Introduction to the issues: sustainability, genetics and new (agricultural) technologies

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Grand challenges – increase food production

- Increase productivity, profitability and sustainability across the agri-food value chain
- Current rate of crop improvement will not meet projected demand
- Inputs
  - land, water, nutrients
  - energy, labour, capital, logistics...
- Threats
  - biosecurity
  - climate
  - social licence

Grand challenges - health

Health-promoting foods with consumer acceptance to manage hunger, inadequate nutrition, over consumption

- Modified polysaccharides
  - better glycaemic control, gut health
- Modified oils
  - improve fatty acid profile, increase omega oils
- Bioavailability of micronutrients
- Acceptability of whole grain foods, pulses
- Bioactives, reduced allergens, nutraceuticals, ...
- Agriculture is an instrument of public health
- Increasing production will not address problems of excess nutrition

“It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, …”

A Tale of Two Cities
Charles Dickens (1859)
**Food systems are complex**

- Making correct decisions is difficult
  - limited empirical data
  - lag time between action and response
  - link between cause and effect not obvious
  - confounding variables

- Risk management approach for decision making
  - nothing we do is completely safe
  - we all engage in risky behaviour

- Understanding hazard and risk
  - hazard - potential source of harm
  - risk - likelihood of harm occurring
  - risk-reward relationship
  - risk appetite

**Drivers of food supply and demand**

**Demand**
- Demographics
- Affordability
- Dietary enrichment

**Supply**
- Availability of land and water
- Production inputs
- Biosecurity
- Wastage
- Capacity and infrastructure
- Investment in R & D
- Supply chains
- Trade policies and markets
- Weather, natural disasters, climate
- Grain stocks to buffer volatility

**Australian agri-food environment**

- Increased population - older, more urbanised and diverse
  - more pre-prepared meals, convenience foods, bought meals

- Australia can increase agricultural production but will not be a food bowl for Asia
  - scarcity of water, competition for land use

- Australia is a high cost producer
  - niche for high quality, higher value produce
  - provider of research and expertise

- Most food manufacturing for Asia will be in Asia
  - proximity of processing to production may be advantageous for perishable produce

- Small domestic market increases risks for investment
  - benefits of value adding vs increased costs and risks
  - business case to identify value proposition

**Provenance of foods**

- Increased consumer interest in
  - practices, location, sustainability
  - ethical values
  - quality
  - nutrition

- Safety is considered an entitlement, not a way of building trust
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