

Sustainable and Secure Food Systems for Victoria

What do we know? What do we need to know?

June 2008

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VEIL | victorian eco
innovation lab



Outline of today's presentation

- The Victorian Eco-Innovation Lab & the report

- Why Food?

- Key Messages

- What Now?

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The Victorian Eco-Innovation Lab (VEIL)

VEIL seeks to:

- Change expectations of a sustainable future
- Identify and promote innovations for sustainability
- Explore and stimulate new ideas

Research stream - closer look at innovation needs and opportunities

Methodology



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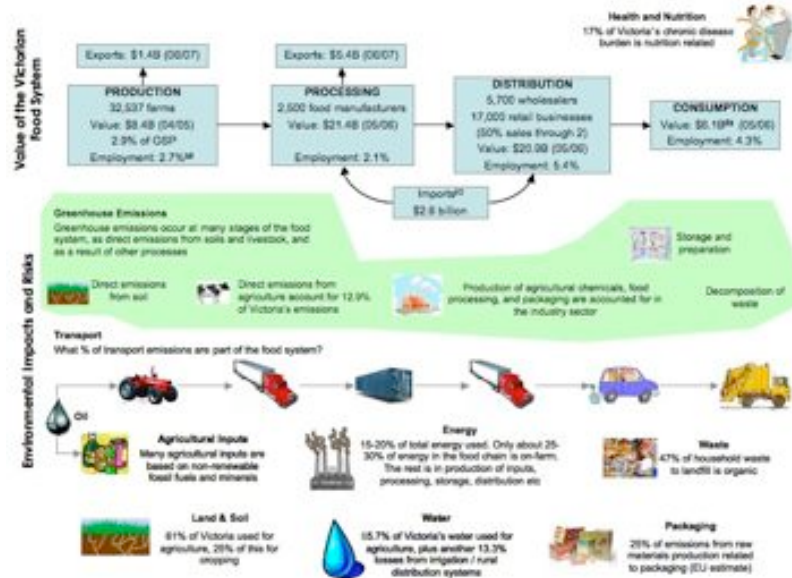
• Key Messages

• What Now?

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Food is a very significant sector in Victoria



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Food is a very significant sector in Victoria

17% burden of disease

≈ 20% of GDP

12-14% total employment
(up to 35% in some regions)

36% of exports

≈ 30% of greenhouse gas emissions

25% of emissions from raw materials production related to packaging

≈ 20-30% of environmental impacts of private consumption

37% of Victoria's ecological footprint

≈ 15-20% of total energy use

almost 80% of managed water

61% of land

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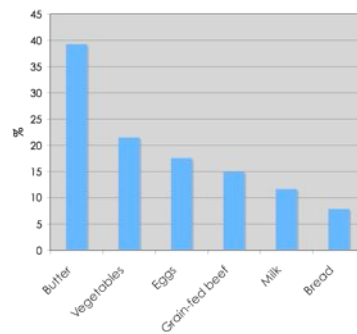


Access to affordable food is essential for health and wellbeing, and food prices are increasing fast

Food Security: the state in which all persons obtain nutritionally adequate, culturally acceptable, safe foods regularly through local non-emergency sources

- Increasing community concern about food prices
- 12% of Victorians already experience food stress
- Food choices are discretionary but not utilities or rents
- Meeting daily energy needs through energy-dense junk foods costs 10% of what it would cost through fruit and vegetables

Estimated Change in Food Prices
(6 months to November 2007)



Sources: Vichealth 2005, McCaughey Centre 2007, Vichealth 2005, Drew nowski & Mansivalis 2007, Cornish 2007

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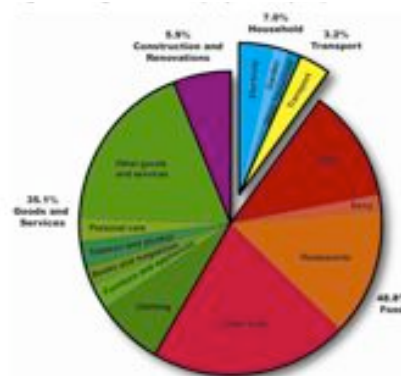


The largest impact people have on the environment is through their food

Sustainability will require changes to the way we eat

- 50% of household water use
 - over 25% of embodied water in Victorian final demand is through meat and dairy consumption alone
- 28% of household greenhouse emissions
- 47% of waste to landfill is organic / food (how much of the rest is food packaging?)

Average household profile (eco-footprint)



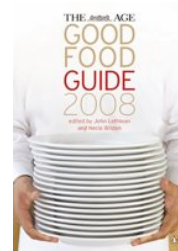
Sources: Lenzen 2001, Muntisov 2007, Carlsson-Kanyama 1993, ACF 2007, EcoRecycle Victoria 2005

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Because it's yummy . .

A celebration of any kind without food is almost unthinkable, and what we eat or drink at it helps to define the importance of the occasion (Bannerman)



I don't know how I shall conceive of the good if I take away the pleasures of taste (Epicurus)

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Key Challenges for the Food System

Challenge 1: Reduce environmental impacts (and risks) while keeping food affordable

Challenge 2: Continual adaptation to complex change

Challenge 3: Engaging innovation

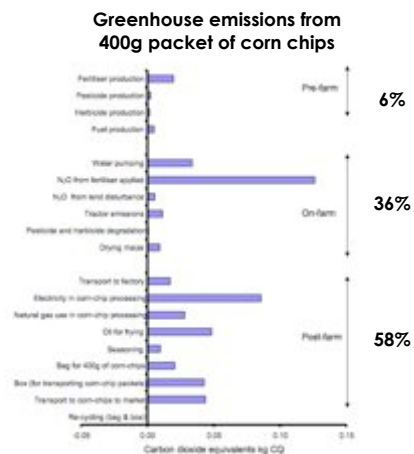
Challenge 4: Consumers driving change

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Internalised environmental costs will increase some food prices

- At least 25% of Australia's emissions are connected to food production and consumption
- Only about 25-30% of energy use from agriculture is on-farm
- Need better understanding of lifecycle impacts
- Accounting for soil carbon might help



Reducing environmental impacts of food will reduce exposure to rising prices

Sources: Agricultural Alliance on Climate Change 2006, Wood et al 2006, Guo & Gifford 2002, Grant & Beer 2006, CSIRO 2005

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Producing food relies on resources, that are increasingly constrained

Water

- Unable to increase supply to meet demand
- Competition for scarce supplies
- Food security impacts?

Land

- Peri-urban production - 25% of value on 13% of the land
- 30% of the world's cropland has been abandoned due to soil erosion & degradation (last 40 years)

Fish

- Overfishing - 76% of world's fisheries
- Aquaculture

Oil, biofuels and agricultural inputs

- Oil prices +500% between 2003 & 2008
- Increasing demand for biofuels
- The cost of key fertilizer products rose 30% between 2006 and 2007



Sources: Cornish 2007, Wahlquist 2007, Budge 2007, Wood et al 2005, VCMC 2007, BBC 2008, Colebatch 2008, Farm Weekly 2007

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INTERNATIONAL Herald Tribune Europe

World food stocks dwindling rapidly, UN warns

By Elizabeth Rosenthal

Published: December 17, 2007

ROME: In an "unforeseen and unprecedented" shift, the world food supply is dwindling rapidly and food prices are soaring to historic

Read More
Listen to Article

THE LAND

The stakes get higher as food, fuel and fertiliser costs soar

MATT CAWWOOD
23/05/2008 11:43:00 PM

Urea prices soaring towards \$1000 a tonne

BY BETH JOHNSTON
11/05/2008 3:38:50 PM

UREA prices are rapidly approaching \$1000 a tonne as global demand, combined with a 135pc export tariff from China, takes its toll on Australian suppliers.

theage.com.au THE AGE

Farmers hit hard by soaring fuel prices

May 22, 2008 - 1:18PM

The soaring price of diesel is driving down farmers' profits and forcing them to think twice about planting crops, despite attractive commodity prices.

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Waste is a potential resource . .

If we stopped wasting food which could have been eaten, it would have the same impact on carbon emissions as taking 1 in 5 cars off UK roads (WRAP UK 2007)

Wasting food is a waste of the resources that go into it . .

- 50% of food produced is wasted (US 2004)
- 33% of food purchased by households wasted (UK 2007)
- In 2004, Australians threw away \$5.3B worth of food



And it could be a valuable resource

- 47% of municipal waste . .
- Home composting has been found to be the most 'environmentally friendly option'
- Just under half of Aus households 'recycle or reuse kitchen or food waste'

Closing cycles of organic waste will become increasingly important as conventional inputs become scarce - huge opportunities

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Key Challenges for the Food System

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Challenge 3: Engaging innovation

Challenge 4: Consumers driving change

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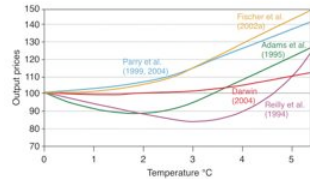


Complex change in environmental systems will affect food supplies

Changing and unpredictable weather

- Localised advantages and disadvantages, but worldwide and local declines in productivity expected

Cereal crops vs global mean temperature change



Climate change is very difficult to predict, particularly extreme weather events and local conditions

Biodiversity

- Agriculture has been a major driver of native biodiversity loss

44% plants **Victorian native species** **30% vertebrates**
 extinct, threatened or vulnerable

- Declining genetic diversity of crop and livestock varieties

12 plant species provide 75% of our food, 4 of these provide over 50%



- Opportunities for biodiversity to increase productivity and resilience

Systemic impacts and ecosystem 'tipping points' could affect food systems, as could diminishing access to genetic resources

**Unpredictable events are inevitable
 - we will need to deal with uncertainty and constant change**

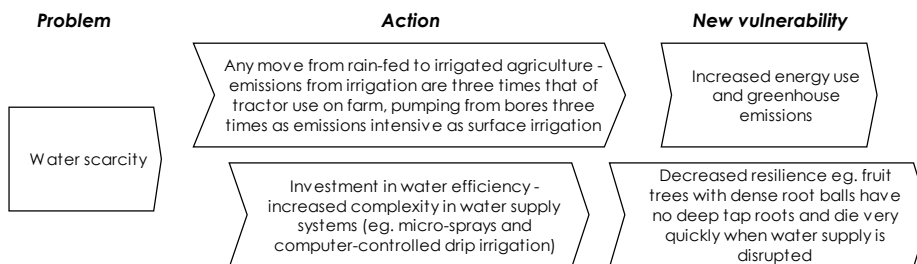
Sources: IPCC 2007, VCM C 2007, UN FAO 2007

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Multiple risks to the food system must be considered together

- Solutions which deal with only the 'most urgent' problem may have unintended side effects



- Solutions which assume ongoing availability and access to cheap oil and agricultural inputs will remain vulnerable

Think big picture - the more you try to grasp, the more possibilities you have
(Jorge Zapp, Gaviotas)

Sources: Grant & Beer 2006, CSIRO 2005, Wahlquist 2007

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Resilient food systems will require diversity and redundancy

Building social and environmental capital now will help to increase resilience

- The resilience of a system refers to how effectively it can respond to shock and change while still delivering its critical functions (in this case providing food)
- Resilience requires ability to adapt, affected by:

Diversity



Flexibility & Redundancy



Ability to learn



- Distributed systems increase resilience

*Local communities are better able to withstand cycles of change if they know more about the ecological drivers of their region, embrace the processes of natural change, and are empowered to make their own decisions
(Walker and Salt 2006)*

Sources: Egerton 2008, CSIRO 2006, Walker & Salt 2006

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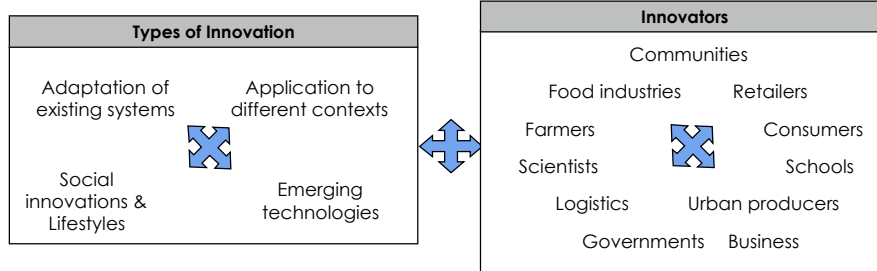
Need for significant change opens up opportunities for innovation

Urgent need for change
(eg. more than 60% cut in greenhouse emissions)



OPPORTUNITIES

All possible contributions need to be considered



*As many people as possible trying as many things as possible
- we don't know what the future will look like*

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New technologies will reshape our food systems, but some must be handled with care

Over the next two decades, the impacts of nano-scale convergence on farmers and food will exceed that of farm mechanisation or of the Green Revolution (ETC Group 2004)

ICT	Biotechnology	Nanotechnology

Public trust in the new technologies is a key issue . . . Continued challenge can be expected (UK Cabinet Office 2008)

Sources: ETC Group 2004, Zappacosta & Paloma 1999, Agricultural Biotechnology Council 2006, UK Cabinet Office 2008, Horizon Scanning Centre 2006,

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Farmers have an incentive to innovate, and many are doing so

The object of agriculture is to feed and clothe people. Two things will guarantee this happens with maximum efficiency. Firstly, farming must be prosperous and secondly, soil fertility must constantly improve (P.A.Yeomans)

- Cost to benefit - Enviromeat 25% premium
- Multiple benefits - productivity and sustainability
- Innovations for Australian landscapes
 - Pasture cropping
 - Natural sequence farming



Polycultures Perennials Crop rotation
Reduced tillage Trace elements
IPM Cover crops Landscape hydrology

Observation / understanding of ecosystems will be essential for adaptable and productive food systems

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Diversification can create space for more innovation

- Scale

The quality of rural life and the existence of rural communities depend on a mix of different size farms (Duffy 1997)

- Products: polycultures & mixed farming
- Systems: hydroponics, aquaponics, urban, intensive, broad-acre, roof-tops
- Distribution: conventional, direct (farmers' markets, CSA)

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Techniques that reduce reliance on constrained inputs will be increasingly valuable

What is it that makes a difference? Where and why? Can it be applied in other contexts and systems - invest in the most significant change

What and why?

- Organic, Biological, Natural, Regenerative
 - Health, Environment, Inputs, Quality
- Contest for scarce inputs will only increase - learning how to produce food without them is in everyone's best interests**

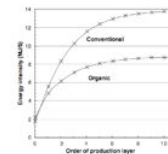
Increasing fast

- Number of organic farms increasing 30% each year
- Australian organics industry on a recruitment drive, retail - \$28m in 1990 to \$250m in 2003

So what do we know?

There is no doubt that, for many foods, the environmental impacts of organic agriculture are lower than for equivalent conventionally grown food (Report produced for DEFRA UK)

Water intensity in organic 20% of conventional



- Yields are comparable for many products
- Nutritional benefits

Adoption of 'low-input' practices could significantly reduce impacts - which ones?

Sources: Troeth 2001, Farm Online 2007, Cuthbertson & Marks 2007, Prance 2007, Foster et al 2006 (DEFRA), Wood et al 2006

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There are challenges and opportunities for food industries (processors)

We must be able to guarantee sustainable production if we wish to continue to satisfy the wishes of the consumer and thus survive as an enterprise. In other words: conviction coupled with enlightened self-interest. No fish, no fish fingers. No water, no tea. It's as simple as that. (Antony Burgmans, Chairman, Unilever)

- Food processors are important
- Roles may change
- Opportunities and challenges

Case Study: Sustainable Food Lab

The screenshot shows the Sustainable Food Laboratory website with a navigation menu on the left and a main content area. The main content area features a header with the organization's name and logo, followed by a grid of logos for partner organizations including Rainforest Alliance, Heinz, C.H. ROBINSON, and others. Below the logos is a 'TOGETHER' banner and a 'PROJECT SPOTLIGHT' section with images and text. At the bottom, there is a mission statement: 'The mission of the Sustainable Food Lab is to accelerate improvement in mainstream food and agriculture systems so we can sustain a high quality life on earth.'

Source: www.sustainablefoodlab.org/business-coalition

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Rapidly increasing interest and practice of urban food production

Opportunities: From permaculture to vertical farming . .

- Increased food security
- Export knowledge and technologies for highly productive urban food systems



Urban Ecological Systems Pty Ltd

10 good reasons to support urban food production

- Reduce reliance on oil
- Reduced emissions (transport and storage)
- Use urban water resources
- Use urban organic waste
- Distribution and diversity -> resilience
- Plenty of room, improved amenity & micro-climate
- Affordability
- Social capital - community interaction
- Connection to environment, and food production
- Health benefits



Mark Richardson, Monash University

Sources: Lloyd & Wong 2008, Digger's Club 2007, VEIL (Monash) 2007, <http://rivendellorganics.com/ecocity.html>

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Communities are leading development of other options . .

Community Supported Agriculture

- Over 1,000 enterprises in the USA
- Direct link / involvement between producers and consumers

Victorian version? Food access in outer suburbs?

Reducing food waste



Skills and Enterprise



Food Taskforce?

Low Income Vegetable Offer

Make a limited income stretch further with this collection of our highest yielding varieties. Grow 2 tonnes of food for \$19.50!* This collection has helped over 5000 Aussie Battlers and the unemployed get started.

With 13 packets of seed you can grow:

350kg of pumpkins	8 kg of beans
1025kg of tomatoes	700 lettuces
610kg of cucumbers	1200 carrots
9 kg of peas	300 parsnips
200 broccoli heads	300 onions (2 pkts)
100 bunches silverbeet	

13 packets of vegetable seed \$19.50, \$260
*Available to Health Care Card holders only.

Potential for community innovations with social, environmental and economic outcomes

Sources: Food Connect 2005, VEIL Food Map.

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Considerable amounts of international activity, but findings and recommendations are not directly applicable

Victorian information systems to enable sustainable food choices could reduce market failure

- Consumers are driving change, particularly in UK and EU
- Some countries are developing good information systems
- Findings are not necessarily applicable
- Good use for ICT!



Tesco to pledge £1bn-worth of local food
Tesco chief executive Sir Terry Leahy is expected to unveil plans to sell £400m of local products in its stores this year.



LCA Food Database
Method Download Database structure Examples About Links Material In Danish

Food consumption is one of the major driving forces behind environmental impact i consumption in Danish households¹¹.



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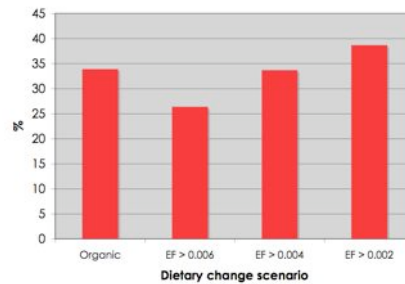


We can suggest general guidelines for Victorian consumers, but there are no simple answers

Seasonal, less processed, look for low-impact production, don't drive your car to collect it

- Local food is not always better, but for many seasonal foods in Victoria it probably will be
 - Car trip to the supermarket is significant
- For many foods, organic and other low-input production will have a lower environmental impact for many foods
- Changing the type of foods eaten can make a very significant difference
- Reduce food waste, grow some fruit and vegetables and compost if you can

Ecological footprint reductions from dietary change



Sources: Foster et al 2006, Collins & Fairchild 2007

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There is alignment between healthy diets and more sustainable diets: changing food consumption patterns will be a 'win-win'

Eat food, not too much, lots of plants . .

(Michael Pollan)

People should eat less high-calorie foods, especially foods high in saturated or trans fats and sugar, be physically active, prefer unsaturated fat and use less salt; enjoy fruits, vegetables and legumes; and select foods of plant and marine origin. This consumption pattern is not only healthier but more favourable to the environment and sustainable development.

- Maintain ideal weight – excess calorie consumption is wasted food
- Snacks, sweets and drinks have little nutritional value but account for up to a third of the total energy inputs to the food system
- Storing foods a long time leads to nutrient reduction and uses energy
- Intensified production methods may have contributed to lower nutrient levels in fruit and vegetables
 - 12 - 76% decline in the trace mineral content of UK grown fruit and vegetables between 1940 and 1991

Sources: Pollan 2008, WHO/FAO 2003, Gussow & Clancy 1986, Choice 2006, Mayer 1997

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Key Messages - General Areas of Action

Broaden perception of 'innovations' worth investing in

Two tracks

Priority research areas

There's a lot we don't know, but a lot we do

Look to the people in the system who are already redesigning it

The food system is a complex interaction of economic, social, health and environmental issues - need coordinated response

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