Climate change and the future of farming in Canterbury

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AERU

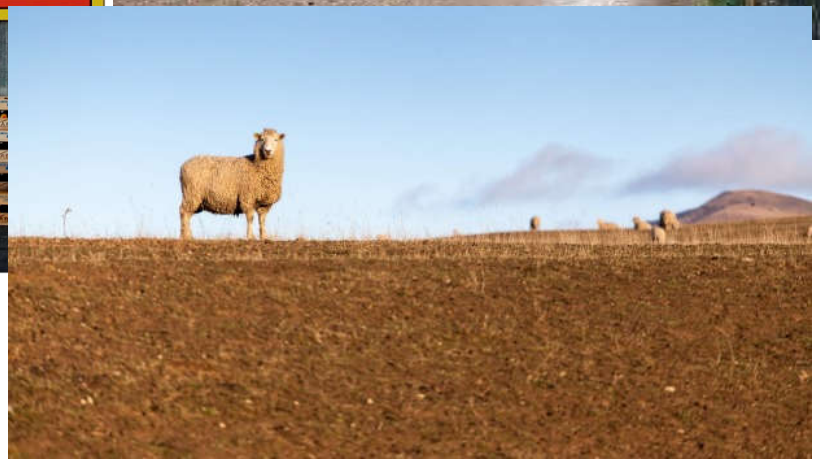
2 May 2019

New Zealand

- Growth model has started to show its environmental limits
- Urgent need to address GHG emissions, water quality, also biodiversity loss, soil erosion; while
- Realising greater value-add from primary sector
- Promoting regional rural development
- And adapt to a changing climate

- ***"A long-term vision for the transition towards a low-carbon, greener economy is necessary" (OECD 2017)"***
- ***Choices are not always straightforward (MfE 2019)***

Costs of climate change



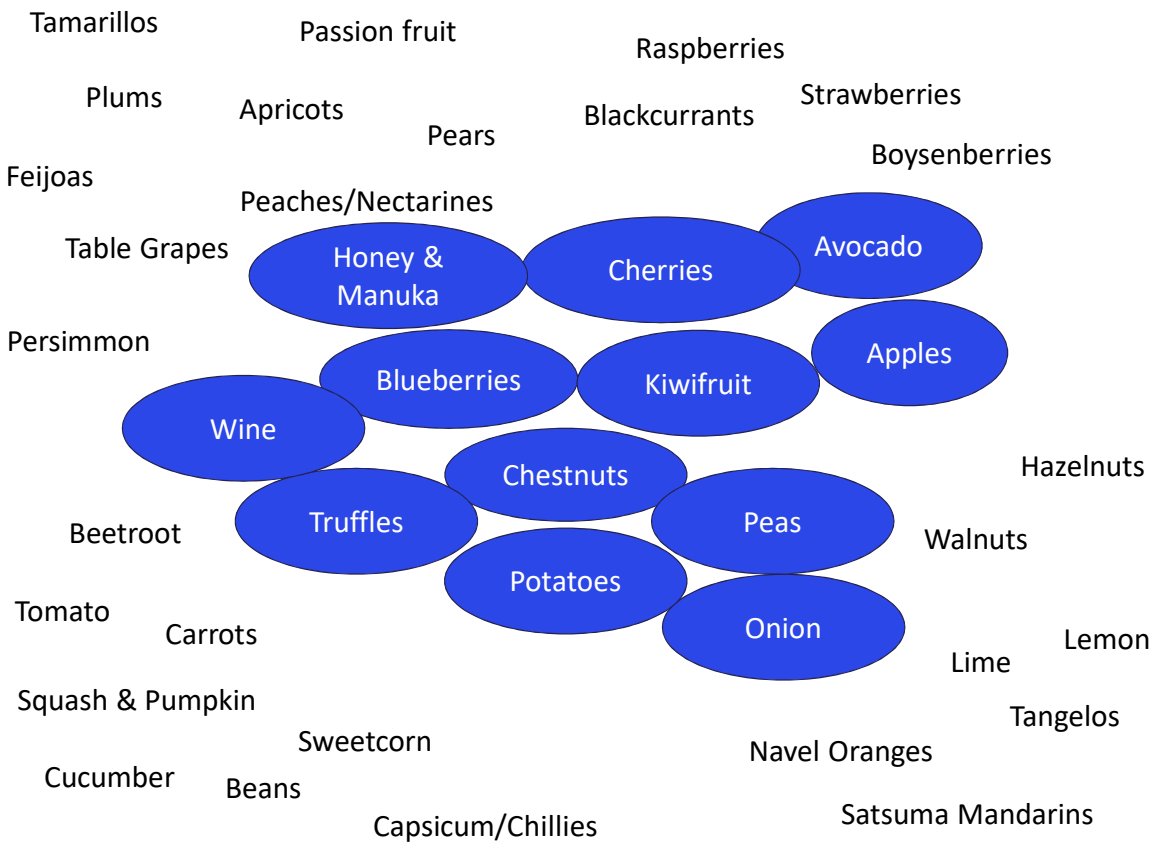
Projections of future climate change for Canterbury

- Higher temperatures (increase of 0.7-1deg by 2040)
- Increased wi
- Decreased sp
- Increased fre
- Increased fre
- Some increas nderstorms
- Increase in number of hot days
- Decrease in number of frost and snow days

Increased variability and extremes

(www.mfe.govt.nz/sites/default/files/media/Climate%20Change/climate-projections-snapshot.pdf)

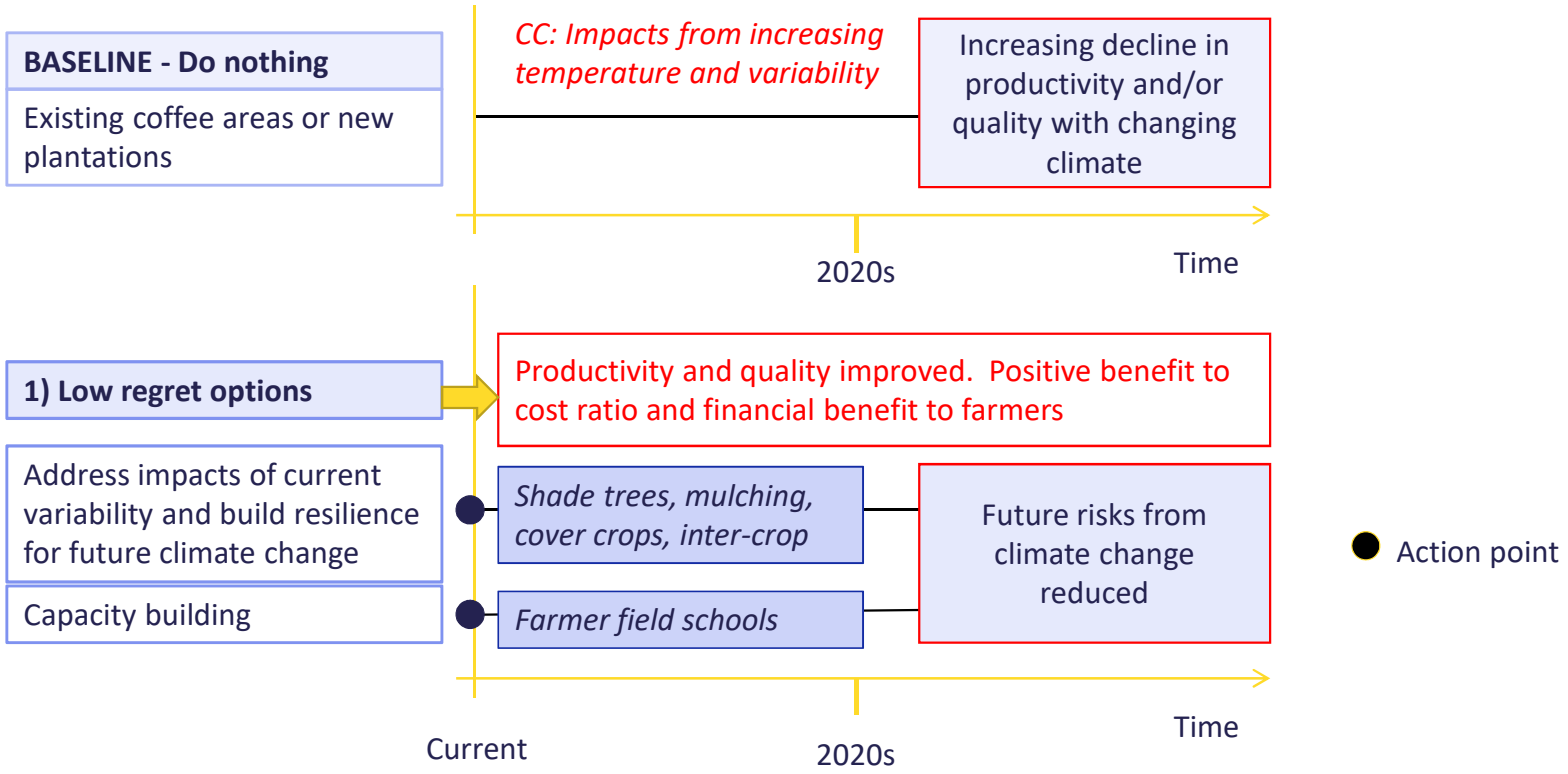
Range of Land-Use and System Changes

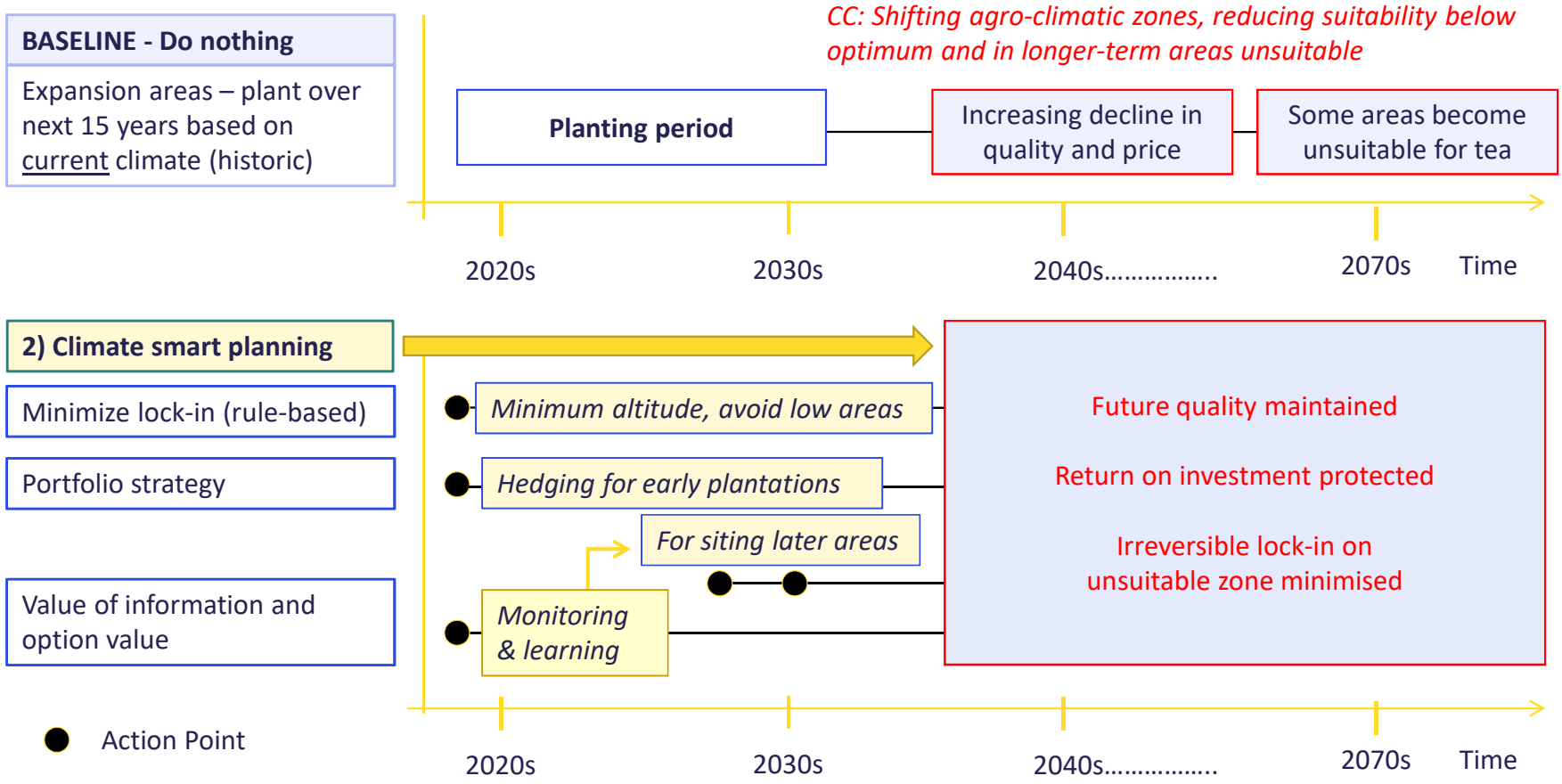


Source: Renwick et al Research funded through SLMACC Evaluation of profitability and future potential for low emission productive uses of land that is currently used for livestock

Planning for the future?

- Plan for the unexpected/surprises
- Flexible, adaptive approaches likely to be more robust under uncertainty
- Diversity
- Prioritisation of short term economic goals can lead to systemic ‘maladaptation’


BASELINE - Do nothing
Existing coffee areas or new plantations
CC: Impacts from increasing temperature and variability
Increasing decline in productivity and/or quality with changing climate
2020s
Time
1) Low regret options
Productivity and quality improved. Positive benefit to cost ratio and financial benefit to farmers
Address impacts of current variability and build resilience for future climate change
Capacity building
Shade trees, mulching, cover crops, inter-crop
Farmer field schools
Future risks from climate change reduced
Action point
Current
2020s
Time


BASELINE - Do nothing
Expansion areas – plant over next 15 years based on current climate (historic)
CC: Shifting agro-climatic zones, reducing suitability below optimum and in longer-term areas unsuitable
Planting period
Increasing decline in quality and price
Some areas become unsuitable for tea
2020s
2030s
2040s.....
2070s
Time
2) Climate smart planning
Minimize lock-in (rule-based)
Portfolio strategy
Value of information and option value
Minimum altitude, avoid low areas
Hedging for early plantations
For siting later areas
Monitoring & learning
Future quality maintained
Return on investment protected
Irreversible lock-in on unsuitable zone minimised
Action Point
2020s
2030s
2040s.....
2070s
Time

Cost and timing of action

- International evidence suggests early action (in both mitigation and adaptation) is usually more cost-effective
- Need to start planning for adaptation
- Transformation?

Early action on climate change would save New Zealand $30b, report finds

CHARLIE MITCHELL
Last updated 06:00, April 4 2018

ROSS GIBLIN/STUFF

hit if the transition to a low-carbon economy is delayed.

Agriculture faces decarbonisation challenges under both scenarios, but it benefits from an early and phased introduction into the New Zealand Emissions Trading Scheme (NZ ETS).

RA1

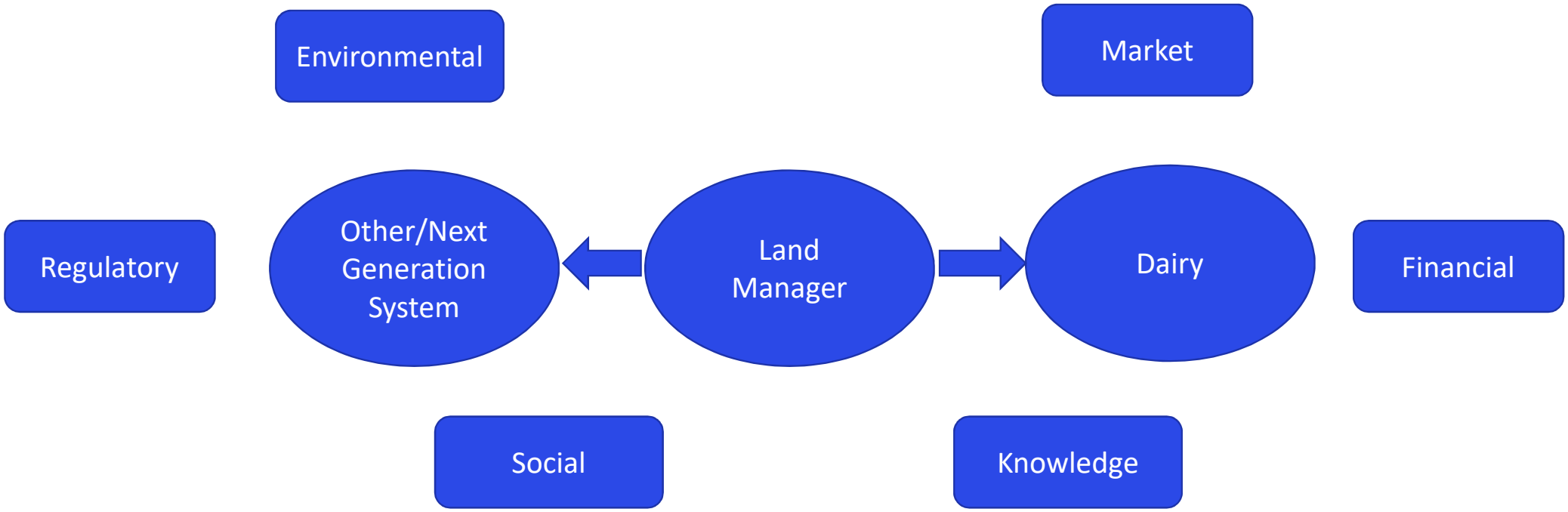
Source: Renwick et al forthcoming

Research funded through the Our Land and Water National Science Challenge: Next Generation Systems

Slide 10

RA1 Renwick, Alan, 30/04/2019

Central Plains Water: The push and pull of Dairy



It seems we have systems that achieve the environmental, social and regulatory needs but not the market (particularly scale), financial and knowledge (and *vice versa)*

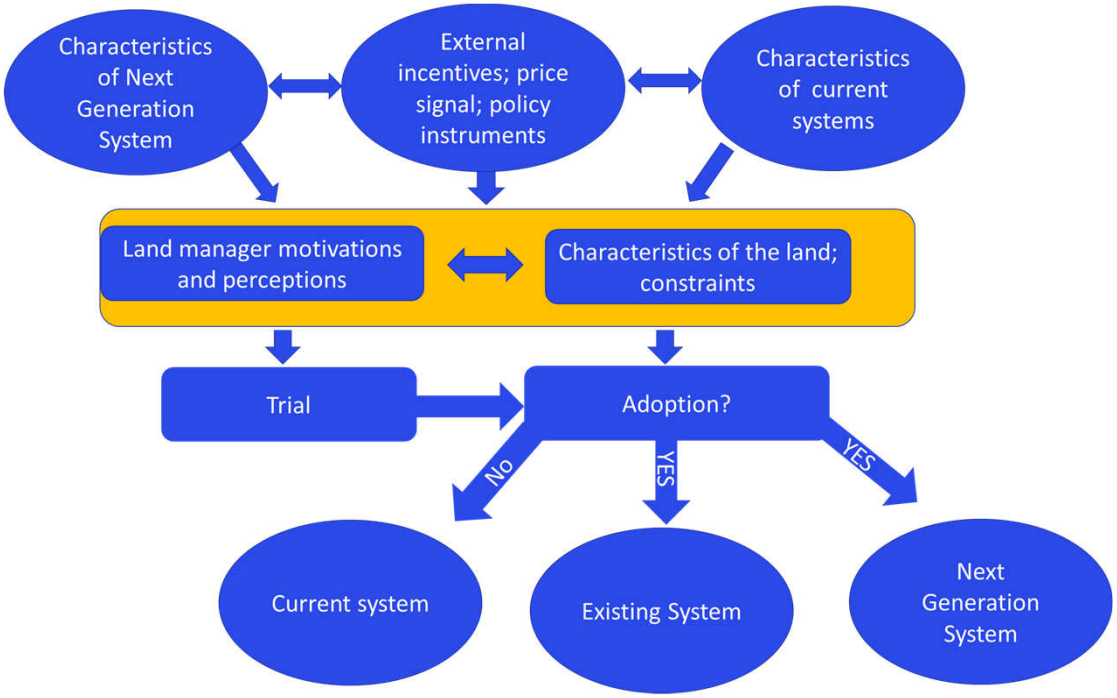
(Renwick et al forthcoming

Research funded through the Our Land and Water National Science Challenge: Next Generation Systems)

Can science help?

- In this context our approach can highlight the areas where *knowledge/information* can support the transformation:
- What is important to the decision maker?
- Do we know the answers?
- If not what *Science* is needed to fill the gap*?*
  - Production (how to grow, suitability for the farm etc)
  - Environment (nitrate leaching, GHG emissions etc)
  - Supply chain (existence of processing, logistics etc)
  - Markets (is there a market, where is it)
  - Etc

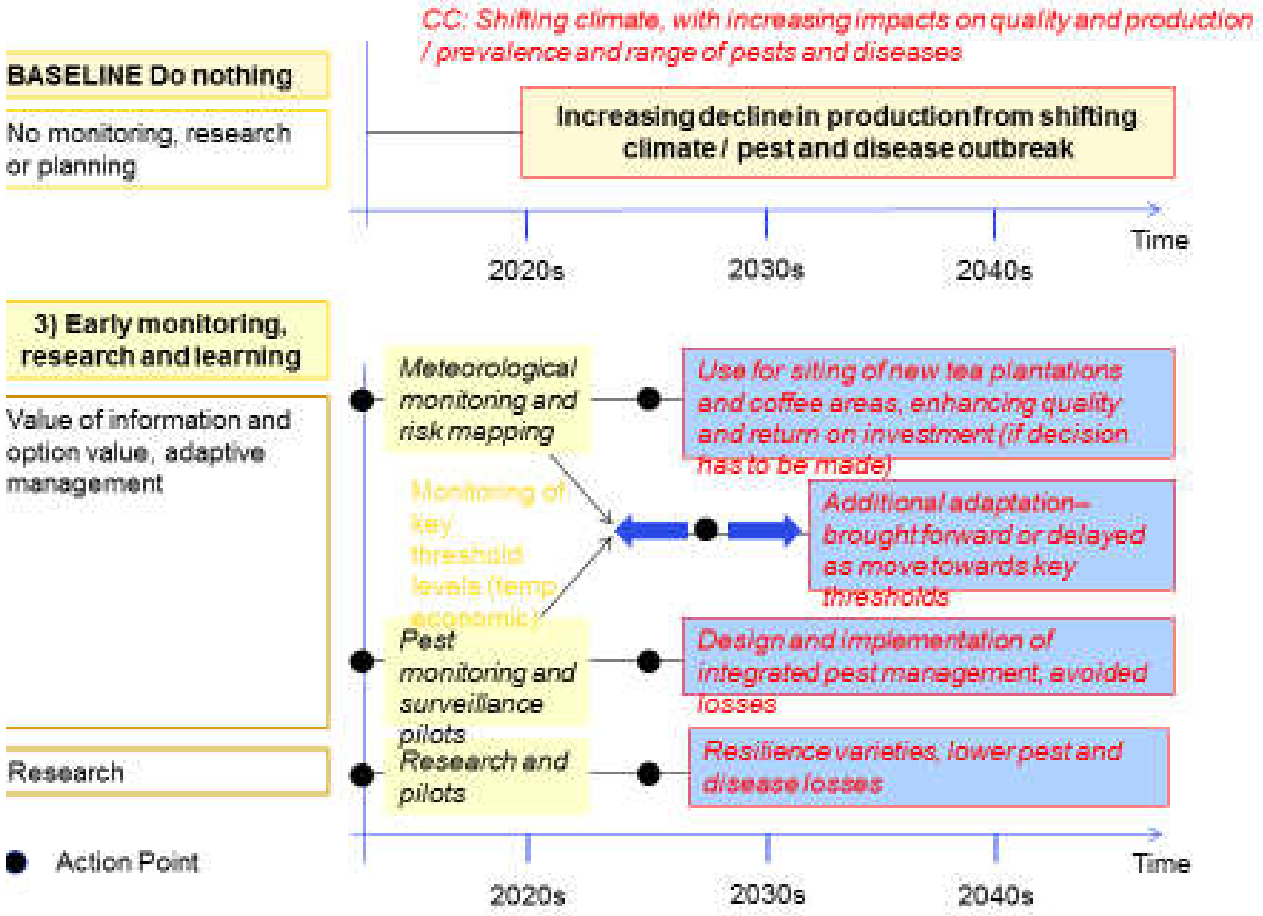
Filling the gaps can reduce the risk if not remove it



It’s not up to producers alone

Consumers:

Government/ Producer organisations



RA1

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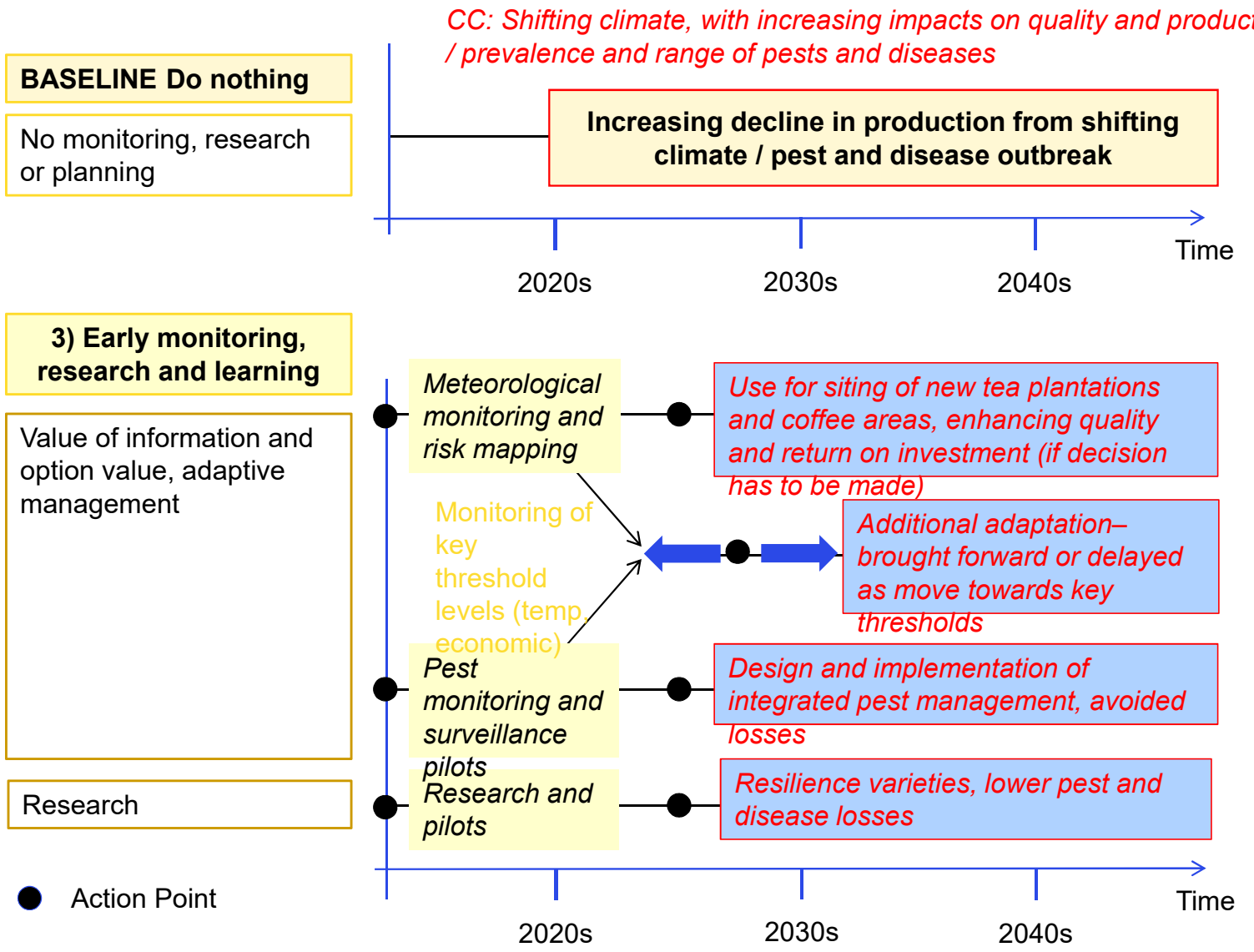
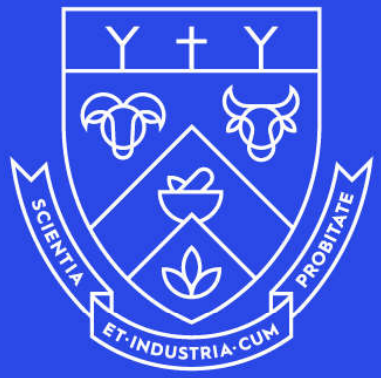
RA1 Renwick, Alan, 30/04/2019


CC: Shifting climate, with increasing impacts on quality and production / prevalence and range of pests and diseases
BASELINE Do nothing
No monitoring, research or planning
Increasing decline in production from shifting climate / pest and disease outbreak
Time
2020s
2030s
2040s
3) Early monitoring, research and learning
Value of information and option value, adaptive management
Meteorological monitoring and risk mapping
Use for siting of new tea plantations and coffee areas, enhancing quality and return on investment (if decision has to be made)
Monitoring of key threshold levels (temp, economic)
Additional adaptation– brought forward or delayed as move towards key thresholds
Pest monitoring and surveillance pilots
Design and implementation of integrated pest management, avoided losses
Research and pilots
Resilience varieties, lower pest and disease losses
Research
Action Point
Time
2020s
2030s
2040s

Sectoral silos

- Wreford et al. 2018 'Enabling a transition to a bioeconomy in New Zealand, *Environmental Innovations and Societal Transitions* https://doi.org/10.1016/j.eist.2018.11.005



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