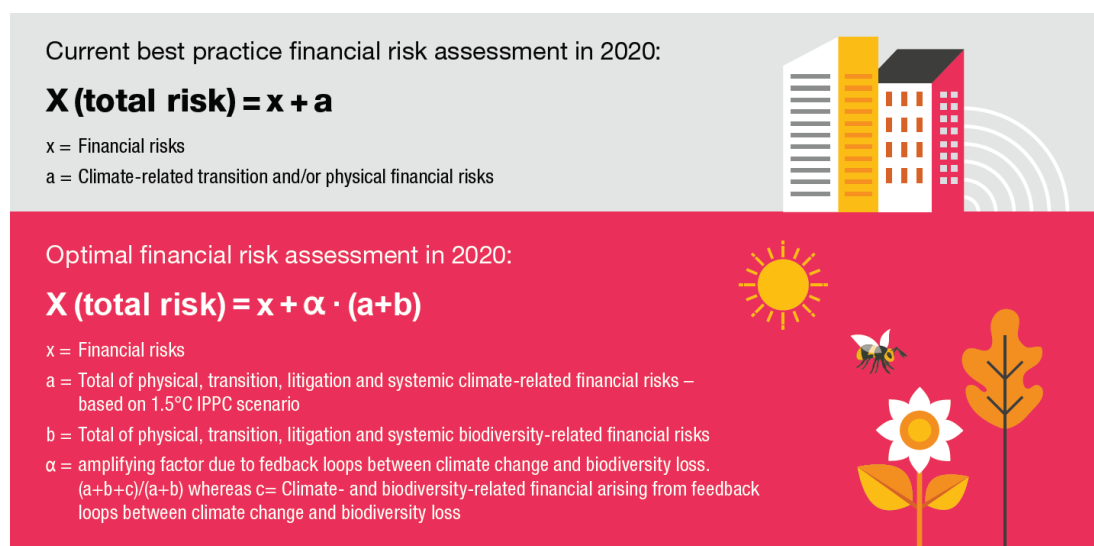
- Impacts of river flooding are closely linked to what is built by the river, and how natural vegetation in the river's catchment area mitigate the intensity of precipitation arriving in an area of flooding.
- Impacts of heatwaves on livelihoods and work productivity increase in areas that are dominated by grey infrastructure prone to create heat islands and decreases through availability and access to green spaces or natural vegetation along streets, facades and roofs of buildings.
- Impacts of storm surges and sea-level rise on coastal assets (e.g. ports) are mediated through the availability natural barriers such as coral reefs, coastal wetlands and the state of coastal vegetation (e.g. mangroves).

As a result, improving physical risk assessment has been seen to need an improvement in inclusion of data on the state of local natural environments.

2.5 How to include these drivers in vulnerability assessment

This causal connection between climate physical risks and the local natural environment has been taken up and formalized by leaders in the field of climate risk assessment as the basis for an *optimal assessment of financial and climate risks*, and described in Figure 3 ([PwC and WWF 2020](#), p.33):³

³ Further insights on the consequences for financial sector participants have been underlined by the Finance for Biodiversity Initiative's report on "[The Climate-Nature Nexus](#)" in May 2021.

Figure 3: Current best practice and optimal financial risk assessment

Source: PwC and WWF 2020, *Nature is too big to fail*, p. 33.

The formula for an optimal assessment of financial risks is one illustration that climate-related financial risks faced by financial institutions are influenced, or mediated, by the natural environment surrounding physical assets, infrastructure and humans.

This implies that all actors seeking assessment of climate risks – for example, owners of debt titles or other securities of (non-financial) companies, insurers, other financial institutions, and their regulators, have an interest in access to detailed, relevant investee-specific climate-related information on nature. The link is labelled as the ‘climate-nature’ nexus.

Making the same point, EIOPA notes that “Adaptation measures can influence the hazard and the vulnerability components of the weather-related risk” (p. 18) and that for the recalibration of relevant models, **information on vulnerability is necessary to perform the task** (EIOPA p. 21).

2.6 Harnessing existing data for improving climate-risk assessment

Releasing ‘siloes’ expertise would allow a step-change

Much relevant data on the vulnerability of investments to physical risks is available, but not currently accessed to inform assessment. This presents an opportunity for significant improvement.

Researchers, development banks, wider initiatives and further actors gather and process large amounts of data and expertise on local natural conditions that could inform the vulnerability analysis of physical assets. Yet, it is not currently factored into climate risk assessment, in part because it has been seen to relate to ‘biodiversity’ rather than climate risk.

Although the term “natural capital” is now often used to signify the financial-significant natural environment which provides the type of risk mediation services described above (and others), as a way of bridging between the finance and nature communities, this terminology has not solved the problem.⁴

⁴ As used in the Natural Capital Protocol, it is a “term for the stock of renewable and non-renewable natural resources on earth (e.g., plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits or “services” to people”.

Outside financial and economic circles, where much of the information on natural capital is kept, the terms 'nature' and 'biodiversity' are still used. Whilst these conjure up pictures of exotic animals, birds and rainforest; and win hearts, they obscure the key issue of the value of natural capital and its role in the analysis of dependencies, risk assessment and management.

As 'biodiversity' is an agenda in itself, the role of natural capital in climate-risk assessment has remained alienated, and effective exchange between experts in climate-risk and the climate-risk relevant climate-nature nexus has been held-back.

The SFWG Roadmap approach of convening relevant stakeholders is the solution to this problem. A practical suggestion for convening of these stakeholders is contained in Annex 1.

The calls for international stakeholders to work together within Roadmap Actions 7 and 8 already provide the over-arching goals and direction on issues, including physical risk assessment and improvement in decision-useful data.

However, convening of expertise from 2 different communities - 'sustainable finance' and 'biodiversity' - does not happen naturally. It will **require leading actors in the SFWG Roadmap process to identify the improvement of vulnerability assessment as key** to physical climate risk assessment, and call for the stakeholders to work together.

The resulting improvements to physical climate risk assessment by market participants, financial institutions and financial market authorities can be expected to accelerate market differentiation and alignment of investments with climate goals.

This would also facilitate stakeholder action on improving physical risk assessment of financial risk co-ordinated by the FSB, being taken forward by Actions 11 and 12 of the Roadmap.

The [creation of the International Sustainability Standards Board](#) (ISSB) by the IFRS Foundation Trustees in the beginning of November 2021, takes a major step in accomplishing Action 6 of the Roadmap, and increases the timeliness of convening action to create improved, more-aligned assessment of firms' vulnerability to climate hazards, as the demand for the alignment of best-practice can be expected to accelerate rapidly.

Annex 1: Improving the vulnerability aspects of physical risk assessment:

A practical suggestion for stakeholder exchange, as part of SFWG implementation

This Annex describes:

- A: the issues around which stakeholders could work to improve assessment of vulnerability in physical risk assessment, and some next steps to achieve that goal: and
- B: a draft agenda for realising the first step in that progress.

A. Possible improvements and steps to achieve them

Table 1: SFWG Roadmap Actions set to integrate natural capital considerations for climate risk vulnerability analysis

Roadmap Action	Improvements Sought	Next Steps
Action 7: Data gaps and the advancement of sustainability data strategies	<p>Granular high-quality data on natural capital surrounding physical locations of assets (such as production sites) is required to enhance vulnerability analysis of climate risks.</p> <p>Innovative technologies and incentivising data governance systems can drive data generation and management, benefitting the availability of raw sustainability data.</p>	The convening of key stakeholders on data generation and management can accelerate the availability of decision-useful natural capital data for climate risk vulnerability analysis.
Action 8: Improving data quality, usefulness and work done by ESG rating agencies and data providers	<p>Climate risk-relevant data on natural capital needs to be gathered and edited to provide decision-useful and material information to financial sector participants, including financial institutions and supervisory authorities, and the general public.</p> <p>This encompasses the availability of datasets combining climate, environmental, geolocational and financial data to allow efficient allocation of financial resources to companies and firm level assets.</p>	Increased dialogue between current or future data providers for local natural capital data and future financial users can facilitate the development of decision-useful datasets that enhance the vulnerability analysis of climate risks.

Roadmap Action	Improvements Sought	Next Steps
<p>Action 11: Research on the identification, measurement and management of sustainability-related financial and financial stability risks</p>	<p>Piloting research on the climate risks exposure of financial systems (such as top-down climate stress tests) can be calibrated by incorporating data on nature and biodiversity into systemic risk assessments.</p>	<p>Expert communities researching financial systems’ exposures to climate risks can be brought together with experts on climate risk vulnerability analysis to enhance the informative value of climate stress test models.</p>
<p>Action 12: Identification, measurement and management of sustainability-related financial risks by regulatory and supervisory authorities, including guidance for issuers</p>	<p>Better integration of nature and biodiversity into climate scenario analyses and the facilitation of respective data flows allows for enhanced oversight on issuers’ and financial institutions’ exposure and vulnerability to idiosyncratic climate risks.</p>	<p>Central Banks and financial authorities can establish new standards for climate risk assessments by leveraging their access to data and resources for creating better risk models, and mandating disclosure of key metrics.</p>

B. Suggested Agenda for convening stakeholders – an example

Based on our understanding of the current state of risk assessment, best-practice and expertise bridging finance and natural capital assessment, we suggest the following themes for exchange to promote the ongoing improvement of vulnerability assessment within physical climate risk assessment.

These exchanges aim at initiating dialogue between the sustainable finance community and wider sets of expertise, in ways that engage both sets of people in the shaping of research, methodologies and data on local conditions, to provide improved future decision-relevant data for the finance community.

The key participants in the discussions would be key actors shaping future assessment practices, from the market participants and public authorities. Deeper exchange may include: providers/developers of climate risk tool methodologies, sustainability data providers, organisations working on sustainability data generation and gathering, insurers’ CAT-model experts, (sustainability-focussed) investors and banks and the research community and officials designing climate stress-tests for prudential market supervisory authorities.

Table 2: Timings, Discussion Points, Appropriate Speakers

Theme and Time	Discussion points/aims	Appropriate Speakers (choice of)
<p>Climate risks to the financial system: current practices and limitations</p> <p>- 10 mins</p>	<ul style="list-style-type: none"> • Present state of assessment of climate physical, transition and systemic risks • Sensitize for limitations of methodologies (GDP vs. asset level), data issues, lacking integration of state of nature 	<p><i>Current frontiers of climate risk integration in financial markets:</i></p> <p>Simon Dikau, LSE, Nick Robins, LSE, Tianyin Sun, Tsinghua PBCSF/NGFS; Etienne Espagne, AFD; Pierre Monnin, CEP; Ma Jun, IPE/PBOC; Oliver Marchand, ex-CEO & Founder of Carbon Delta, now acquired by MSCI.</p> <p><i>Climate Systemic risks:</i></p> <p>Stefano Battiston (Uni Zurich), and Irene Monasterolo (EDHEC) (developers of first network model to assess systemic risks).</p>
<p>The climate-nature-finance nexus</p> <p>- 15 m</p>	<ul style="list-style-type: none"> • Present interaction of climate and nature physical (and transition) risks • Present case studies on how state of nature and biodiversity mediate climate risks • Point towards next steps that decrease analytical uncertainties and promise successes for climate risk management 	<p><i>How could natural capital reporting benefit climate risk analysis:</i></p> <p>Simon Zadek, Chair F4B, led G20 Green Finance Study Group</p> <p>Charlie Dixon, Vivid Economics, author of Climate-nature nexus report</p>
<p>Identifying and realizing co-benefits of integrating vulnerability analysis into climate risk assessments</p> <p>- 25 m</p>	<ul style="list-style-type: none"> • Outline current limitations and way forward for: <ul style="list-style-type: none"> ○ Reporting, ○ Data, ○ Metrics, ○ Risk assessment methodologies, ○ Scenario analysis ○ Climate stress-tests, <p>considering the co-benefits of integrating natural capital into climate risk vulnerability analysis</p>	<p><i>General trends:</i></p> <p>Margaret L. Kuhlrow, Global Finance Practice Leader at WWF International</p> <p><i>Reporting and metrics:</i></p> <p>David Craig, ex-CEO Refinitiv, Senior Advisor LSEG</p> <p><i>Data:</i></p> <p>Matthieu Maurin, Iceberg Data Lab; Sherry Madera, LSEG and Future of Sustainability Data Alliance (FoSDA), Delphine Dirat, LSEG and FoSDA</p> <p><i>Spatial Finance:</i></p> <p>David J. Patterson, Head of Conservation Intelligence - WWF-UK; Susanne Schmitt, Nature and Spatial Finance Lead - WWF-UK</p>

Theme and Time	Discussion points/aims	Appropriate Speakers (choice of)
<p>Best practices for natural capital-sensitive assessments of climate risks, opportunities and impacts by private institutions</p> <p>- 20 m</p>	<ul style="list-style-type: none"> • Corporate: Tangible advantages through consideration of natural capital for climate risk assessment and management • Financial: Effects of consideration of natural capital for climate risk-return profile and impact 	<p><i>Finance:</i> Ulrike Decoepe, AXA Group Chief Communications, Brand & Sustainability Officer, UNEPFI European Insurance Representative; Céline Soubranne, AXA Group Chief Sustainability Officer</p> <p>Others, such as BNPP AM, Sycomore</p> <p><i>Corporate:</i> E.g. WBCSD, WEF</p>
<p>Q&A - 20 mins</p>		<p>Facilitator</p>

End Piece

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