Victorian Food Supply Scenarios: Impacts on Availability of a Nutritious Diet

A selection of scenarios to stimulate thinking . .

Part 1: International

VEIL | victorian ec innovation

CSIRO

DEAKIN UNIVERSITY

Victoria The Place To Be

Department of Planning and Community Development

VicHealth

Scenarios to explore

- Global
  - UNEP Global Environmental Outlook 3
- Europe

  European Food Systems in a Changing World (2009)
  - Review of previous work: Ground for Choices (1992); EUralis – European Land Use Scenarios, Standing Committee on Agricultural Research (SCAR) Foresight Project
  - ESF/COST Forward Look Scenarios
- UK
  - Chatham House: Thinking About the Future of Food
  - Food Ethics Council: Future Scenarios for the UK Food System
- Australian / Victorian
  - Irrigation Futures for the Goulburn Broken (2006/07)
  - DPI: 20 Year Strategy Project (2008/09)
  - DPI: Climate Change Adaptation in the South West (2009)
  - Future Scenarios of Energy Descent (2008)

UNEP – Global Environmental Outlook 3

- The UNEP Global Environmental Outlook (GEO-3) emphasises that the next 30 years will be as important as the past 30 for shaping the future of our environment.
- It develops and analyses four scenarios to explore what the future could be, depending on principally different approaches to policy making.
- It sets out narrative descriptions of possible futures, which are supported by quantitative scenario analysis. A set of four main modeling tools is employed to provide detailed output for Europe per scenario for demographic and economic development, cropland degradation, built environment, infrastructure expansion, water stress, greenhouse gas emissions, climate change and land and biodiversity.

Environmental implications addressed globally	**Four Scenarios (UNEP GEO)**
• Climate trends • Ecosystem pressure (built-up area, infrastructure) • Water stress (area, population) • Population living with hunger **Results that focus on Europe:** • Emissions and land use • Energy- related carbon dioxide emissions • Extent of built-up areas • Land area impacted by infrastructure expansion • Natural Capital Index • Population living in area with severe water stress • Thought experiment: "Imagine a food scare in Europe"	The ***Markets First*** scenario envisages a world in which market-driven developments converge on the values and expectations that prevail in industrialised countries; In a ***Policy First*** world, strong actions are undertaken by governments in an attempt to reach specific social and environmental goals; The ***Security First*** scenario assumes a world of great disparities, where inequality and conflict prevail, brought about by socioeconomic and environmental stresses; and ***Sustainability First*** pictures a world in which a new development paradigm emerges in response to the challenge of sustainability, supported by new, more equitable values.

Box based on UNEP, 2002 and RIVM, 2004; images from UNEP, 2002

Europe

Ground for Choices (1992)

- Examines the viability of different possible future developments in Europe's rural areas.
- The four scenarios highlight a range of options related primarily to different societal priorities regarding free market and free trade, regional development, and the protection of nature and environment. They also include some assumptions on the type and level of future food consumption, and for each scenario quantitative estimates show a comparison of effects of diets on land use (eg. "current diet" vs "luxury diet").

Policy goals addressed in Ground for Choices	**Four Scenarios (Ground for Choices)**
Economic • Employment (in agriculture) • Self-provision/protection • Regional economic development • Productivity development **Social** • Income • Regional development **Environment** • Emissions **Nature and Landscape** • Nature values	***Scenario 1:* Free Market & Free Trade** In this scenario agriculture is treated primarily as an economic activity: economic criteria determine where agricultural production takes place. ***Scenario 2:* Regional Development** In this scenario, the maintaining of agricultural employment is a key driver. Market forces, including import and export, are assumed to be heavily regulated. ***Scenario 3*: Nature and Landscape** In this scenario, a large focus is put on the reduction of agricultural pressure on nature in Europe. This leads to an assumption of reduced agricultural area in Europe. ***Scenario 4*: Environmental Protection** In this scenario, environmental criteria restrict agricultural production — regardless of where it takes place. Also here, import and export are assumed to be heavily regulated.

Box based on WRR, 1992

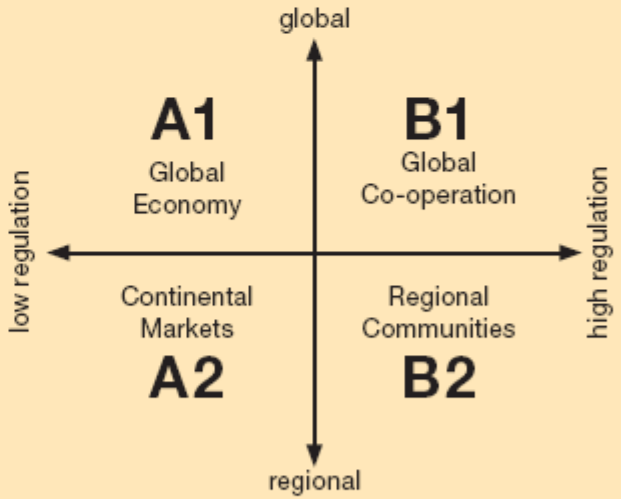
EUruralis – European Land Use Scenarios

- Examines current policy issues in EU rural areas depicting land use changes under changes predicted under three realms of sustainable development: ecology, economy and socio-cultural aspects.
- Four contrasting scenarios, based on the IPCC-SRES scenarios, are analysed, focused on those driving forces that shape land use and agriculture in Europe.
- The focus is on land use changes, and thus address food systems only from the food production and food trade perspective.

Key drivers addressed in EUruralis

- Demographic changes, i.e., growth, decline of populations, major migration flows, and the ageing of people in case of declining population growth.
- World economy is a powerful determinant of changes in agriculture and other sectors (industry, services). Supply and demand determine trade.
- Technology, but completely new inventions are hard to predict; once their relevance has been shown, dissemination of technologies can be assumed.
- Climate change and sea-level rise
- Geopolitical change, i.e., EU enlargement, international agreements (WTO or other).
- EU Common Agricultural Policy.
- Consumption patterns: all kinds of human preferences, diets, attitude towards animal welfare.

Four Scenarios (EUruralis)



Box based on www.eururalis.nl

European Science Foundation (ESF) & European Cooperation in Science and Technology (COST) 'Forward Look on European Food Systems in a Changing World', (2008) available at http://www.esf.org/

Standing Committee on Agricultural Research (SCAR) Foresight Project

- Europe's Foresight expert group formulate scenarios based on a 20 year perspective to identify long term research priorities.
- The primary focus is on food production systems, however under the 'food crisis' scenario, food consumption, packaging and health systems are highlighted.
- Four disruption scenarios are compared to a baseline scenario.

Key drivers addressed in the SCAR Foresight Report	**Five Scenarios (SCAR Foresight Report)**
• Societal and demographic changes • Economy and trade • Climate change/Global warming • Environment • Energy • Science and technology • Health	***A "baseline-like"*** Scenario: Identifies an emerging trend towards competitiveness, disruption in agriculture, largely due to globalisation. ***Disruption Scenario:*** Climate Shock Focus on climate change and the acceleration of related environmental impacts as the key drivers. ***Disruption Scenario:*** Energy Crisis Focus on energy and "industry-manipulated" acceleration of related economic and societal impacts as key drivers. ***Disruption Scenario:*** Food Crisis Focus on food, health, and society as key driving forces jointly determining a more consumer-oriented research. ***Disruption Scenario:*** Cooperation with Nature This scenario focuses on society and science as key joint drivers evolving in a beneficially symbiotic relationship.

Box based on EU, 2007

European Science Foundation (ESF) & European Cooperation in Science and Technology (COST) 'Forward Look on European Food Systems in a Changing World', (2008) available at http://www.esf.org/

ESF/COST Forward Look Scenarios

- The four scenarios that have been defined in the ESF/COST Forward Look were named after the buttons of a tape recorder: what could happen to European food systems if we press the button “fast forward”, “pause”, “rewind” or “play”
- The assumption behind this approach is that it provides a means of identifying a research agenda which anticipates discontinuities, considers wider contextual developments, and is relevant to the design of policy concerning European food systems
- The four scenarios are related to the identified driving forces, in particular to the drivers on economic growth and global markets and policy development.

“In retrospect, we feel that the scenario approach applied here has not sufficiently opened up our analysis of possible future developments in food production activities. Some of the assumptions ascribed to the scenarios seem arbitrary and lack scientific underpinning, e.g., the proposition that low-input or high-input agriculture have particular implications or that society would become highly perceptive to various perceived risks”

European Science Foundation (ESF) & European Cooperation in Science and Technology (COST) ‘Forward Look on European Food Systems in a Changing World’, (2008) available at http://www.esf.org/

A: Fast Forward – continuing 2007 for another 20 years

Implications for food production

- Strong continuation of intensification of agricultural production; farming systems will further specialise (separation of different production sectors on-farm, but at higher levels they may well mix) and scale up in size
- Current trends will continue and agricultural production will concentrate in areas and regions where this can be done in the most efficient way (efficient mostly from an economic perspective)
- Resource-use efficiency will be a key concept, but expressed predominantly in monetary terms.
- Vulnerability to large-scale epidemics because of globalising agriculture with large trade flows and narrowing of the set of cultivars or varieties in use
- Much land freed up for other purposes than food production due to high productivity

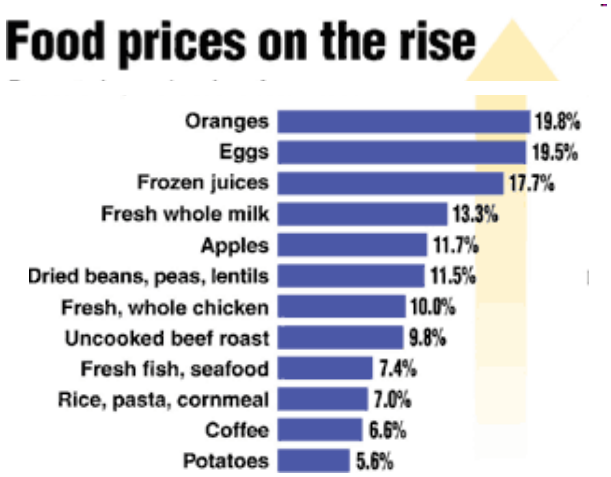
Implications for food processing

- This scenario seems to provide the most advantageous circumstances for technological advances in the food processing industry, catering to the following consumer groups:
  - … consumers who seek convenience
  - … hedonistic and variety-seeking consumers enjoying the global offering of exotic foods
  - … price-conscious consumers as this scenario is assumed to result in the lowest food prices

B: Pause – Globalising markets and higher perception of risk

Implications for food production

- Society responds actively to perceived risks, which can be of various kinds (environmental, social and economic) as a result of global drivers such as climate change, large-scale epidemics, obesity and resource depletion and scarcity.
- The need for 'trust' in the food system is crucial and people are much more cautious about what they eat and drink
- Higher prices because of a focus on more quality control in food production systems. Tracking and tracing, supported through life-cycle assessments, give incentives to efficient, yet low-risk production systems – with enormous implications for the entire food chain
- It is still likely that land in some parts of the world (including Europe) can be freed up from food production purposes
- Resource efficiency approached from multiple angles, not just economic.



Implications for food processing

- As the majority of consumers are worried about the safety of their foods, food processing industry will have to take measure to secure consumer trust eg. detailed contracts with suppliers stipulating mode of operation and compliance measures and expansion of tracking and tracing
- High costs to ensure food safety – will slow down technological innovation and raise food prices
- Consumers who are concerned about their health will not consider this a serious drawback

C: Rewind – global crisis, act local

Implications for food production

- Agricultural food production will regionalise. Trade and transport flows decrease and people prefer food from within the region (which can still be fairly large, but generally from within the same continent). Seasonality or availability of products will increase and there will be less diversity.
- Enormous efforts will be needed to prevent local food shortages (more so in Asia than Europe).
- Trust in the food system is important and this is achieved through a combination of extensive tracking and tracing and local production.
- Food miles will be low; food self-sufficiency of regions is an important aim and protectionism prevails. Production does not take place in the most suitable places nor in the most efficient way – therefore requiring much more land. Overall resource use efficiencies will decrease.
- Requirement for agricultural labour is much higher than in A and B.

Implications for food processing

- A move towards more regional markets and a lower availability of overseas products might force the food industry to decentralise and use smaller-scale processing.
- Reliance on regional production could cause problems in year-round supply of raw materials due to the seasonal production under EU conditions.
- The food industry will face higher production costs which may, again, reduce the budget for R&D and hamper technological development

D: Play – regionalised markets and low perception of risk

Implications for food production

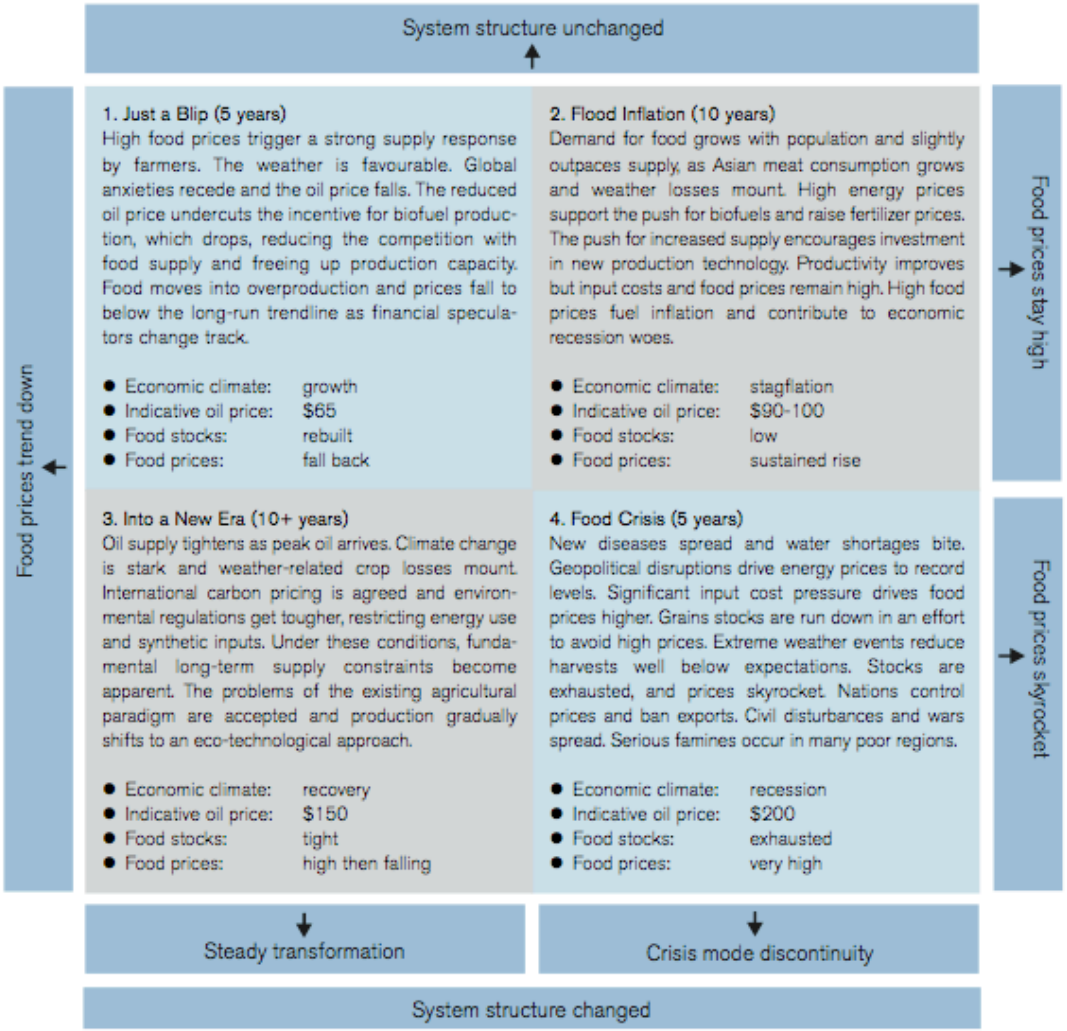
- Production systems with low use of external inputs will prevail. This could be organic production or a Tuscany-type of agriculture. Certainly on a per-hectare bases energy use will be relatively low, although this may be less evident for the entire sector
- Resource use efficiency for most resources will be relatively low.
- Local biodiversity may benefit from this type of production; globally, food production will require much more land
- Agro-biodiversity (ie. the pool of genes used in cultivars, varieties and breeds) will be relatively high and multi-functional types of agriculture will flourish.
- Trust is less of an issue – it is mainly obtained through the assumption that organic and locally -grown food is safe
- Production methods are relatively labour-intensive

Implications for food processing

- This scenario would best suit the environment -conscious and nature-loving consumer as it offers opportunities for short production chains and close control of production practices.

UK

Chatham House: Thinking about the Future of Food



This research details outcomes relating to the UK wheat and dairy industries, extrapolated from workshop discussions relating to the UK food system as a whole and subsequently researched.

http://www.chathamhouse.org.uk/files/11622_bp0508food.pdf

‘Just a Blip’: food prices trend down, system structure unchanged

1 Just a Blip (5 years)

High food prices trigger a strong supply response by farmers. The weather is favourable . Global anxieties recede and the oil price falls. The reduced oil price undercuts the incentive for biofuel production, which drops, reducing the competition with food supply and freeing up production capacity. Food moves into overproduction and prices fall to below the long-run trend-line as financial speculators change tack.

- Economic climate: growth
- Indicative oil price: $65
- Food stocks: rebuilt
- Food prices: fall back

Summary

» High food prices prove to be a temporary blip and soon return to the long term trend line.

» The scenarios considers the possibility that food prices fall and financial speculation in commodities will operate in reverse and lead to exaggerated food price volatility.

» Participants deemed this scenario to be too complacent.

Implications for Food

In the wheat sector:

» Little incentive for agricultural investment and R&D

» Further migration of food processing to lower-cost sources of labour will continue

» Minimum impact on the consumer

In the dairy sector:

» Decline in milk production

» Heard size increases in response to increase in ‘exits’ from the industry

» In regional areas where there is limited scope for alternative industries and smaller farms, may experience a slow decline in production as a response to market changes.

Food Inflation: food prices stay high, system structure unchanged

2 Food Inflation (10 years)

Demand for food grows with population and slightly outpaces supply, as Asian meat consumption grows and weather losses mount. High energy prices support the push for biofuels and raise fertilizer prices. The push for increased supply encourages investment in new production technology. Productivity improves but input costs and food prices remain high. High food prices fuel inflation and contribute to economic recession woes.

- Economic climate: stagflation
- Indicative oil price: $90-100
- Food stocks: low
- Food prices: sustained rise

Summary

- Food prices stay high for an extended period, contributing to inflation, but the economy adapt and the existing food system copes.
- A more plausible scenario, with some contributors noting that elements are already observable.

Implications for Food

In the wheat sector:

- Higher input costs, particularly fuel and fertiliser reinforcing intensive production methods in demand for efficiency
- More power to multinational corporations within the food system
- Longer term supply network relationships gain importance to protect supply sources
- Possible removal of single farm payments

In the dairy sector:

- Increased costs in keeping herds, move to more intensive methods
- Increased competitiveness in sources dairy commodity products
- Waste will become a concern
- Less priority given to environmental and ethical concerns
- Greater acceptance among poorer consumers of intensive production methods

Into a New Era: food prices down, system structure changed

3 Into a New Era (10+ years)

Oil supply tightens as peak oil arrives. Climate change is stark and weather-related crop losses mount. International carbon pricing is agreed and environmental regulations get tougher, restricting energy use and synthetic inputs. Under these conditions, fundamental long-term supply constraints become apparent. The problems of the existing agricultural paradigm are accepted and production gradually shifts to an eco-technological approach.

- Economic climate: recovery
- Indicative oil price: $150
- Food stocks: tight
- Food prices: high then falling

Summary

- Input prices initially stay high as per capital production falls steadily.
- The food production systems shifts dramatically in response, to ensure increased yields are delivered efficiently through 'regenerative' rather than 'extractive' uses of resources.
- Observers have noted the appearance of pockets of innovation in line with this scenario as already present in the food system

Implications for Food

In the wheat sector:

- Investment in diverse technologies
- Demand for agricultural land will grow – may reverse rural depopulation
- Multinationals challenged by regionally and locally based solutions
- Consumer choice increasing based on true value of food, lower consumption overall
- Increase in agricultural subsidies

In the dairy sector:

- Technology innovation in control of methane
- Innovation in packaging and production and conflict between science and perceived product 'naturalness'
- Consumer demanding ethical and environmental regulation
- Lower levels of consumption of meat products with the potential for 'nutrition transition in reverse' back to traditional staple foods

Food in Crisis: food prices skyrocket, system structure changed

4 Food in Crisis (5 years)

New diseases spread and water shortages bite. Geopolitical disruptions drive energy prices to record levels. Significant input cost pressure drives food prices higher. Grain stocks are run down in an effort to avoid high prices. Extreme weather events reduce harvests well below expectations. Stocks are exhausted, and prices skyrocket. Governments control prices and ban exports. Civil disturbances and wars spread. Serious famines occur in many poor regions.

- Economic climate: recession
- Indicative oil price: $200
- Food stocks: exhausted
- Food prices: very high

Summary

- Multiple shocks disrupts food production and supply systems.
- Prices increase dramatically as stocks plummet, stimulating food shortages, famine and societal panic.
- The rapid response of food prices to the GFC suggests that serious shortage can develop

Implications for Food

In the wheat sector:

- Grain feed diverted to human food production, placing pressure on pig, poultry and egg producing industries
- Restriction on trade and consumer preference for local food and an increase in regionally based supply networks
- Lifting of restrictions of foodstuff (such as GM)

In the dairy sector:

- Herd replacement will become a key factor determining success of individuals farms
- Switching from dairy products to crops placing additional pressure on resources
- Regions over-reliant on livestock face significant stress of systems
- Basic foods become a focus, substitute dairy products may gain importance
- Partnership approaches across the supply network (eg: retailers investing directly with farm-based operations)
- Supply chains shorten

Food Ethics Council UK: Future Scenarios for the UK Food System

www.**foodethicscouncil**.org/files/FEC**scenarios**report(web)_0.pdf

A lot of Allotments

- Regional chains mix with street markets and smaller more specialist shops; market share of the multinationals down.
- Urban agriculture using sophisticated systems making a real contribution to food supply
- More consumers producing (and exchanging) more of their own food
- Socialising around food at home; not eating out
- Distribution networks - shorter-distance and built around food hubs

Feature Report:
"SOARING PETROL PRICES CREATE RECORD NUMBERS OF TELECOMMUTERS AND TIGHTER-KNIT FAMILIES"

Pass the VatbeefQuiknoodle

- High-tech manufacturing and processing help get sufficient nutrition to the people
- Protein is manufactured and ‘real’ meat and milk are niche products sold in small qualities
- Exceptional levels of resource efficiency and innovation help avert worst of climate change
- International trade much reduced and global tensions mean People buy on convenience and price
- Increasing self sufficiency in bulk commodities a priority - state takes a proactive role in guaranteeing food supply

“From vats straight into packs. It’s nutritious, tasty and exceptional value.”
CEO processing firm

Carry on Consuming

- Food is fun, quick and easy
- Focus on bulk commodities
- Functional foods for every health concern under the sun
- Obesity is on the rise.
- “Extreme” vertical integration – control up and down the supply chain
- Niche branding and value-added processing
- Super-efficiency and more regionalised supply networks (climate response)

SHOP MORE, WORRY LESS: THE NEW CONSUMER MANIFESTO?

Cash rich, time poor, experience hungry

- Foodie revolution
- Intelligent kitchens and smart, automatic i-ordering
- Enviro friendly products sought, but no time to check credentials
- “In” to order direct from artisan producer

Blog: My AIA had a craving! Software glitch delivers entire output of Tuscan olive grove to flat in Sheffield. …. civil servant David Hunt reeling after coming home to a delivery of 360kg olives and 2,000 litres of cold pressed olive oil.