Notions of Food System Resilience for policy, business and society

Reflections from an OECD Co-operative Research Programme Fellowship to the University of Queensland

Seven in 10 Australian men are overweight or obese

One in two — Women are overweight or obese

One in four — Children are overweight or obese

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Food Systems Programme Leader
Environmental Change Institute, University of Oxford
OECD CRP Research Fellow, University of Queensland

Environmental *Change* Institute

eci — UNIVERSITY OF OXFORD

RESILIENCE OF THE UK FOOD SYSTEM IN A GLOBAL CONTEXT — A Global Food Security Programme

OECD

THE UNIVERSITY OF QUEENSLAND — AUSTRALIA

OECD CRP Research Fellowship

Objective

Taking a 'food systems' approach and interacting with a wide range of stakeholders,

to analyse Australian agriculture, food and natural resource management policies and practice and identify options to enhance food system resilience.
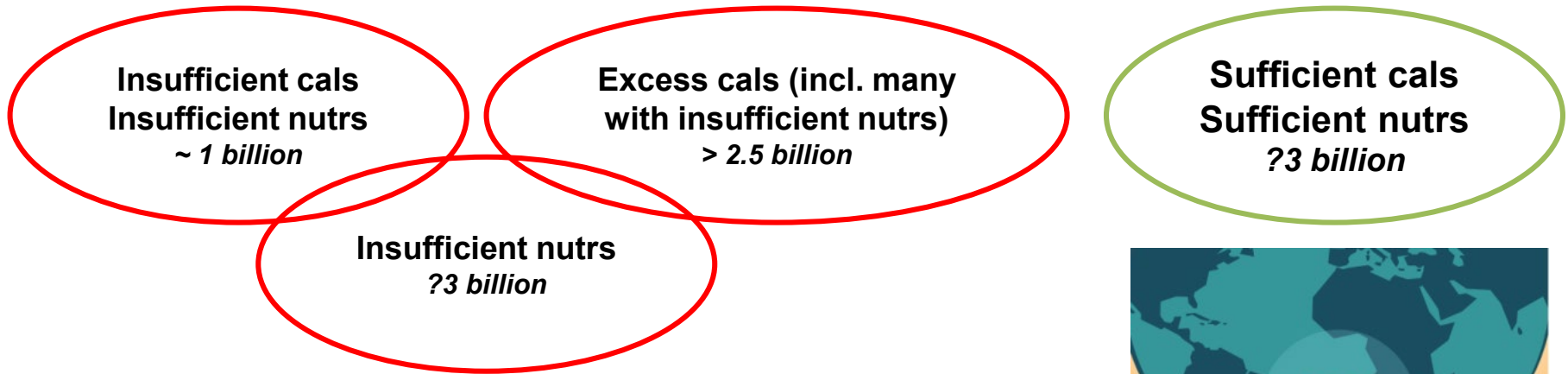
Method

1. Review of policy and scientific literature

2. Seven seminars/feedback sessions (UQ, ANU, U Adelaide)

3. >20 semi-structured conversations with a wide range of stakeholders:

- University academics (agriculture, economics, logistics, marketing, health)

- CSIRO researchers (ecology, agriculture, global change and foresight science)

- National and state-level policy makers (agriculture, food safety, biosecurity)

- Representatives of industry associations (agriculture, marketing)
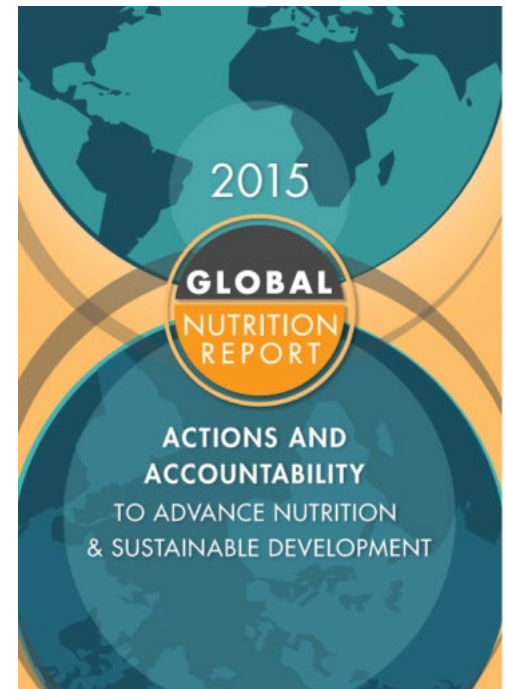
- NGOs (health)

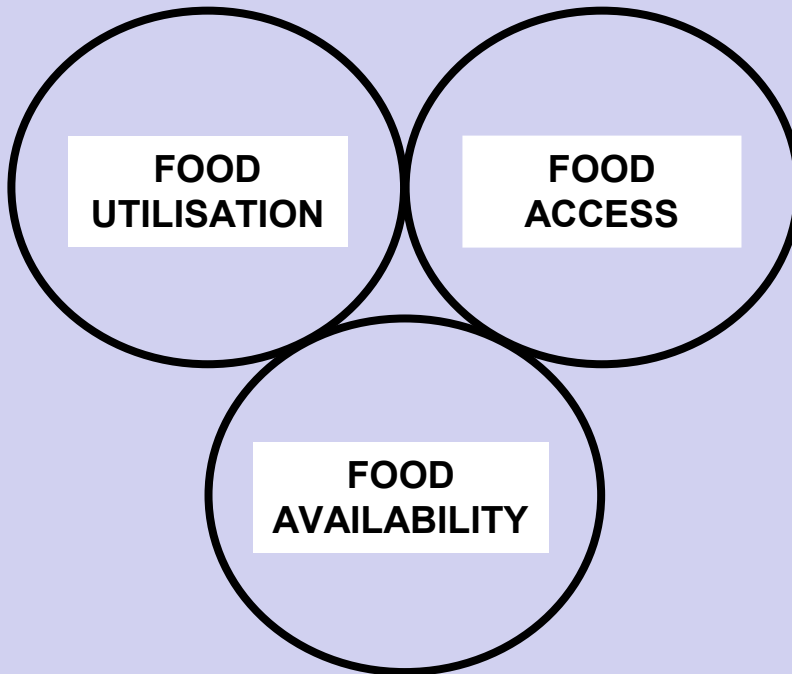"Chatham House Rule"

Overall global food security 'situation'

Insufficient cals
Insufficient nutrs
~ 1 billion

Excess cals (incl. many
with insufficient nutrs)
> 2.5 billion

Sufficient cals
Sufficient nutrs
?3 billion

Insufficient nutrs
?3 billion

➢ **"Triple Burden of Malnutrition"**
Different, overlapping forms of
malnutrition the 'new normal'
(IFPRI 2015)

2015

GLOBAL
NUTRITION
REPORT

ACTIONS AND
ACCOUNTABILITY
TO ADVANCE NUTRITION
& SUSTAINABLE DEVELOPMENT

What do we want from food systems?

Food Security

- FOOD UTILISATION
- FOOD ACCESS
- FOOD AVAILABILITY

Other Societal Interests

- Employment
- Health
- Profit
- Rural development
- Environment
- Landscape
- Ecosystem services
- Animal welfare
- Fair working conditions
- …

So what's the purpose of the Australian Food System?

"To feed the Australian people"

"To reduce diet-related NCDs"

"To provide safe and nutritious food for all"

"To maintain vibrant rural communities"

"To ensure a profitable export market"

"To reduce food-borne disease"

"To generate potential business opportunities"

"To support livelihoods in the value chain"

"To give high quality food whenever at reasonable price"

"To give +ve outcomes for the population: health, equity and env"

"The Lucky Country": Why worry?
> 86,500 farm businesses in Australia

- On average, each produces enough food to feed 600 people, 150 at home and 450 overseas.

  "The Australian food system feeds 80 million people"

- Collectively produce almost 93% of daily domestic food supply.

  "We have probably the best biosecurity in the world "

- Gross value of production in 2016-17 was $60 billion (3% GDP)

  "Blessed with 'Brand Australia'"

- Australia's farm exports about $44.8 billion in 2016-17

"The value of our farm exports, and indeed the future of Australian agriculture, depends largely on conditions in overseas markets, due to our high level of exports."

"This is the land of plenty. We don't worry about vulnerability; we don't think about resilience"
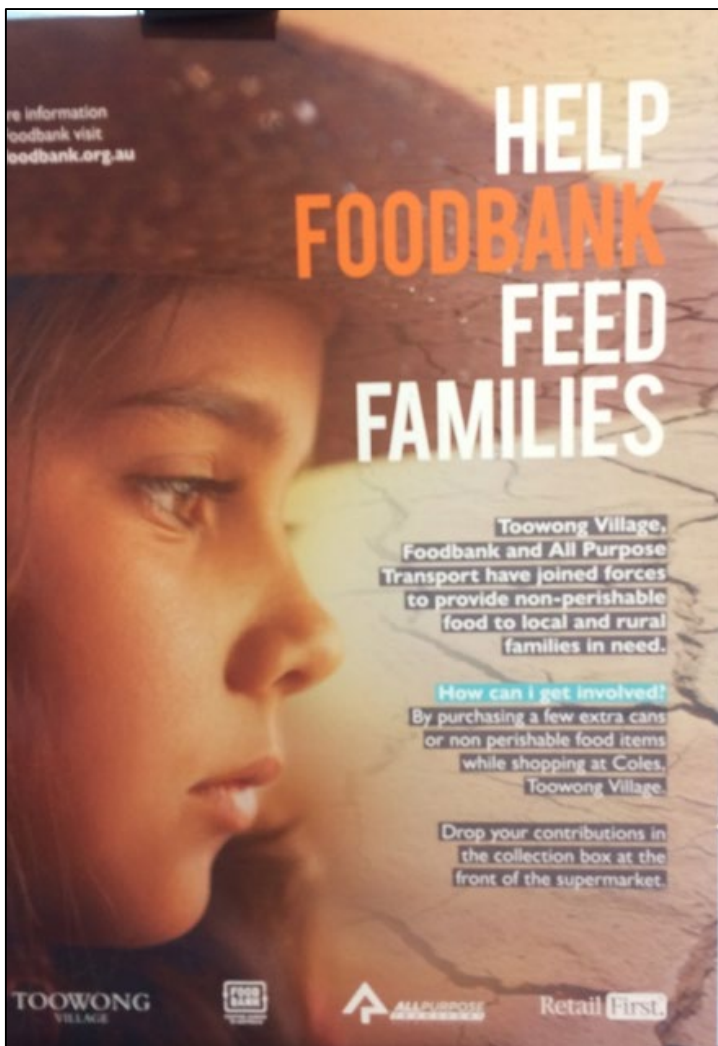
"She'll be right, mate"

www.nff.org.au/farm-facts.html

But things can change …

Since the late 1980s, food imports have been increasing by 4.8% a year on average, now accounting for 15% of Australia's total food consumption.

Australia is now a net importer of:

- seafood
- processed fruit and vegetables
- soft drink
- cordials and syrup
- confectionary
- bakery products
- oils and fats

https://esriaustralia.com.au

A growing worry

"Australia is not food secure"
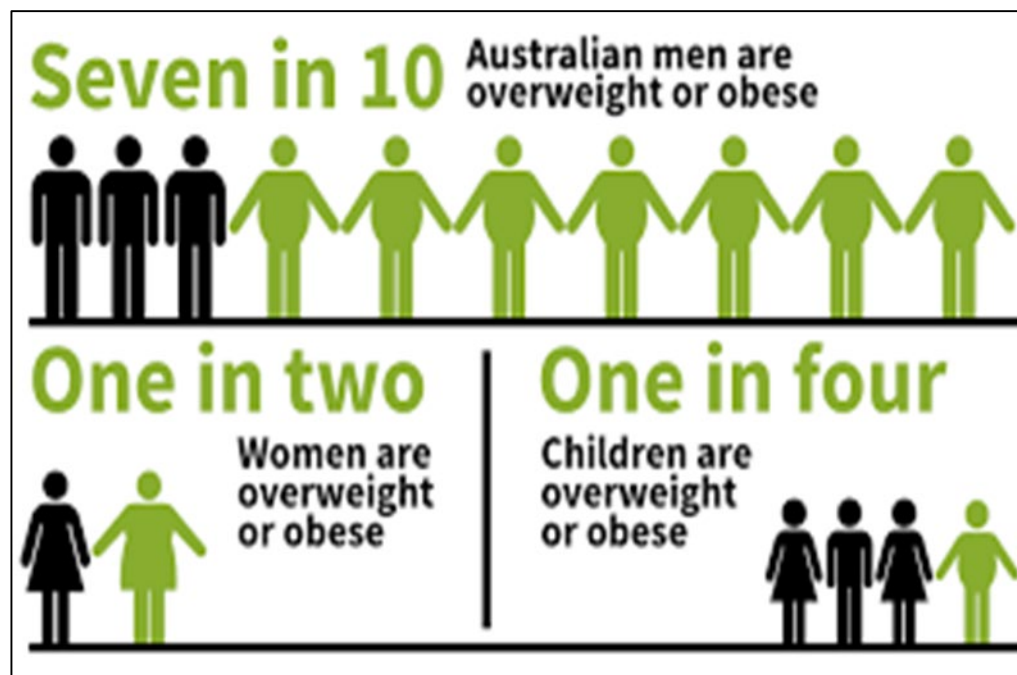
And we also have a host of ethical concerns

- Animal welfare

- Food system workers' rights

- Inter-generational legacy

- Food waste

- Farmer welfare and safety

- Equity and fair prices

- Civil harmony

- Food additives

- S&T

- …

World Economic Forum Global Risks Report
2019

With climate change placing growing strain on the global food system, and with international tensions already heightened, the **risk of geopolitically motivated food-supply disruptions increases**.

Worsening trade wars might spill over into **high-stakes threats to disrupt food or agricultural supplies**.

Conflict affecting supply-chain chokepoints could lead to **disruption of domestic and cross-border flows of food**.

World Economic Forum Global Risks Reports
2018 & 2019

Top 5 Global Risks in Terms of **Likelihood**

2018 | 2019

2018	2019
Extreme weather events	Extreme weather events
Natural disasters	Failure of climate-change mitigation and adaptation
Cyber-attacks	Natural disasters
Data fraud or theft	Data fraud or theft
Failure of climate-change mitigation and adaptation	Cyber-attacks

Top 5 Global Risks in Terms of **Impact**

2018 | 2019

2018	2019
Weapons of mass destruction	Weapons of mass destruction
Extreme weather events	Failure of climate-change mitigation and adaptation
Natural disasters	Extreme weather events
Failure of climate-change mitigation and adaptation	Water crises
Water crises	Natural disasters

Legend:
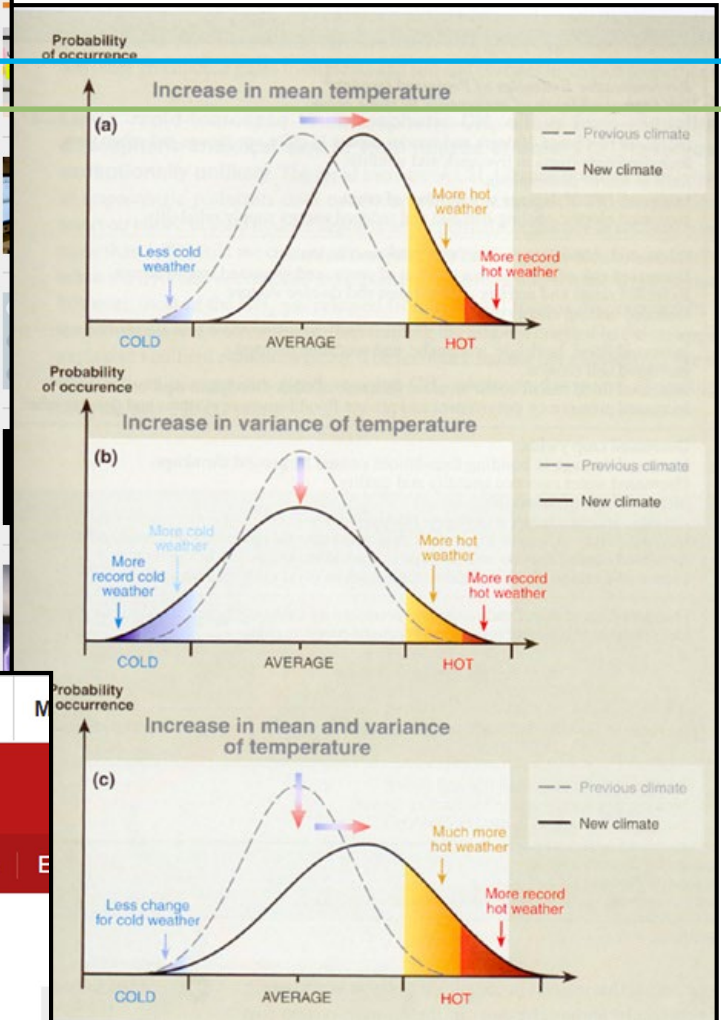- Geopolitical
- Environmental
- Social
- Technological

Extreme weather: temperature and drought

Extreme weather: storms and floods

Maize, rice, wheat: alarm at rising climate risk to vital crops

Simultaneous harvest failures in key regions wou[ld] famine, says the Met Office

▲ A villager lifts up fallen corn plants after a flood at a farm in Jianhe coun[ty] Photograph: Reuters

Governments may be seriously underestimating th[e] occurring in major farming regions around the world, a study by British researchers has found.

Major supermarkets shut down as shelves empty

Katherine Feeney
January 12, 2011

⭐ Read later | Be the first to comment

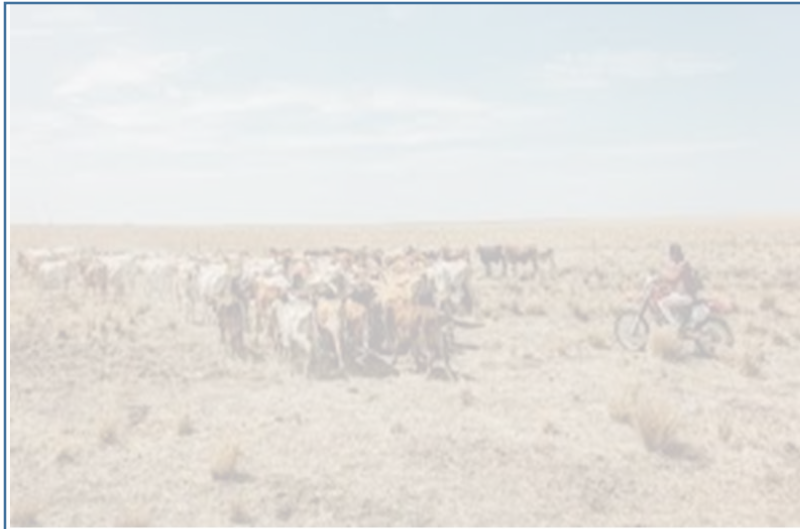**Ads by Google**

But what about other concerns?

Seven in 10 Australian men are overweight or obese

One in two Women are overweight or obese

One in four Children are overweight or obese

So what is
'Food System Resilience'?

"The capacity over time of a food system and its units at multiple levels, to provide sufficient, adequate and accessible food to all, in the face of various and even unforeseen disturbances." – *just relates to Food Security*

Enhanced understanding needed to:

- ✓ accommodate different perspectives looking at a common problem (esp. concerning <u>multiple</u> societal goals)

- ✓ be based on use of evidence in a value-laden debate

1. Of what?

2. To what?

3. For whom?

4. Over what time period?

1. Of what?

Food System
Functioning
(Activities)
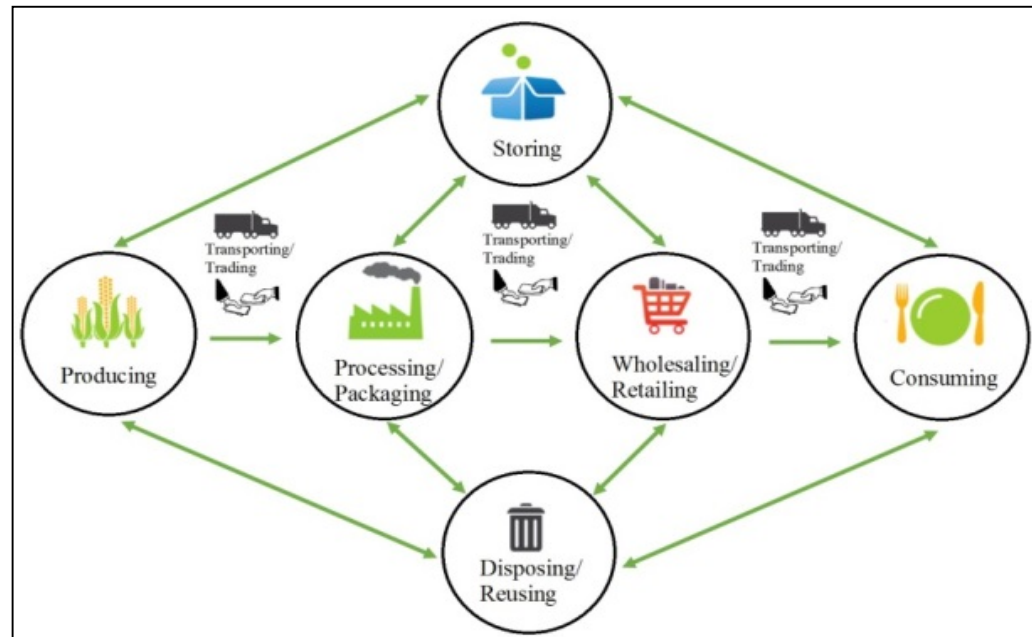
OR

Food System
Function
(Outcomes)

Storing

Transporting/Trading

Producing

Processing/Packaging

Wholesaling/Retailing

Consuming

Disposing/Reusing

Food System OUTCOMES

Social Welfare
- Income
- Employment
- Health
- Social capital
- Political capital
- Ethics
- …

Food Security

Food Utilisation

Food Access

Food Availability

Environment
- Climate change
- Water availability
- Water quality
- Biodiversity
- Biogeochemistry
- Soil degradation
- …

Adapted from: Ingram, Food Security, 2011

2. To what?
Food System Stresses and Shocks

"Stream Trains"

Easily perceived drivers and trends that will influence change - direct and indirect

"Black Swans"

Unimagined, rare and/or unpredictable events that have a big impact

Foresight4Food
International Collaborative Initiative

2. To what?
Food System Stresses and Shocks

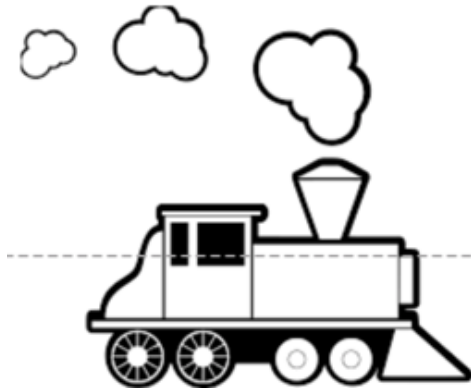| Stress *pressure or tension exerted on a system [Steam Trains]*	Shock *sudden surprising event affecting a system [Black Swans]*
Demography	
Social & cultural norms	
Natural resource degradation	
Climate change	
Urbanisation	
Automation	
Science & technology	
Geopolitics	

2. To what?
Food System Stresses and Shocks

Stress *pressure or tension exerted on a system [Steam Trains]*	Shock *sudden surprising event affecting a system [Grey Swans]*
Demography	Trade wars
Social & cultural norms	Election and Referenda results
Natural resource degradation	Food scares
Climate change	Extreme weather
Urbanisation	Conflict
Automation	Geophysical events
Science & technology	
Geopolitics	

Australian Food System
Stresses

"Labour shortage: it's increasingly scarce, increasingly expensive"

"Agriculture dominated by family farms"

"Tariffs on importing soy"

"Water stress"

"Processing dominated by international players"

"Aging farmer population; hard to maintain skills"

"Australian 'land grab' by China"

"Insect pollinators in decline"

"Chilean produce cheaper threatening international markets"

"New landscape caused by changing Trade and Direct Foreign Investment"

Australian Food System
Shocks

"Drought"

"Frost damage in wheat"

"Hail storms"

"Russian wheat aphid"

"Blue tongue limiting exports to China"

"Food scares (e.g. strawberry industry lost $500m)"

"Weather extreme affecting food distribution"

"SARS epidemic hitting 30% of the workforce"

"Electrical cut to the banking system"

"Geopolitical incident affecting export market"

3. For whom?
Food system 'actors'

"A beef farmer, a processor, a retailer, a consumer, an exporter?"

4. Over what time period?

- **Short-term *interruptions* (usually due to shocks)** to e.g.:

  - Fishing or agricultural activities (due to e.g. extreme weather)
  - Critical ingredient shortfall (due to e.g. disease outbreak)
  - Just in time groceries delivery (due to e.g. IT malfunction)
  - Consumer shopping patterns (due to e.g. food scares)

- **Longer-term *disruptions* (usually due to stresses)** to e.g.:

  - Natural resource degradation
  - Energy price
  - Low-carbon emission regulations
  - Change in dietary preferences

What can amplify these Stresses and Shocks?

"Good harvests outside Aus leading to drop in world prices"

"China politics and losing market"

"Horticulture at highest risk as essentially self-regulating"

"Fuel price hikes and transport costs"

"Frequency of cyclones"

"Public opinion, e.g. shocking news about live animal exports"

"Volatility in markets, esp. beef price fluctuations"

"A few big producers can organise political power"

"Politics around migrant labour"

"No sense of vulnerability"

Notions of Resilience of Food System Outcomes

1. Robustness Aim to resist disruption to *existing* FS outcomes

2. Recovery Aim to return to *existing* FS outcomes after disruption [bounce back]

3. Reorientation Accept *alternative* FS outcomes before or after disruption [bounce forward] (transformation)

All involve

Reorganisation Making changes to the system *activities* (adaptation) either directly or via 'environments'

'Reorganise' to enhance *Robustness*

"Trade deals aiming to diversify market"

"Maintain good relationships with China"

"Planting N-S instead of E-W"

"Improve transport infrastructure"

"Protect reputation"

"Even stronger biosecurity"

"Focus on food safety"

"Phase out bad farmers"

"Future Proofing"

"Guardsmanship"

'Reorganise' to enhance *Recovery* [bounce back]

- "Better coordination post-farmgate"
- "Adaptability of social and institutional structure"
- "Joining together into associations"
- "Improve logistics infrastructure"
- "Enhance State Emergency Service"
- "Enhance biohazard response"
- "Import food temporarily (e.g. Sunrice)"
- "Path dependency vs. deviant dependency"
- "Use scenarios and foresight"
- "Automation"

'Reorganise' to encourage *Reorientation* [bounce forward]

"Introducing sector-led minimum standards of operation/efficiency"

"Using renewables in production"

"Aim for high-value commodities for sale on world market"

"Healthier diets; eating seasonally"

"Reduce food waste"

"Reduce processed foods and aim for NOVA classification "

"Reduce red meat consumption"

"Food/diet classes need to be part of national policy"

"Recommission National Agriculture White Paper"

"Aim for systemic innovation (i.e. avoid component innovation)"

Enhancing Resilience 1
Reorganise the Food System Activities

Do the "doing" words differently

Enhancing Resilience 2
Reorganise the Food System 'Environments'

Social: *education, media, household structure, social movements, health care systems, ...*

Policy: *agri-environment schemes, nutrition, labour, health and safety, ...*

Market: *preference, market structure, competition, trade, ...*

Sci & Tech: *farm inputs, food processing, food preparation, logistics and health technologies, ...*

Biophysical: *climate, soil, water, pollution, biodiversity, ...*

Enhancing Resilience 3
Reorganise our 'views' on Food System Outcomes

Opportunities for future research and innovation on food and nutrition security and agriculture
The InterAcademy Partnership's global perspective

Synthesis by IAP based on four regional academy network studies

ISBN: 978-88-940784-5-9

This report can be found at
www.interacademies.org

"Providing a healthy, affordable, and environmentally-friendly diet for all people will *require a radical transformation of the system*.

This will depend on:

better farming methods,

wealthy nations **consuming less meat** and

countries **valuing food which is nutritious rather than cheap**."

InterAcademy Partnership: 28 Nov 2018

Challenges for enhancing resilience

"3-5 yrs max planning timeframe for ag enterprises"

"There is no real use of scenarios or foresight"

"Need both public and policy 'will' to work on interventions"

"No comprehensive strategy in place; more planning is needed"

"Take consumer sentiments seriously"

"Reliance on mixing of supply in food processing"

"People value eating out; changing hospitality culture difficult"

"No sign of legislation because of fear of "nanny state""

"Better understanding of the dynamics and sensitivity of the system"

"Need Food Systems thinking"

Food security…

… exists when all people, at all times, have physical, economic and social access to **sufficient**, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

"enough for a particular purpose; as much as you need"

… OED

Aim for healthy diets
from sustainable food systems

THE LANCET

January, 2009   www.thelancet.com

Food in the Anthropocene: the EAT–*Lancet* Commission on healthy diets from sustainable food systems

"Food in the Anthropocene represents one of the greatest health and environmental challenges of the 21st century."

A Commission by *The Lancet*

Great Food Transformation
The unprecedented range of actions taken by all food system sectors across all levels that aim to normalise healthy diets from sustainable food systems.

Sustainable Food System *Activities*

✓ Environmentally sound
✓ Socially acceptable
✓ Economically/Enterprise viable

Healthy Diet *Outcomes*

✓ Calorie and nutrient density
✓ Quality
✓ Diversity
✓ Safe
✓ Affordable
✓ Acceptable
✓ Sufficient

January 2019

Summary Blog on
UK Global Food Security Programme web

Global Food Security
Sustainable, healthy food for all

The UK cross-government programme on food security research

About us | The challenge | Resea

When complacency poses a risk to the Australian food system

8 August 2019

John Ingram

Thank you

www.foodsecurity.ac.uk/blog/ when-complacency-poses-a- risk-to-the-australian-food- system/