

# Sustaining Victorian Food & Farming

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This paper<sup>1</sup> explores the future of the Victorian food and farming system in a rapidly changing and more demanding world, focusing on the period between now and 2020. It explores ideas and tries to anticipate and imagine the sorts of activities and investments that will be needed if Victoria is to equip its food and farming system to produce more healthy foods, more sustainably, in a much more difficult climate, while consuming less water, nutrients and energy.

In contemplating the future, we are in a mental dance between fate and desire. We know that ‘what’s coming at us’ will generate all sorts of possibilities and constraints. For the Victorian food and farming system, such macro forces include the environmental, human health and policy drivers discussed below, and the basket of forces and trends that are captured under globalisation; including market forces and the progress of technology. We have little control over what is coming at us. Irrespective of the tide of events over which we have no control though, we still have choices, as Phillip Adams notes:

*“The future is not some place we are going but one we are creating. The paths to it are made, not found.”*

There are no facts about the future. In envisaging the future, leaps of imagination are as likely to be accurate as scientific extrapolation or deduction. Such leaps of imagination are more likely to be instructive however, if they are grounded in an appreciation of the current situation, forces for change that are likely to affect it, and opportunities to improve it.

The food system is a heavy component of the human environmental footprint on the planet. If current trends in human population and consumption patterns continue, the world will need to produce about twice as much food by 2050, in a rapidly changing climate, with declining production of oil and rising prices for energy, water, fertilisers, and soon, carbon. The era of abundant, cheap fossil fuels is over. Traditional avenues of expanding production through clearing, irrigating and cultivating more land are narrowing, and food is now competing with energy for land and water resources.

Consumers in developed countries are increasingly concerned about the quality, safety, environmental impact, human health and animal welfare aspects of their food. Governments in developed countries are increasingly concerned about levels of obesity and associated chronic diseases and escalating health costs, which are driven in part by increasing consumption of processed foods high in sugars, salts and saturated fats. The role of modern industrial food systems in human health is under question.

Healthy environments, healthy farming systems, healthy foods and healthy people are intricately intertwined.

After a dry decade in southern Australia, it is clear that current conventional farming systems as practised by most farmers are not good enough. They simply don’t make enough money in poor seasons to be viable in the long term without extensive and prolonged subsidies, and they run down the resource base in the process. Persistent unprofitability and increasing debt levels have obvious economic consequences for rural communities. They generate insidious and corrosive social impacts, including elevated levels of stress, depression and suicide, deterring talented young people from careers in agriculture.

We are finally beginning to understand the real cost of our food.

The world will always need food – in fact it is demanding more and better food than ever. After declining in real terms for decades, food prices are now rising for many commodities. The

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emergence of carbon and other ecosystem services markets around the world will generate opportunities for smart and nimble players. The growing size and purchasing power of the discerning consumer base opens up the potential for more sustainable production systems to generate handsome returns.

How can we improve the performance and resilience of the Victorian food system?

This paper analyses drivers for change, looks at international trends, outlines areas for improvement, and explores new ideas that would substantially improve the performance of the Victorian food system in delivering healthier foods and healthier profits. We can do this while making much better use of energy, water and nutrients, substantially reducing greenhouse gas emissions, minimising waste and pollution, improving wildlife habitat, producing renewable energy, reducing reliance on food imports, and reconnecting both rural and urban communities with the production of healthy, safe, delicious food.

Victoria can lead the world in designing sustainable food and farming systems for a warming, drying climate, generating significant know how, innovation, regional development and export income along the way.

Our fundamental challenge is to develop farming systems that are more intrinsically Australian: that are resilient in the face of extreme weather and extreme seasonal variability; that are miserly with water and conserving of energy; that maintain groundcover and are kind to the soil; that sit lightly on the landscape and don't displace native wildlife or habitat; that are highly profitable in good seasons and don't lose money in bad seasons; that preserve and build their natural, human and financial capital; that recover quickly from shocks and stress; that attract and retain young, talented people on the land; that generate jobs and income in regional communities; and that produce things in high demand for good prices.

One of the big policy challenges for industries, communities and governments is to find ways to return a bigger slice of the food price cake back to the producer – and to ensure that higher returns are reinvested in measures that improve the sustainability of the system. Just as climate change writ large represents a colossal market failure, the fact that the price paid for food by consumers does not reflect the full costs of production in terms of agriculture's environmental footprint, is also a market failure that fundamentally constrains the ability of farmers to produce food and fibre more sustainably. Correcting the market failures within the food system so that consumers pay a more realistic price for food (mindful of equity issues), and so that farmers receive their due portion of that price, would be one of the most effective ways of enabling food producers to retool their businesses for much more demanding conditions.

## **The Victorian Food and Farming System**

Victoria is an engine room of the Australian food and farming system, producing around 26% of Australia's food and fibre exports (\$6.35 billion in 2007) from just 3% of Australia's agricultural land. However Victoria is also a significant food importer – in early 2008 the value of food imports to Victoria exceeded 50% of the value of food exports. The key food and fibre commodity groups for Victoria's exports continued to be dairy and meat, accounting for over 50% of food and fibre exports. Japan remained the most valuable market for food exports, and the second most valuable market for food and fibre exports overall behind China. Other key markets included the United States, New Zealand, Indonesia, Malaysia and Singapore.

The agricultural and food sector makes a major contribution to economic growth and employment in Victoria, generating around 20% of Gross State Product and employing more than 14% of the Victorian workforce. Food production on-farm was worth around \$8 billion in 2004-5, employing around 2.7% of the Victorian workforce, whereas food processing and distribution were each worth around \$21b in 2005-6 and employed 2.1% and 5.4% of the workforce respectively. The food consumption sector (fast food outlets, hotels, restaurants, public sector food provision such as hospitals etc.) was worth a further \$6b in 2005-6 and employed over 4% of the Victorian workforce. The post-farm components of the Victorian food system include 2,500 food manufacturers, 5,700 wholesalers and 17,000 retail businesses (not including thousands of cafes, restaurants, hotels and clubs), collectively turning over almost \$50 billion per year and employing almost 12% of the workforce. Like the farm sector, there has been considerable

consolidation over recent decades, and a small proportion of players generate a disproportionate share of the total market.

In rural areas of the state, the proportion of the workforce engaged in food production and processing, and the proportion of businesses dependent on activity in that sector for their turnover, is much higher than in the cities. Outside Melbourne, food and farming account for nearly one in four jobs, and play a vital role in the lives and livelihoods of communities across the state.

In 1900, almost 60 percent of people lived outside Melbourne. By 2006, just 27 percent (1.39 million people) lived in regional Victoria. Victoria's population has increased dramatically over the last century from around 1.21 million in 1900 to 5.13 million people in 2006, and at current growth rates it is estimated that Victoria's population will exceed 6.2 million people by 2020. This will increase local demand for food and for release of significant areas of new land for urban development.

## Drivers for Change

There are formidable external drivers for change in the Victorian food and farming system.

### Profit

The number of farms in Victoria has halved from almost 70,000 in 1963-64 to around 32,000 in 2004-05, and over the same period the average farm size has grown from 210 hectares to over 430 hectares. While the number of farmers has declined the number of people servicing them has increased. Increases in average farm size and labour unit productivity have been a response to falling farm terms of trade. Only the top third of farms (by gross value of production) have had productivity gains that have exceeded the decline in their terms of trade, and only the top one fifth of Australian farms generate a positive long-term return on capital. The top 10% of Australian farms generate more than 50%, and the bottom 50% generate less than 10%, of Australia's gross value of agricultural production.

This means that most farmers are losing money in most years, increasing their level of debt. Those remaining in agriculture who are not in the top 10% are subject to chronic unprofitability, rising indebtedness, and consequently increased stress levels and health risks, including depression and suicide. These social impacts have consequences well beyond the individual concerned, obviously for their families, but also their communities and the wider society, health system and economy.

These social impacts and associated costs are not costed against the economic returns from the food and farming system, nor are the costs associated with the environmental impacts described below. Consumers have become accustomed to very cheap food, the price of which does not reflect the true costs associated with its production, nor does the majority of food sold in supermarkets allow a sufficient return to food producers to provide for an adequate 'repairs and maintenance' or reinvestment budget line in the balance sheet of natural capital that underpins our food production systems.

We need our food system to make more money, and we need more of that money to find its way back to producers, but we need to do so in ways which ensure that healthy, safe food is accessible and affordable for everyone.

### Climate change

Climate change represents the biggest market failure the world has ever seen. Temperate regions with a Mediterranean climate, like Victoria, look like being among the worst affected regions around the world, with strong warming and drying trends, more variable and extreme weather and less reliable seasons. Even ABARE concludes that Australia is one of the countries most affected by climate change, and that agriculture is among the most affected sectors of the Australian economy. Unless there are fast and deep cuts to global greenhouse pollution, the

more alarming of the predictions coming from global climate models may turn out to be underestimates. The policy responses to climate change, especially but not only the emergence of a price on carbon and a market for emissions permits, will impose a new operating environment on agriculture, with both costs and opportunities.

The food system is directly responsible for about 23% of Australia's greenhouse pollution. Of that, agriculture is the biggest component with about 16% of total national emissions in 2005 (13% of Victorian emissions). The enteric fermentation of ruminants is the biggest component of agricultural emissions, followed by nitrous oxide lost from nitrogen fertilisers, animal manure and soils. Agriculture accounts for 60% and 85% respectively of Australia's total methane and nitrous oxide emissions, both potent greenhouse gases. It will come under increasing pressure to meet its share of responsibility for reducing carbon pollution. As soil and vegetation are the largest terrestrial carbon stocks, there are potentially significant opportunities for agriculture to assist other sectors to offset their own carbon pollution.

Managing climate risk means being proactive rather than just crossing fingers and hoping for the best. That may mean taking big, uncomfortable decisions about the whole farm enterprise, its location, opportunities to invest off-farm, and whether or not to remain in agriculture. Farming profitably in Australia has always demanded sophisticated risk management. Climate change will force us to get much, much better at farming in the tough and variable Australian environment.

There is considerable room for adaptation at a farm scale, as our best operators are already showing. However systemic changes will also be required – in policies, infrastructure, education and training, research and innovation – concerning the whole food value chain from paddock to plate in order to bring about widespread, durable gains in the performance and resilience of the Victorian food system.

## Environment

Farming practices – clearing, cultivating, irrigating, grazing, spraying, fertilising, cropping and so on – are the single biggest ecological disturbance across Victoria. Their aggregate and cumulative impact, including related impacts such as the introduction of pests and weeds and the downstream impacts of agricultural water use, soil loss and dryland salinity, have profoundly changed Victorian landscapes over the last century and a half. Victoria has the highest proportion (48%) of sub-regions in Australia assessed as being in poor landscape condition and suffering landscape stress. In cleared agricultural country, a very low proportion of rivers meet SEPP water quality objectives.

The enormous wealth, economic activity, export income and employment generated by the on-farm dimension of Victoria's food system has had an extensive and profound environmental impact in rural landscapes. This impact is on-going. However just as farming systems and practices are the largest disturbance on Victorian rural landscapes, so they are the single biggest ecological lever in landscape restoration. Farming systems and practices play a large role in determining soil health, and the amount, type and location of water, vegetation and other organic matter in the landscape.

Moreover, it could be argued that farmers have taken the rap for the environmental impacts of the food system, while agribusinesses and food retailers (and by extension their owners the shareholders) have been the main beneficiaries and have generally avoided opprobrium. Just as we need to ensure reasonable returns to food producers that reflect the full costs of production (with an appropriate margin for reinvestment in human and natural capital), so do we need to recognise the role of agribusiness and the food processing, distribution and retailing sectors in being accountable for and driving improved food system performance and sustainability.

## Water

The single largest impact that Australian households have on water use is through the food they consume – about half of total household water use compared with around 11% used directly in washing, cleaning and gardens. Of that, red meat and dairy products consume more than 70% of the water. Rivers, floodplains and wetlands are collateral damage, caught in the crossfire

between a drying climate and the water demands of industries and communities. Governments have over-allocated water resources during a series of relatively wet decades, and have yet to face up to the tough choices that have to be made to bring water allocations back within sustainable limits for the much drier conditions that now prevail in southern Australia. Considerable reconfiguration of irrigation systems, and consequent structural adjustment within rural communities, are required.

## Energy

World oil production appears to have peaked, while demand continues to increase. The era of abundant cheap fossil fuels is over. The recent spike in oil prices was relatively mild, reaching less than half the real price of crude oil that was reached in the oil shocks of the mid 1970s and early 1980s. Over the next decade, oil prices are likely to rise much further than they have recently. This has strong flow on effects in rising prices for fuel, nutrients and many other inputs throughout the food system. The introduction of a carbon price will further increase energy prices. This will change the relative prices of some foods. Travel costs embodied in food will become more important. Farming systems that are less dependent on external inputs of diesel and synthetic fertilisers will become relatively more competitive.

## World food demand and supply

On current population and consumption trends, the world needs to double food production over about the next forty years. This has been achieved relatively easily in the past through clearing, cultivating and irrigating more land, intensifying production through better varieties and more fertilisers, diverting more freshwater resources, and catching more fish. With climate change and with resource constraints, those options are narrowing considerably. The best lands have already been cleared and cultivated – in fact the area of fertile arable land is declining through land degradation. Water resources in all the world's big food bowls are fully- or over-allocated. We should be re-establishing forests, not clearing those remaining. The world wild harvest fish catch has flat-lined. Aquaculture continues to grow strongly, but is starting to confront resource and environmental challenges analogous to agriculture. Energy crops are now competing with food crops for land and water.

Food prices have risen sharply in recent months, but again in real terms they remain well under half what they were throughout the 1960s and less than quarter of the peak reached after the oil crisis of the early 1970s. Food prices could rise much further yet, world demand for food creates potentially significant opportunities for the Victorian food system, and the biggest growth in world GDP over the next decade is within Asia. Potential opportunities for food exporters are enormous.

However rising concerns about food security and recent food riots have already led to constraints on food exports in several countries. Prospects for freeing up world agricultural trade to allow farmers to respond to market signals look remote. Governments everywhere need to re-invest significantly in agricultural research, technology and education. It is difficult to see how the current rate of expansion in production of 'first generation' biofuels can be sustained without leading to massive resource degradation pressures and food insecurity. So while the rewards are potentially large, so are the levels of uncertainty about world food markets.

## Health

The way in which we produce food is changing, as is the way we prepare and eat it.

In Australia, as in much of the developed world, there is an increasing trend towards eating out, take-away food, home deliveries, pre-processed and packaged food. There has been a steady increase in consumption of fast foods, meat, fats and sugars, and a corresponding decrease in the proportion of fresh whole foods, fruit and vegetables. Food portions have also increased in size. We may have replaced some red meat with poultry, but we still have the second highest average meat consumption in the world at 304 grams per person per day, behind only the USA at 342, well in excess of the developed country average of 224 and dwarfing the developing country average of 47g/person/day. Cutting greenhouse pollution and tackling health problems will

mean placing more policy and research attention on the livestock sector – especially grain-fed beef and sheep meat – and the role of animal products in our diets. Conversely, grazing industries have a key role to play in landscape restoration.

The steady improvement in human health over recent centuries appears to have peaked. This generation may live shorter and less healthy lives than our parents. More sedentary lifestyles and less exercise are important factors, but it is widely accepted that the biggest contributor to rapidly rising levels of obesity – and associated chronic diseases such as diabetes, cardiovascular disease, osteo-arthritis and cancer – is diet and nutrition.

In 2005, 3.24 million Australians were estimated to be obese – 15% of males and 17% of females – and at current rates of increase, this will more than double to exceed 7 million people by 2025. This has enormous economic implications. The direct impacts on the health system are obvious – estimated to be around \$3.7 billion in 2005. However there are also significant indirect economic impacts through lost well-being, estimated to exceed \$17 billion, bringing the total 2005 cost of obesity to \$21 billion. The intersection of rising obesity levels with the demographic momentum of an ageing population will impose enormous costs on the Australian economy. Conversely, turning the current trends around would generate significant returns for the economy.

We need to rebuild and strengthen the linkages between the health system, the food system and the farming system – in science, in public policy and in the daily lives of citizens. The food system should be seen as being central in the front line of preventative health care. Investment in measures that lead to more people eating better food in healthier ways is likely to be more effective and to have a much bigger return than remedial expenditure on health care after people have become obese.

There are very strong synergies between healthy lifestyles and sustainability goals.

## Policy

The key national policy settings that impact on the Victorian food and farming system centre around climate change, water and drought relief.

### Climate change

Agriculture will not be included in the Carbon Pollution Reduction Scheme (CPRS) before 2015 (two years after New Zealand agriculture has entered its national emissions trading scheme) due to the considerable technical difficulties in measuring agricultural emissions, the huge number of firms involved compared with other sectors, and the dynamic nature of agricultural emissions within and between years. The policy settings with respect to agriculture, if and when it enters the CPRS, will be important in framing the operating environment for Victorian farmers. There is considerable interest within the farming community about the possibility of farmers being paid for their carbon, around soil carbon in particular. There are many good reasons to increase soil carbon in any case, but soil carbon is difficult to account for to the extent required in an emissions trading scheme. It is difficult (and requires significant investment in nutrients) to permanently build soil carbon stocks over time, especially while cropping or grazing the land. The relative prices for carbon, oil, nutrients and farm outputs will determine the profitability of carbon sequestration options for farmers, and it may be that trees remain a more viable carbon offsets option for most Victorian farmers.

There are potentially valuable opportunities from some of the CPRS revenue from agriculture to be re-invested in complementary mitigation and adaptation strategies for new carbon-neutral or carbon-positive farming systems. Similarly, a well-designed emissions trading scheme may create incentives for agribusiness and new investors in low-emissions farming systems and supply chains. It will be crucial to ensure that the design of the CPRS does not lead to perverse incentives that compromise other environmental objectives such as water or biodiversity.

## Water

The last decade has seen a significant ramping up of Commonwealth attention to, and investment in, water policy and water reform. The National Water Initiative sets out a comprehensive policy framework for water reform and the \$12 billion Water for the Future package will fund its implementation. For the first time, Australia will have a comprehensive, nationally consistent water accounting framework, overseen by the Bureau of Meteorology. We will finally have a good handle on how much water is being used, by whom, where and when. Apparent inefficiencies will be obvious, as will best practice. Continuing a process that commenced with the COAG Water Reform agreement of 1994, the price of water will increase to reflect the true cost of its provision and delivery. Inefficient users of water will find it increasingly difficult to afford. For businesses looking to implement measures that will substantially lift water productivity, there are now realistic funding options. Conversely, for those looking to get out of irrigated agriculture, there is now a large willing buyer for water entitlements. Urban water reform, urban water infrastructure improvements and an increasing number of reuse and recycling schemes, will see greater availability of wastewater within and close to major population centres, potentially available for food production.

Carbon and water are being counted and valued as never before, which is a good thing. It has fundamental implications for our food system.

We are finally starting to understand the real cost of our food.

## Soils, vegetation and biodiversity

Soils, vegetation and biodiversity are crucial environmental assets in their own right, and their stewardship should be a high national priority irrespective of climate change. However they are also pivotal in the carbon and water agendas. Soils and vegetation contain all of the terrestrial carbon store, they can generate both significant carbon pollution and sequestration opportunities, and they comprise the catchments that largely determine water yields, water holding capacity and water quality. Soil management is a crucial issue for sustainable food production. A more coherent policy framework, with commensurate investment in soil information and an associated research and extension effort, would provide much needed assistance for farmers on issues like soil biology and soil carbon, managing nutrient cycling and soil moisture, and improving soil health and fertility during difficult climatic conditions. Such work is also necessary to underpin more comprehensive food certification and labelling systems.

Soils, vegetation and biodiversity should be receiving more policy attention and investment. They remain important determinants of the sustainability of food production on-farm. Again, with a stronger appreciation of the links between the farming system, the food system and the health system, we can join the dots between our food consumption, the supply chains that support it, and environmental impacts in rural landscapes. There are opportunities for retailers, restaurateurs and agribusiness firms to work with food producers to develop and promote food production systems that genuinely do deliver better environmental outcomes from paddock to plate.

At a Victorian level, the key policy developments are the Future Farming strategy and its \$205 million constituent programs, and the White Paper on Land & Biodiversity in a time of Climate Change. Both of these provide useful background information and analysis, and set out a policy framework for the next decade. On the whole, the two documents are more comprehensive and forward-looking than anything comparable in other jurisdictions. However the considerable overlap between them in terms of sustainable farming systems is not articulated in sufficient depth, nor are links to the wider food system, the energy and transport sectors, and in particular the health system, explored as well as they might. Both appear to assume an extrapolation of current trends, and read more like an adjustment package, rather than pushing the envelope for a new approach to agriculture and land use in Victoria. This is disappointing given Victoria's history of innovation and national leadership in natural resource management, and the fact that it has the most mature and professional catchment management framework in Australia, among the best in the world. It is interesting (albeit largely academic) to ponder what these documents

might have looked like had the former DNRE (Department of Natural Resources and Environment) not been split into the DPI and the DSE.

### Drought relief

The current system of drought assistance based on the notion of ‘exceptional circumstances’ is unsustainable, is costing billions in relief payments and interest rate subsidies, and needs radical surgery. It is no longer valid (if it ever was) to define extended periods of extremely dry weather in Australia as exceptional. We need to abolish the very word ‘drought’ from our lexicon, and from our mental models of what it means to live in Australia.

This is not for a moment to suggest that farmers, farm businesses and the rural communities that depend on them should simply be abandoned to their fate. There are compelling arguments for improving the full range of social services available to people who are doing it tough and suffering the debilitating effects of stress and associated social problems. There are also a wide range of potential assistance measures to improve risk management and climate adaptation among farmers, including the successful Farm Management Deposit scheme.

But it is not just about improving the resilience of the Victorian food and farming system in the face of external stresses and surprises. It is equally, perhaps even more importantly, about improving its performance here and now. The status quo is patently unsustainable. It does not make enough money for enough people, and it is running down the resource base and declining human health in the process. Even in the absence of climate change, water scarcity and rising energy and nutrient prices, we would need quantum improvements in the performance of the Victorian food and farming system. Those external pressures simply up the ante, and make the business as usual trajectory even less credible.

## **International developments**

Internationally, especially in the western world, other countries are already re-examining their food systems from both public health and environmental perspectives. Countries like Finland have made major strides in changing dietary behaviour, doubling vegetable consumption within a decade and more than halving deaths from coronary heart disease within two decades. Europe is seeing environmental modernisation as a new frontier for innovation, making its big manufacturing industries meet cleaner and leaner targets that are setting new world benchmarks, giving its firms an edge in export markets.

The most comprehensive re-thinking of food systems is taking place in the United Kingdom, across the whole of government, leading think tanks, industries, NGOs and the community sector. This focus, spurred in part by the BSE scares of the 1980s and 1990s, and the 2001 foot-and-mouth disease outbreak as well as the overarching concerns listed above, has led to the development of a comprehensive evidence base about the British food system – much deeper and broader than the information available here. In the most developed fresh food retailing market in the world, supermarkets are frustrated by a perceived lack of long-term government strategy on how the food sector can best contribute to government policy goals. British supermarkets are already meeting targets for reducing energy and water consumption, waste and greenhouse gas emissions along the food chain, that are extremely ambitious by Australian standards. They want to work with government to develop a coherent vision for a green, healthy and fair food system, with a roadmap that identifies priorities for retailers, continues to build the evidence base and implements policies that will enable progress across six key priority areas: climate change; waste; water; ecosystems; nutrition and obesity; and fair supply chains. In the words of Sir Terry Leahy, the Chief Executive of Tesco, *“if we want long term growth, we must go green”*.

The take home message from the big re-thinking of food systems happening in Europe, and the UK in particular, is the importance of leadership. The Prime Minister and the Cabinet Office is leading the strategy development process and the very considerable analytical work underpinning it. All key portfolios have defined roles and are actively engaged. Agencies like the Sustainable Development Commission and Renewable Energy Authority, think tanks like Chatham House, industry leaders from across the sector and significant expertise from a number

of British Universities and think tanks are also contributing analysis, ideas and energy to the debate. It will be interesting to see what sort of systemic changes emerge.

The Nordic countries provide lessons on how farmland and private farm forests can be major providers of biomass energy. Finland, with a similar land area and population to Victoria, but a much shorter growing season and harsher climate, produces 23% of its primary energy, over 75% of domestic and industrial thermal energy needs, and 20% of its electricity, from woody biomass (by-products of forestry and timber processing and bioenergy plantings such as willow) in Combined Heat and Power plants of up to 500MW.

## Key uncertainties and propositions

After reviewing recent literature, a number of recent scenario planning exercises in Australia, and the very good food supply scenarios developed by Chatham House in the UK in 2008, a range of key uncertainties emerge, as do some key propositions about probable trends in the Victorian food and farming system. First the uncertainties:

- Will agriculture be part of a national carbon emissions trading scheme, if so then when, and how will it be treated? Moreover, will there be any incentives over and above the CPRS (Carbon Pollution Reduction Scheme) for farmers to deliver environmental services such as wildlife habitat protection or water quality improvement?
- Can Victoria get its act together on infrastructure – such as transport, renewable energy and water – sufficiently to enable the food and farming system to anticipate and respond to rising demand for food, competing internationally while coping with a much more difficult climate, rising energy, nutrient and carbon prices, and the need to reduce carbon pollution?
- Are alternative (closed loop, low input, regenerative, energy efficient etc) agro-ecological food production systems able to produce enough food to meet demand?
- Can a food system simultaneously deliver both conventional and low-input agricultural paradigms, and both premium and generic food product trajectories, or are the types of infrastructure, value systems, human behaviour and policy settings so different that co-existence is unlikely?
- Will huge demand pressures simply lead to even more industrialised agriculture, making environmental and health concerns a policy-driven luxury that governments find too difficult?
- Will a consensus evolve around the metrics to measure and certify the performance of farming systems and the food chain in terms of environmental impact, human health, animal welfare and socio-economic factors such as fair trade and support for local producers; and will such consensus translate into well-accepted accreditation and food labelling systems in Australia and internationally?

Notwithstanding these uncertainties, here are some propositions:

- The Victorian food and farming system will have to get used to a drying, warming climate, with more frequent and intense droughts, much lower run off into storages, a less Mediterranean seasonality with shorter growing seasons, more extreme and unpredictable weather events, and greater risk of losses due to storms, floods, bushfires, pests and weeds;
- A doubling of world food demand over the next forty years, coupled with severe supply constraints and rising input prices, will lead to sustained increases in the real price of food, exacerbating inequitable food distribution problems, and intensifying public and political concern about food;
- The end to the era of cheap fossil fuels, the increased cost of alternatives and a price on carbon will see sustained rises in the real cost of fuel, fertiliser and chemicals;
- Consumers will continue to seek, and will be prepared to pay for, highly differentiated food of known quality and origins that meets defined and accredited standards in terms of environmental footprint (carbon, water, land, biodiversity, waste) and ‘free from’ concerns (pesticides, antibiotics, hormones, preservatives, allergens, GMOs);

- The rising cost of obesity and related problems will see renewed focus on the linkages between the food system, the health system and the farming system; greater interest in transport and lifestyle factors affecting health, functional foods and nutraceuticals; and more public investment in promotion of foods that are *'good for you and good for the environment'*;
- Intensifying public concern about climate change and food (including food insecurity for increasing numbers of people) will see more individuals and communities taking an active role in their food choices and suppliers, ranging from environmental, animal welfare and health credentials; through changed dietary choices; to active participation in local food systems to improve access to fresh healthy foods.
- Victoria will offer more incentives for firms and households to generate their own energy, giving farmers the opportunity to become net energy producers rather than consumers; and
- Rising food demand, food shortages and price rises for carbon, energy and nutrients will see increasing technological development and investment in more industrialised production of food off-farm, in factories and fermentation vats, for bulk generic ingredients produced to minimum defined standards at lowest cost.

## Opportunities to improve the Victorian food system

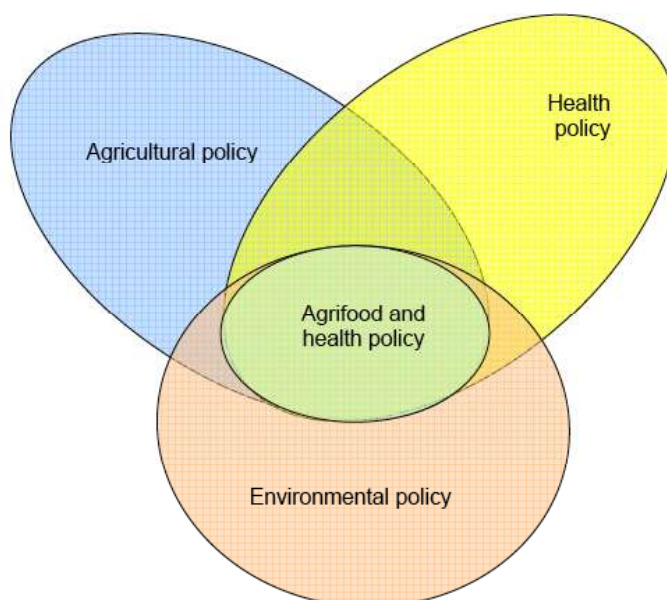
So where are the key opportunities to improve the performance, sustainability and resilience of the Victorian food and farming system?

### A policy agenda

The first key challenge in a policy sense is to comprehend the food and farming system and to develop a coherent evidence base that can underpin policy development.

The diagram at right below (from a Canadian proposal for an integrated Agrifood and Health Policy) highlights the interaction between three major policy areas: agriculture, health and environment. Each of these policy domains has established leaders, forums, stakeholders, knowledge systems, jargon, traditions and ways of operating.

Different bits of the food system have always been connected at various levels with a wide cross section of policy areas, but the food and farming system as a whole does not have a mature, coherent policy framework, institutional apparatus or information-gathering capacity. This major barrier constrains it from comprehending something as big and multifaceted as climate change, resource constraints or responding to increasing demand for food in a carbon-constrained economy.



The challenge for Victorian policy makers is to develop a coherent view about the future development of the food and farming system and the challenges it faces, across traditional departmental boundaries. Getting synergies across departments is important, but not sufficient. It is equally important to develop productive collaborative approaches that extend beyond government to include industry (along the entire food value chain), NGOs (in the environment, agriculture, health and community sectors) and consumers.

## Leadership

*“One doesn’t discover new lands without consenting to lose sight of the shore for a very long time.”<sup>2</sup>*

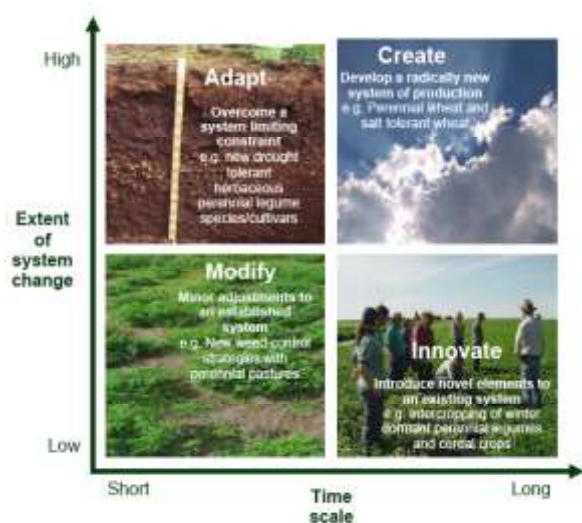
In thinking about where to start, always start with leadership.

Leaders are crucial in changing perceptions about what is possible, in being prepared to ‘lose sight of the shore’ and in setting directions. Crucially, leaders inspire followers. It will be very difficult to attract the sorts of people and skills needed in the Victorian food and farming system in a tightening labour market if the sector is not, and is not seen to be, well led.

This means building the skills, networks, confidence and profile of existing and emerging leaders within the sector. A strategic partnership with an existing leadership program (for example the [Australian Rural Leadership Program](#), the [Williamson Community Leadership Program](#), or the [Vincent Fairfax Fellowship Ethics in Leadership Program](#)) could deliver several cohorts of industry leaders sprinkled across the sector, with a powerful network grounded in shared experience and mutual understanding. This would be one of the fastest and most effective ways to build cohesion across the sector, in addition to the obvious benefit of developing people who are indeed able to discover new lands.

Such distributed industry and community-based leadership will be easier to attract and motivate however, if there is a clear direction and commitment right from the top of the state, from the Premier, the Cabinet and the heads of government agencies, about the fundamental importance to Victoria of improving the performance, sustainability and resilience of the food and farming system.

The graph below<sup>3</sup> provides a good conceptual framework for responding to the challenges facing the Victorian food and farming system. Some aspects of the system need relatively minor tweaking – modifications or adaptations to better cope with changing circumstances.



Incremental R&D and extension can deliver these relatively easily, given sufficient resources.

But it is crucial not to default to this comfort zone. There are many areas where the status quo is patently not good enough, where mere tweaking or incremental improvement is insufficient. In such instances genuine innovation is required to deliver quantum improvements. Finally, in the blue sky quadrant, it is important to allocate sufficient space, resources and talent to be creative, to think well outside the box of existing systems – to ‘lose sight of the shore’. A well balanced strategy would be consciously working in all four of these quadrants, using different approaches in each one.

## A knowledge agenda

*“I have always felt that knowledge was better than ignorance, and we should try knowledge in this country because ignorance hasn’t got us very far.”<sup>4</sup>*

We need better knowledge for three key purposes:

- to help us make better decisions;

<sup>2</sup> André Gide, 1925 *Les Faux-Monnayeurs* (The Counterfeiters), cited in Pretty (1995).

<sup>3</sup> From the Future Farm Industries Cooperative Research Centre’s (FFICRC) EverCrop project

<sup>4</sup> The late Peter Cullen, quoted in an obituary by Asa Wahlquist, rural writer for *The Australian* <http://asawahlquist.com/content/view/26/2/>

- to underpin innovation; and
- so that we learn as we go along, so that, in the words of Peter Cullen, “*at least we should be making new mistakes.*”

A more coherent policy framework for the Victorian food system, linking agriculture, food and health, will only be as good as the knowledge base underpinning it. Sorting out basic data about the sector is a key priority, as is developing a research capability that comprehends the system as a whole, and having people who are capable of leading the system in new directions.

Because the Victorian food and farming system is not seen as a distinct and coherent entity, there are no mature frameworks to either develop policies or support research and innovation across the sector as a whole from paddock to plate. There are well-established research funding models for agriculture, although the fact that most funds are allocated along commodity lines is proving to be a constraint to amassing sufficient investment in the big cross-cutting issues like water, energy and carbon; or along the food value chain.

#### Building skills and attracting talent

As brands, “agriculture” and “farming” are tired and shop-worn, with some negative connotations in terms of profitability, lifestyle, ‘old economy’ and environmental virtue.

We have to re-think, re-tool, re-wire, re-skill and re-brand agriculture if it is to be competitive in attracting and retaining the sorts of people we need. We need to be thinking about and presenting agriculture as a key part of the food system and consequently the health system, and we also need to start seeing it as part of the energy system. Agriculture needs a new discourse around human health, nutrition, carbon, water, energy, biodiversity and survival, linked to the big demographic challenges that already have policy attention in Australia.

Such a change of tone might start to see agriculture (producing food, fibre, bioenergy and environmental services in clever ways, working with the landscape rather than against it) become sexy again. The entry scores for university courses would start going up again as the best and brightest students want to engage in one of the world’s biggest challenges, and to work in an exciting 21<sup>st</sup> Century industry with enormous growth potential domestically and internationally.

#### Filling knowledge gaps

The Victorian Eco-Innovation Lab (VEIL), through its Sustainable and Secure Food Systems for Victoria project, has done a very comprehensive job analysing the areas where we suffer from a lack of evidence or knowledge, and the areas where we need to innovate.

Some key priorities for urgent work to fill information gaps include detailed life cycle analyses (LCAs) to explore and map the stocks and flows of carbon, water and energy across the food system, in particular the through chain. It is also important to explore how big a contribution low-input, ‘regenerative’ farming systems could make under various carbon, water, energy and food price scenarios. In areas close to main population centres, we need to be looking much more creatively at waste – how to minimise it, and how to turn waste streams into nutrient, energy and income streams.

#### **A farming systems agenda**

Considerable work is already underway in Victoria to improve the sustainability and resilience of both broadacre and intensive farming systems, in particular to improve the management of climate risk. The EverGraze, EverCrop and Enrich programs of the [Future Farm Industries CRC](#), in which the DPI and Melbourne University are participants, are notable examples in the broadacre sector, and Dairy Australia’s [Confidence to Grow](#) project is a good example in the more intensive domain. The DPI’s [Greenhouse in Agriculture](#) (GIA) program is also investigating options to help mitigate greenhouse gas emissions in Victorian farming systems.

An apparent gap in the research and extension effort around new farming systems is to explore the sorts of farming systems that would be viable under severe shortages and/or very high prices of energy, nutrients, water and carbon. There would seem to be big potential advantages in developing a new dialogue between so called 'conventional' agriculture and 'alternative' farming systems like organic, biological and biodynamic farming. Climate change, the policy responses to climate change, rising energy and nutrient costs and increasing water scarcity and hence prices, will all put pressure on the Victorian farming system to use inputs more frugally and efficiently, to make greater use of organic as opposed to synthetic nitrogen, to apply the principles of integrated pest and weed management, and to manage water very carefully. Health and broader environmental concerns will also put pressure on the food system to deliver fresher, healthier foods that meet consumer needs, are not so replete with sugars, salts, saturated fats and food additives, and that minimise net greenhouse gas emissions along the value chain.

From both of these perspectives, organic agriculture as it has been practised for centuries around the world has lessons to offer. It needs to be brought in from the cold in terms of mainstream research and extension systems, treated as a legitimate farming approach and resourced accordingly.

### **A food value chain agenda**

While the bulk of the environmental footprint of the food system is on-farm, there is still much that can be done to improve the sustainability and resilience along the food value chain. Systemic improvements to the food value chain will also involve changes to infrastructure such as renewable energy supplies and improved transport logistics, more sustainable packaging options, and better access to water and waste recycling schemes.

As with farming systems, it will be important to operate in all four quadrants – adapt, modify, innovate and create – with changes ranging from incremental to radical. There is considerable scope to expand alternative food production and distribution strategies such as farmers' markets and urban food production, especially if that can be integrated with public transport and re-engineering of waste streams to provide recycled water, energy and nutrients for food production.

Food chain redesign should aim to achieve various combinations of several objectives: to shorten food chains; to reduce the transport and energy costs associated with food distribution; to support local producers; to keep people in touch with where their food comes from and how it is grown; and to increase consumption of fresh, whole foods – all consistent with what Kirsten Larsen calls 'food sensitive urban design'.

One of the key factors that may influence whether or not the farming sector can meet its share of the challenges facing the whole food system is the extent to which prices paid by consumers reflect the full cost of food production, and the share of the retail price that is received by the farmer. One strategy is for farmers to try to move further down the value chain, and to capture more of the value accordingly, by differentiating their product and getting involved in its further processing, distribution and marketing. An excellent review just completed by Michael O'Keefe for the Australian Farm Institute suggests that this can indeed be a successful strategy, but it demands a sophisticated understanding of brand differentiation on the basis of developing capabilities that are difficult for others to copy, and close alignment with retailer-driven supply chains.

Industry- or commodity-based EMS (Environmental Management Systems) schemes play a valuable role in establishing acceptable standards of practice and performance within an industry, and in developing more professional and rigorous quality assurance systems at an enterprise level. They lift the bar for the average producer, underpinning food safety and quality, and setting baselines for minimising environmental damage – although their environmental value is limited to the extent that they are only process measures, not actual indicators of environmental performance. Moreover according to O'Keefe, farm accreditation schemes like EMS are a necessary but not sufficient element in securing a greater slice of the consumer dollar for producers. From a brand marketing perspective, having an industry EMS is a

useful underpinning quality assurance measure, but it does not help much in brand development or differentiation.

## An infrastructure agenda

There are some key areas where new or upgraded infrastructure would make a big difference in facilitating reforms within the Victorian food and farming system that would lead to substantial improvements in its performance and sustainability (in addition to the program already underway on water), including:

- a more comprehensive network of rail freight depots within the existing network;
- an integrated food transport strategy that looks at how road, rail, sea and air can best fit together to maximise efficiency while minimising greenhouse gas emissions;
- increasing the natural gas supply and extending the distribution network to enable widespread use of [Compressed Natural Gas](#) (CNG) so that large components of the truck, bus, tractor and vehicle fleet can be converted either fully to CNG, or as dual fuel with diesel; and
- accelerated pilot projects looking at biomass energy from woody perennials integrated into broadacre farming systems, and from methane digesters integrated into intensive farming systems.

## Conclusion

Healthy environments, healthy farming systems, healthy foods and healthy people are intricately intertwined.

From a human health, environmental health and economic health perspective, there are very strong imperatives to improve the performance of the Victorian food and farming system right now. Business as usual is not a viable option, especially when the challenges of the decade ahead are considered.

Strategically, the Victorian food and farming sector needs to make a conscious decision about its positioning across two key trajectories in the global food market:

- The 'premium road' servicing discerning markets demanding high quality foods with known and trusted characteristics about environmental impacts, animal welfare and food safety; or
- The 'generic road' producing large volumes of undifferentiated base commodities at least cost on lower margins, meeting the minimum regulatory food safety and environmental standards.

If it is to target the former high-margin end of the market, then serious attention needs to be given to the measurement systems, standards and systems of accreditation and labelling that are necessary to provide consumers with the information and confidence they need to be comfortable with the premium prices paid for these products. In order to develop such systems, considerable work needs to be done at a base line level with Life Cycle Analyses of different products, production systems and value chains to generate robust data and to identify areas for improvement.

Looking beyond the farm gate, there are opportunities to improve carbon, water, nutrient and energy efficiencies. However these are generally more modest than the on-farm opportunities and involve more systemic changes to infrastructure and policies. More could be done to improve the linkages between the food system and the health system, to make healthier, fresh local produce more accessible for more people and to reduce the carbon pollution associated with its consumption.

Positioning the Victorian food system at the premium end of the market will also entail significant attention to infrastructure such as renewable energy, water and transport to improve the systemic efficiency and reduce the environmental footprint of the system as a whole.

In order to deliver all of the above, a very significant investment in human capacity will be required, to develop the necessary leadership and skills among food system participants, and also to improve the environmental literacy of the wider community. Knowledge is already one of the major export products of the Australian mining industry. Hard won Victorian know how in the production of premium foods in a variable climate will be a significant export opportunity as other countries start to grapple with similar challenges, but from a much lower base of climate risk management.

The performance and quality of the food system is a core indicator of the health of any society. The food system has a huge environmental footprint, and is fundamentally dependent on natural resources and environmental services. Food is Victoria's largest manufacturing sector and a very large component of export revenue. The food and farming system is a very significant employer of Victorians throughout the state, especially in the regions. Victoria has a strong science base underpinning its food and farming system and a great platform for innovation and adding value.

Improving the performance, sustainability and resilience of the food and farming system, to thrive and to meet community expectations in a more demanding world, is a very good fit with the government's priorities in innovation, regional development and sustainability.

The major challenge of our time is how to develop a vibrant, self-reliant, carbon-constrained economy and sustain a reasonable quality of life, equitably shared, without depleting or degrading the resources upon which we and future generations depend. This challenge is universal. Grappling with it is a certain growth industry of this century.

Victoria is uniquely placed to make an important contribution.