



Wise Up! Tool Up! Skill Up!



Climate change and financial risk:
Things about to get interesting!

CCRSPI
Sydney
27 April 2016

And...

Be warned, this is not “SUSTAINABILITY”

What is this?



21st century climate risk tools Why now?

Right Time

- We've had a clear call to action on climate risk
- Climate data is now good enough for business use
- Data analytics are more than powerful and now accessible

Who we are

- Dr. Nick Wood, Director,

**Climate Policy
Research**

- Lil Bianchi, CEO,

L U C S A N

Data Advantage



Two organisations coming together to build 21st C tools
applying great science to complex business problems

Support Australian business to manage the ***financial
risks*** they face from a changing climate

Why is financial risk important?

Growth, market share, ability to export, and healthy profits require investment

Ability to adapt in face of volatility and change requires investment

To make good investment decisions we need robust risk assessment

Securing investment capital at the right price requires robust risk assessment at asset and portfolio levels

the finance sector concerned
about climate risks?



Mark Carney, Governor of the Bank of England

Speech to Lloyd's of London, 29 September 2015

- “Today Lloyd's underwriters are required to consider climate change explicitly in their business plans and underwriting models”.
- “Your genius has been to recognise that past is not prologue and that the **catastrophic norms of the future** can be seen in **the tail risks of today**”.

Michael Bloomberg

Task Force on Climate related Financial Disclosures

- “It’s critical that industries and investors understand the risks posed by climate change, but currently there is too little transparency about those risks”.

This has only just started



**Natural
Capital
Declaration**
Financial sector leadership
on natural capital

Secretariat:



Tender Specifications

Project title: Stress Testing Corporate Lending Portfolios for Drought Scenarios

Objective: Develop a model and framework to stress test corporate finance portfolios for exposure to economic risks from drought, piloted in five countries.

Core Deliverables:

- 1.) Drought scenarios
- 2.) Exposure modelling for 8-12 industries in each of the 5 focus countries (Brazil, China, India, Mexico and United States)
- 3.) Framework to link economic impacts of drought to banks' portfolio stress testing.

Deadline for Proposal Submission: 15 February 2016

Deadline for Project Completion: 15 December 2016

Can the finance sector assess
climate risks?



Lake Urmia, Iran, 2000 to 2014, NASA images



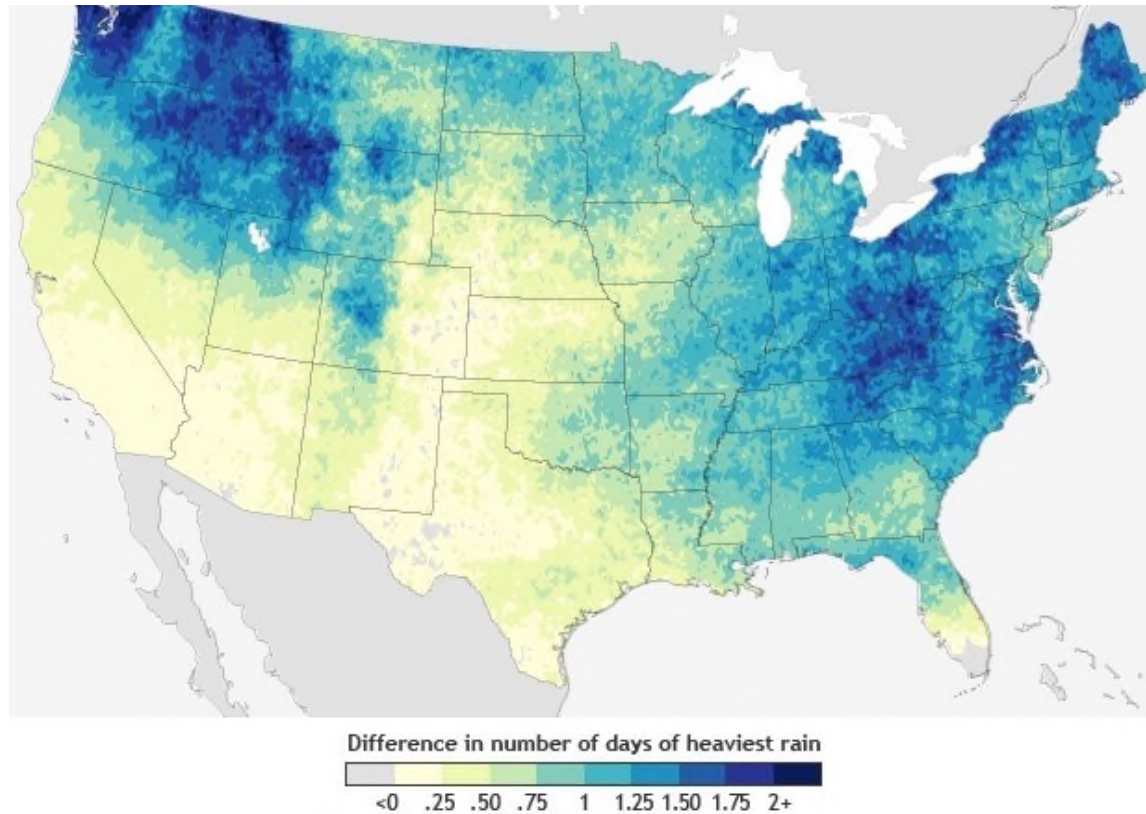
http://climate.nasa.gov/system/gallery_images/large/Lake-Urmia-Iran-2000-2014_1920px.jpg

What do you see?

A drying lake

But.. information about future risks?

National Oceanic and Atmospheric Administration and the Department of Commerce, USA.



What do you see?

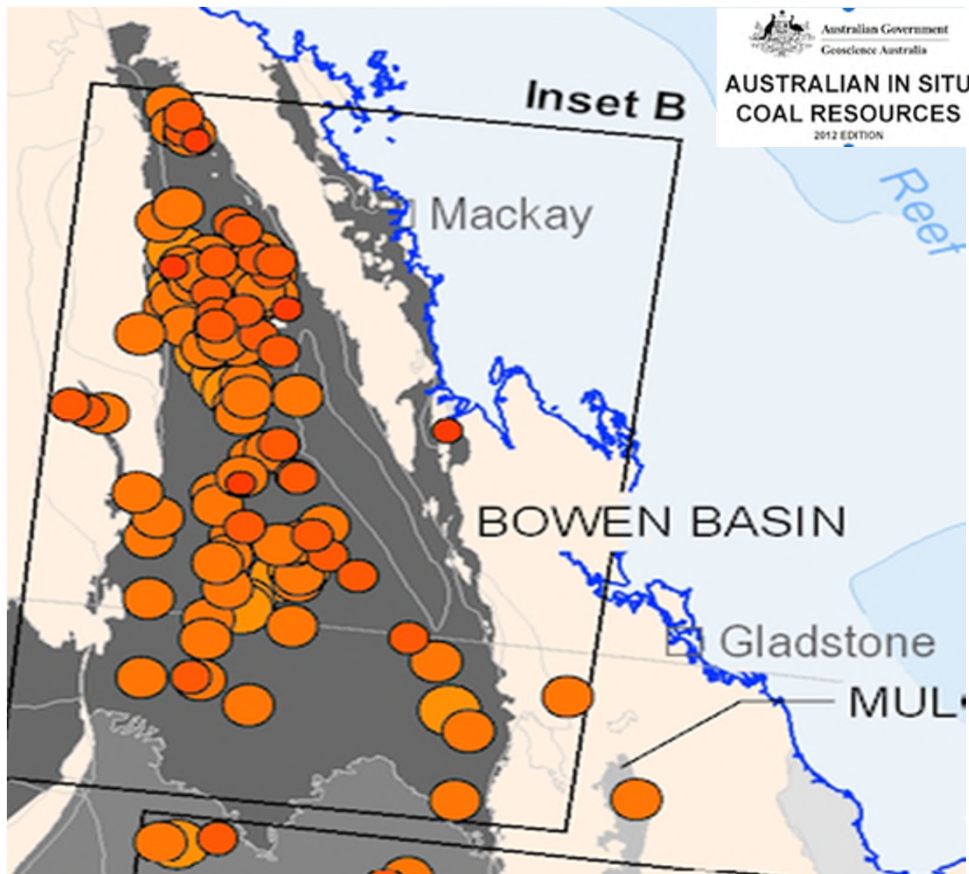
- Detailed information about future rainfall
- At the scale of a cattle property, a railway, a mine or a city
- Intelligence suitable for risk analysis
- Open source!

<https://www.climate.gov/news-features/featured-images/heavy-downpours-more-intense-frequent-warmer-world>

Would you invest in this mine?



Bowen Basin: “\$500 billion worth of coal assets on a flood plain”



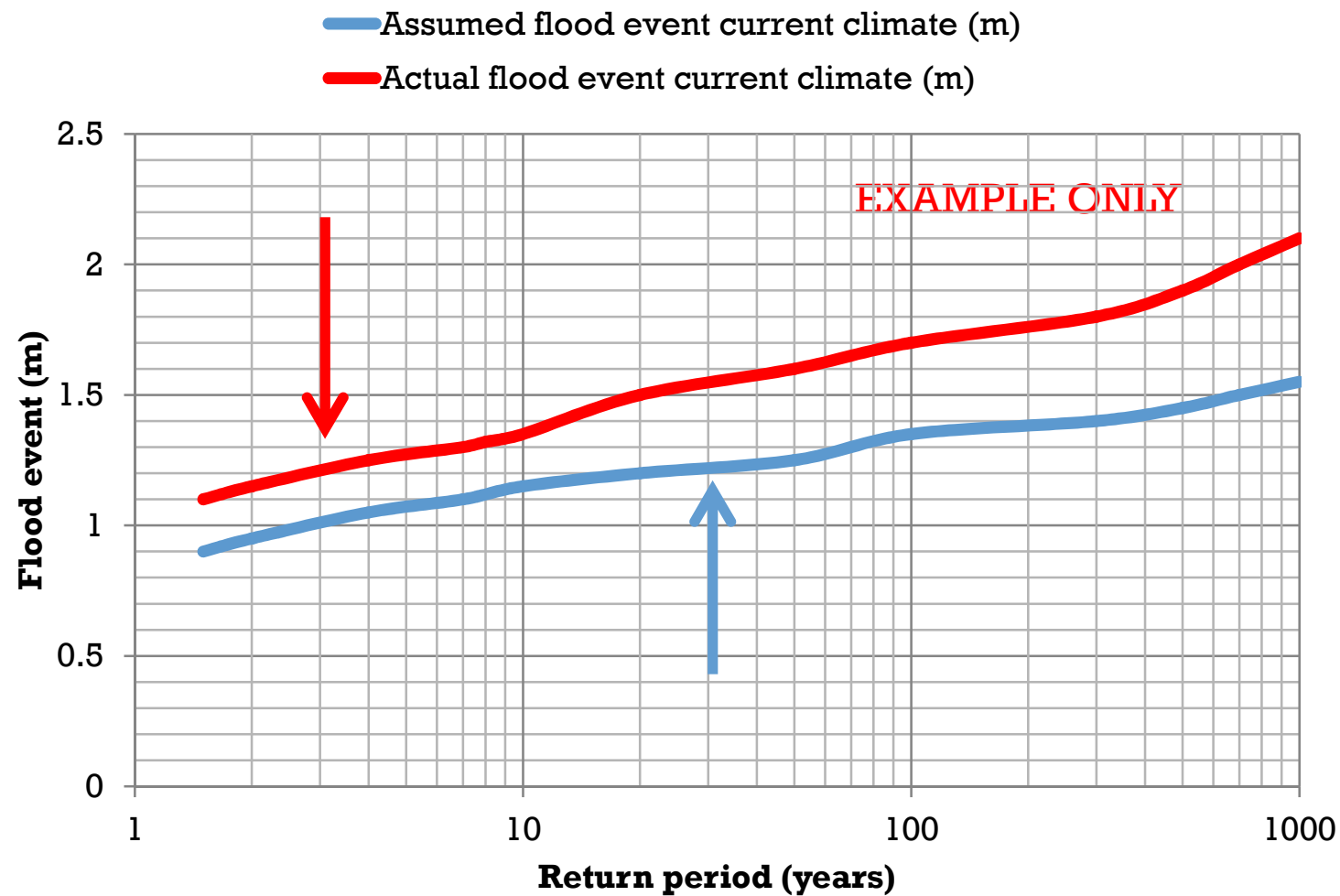
- The Bowen Basin region of Queensland
- One of the largest coalfields in the world
- 30 + operational mines
- Exports of 250 million tonnes of coal every year.
- Value (mine assets and the supporting rail and port infrastructure) = \$300 - \$500 billion (40-year horizon).

Climate risks and rail

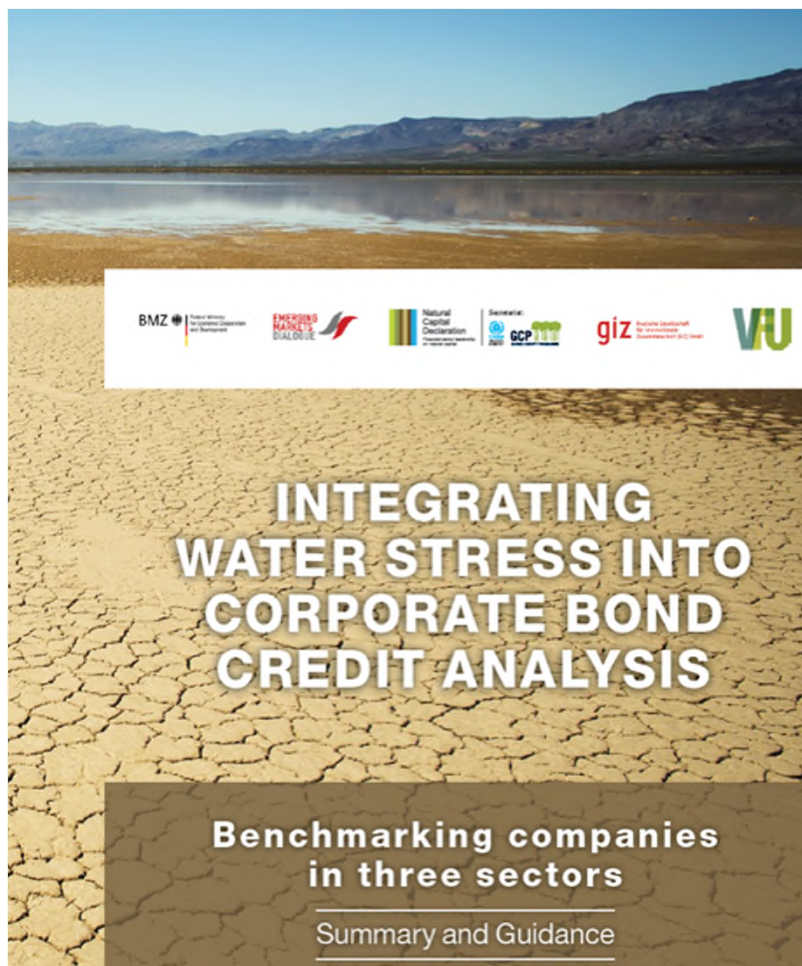
- **Aurizon Beyond 2020 Sustainability Report 2014**
- “Advanced hydrology mapping and 2D/3D catchment modeling is used to understand historic flood levels (over the last 50 and 100 years)”.
- “Critical infrastructure (such as electrical assets) is located as high as possible, and at a minimum, above 1 in 100 year flood levels”.
- “Movement of signaling assets above flood plains”.



Now consider this..1:30 year event



Hostile Analytics



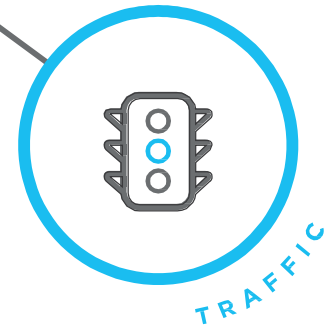
- Climate data is open source!
- On line tools are being developed
- A challenge to corporate traditional risk management

Building a climate risk tool

All about data and
automation



Data
changes
everything



- “If you can't measure it, you can't manage it”
Mark Carney at COP21

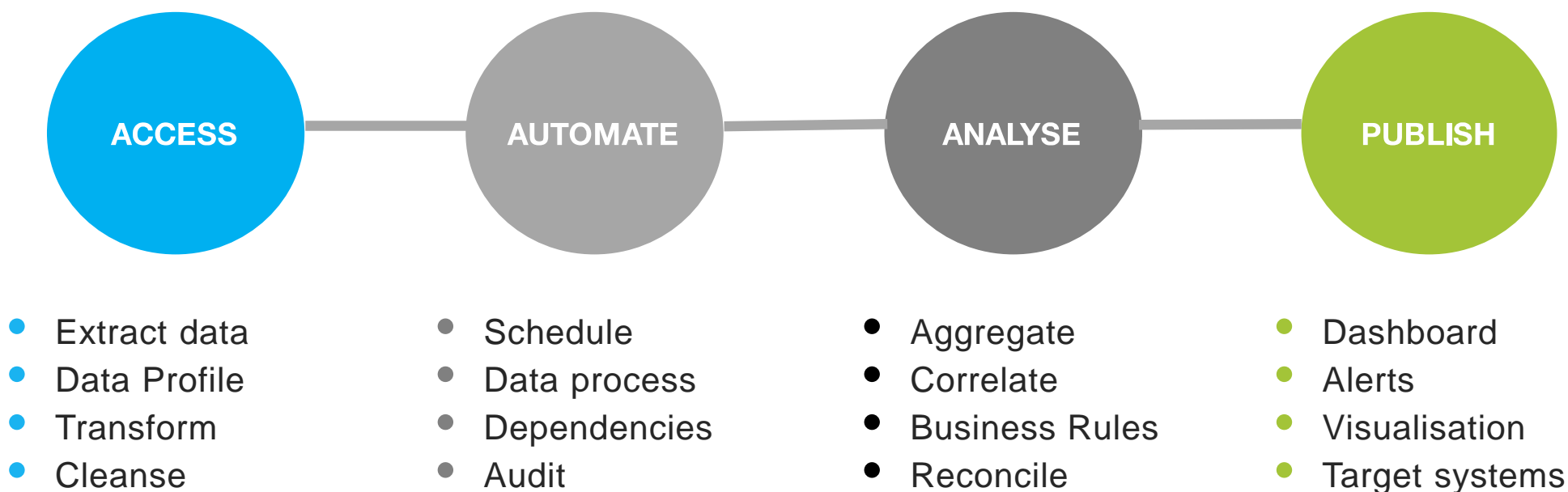
Asset value, asset risk, adaptation

- “Analysis of climate science is critical to resilience.... at an asset level, improving understanding of the material climate vulnerabilities that face our Businesses. The most appropriate response will vary depending on the life of the asset, its exposure to climatic factors and its criticality of function.” *bhpbilliton*
- “The climate is changing and further change seems unavoidable. For ... industries to continue to thrive in the future we need to anticipate these changes, be prepared for uncertainty, and develop adaptation strategies now.” *CSIRO*

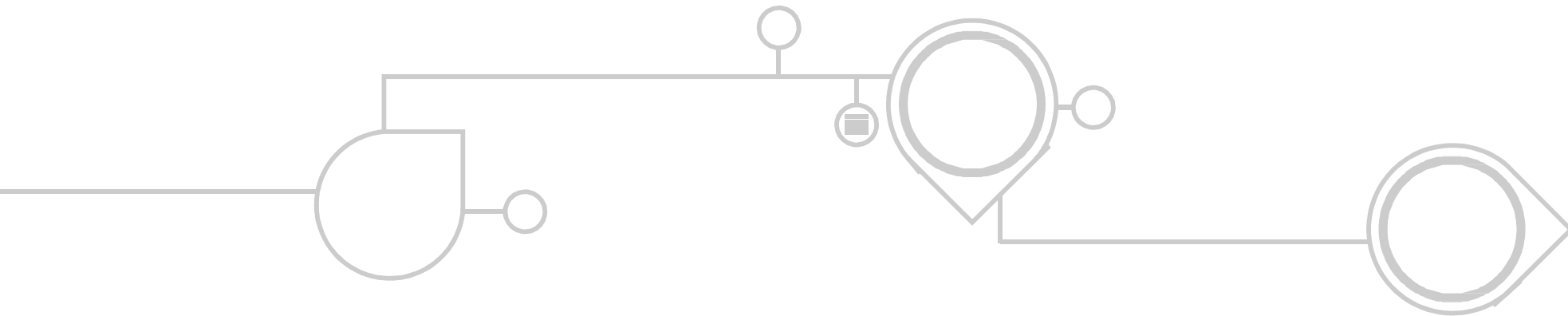
The good news

- Trend based climate data is publically available
- Primary industries collect a lot of data
- Data analytics are very powerful and now very accessible
- Technology is ubiquitous
- Risk is priced everyday

Step 1 – automated pipeline of good data



Step 2 – build consolidated model



ASSET MODEL

- Bio-physical
- Geo-spatial
- Location
- Sensitivity to climate events
- Adaptation ability

CLIMATE MODEL

- Climate data past and future
- Propensity for extreme events
- Change – sea levels, precipitation, temperature, humidity

PRICING MODEL

- Asset valuation
- Revenue impact modelling
- Financial risk
- Discount rate
- Portfolio position

Practical examples

- Dairy Australia
- Financial models for variability

Dairy Businesses for Future Climates



Tasmanian dairying
Context for project
What we did
What we found out



Rachel Brown
Land Water and Carbon
Team

What impacts the business most?

The farmers told us:

- The winter wets
- The summer dry – but irrigation buffers
- The VARIABILITY...stacking of wet on wet, wet then dry, dry and dry.....
- The EXTREMES...4 days over 35°C, 6 weeks of flooding, 3 day power outage with storms...

And....

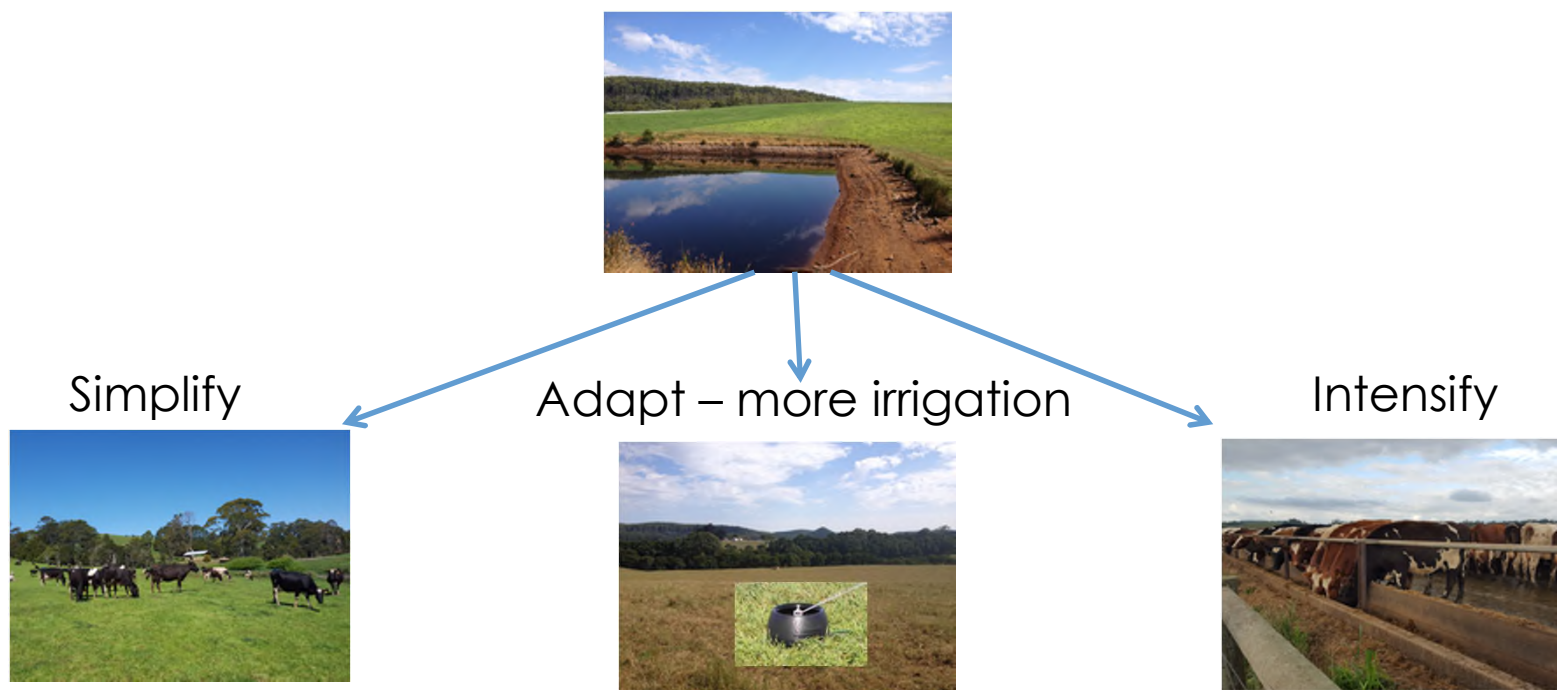
- Milk price
- Skills of farmer and staff to anticipate and cope
- Debt/equity level



Making the crystal ball “real”

So many “what ifs?” How to make it tangible?

- Worked with a real farm that we could see and understand “the base farm”
- Modeled to 2040. Farmer preference because within lifetimes.
- Farmers developed three scenarios



Variance!!!!



UNSW AUSTRALIA | Climate Change Research Centre (CCRC) Science

Home CCRC Team Study @ CCRC Research Publications News

Climate Change Research Centre EVENTS

Home > Events > Michael Goldstein Seminar ~...

Michael Goldstein Seminar - "From Drought to Ice Roads To Sea Ice: A New Approach to Assessing and Pricing the Combined Costs of Climate Trend and Variance"

Event type: Seminar

Date: 15 February 2016

Time: 2.00pm - 3.00pm

Location:
Climate Change Research Centre seminar room, level 4 Mathews Building, Kensington Campus, Sydney

Presenter:
Michael Goldstein
Chair in Applied Investments and Professor of Finance, Babson College, USA

Host: Climate Change Research Centre, UNSW, Australia

- To date most focus has been on trend changes
- Finance specialists are starting to deploy options pricing models to climate impacts
- Changes in climate variability are as important as trend changes.
- Black –Scholes Option Pricing Formula applied to climate variables.

Step 3 – make it useful & accessible

LARGE ASSETS

- Portfolio value
- Investment risk assessment
- Adaptation decision making
- Shareholder reporting
- Operational reporting
- Market pricing
- Cloud or onsite implementation

MID / SM ASSET

- Asset value
- Cash flow
- Adaptation decision making
- Bank / finance reporting
- Pay per use cloud based

FINANCE

- Pricing climate risk asset level
- Quantifying adaptation mitigations
- Differential offerings
- Pricing variability
- Insurance
- Portfolio exposure / balancing

Don't Wait!



Climate change and financial risk: It
s already got interesting!

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