

Overcoming the tyranny of climate

Capturing the social and economic benefits of great climate research



Unpredictable climate has changed the course of history



Decline of the Roman Empire

- Between 250 and 550, a prolonged period of wet weather spurred the spread of the Bubonic plague.



Mongol invasion of Japan, 13th Century

- In the 13th century, Kublai Khan, leader of the Mongol Empire, set out to defeat Japan,
- His army was defeated by not one, but two monsoons.
- Shinto priests, who believed the storms were the result of prayer, called them kamikaze or "divine wind."



Spanish Fleet 1588

- Spanish invasion of England 1588
- Spanish fleet blown off course, dashed against rocks
- England retained its bland food
- *"I sent my ships to fight against men and not against the winds and waves of God."* Phillip II



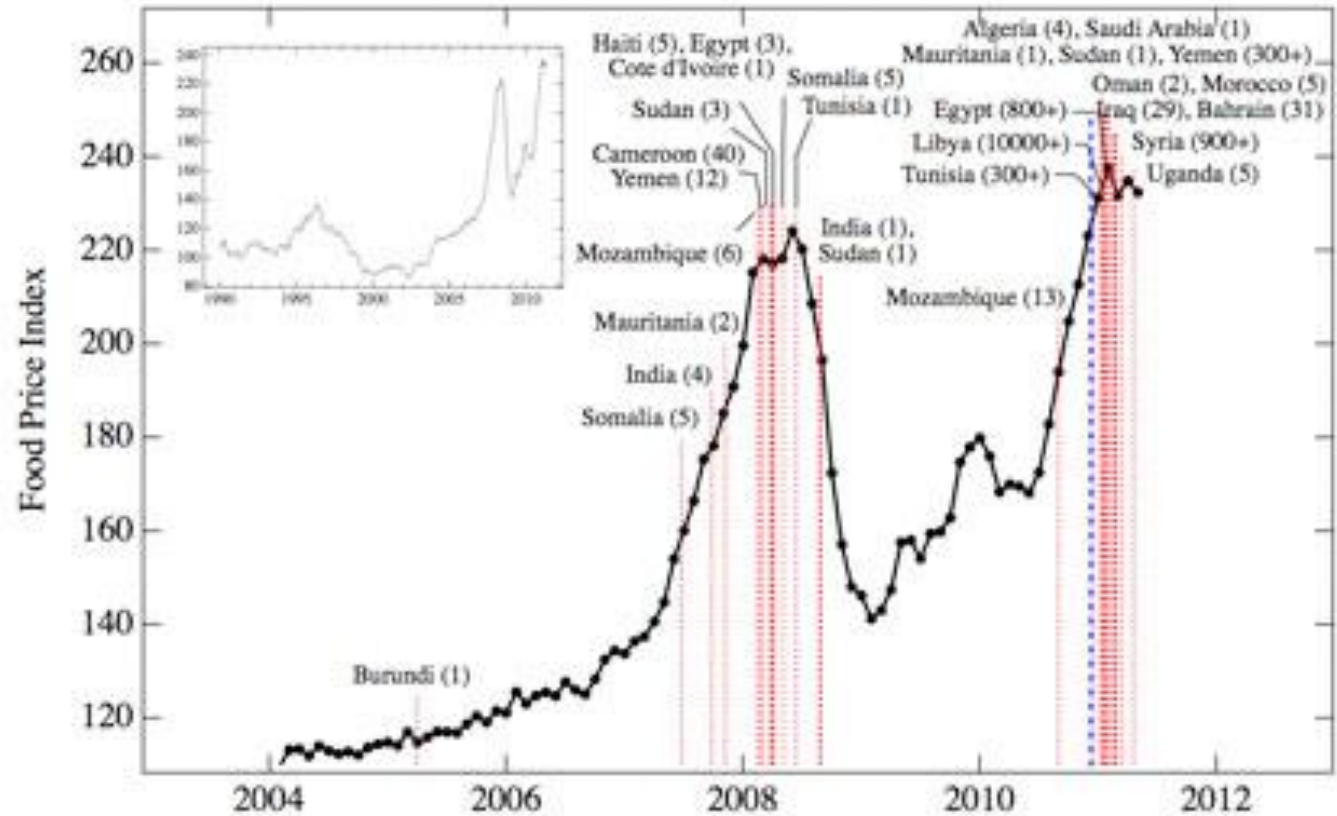
Battle of Long Island, 1776

- George Washington led an army of volunteers without uniforms and often without weapons.
- The British army, by contrast, was a well-equipped fighting force.
- An unexpected, thick fog allowed the colonial forces to retreat unseen and to fight another day.



Arab Spring

- The UN FAO food price index correlates with "food riots" around 2008 and the "Arab spring" conflicts. Death tolls are reported in parentheses. Graph: New England Complex Systems Institute



Australia is a lucky country ...

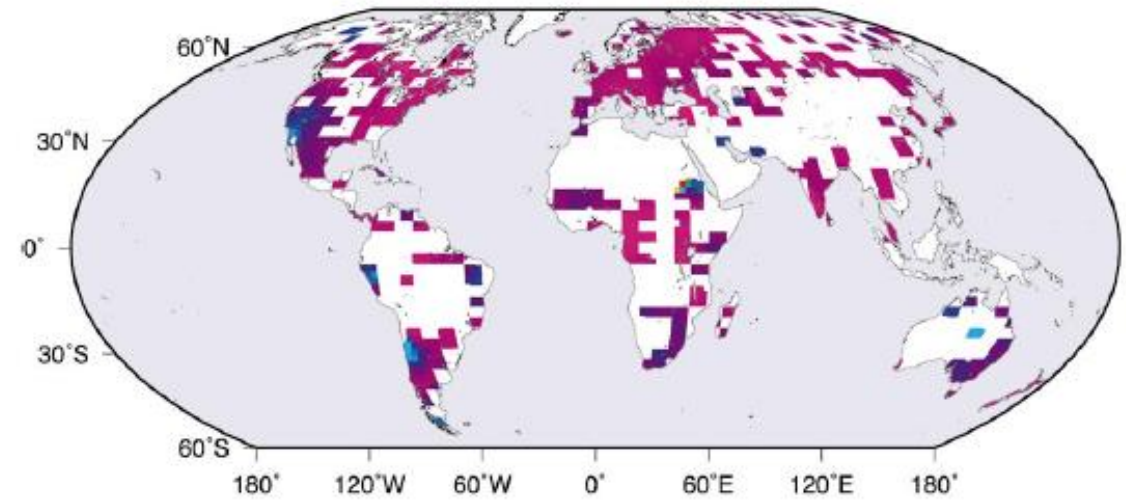
- Tyranny of distance
 - Geoffrey Blainey in 1969
 - The remoteness from Europe and US shaped Australia's economy and psyche
- Tyranny of climate
 - Highly unpredictable, variable climate
 - Shaped infrastructure, agriculture, government investment, psyche



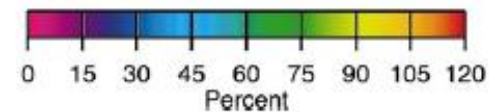
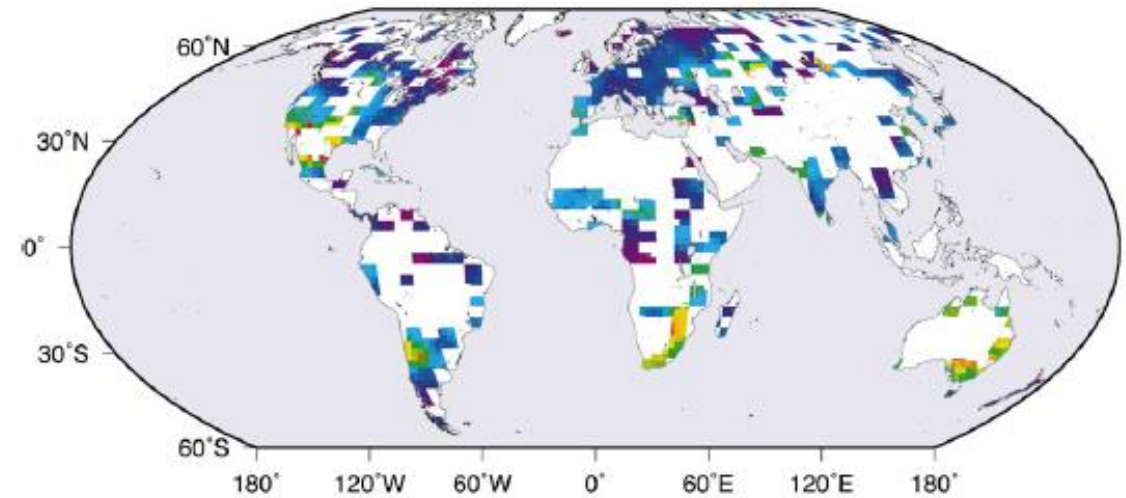
Climate variability

- Australia has a variable climate, similar to other latitudes

a) COEFFICIENTS OF VARIATION OF ANNUAL PRECIPITATION



b) COEFFICIENTS OF VARIATION OF ANNUAL STREAMFLOW





Everybody talks about the weather, but nobody does anything about it.

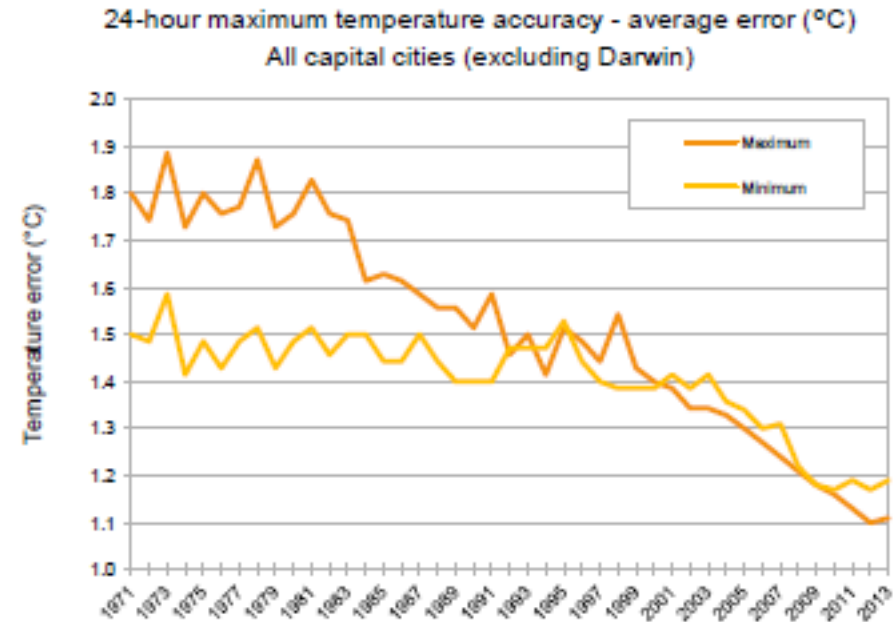
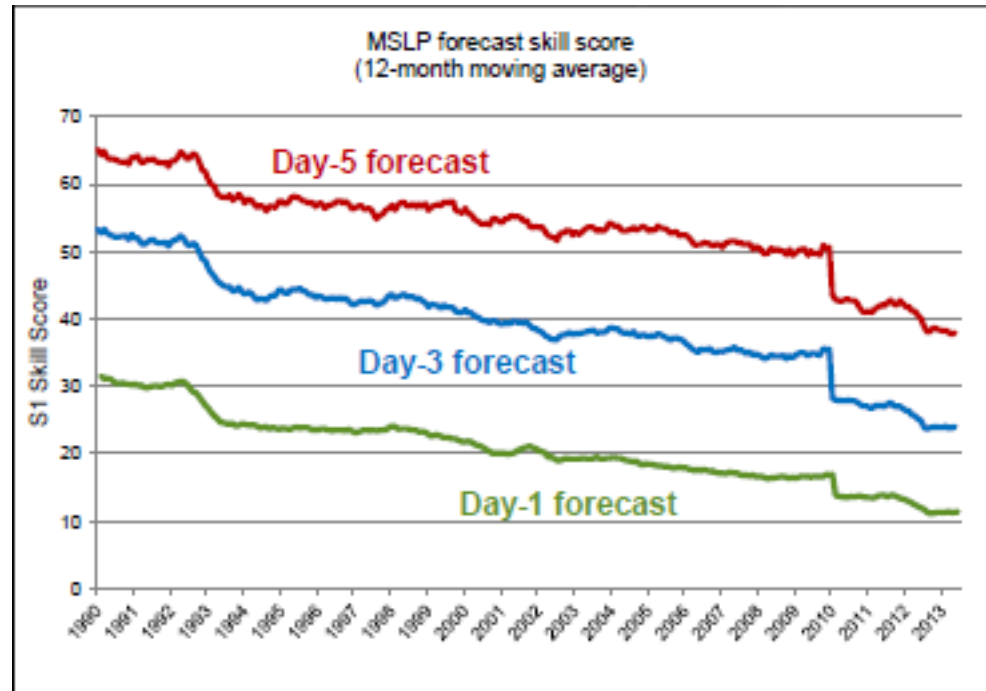
(Charles Dudley Warner)

izquotes.com

Your research is leading to major improvements in forecasting

- Improving skill of prediction
 - Computing power
 - Human resources
 - Data sharing via the internet
 - GPS location of data points

Improved skill in weather forecasting











Source: Rob Vertessy, BOM

Model skill comparison

Seasonal summaries



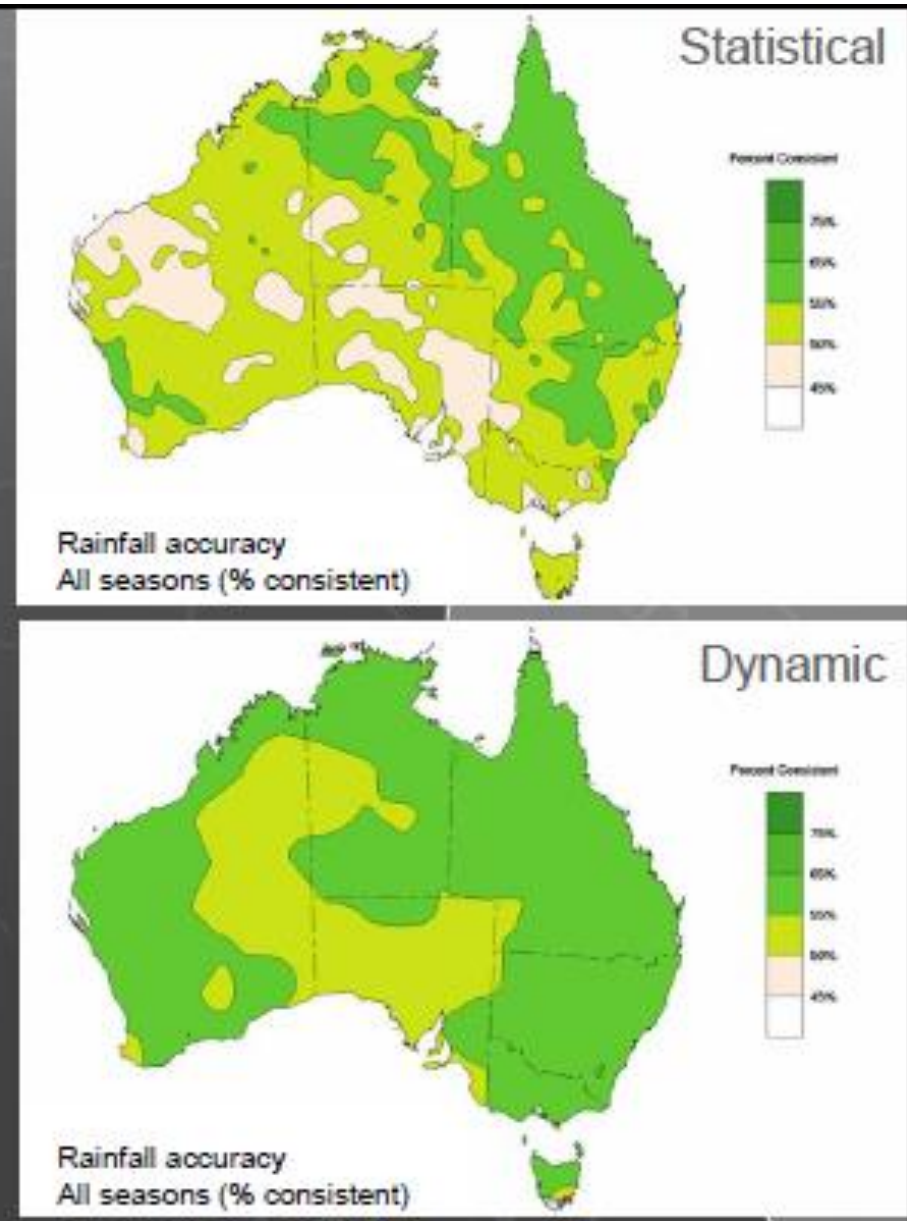
Rainfall accuracy (per cent consistent)	Autumn	Winter	Spring	Summer
New dynamical (POAMA)				
Old statistical				

Source: Rob Vertessy, BOM

Model skill comparison

Overall summary

	Hit Rate Statistical	Hit Rate Dynamic
Rainfall	53	56
Maximum temperature	58	60
Minimum temperature	59	56



Source: Rob Vertessy, BOM

Climate modelling skill needs to translate into competitive advantage for Australia

- Smarter and more effective early warning systems
- Smarter data and insurance products
- Smarter infrastructure investment



Smarter warning systems

- Bushfire prediction

- The MacLeod enquiry found that “the dryness of the vegetation ... and the high volume of flammable fuelcoupled with weather conditions ...meant that once the fires gained hold... ‘unstoppable’.”

- Flood

- Queensland Commission of enquiry recommended creating an integrated flood risk assessment model that accounts for climate and pre-existing conditions in the catchment, and link to cadastral datasets

CLIMATE | BASIC

See what's happening in each field

- Field Workability
- Weather
- Alerts
- Field Details
- Scouting & Notes
- Reports

Get Started



CLIMATE | BASIC

CLIMATE | PRO

PRECISION ACRE

CROP INSURANCE

CLIMATE | BASIC

- ✓ Weather, soil and crop data at a field level
- ✓ Better online tracking and scouting tools
- ✓ Improves your production decisions
- ✓ Field and weather information updated as it happens
- ✓ Available on any device



Climate Corporation link climate models to existing conditions on farms (data collected using satellites) to create products for sale:

Intelligence for farm management

- Soil moisture maps
- Climate scenario analysis
- Crop growth maps

Insurance on seasonal climate:

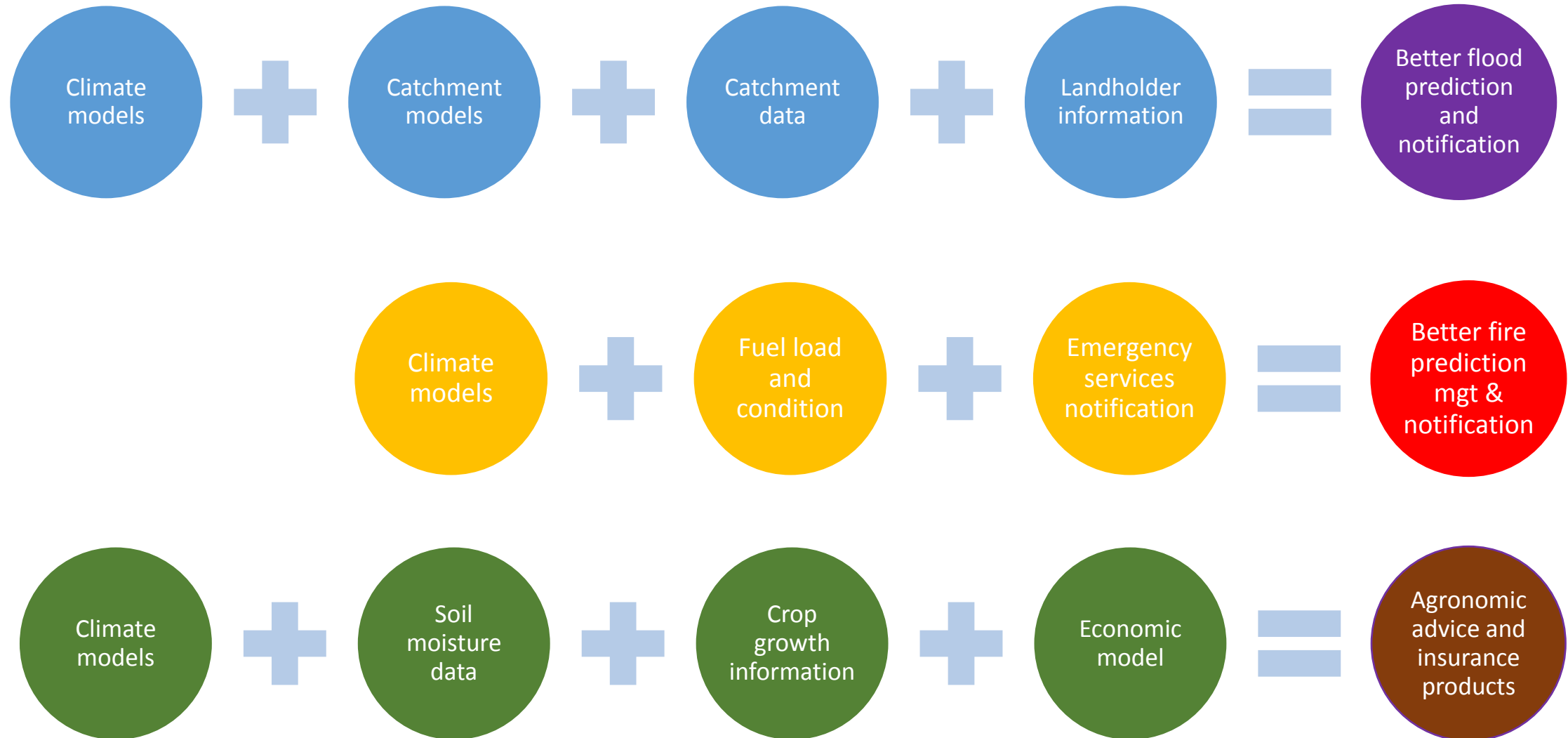
- Based on climate models, satellite data on soil moisture and crop growth
- Not a “crop failure” payout model
- Money is deposited in an account if the weather falls outside the insured envelope
- No claims, forms, adjusters, or negotiations are required.

Repeat globally if you are a commodities trader

Smarter infrastructure investment

- **Agricultural Green Paper** - business cases for new dams
- **Urban design** – align with existing infrastructure
- **Coastal development** – avoid future costs from climate change
- **Development in the North** - transport, energy, irrigation, housing

Linking data in smart ways = greater value



Overcoming the tyranny of climate

- We cannot change the weather
- But we can do something about it
- Interdisciplinary effort
- Partnerships with other disciplines, customers and industry

