Climate data and services for the finance sector: challenges, opportunities and experiences

Robin Hamaker-Taylor
Financial services consultant, Acclimatise

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building climate resilience

Topics to cover

1. Acclimatise – experts in physical climate risk analysis for financial services
2. Why are financial institutions increasingly interested in climate data and information (climate services)?
3. Barriers to provision and use of climate services in financial sector
4. What demand for climate services by banks and investors do we see?

Introducing Acclimatise: experts in adaptation and resilience, providers of climate services

Established in 2004, help financial institutions, corporates and governments to identify, quantify, manage and disclose physical climate risks and opportunities

- Climate adaptation planning
- Climate finance & sustainable finance flows
- Communicating climate resilience
- Vulnerability analysis
- Identifying investment opportunities
- Mainstreaming resilience into decision-making

400+ assignments | **120+ clients** | **70+ countries**

citi, Rabobank, Bradesco, TD, UBS, Itaú, nab, RBC, DNB, Standard Chartered, Santander, BARCLAYS, ANZ

EU-MACS

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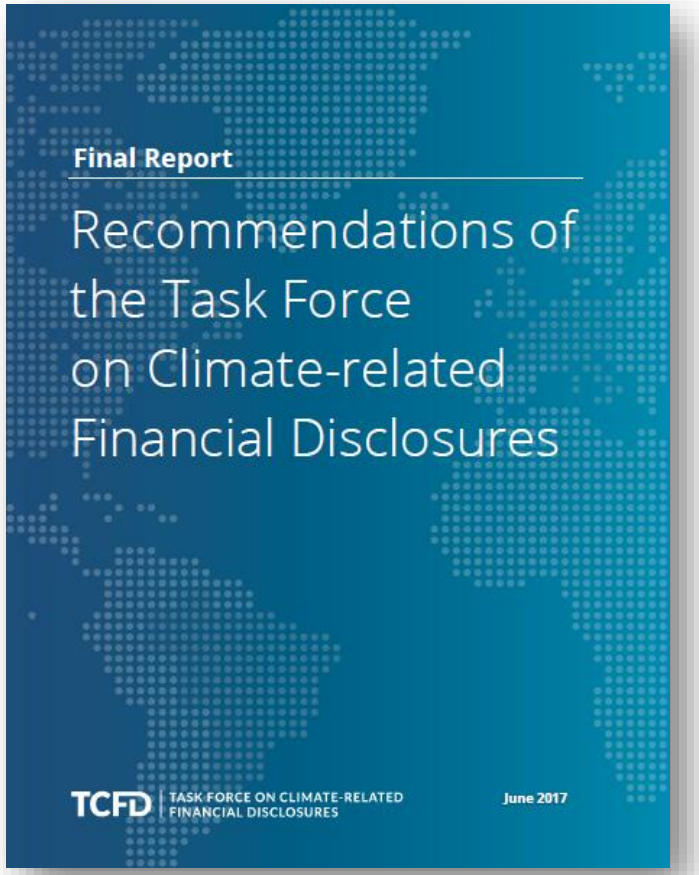
Task Force on Climate-related Financial Disclosures (TCFD) recommends physical risk analysis and disclosure, driving demand for climate data and services



Voluntary reporting framework for financial institutions and companies in the real economy.

1,027 supporting organizations

Physical risks: include the financial impacts of the physical effects of climate change.

Acute hazards: disruption to operations from extreme weather such as floods, droughts, heatwaves and hurricanes.

Chronic climate change: risks from longer-term shifts in climate patterns, e.g. sustained higher temperatures; sea level rise.

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TCFD has helped motivate regulators and central banks to incorporate climate risks into their supervision of financial risks

Network for Greening the Financial System ('NGFS') of Central Banks and Supervisors

Share best practice on climate risk disclosure requirements among 63 members and 12 observers

Regulatory oversight of climate risks emerging in many jurisdictions – e.g. Bank of England Biannual Exploratory Scenario (BES) 'climate stress test'

https://www.ngfs.net/en/about-us/membership
https://www.ngfs.net/en/liste-chronologique/ngfs-publications

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While significant market drivers exist, challenges in provision and use of climate services for financial institutions remain

Demand	Supply	Use
• Misperception physical risks will happen in future only (+ extreme events focus). • **Limited bandwidth to take on additional risk analysis (coronavirus, transition risk).** • Ad-hoc analyses. • Desire to stick to what peers are doing.	• Inflexible and poorly tailored climate scenarios. • **Data portals and climate impact studies do not target existing risk assessment processes.** • Lack of climate model outputs for the short – medium term, particularly inter-annual and decadal projections. • Lack of climate impact studies across all sectors and geographies.	• Internal capacities within banks on spatial risk analysis. • **Non-climate data gaps (asset-level information).** • Confidentiality issues. • Aggregating risk at portfolio level.

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Acclimatise has developed a suite of analytics to evaluate physical climate risks in financial portfolios and investment decisions

These analytics help bridge the gap between the climate science and financial institution risk assessment methods

Scope	Analytical approach	Summary
Semi-quantitative risk assessment	Heatmapping	Key segments of risk in the portfolio are identified
Quantitative risk assessment	Sector deep-dive assessments	For risk 'hotspots', impacts on key financial metrics are quantified where possible
Client benchmarking & engagement	Corporate benchmarking	Clients' progress on TCFD is assessed against peers, leading to meaningful engagement between FIs and clients

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Acclimatise heatmapping can identify key areas of physical risk by screening for vulnerability to a full range of climate impacts

Sub-sector vulnerability indicators

- E.g… Reliance on climate-sensitive supplies
- Reliance on efficient operation of assets
- Potential for environmental and social impact
- Climate sensitivity of market demand
- ….

X

Climate hazard scenarios

- Chronic changes
- Acute hazards

X

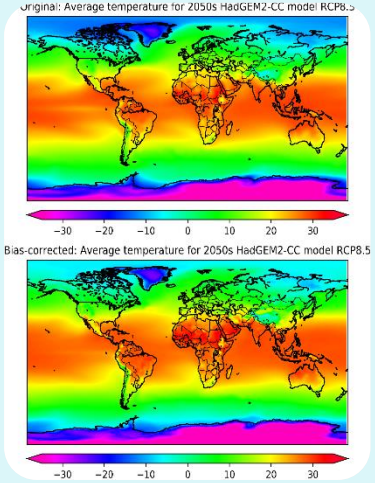
Exposure

- Presence of investments in locations exposed to hazards

Example vulnerability indicator scores for electricity, gas, steam and A/C supply

Vulnerability indicators	Thermal power stations: natural gas	Biomass power stations	Solar CSP	Hydropower	Power transmission & distribution
	Sub-sectors				
Natural resources	High	High	Low	High	Low
Energy supply	Med	Med	Low	Low	High
Climate sensitive supplies	Low	High	Low	Low	Low
Transport routes	Med	Med	Med	Med	Med
Assets & processes	Med	Med	Low	Med	Med
Market demand	High	High	High	High	Med
Environment & social impact	Med	Med	Low	Med	Low
Labour health & productivity	Low	Low	Med	Med	Med

Annual temperature anomaly, 2050s, RCP 8.5



Hazards in heatmapping: Climate variables and climate-related hazard data are processed for present-day and future scenarios, for investment locations

High quality sources — e.g. IPCC, NASA, NOAA, UNEP, World Bank

Wide range of hazards — Including chronic (incremental) changes and extreme weather events

Multiple models — Over 40 climate models provide a comprehensive view of potential changes

Diverse scenarios — e.g. Corresponding to 2°C and 4°C warming by end of 21st century

Multiple time periods — e.g. Present day, 2030s and 2050s

Hazards	Spatial resolution
Chronic (incremental):	
Average annual / seasonal precipitation	CMIP5 100 km CORDEX* 50 km
Average annual / seasonal temperature	CMIP5 100 km CORDEX* 50 km
Sea level rise	25 km x 25 km
Acute (extreme)	
Heavy precipitation (1day/5day)	CMIP5 100 km CORDEX* 50 km
Heatwave (# days max temperature >90th %ile	CMIP5 100 km CORDEX* 50 km
Drought	Hydrological sub-basin
Storms	Storm tracks
Storm surge	Down to 0.25 km*
Climate-related	
Flood	Down to 1 km*
Water stress	Hydrological sub-basin
Seasonal water variability	Hydrological sub-basin
Water supply	Hydrological sub-basin
Water demand /withdrawals	Hydrological sub-basin
Wildfire	Down to 0.25 km
Landslide	Down to 5km x 5km
* Not available for all locations globally	

Acclimatise sector deep dive risk assessments investigate some key financial effects of climate change for a range of asset classes

Impacts by asset class

Risk	Corporate loans	Public equity	Private equity	Real estate & infrastructure	Sovereign debt
Economy-wide impacts	Demand for goods and services			…	…
Company value chain impacts	…			…	…

UNEP FI TCFD Phase 1 banking pilot made links between climate change and credit risks

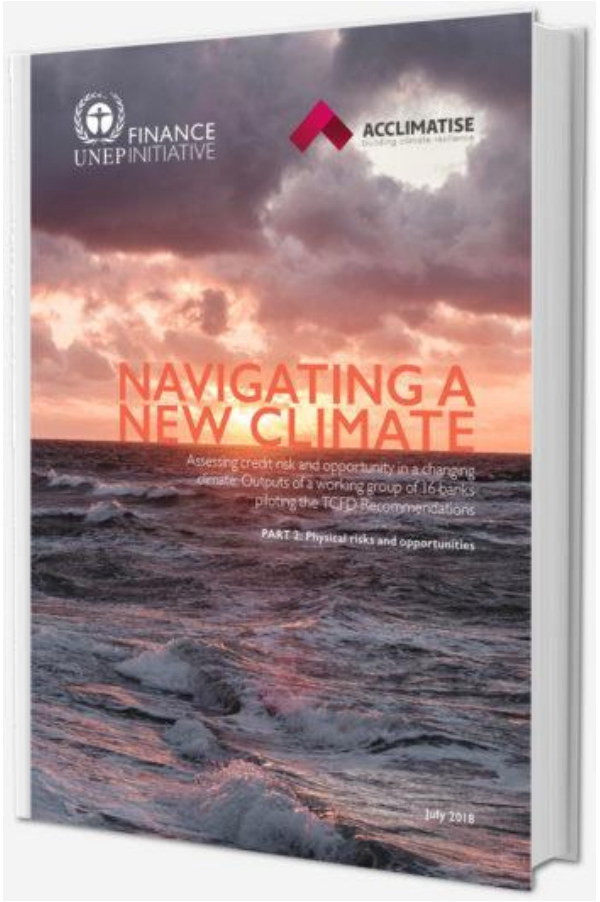
Aims:

- Commercial banks Pilot TCFD recommendations
- Scenario-based approach for estimating the impact of climate change on bank loan portfolios

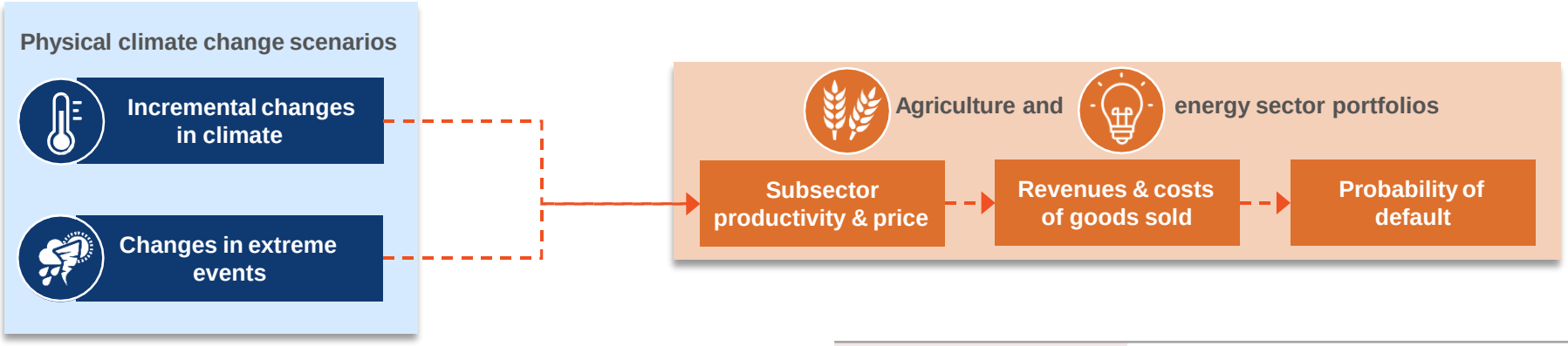
Navigating a new climate report published in 2018

The methodologies help banks begin to evaluate plausible linkages between:

climate change → risks to sector output → financial risk to borrowers → credit risks



UNEP FI TCFD Phase 1 banking pilot: The agriculture and energy methodology relates chronic changes and extreme events to probability of default



Key steps in the methodology

1. Select representative sample of borrowers to assess
2. Identify climate change impacts on representative sample
3. Assess implications for finances of representative sample of borrowers
4. Estimate changes in probability of default for sample
5. Extrapolate findings to whole agriculture / energy portfolio

Aspect	Coverage
Timeframes & temperature scenarios (a)	• 2020s - 2°C & 4°C (grouped 2 and 4 C because the change based on emissions scenarios is indiscernible in this near term horizon) • 2040s - 2°C • 2040s - 4°C
Hazard types	• Chronic changes: Temperature and precipitation • Extreme events: Tropical cyclone, flood, drought, wildfire, extreme heat

(a) Scenarios of change in global average temperature by 2100 relative to the pre-industrial era

UNEP FI TCFD Phase 1 banking pilot: Key metrics of physical risk methodologies for agriculture and energy sectors

	Metric	Description
Extreme events	Return period	Return period (frequency) for the event from hazard data portals
	Encounter probability	Conversion of return period to probability of event occurring over remaining loan period / length of relationship
	ΔProduction	Impacts on production / downtime for each extreme event / hazard, based on literature review and expert judgement
	ΔRevenue_EX $_{(2020\ \&\ 2040)}$	Change in annual revenue from probability of encountering an extreme event, and its associated impacts on production / downtime
	ΔCOGS_EX $_{(2020\ \&\ 2040)}$	Change in costs of goods sold based on empirical relationships between changes in revenue and changes in COGS following an extreme event, using economic demand surge coefficients
Incremental climate change	ΔProduction $_{(2020\ \&\ 2040)}$	Percentage change in production based on sector-specific impact assessments available from literature
	ΔPrice $_{(2020\ \&\ 2040)}$	Percentage change in price - for key agricultural commodities only, available from literature
	ΔRevenue_IN $_{(2020\ \&\ 2040)}$	Change in annual revenue due to changes in production (and changes in price for agriculture only).

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- Latest news and insights on physical climate risks for financial services
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Contact us

Acclimatise Group Ltd
1A Walton Crescent
Oxford OX1 2JG
United Kingdom

T: +44 (0) 7447575841

enquiries@acclimatise.uk.com

r.hamaker-taylor@acclimatise.uk.com

www.acclimatise.uk.com

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