DROUGHT TOOL PROTOTYPE DEVELOPMENT
And the impact on corporate loan portfolios

Stephen Moss, director, RMS
Most industries reliant upon water in some form – systemic risk (?)

Corporations ability to service loans therefore also dependant
Gaps in financial institutions’ (FI) analytical capabilities

Currently, FI’s quantification of environmental risk is limited

Difficult to translate environmental impact into loss

Location and certain financial data not utilised in analysis

Potentially systemic nature important for whole portfolio

Need to quantify portfolio’s exposure and enable differentiation
Interconnectivity

Direct water availability – key driver

Power / electricity – dependant upon generation method

Regional supply and demand – materials and labour

International macroeconomic impact
Analysing the drought
Analysing the drought
How is the company directly affected?

How is the company indirectly affected?

How does that impact revenue and cost of goods sold?

How does that change likelihood of default of specific loan?

What would be the cost to the FI of that default?
Traditional ‘cat’ model

Stochastic events → Peril hazard → Vulnerability → Ground-up impact → Financial loss → Insurance portfolio loss

Exposure data

Policy details
Loan default approach

1. Scenario events → Drought hazard
2. Drought hazard → Direct vulnerability
3. Direct vulnerability → Direct / indirect impact
4. Direct / indirect impact → Loan default probability
5. Loan default probability → Loan portfolio loss
6. Loan portfolio loss → Loan default approach
7. Loan default approach → Macro economic impact
8. Macro economic impact → Macro economic model
9. Macro economic model → Company location data
10. Company location data → Company financial data
11. Company financial data → Indirect vulnerability
12. Indirect vulnerability → Loan default approach
High level example

**Company data**
- (sector / location / financial)

**Drought Scenario hazard**
- Severe five-year drought in West and Central United States
- Reduced rainfall in certain regions by 90%

**Sectoral impact**
- (direct / indirect)
- Reduced water supply in Chicago restricts bottling plant operations
- Power supply from hydroelectric supply reduced by 80%, forcing other sources to be used
- Reduced availability of raw food products from California

**Change in revenue and COGS**
- Revenue decreases by 40% to $60MM due to decreases in productivity
- Water costs increase by 60%
- Power costs increase by 40%
- Costs increase by 30% to 40MM

**Loan default probability and $ loss**
- Reduced revenue and greater costs increase probability of default
- In 3rd year of drought, company becomes insolvent
- Loan default, and loss to FI of $75MM

**Food and beverage manufacturing**
- Production facilities in:
  - Chicago
  - Indianapolis
  - San Francisco
- $75MM loan
- $100MM rev.
- $30MM costs

**Example**
- Company data
- Drought scenario hazard
- Sectoral impact (direct / indirect)
- Change in revenue and COGS
- Loan default probability and $ loss
What are the tool’s limitations?

- Limited number of sectors
- Limited number of countries
- Scenario based - not probabilistic
- Based on currently available data which could improve
Value and benefits

- Provides FI’s context into potential scale of drought-driven default loss
- Build intuition around sectors & regions more / less exposed to drought
- Modular in nature – enabling FIs to tailor components to internal view
- Provides general framework to develop environmental risk models
QUESTIONS