

Easy on the Oil: Policy options for a smaller waistline and a lighter Footprint.

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ABSTRACT Global food systems have changed considerably in recent decades, with larger farms, declining crop heterogeneity, increasing mechanisation and increasing food miles through international trade all key trends. Diets in many parts of the world have also changed, with more animal products and processed, calorie rich food being consumed. These changes have compromised human nutrition, contributed to an epidemic of obesity in many regions and, as Ecological Footprint calculations show, contributed greatly to ecological overshoot. New ways of thinking about food are emerging, and to inform a policy response to the Ecological Footprint of food, this paper explores complementary policy links between the human health and sustainability agendas with respect to diet and food systems.

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Introduction

‘The most political act we do on a daily basis is choosing what to eat...’ Professor Jules Pretty, University of Essex, UK.

It can also be argued that choice of diet is a South Australian’s most environmentally significant act, given 36%¹ of the per capita Ecological

¹ The South Australian Government is presently recalculating its Ecological Footprint to ascertain a trend, and will employ a slightly different method in the calculation. This is likely to yield a slightly different result.

Footprint is attributed to the consumption of food, more than any other type of consumption activity (fig. 1) (DPC, 2006).

Australian food production systems and diets have changed beyond recognition over the past few decades. This has led to the intensification of environmental impact, and contributed to an epidemic of obesity. Clearly, this is socially and environmentally unsustainable.

The paper explores the need and potential for new forms of food policy. It is intended that this work will form the basis of a discussion paper for South Australian Government, and inform strategies to address South Australia's Ecological Footprint. It is anticipated that much of the discussion and policy framework will also prove informative for policy makers in other jurisdictions.

The use of Footprint in South Australia

South Australia's Strategic Plan was launched by the Government of South Australia in March 2004. The plan outlined 6 objectives and 84 targets for achievement largely over a ten-year timeframe, and has become the guiding document for state-level policy (Government of South Australia, 2007). An Ecological Footprint target was included in this first edition of the plan, making South Australia one of only a handful of governments to utilise the Footprint to set a sustainability target for its constituents.

The launch of a revised plan in January 2007 saw the Ecological Footprint target changed to 'reduce South Australia's Ecological Footprint by 30% by 2050', to align with a long-term target to reduce greenhouse gas emissions by 60% by 2050. This target alignment is in recognition of the close relationship between reducing the Footprint and reducing greenhouse gas emissions, and the broader sustainability context that Footprint provides.

Much work is occurring to address South Australia's greenhouse gas emissions. The Ecological Footprint complements this work by providing a consumption based focus on greenhouse emissions, and requires that attention is given to the 42% of South Australia's Ecological Footprint that is not attributable to 'energy land'.

Given the significant contribution of food consumption to the Ecological Footprint, and the mix of land types involved, addressing the Footprint of food is considered key to effectively responding to South Australia's Ecological Footprint target.

Indeed, improving the diet of South Australians has the potential make a very significant contribution to the achievement of several targets in *South Australia's Strategic Plan*, notably reducing the Ecological Footprint, reducing greenhouse gas emissions, reducing the number of South Australians who are overweight and obese and increasing life expectancy.

In recognition of the significant synergies between much food policy for health and food choices for environmental sustainability, this paper attempts to outline policy opportunities, and will inform strategies to reduce South Australia's Footprint.

South Australia's Footprint

South Australia's Ecological Footprint was first calculated in 2005 by proportionally adjusting the Global Footprint Network's (GFN's) 2004 Australian Ecological Footprint accounts using the ratio of South Australian consumption patterns to Australian consumption patterns.

The average South Australian has an Ecological Footprint of 7.0 global hectares (gha) (DPC, 2006), an area of productive land roughly 4.5 times the size of the Adelaide Oval, or more than 9 times the size of the Wembley Stadium pitch.

The Australian Footprint is roughly 10% higher at 7.7gha per person. Both the Australian and South Australian Footprints are way above the world average of 2.2 gha per capita (DPC, 2006).

The Footprint of food

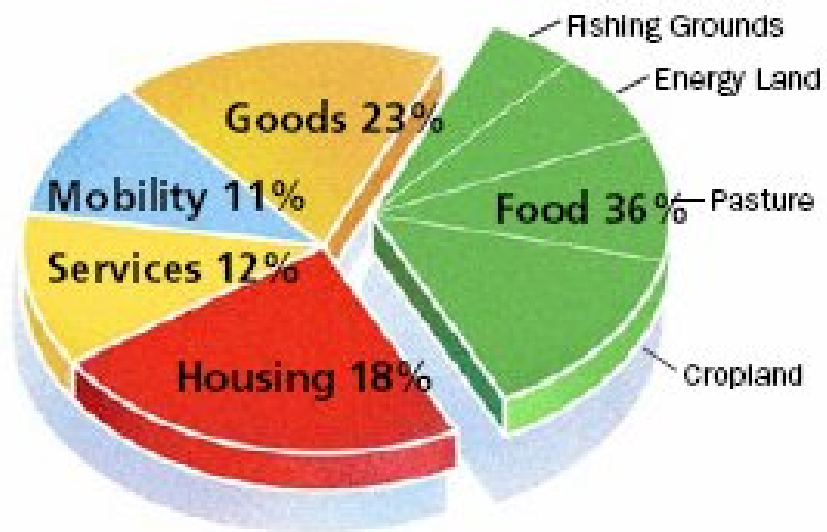
Globally, food systems have changed considerably in recent decades, with larger farms, declining crop heterogeneity, increasing mechanisation and increasing food miles through international trade all key trends (Kimbrell, 2002). Australian diets have also changed, with greater levels of energy-dense, nutrient poor (EDNP) foods being consumed (Smith et. al., 1998).

These changes have compromised human nutrition, contributed to an epidemic of overweight and obesity in many regions and as Ecological Footprint calculations show, contributed greatly to ecological overshoot (Cameron et. al., 2000; HCWH, 2006; Hails et. al., 2006).

As illustrated in figure 1, the contributors to the Footprint of the South Australian diet are the use of productive cropland (39%), the use of pasture (28%), greenhouse gas emissions arising from the use of energy (19%), the use of fishing grounds (12%) and around 1% for the use of forest (wood used largely in packaging) (DPC, 2006)². Combined, the use of energy, cropland and pasture represents 86% of the Ecological Footprint of food consumed in South Australia. Reducing these aspects of the food Footprint therefore requires special focus.

Figure 1:

The SA Footprint by Consumption Type



The energy component - food miles and processing:

'Before you finish eating breakfast this morning, you've depended on more than half the world.' Martin Luther King

The distance our food travels and the degree of processing involved are key determinants of the energy Footprint of our diet.

Indeed, the contemporary food system has been shown to be a significant contributor to climate change (Jones, 2001).

Ever increasing energy demands for processing, packaging, storing and transporting food have created some remarkable imbalances. For example, it takes approximately 7 units of (primarily) fossil energy to produce one unit of food energy in the US (Heller & Koeleian, 2000).

Consuming fresh food, or minimally processed food, is a key way to reduce the energy Footprint. Processing requires energy, frequently involves packaging and may lower the nutritional value of some foods. Certainly, the prevalence and heavy marketing of processed food makes it easier for us to avoid the fresh fruit and vegetables we need while eating foods that may be tasty, but are of minimal nutritional value (Seal, 2006).

Much of our food also makes a very long journey from farm gate to plate. The author is not aware of relevant figures for Australia, but it is estimated that the average food item sold in the United States travels between 2,500 and 4,000 kilometres (Halweil, 2003). Consuming locally grown food can reduce the Ecological Footprint of our diet, as food items from far-flung destinations cause the emission of greenhouse gases in their transportation.

As there is no price placed on the environmental impact of transporting food long distances, there is little incentive to eliminate the impacts, and some counterintuitive behaviour occurs. This is well illustrated by a summary of trade behaviours in the UK. For example, in 2004, the UK imported as much gingerbread as it exported, and sent almost exactly the same amount of potatoes to Germany as it received from Germany (some 1.5 million kilos) (Sims et. al., 2006). There are many more puzzling examples (Pretty et. al., 2005).

Some argue that there are also health benefits to consuming locally grown food, as it may retain a greater proportion of its nutrients if there is a shorter time elapsed between harvest and consumption. Nutrient losses vary by food type and method of storage, but it estimated that between 10 and 50% of selected nutrients can be lost between harvesting and arrival on the supermarket shelf (Jones, 2001).

Food processing can also compromise nutritional content, for example, frozen spinach can have as little as half the vitamin C and a third of the thiamin of fresh spinach (Jones, 2001). In addition, reduced handling and the shorter distance from producer to market can reduce food safety risks. The 1967 and 2001 foot and mouth disease outbreaks in the United Kingdom are illustrative. Through centralised slaughterhouses, the 2001 outbreak spread much further and faster than in 1967, when most slaughtering still took place locally. Furthermore, the 2001 outbreak was traced back to feed imported from China (Halweil, 2003; HCWH, 2006).

Estimates from the UK suggest that total environmental and health costs arising from the current agricultural system exceeded 1.5 billion pounds for the year 2000, not including such impacts as antibiotic resistance arising from overuse in livestock systems and the chronic health effects of pesticides (Pretty et. al., 2005).

The pasture and cropland component – meat vs veggies:

The composition of our diet with respect to animal and plant based food is a key determinant of the Ecological Footprint of food.

In recognition of this, South Australia's Department of the Premier and Cabinet and the University of South Australia have conducted a preliminary analysis of the effect on SA's Ecological Footprint of shifting to a diet consistent with the National Health and Medical Research Council's (NHMRC) recommendations for healthy eating. Compared with current dietary patterns, eating according to the NHMRC's dietary guidelines results in lower energy (kilojoule) intake, lower levels of meat consumption, lower levels of highly processed EDNP food and higher levels of plant based food consumption than current patterns (based on the latest available national survey data) (NHMRC, 2003).

The results indicate a reduction of some 15% in the Ecological Footprint of the average South Australian's diet, or around 5% of their total Footprint (Boland & Agrawal, unpub.)³. Other studies conducted internationally have produced similar results (WWF-UK, 2006; Frey & Barrett, 2006). Notably, moving to a fully vegetarian diet has still greater ecological benefits. A Scottish study showed a balanced vegetarian diet can reduce an individual's food Footprint by a further 23% over a normal healthy diet (Frey & Barrett, 2006).

In both scenarios, the reduction occurs largely due to the lower Ecological Footprint of plant-based food, which per calorie, is roughly a quarter that of animal based food (Deumling, 2003). There is an element of Footprint "double-dipping" involved in meat production, and by limiting meat consumption to healthy levels, we not only reduce our use of pasture, but also of cropland, as grain is often used to feed livestock.

³ Result derived by proportionally adjusting levels of household expenditure on plant based food and animal based food within the South Australian Footprint ratio data.

Eating organic fruit and vegetables can achieve still greater reductions, providing the produce is sourced locally, as manufactured fertilisers and pesticides require significant volumes of energy in their production (Jones, 2001). The Scottish study also concluded that a diet consisting exclusively of organic produce has a 2% lower Ecological Footprint, not including benefits arising from lower energy intensity. There is evidence that the energy intensity of organic farming systems in Australia is less than half that of conventional systems (Wood, 2006), suggesting a significantly smaller Ecological Footprint for organic produce than that produced using conventional techniques.

Food waste and obesity – the hidden contributors

South Australia's Ecological Footprint account simply treats food wastage as part of total food consumption. However, various food waste statistics give us an indication of the scale of the problem. For example, it is estimated that 13.1% of the food purchased by Australians every year is thrown in the bin (cited in Hamilton et. al., 2005).

If we assume similar behaviour in South Australia, we can broadly estimate that food wastage in the home represents 13% of the Footprint of food, or around 5% of the total Footprint, even before taking account of wastage on the farm, spoilage during transport, losses during processing and wastage of damaged and expired items in retail stores. It could be argued that if these 'upstream' contributors to food waste were taken into account, the figure would be higher still.

Over-consumption, which is another form of food waste, is a contributor both to the Footprint and to poor health, through overweight and obesity. Over half of the adult population (54.6%) in South Australia are classified as either overweight or obese and this proportion is increasing (Gill et. al. in DoH, 2006). A 2001 study indicated that some 20% of four-year-old children in South Australia are overweight or obese (Population Research and Outcomes Study Group in DoH, 2006), and overall rates of obesity in children are increasing at about 1% per year (Magarey et. al. in DoH 2006). Non-core foods, defined as those that are surplus to requirements for a healthy diet, have been shown to contribute considerably to obesity (Bell et. al., 2005).

The rising level of obesity is caused by a combination of social factors. Our increasing calorie intake, fuelled in part by ready access and excess consumption of high sugar, high fat processed foods, combined with an increasingly sedentary lifestyle (enabled in large part, by the work that fossil fuels now do for us) cause this concerning health trend (WHO, 2003; Swinburn et. al., 2004; Bell et. al., 2005; Cook et. al., 2001). Any way you look at it, obesity is both caused by, and makes a considerable contribution to, South Australia's Ecological Footprint. If people eat more food than they require, or

replace exercise with motorised transport, human demand on the biosphere is increased.

Due to the diversity of heights, levels of physical activity and age, it is not possible to enumerate a mean energy intake requirement for a given population. Nevertheless, the rising levels of obesity within the population are evidence that a significant proportion of what we eat, and / or a significant proportion of the fossil fuel we consume for transport, is unnecessary consumption. With projections indicating a likely continuation of the trend toward rising overweight and obesity (Allman-Farinelli et. al., 2006), it is safe to assume that a portion of South Australia's food Footprint can be assigned to the fact that people eat in excess of their daily requirements, and that this proportion will continue to increase.

Excess weight exacts a heavy social and economic toll, increasing the risk of Type 2 diabetes, cardiovascular disease, high blood pressure and certain types of cancer. The annual direct and indirect health costs to the State of South Australia are estimated at \$100 million (DoH, 2006).

The obesity of South Australia's population (and of much of the western world) is also a metaphor for ecological wastefulness. The systems that have allowed us to become overweight by allowing access to abundant, cheap, energy dense, nutrient-poor foods have also allowed an increase in the atmospheric concentration of carbon at an unprecedented rate, the salinisation and stripping of nutrients from soils, overexploitation of water resources and reduction of biodiversity.

The context for policy options

It has been established that there are clear complementary links between the health and environmental sustainability agendas with respect to food consumption. Currently the way South Australia (and much of the western world) eats is unhealthy for both people and their environment. The nature of South Australia's diet and food systems deserves a special focus, and an opportunity presents for the development of new knowledge and mutually beneficial partnerships. The remainder of this paper is devoted to the scoping of potential policy linkages and new opportunities.

In this paper's analysis of complementarity between Ecological Footprint and health agendas, three key areas for focus have been identified:

- The methods of production, level of processing and distance of transportation
- The nature and composition of our diets
- The level of over-consumption and food waste.

These will be the focus for the assessment of policy options.

It is also useful to consider the dynamics of the modern food system. Lang and Heasman (2004) offer a framework for the food system with the following key segments:

- *Health*: the relationships between diet, disease, nutrition and public health
- *The environment*: the use and misuse of land, sea and other natural resources when producing food; and
- *Business*: the way food is produced and handled, from farm inputs to consumption
- *Consumer culture*: how why and where people consume food
- *Food governance*: how the food economy is regulated and how food policy choices are made and implemented.

All of these factors have a role in determining the nature of what we eat. It is useful to think of business, consumer culture and food governance as factors that policy makers can seek to influence, with an aim to achieve desirable outcomes for our health and our Ecological Footprint. The relationships between business, food governance and consumer culture are complex and interdependent.

The broad policy approaches

For the purposes of determining appropriate policy to influence these players, four broad options emerge (Lang and Heasman, 2004):

- Laissez-faire or 'hands off'
- To look for corporate solutions
- To frame market conditions
- To empower consumers to make choices that have better outcomes for themselves and the environment.

The 'hands off' approach is an inadequate policy position, as climate change and high levels of obesity represent clear market failures. An effective response to the challenges faced in developing food policy that appropriately responds to environmental and health challenges will necessarily borrow from each of the latter three approaches.

The South Australian context for each of these policy options is discussed below, and a summary of policy opportunities is presented at the end of the paper.

Laissez faire

Obesity and the high environmental impact of our consumption are clearly issues of significance, and they are growing. There exist some positive market trends at the periphery for the provision of products perceived to be healthier and with a lower environmental impact, and as such the market can contribute to addressing the problem. However, over-riding these positive elements are more mainstream trends toward production, marketing and consumption of EDNP and high footprint foods.

Policy options to address these problems must incorporate a mix of market-based initiatives and targeted market interventions. To simply allow market forces to run their course is an inadequate policy position, as the case for action is established and we have sufficient information to act.

Encouragingly, there is already a range of actions being undertaken which directly, or indirectly, tackle the health attributes and environmental impact of our food systems. There is potential to build on this work, and to foster beneficial linkages, but this needs to be addressed with adequate resources and a full suite of policy, infrastructure and program interventions.

Corporate action

Discussion of key issues

Processors, traders and retailers, each in turn responding to consumer demand, are the key influencers in today's food system (Lang & Heasman, 2004). Much public policy with respect to food has in the past focussed on primary production. The concentration of power is now gravitating toward the consumption end of the spectrum, particularly given the consolidation of the food retail sector in Australia, which is now dominated to a very large extent by just two players.

This consolidation presents both challenges and opportunities for improving our food system (Food SA, 2006). Limited distribution channels means limited competition, and fewer opportunities for new, niche food producers to gain a foothold in the market. However, the buying and marketing power of such entities can quickly make niche products mainstream, and large scale changes to the market are possible.

The corporate sector is challenged to effectively respond to emerging trends in attitudes towards food and its impact on the environment. Change provides business opportunities, and changes in some areas of the market are occurring quite rapidly. Consumer demand for products that are perceived to be safe, healthy and have a low impact on the environment is growing, and in some cases, outstripping demand. Some consumers are also willing to pay a premium for products that carry an assurance in relation to their attributes with respect to health and environmental issues (Stone, 2007). The emergence of certified organic and biodynamic products as significant market players is evidence of

the market opportunities available, with the organics market expanding at 10 to 15% per year across all food categories (Food SA, 2006).

In the past few years, British supermarkets have begun to respond to a growing awareness with respect to embodied carbon in food products, with a number of chains investing in and marketing ranges from regional and local producers (Barrett and Keech, 2004). Tesco, a supermarket chain, recently announced that it would label all of its food products with a carbon Footprint to show their full environmental impact. Additionally, a carbon reduction label has been established in the UK for companies wishing to demonstrate a commitment to reducing embodied emissions. A number of UK companies have committed to participating, including several supermarket chains and major food manufacturers.

A rapid increase in public focus on climate change in Australia has occurred over the past 12 months. This has been facilitated in part by the media focus on Al Gore's *An Inconvenient Truth*, the Stern Report and the severity of the current drought which has gripped Australia. Australia has, in effect, been playing political and cultural catch-up with Europe. It is arguable that this will have some flow-on effect on purchasing decisions, resulting in similar trends in consumer behaviour to those currently being witnessed in the UK.

It is also worth noting that initiatives exploring more energy and carbon efficient methods of processing and transportation will not only help to reduce South Australia's Ecological Footprint, but may also prove to be essential in maintaining the competitiveness of South Australian food exports. An increasingly carbon-aware export market may begin to balk at food that has travelled significant distances. However, as alluded to previously, there are instances where the more efficient option may still be food from a far flung destination.

Carbon emissions depend in part on the mode of transportation, for example, sea freighted goods typically have far lower transport emissions than, rail, road and air, with air freight being by far the most inefficient. Production emissions can also be significant. For example, a Lincoln University study showed that New Zealand butter, as sold in a UK supermarket, has half the carbon emissions of locally produced butter. This is because cows in the UK spend part of the year in heated barns eating mass produced food, while New Zealand cows spend their time outdoors, eating grass (Barnett, 2007). Carbon accounting for South Australian food products may help to identify opportunities for efficiency, enhance South Australia's position as a leader in climate change policy, and may prove crucial in maintaining important export markets.

Summary of key challenges for corporate action

- To identify the market opportunities available in a changing food culture.

- To meet the Food Plan targets, while striving for a lower Ecological Footprint and a positive impact on health.
- To respond effectively in an economy that will be increasingly carbon constrained.
- To respond to consumer demand.

Summary of policy options for corporate action

- Participation in 'Buy local' campaigns presents an opportunity to appeal to consumer sentiment with respect to local produce. In particular, utilising geographical origin schemes and farmers markets to promote produce to local retailers and public procurers on the basis of freshness and lower food miles may yield benefits.
- Focussing on waste avoidance initiatives provides opportunities for improved economic efficiencies and opportunities to promote corporate social responsibility.
- Developing an industry-led food sector agreement for greenhouse emissions reduction would assist South Australian food businesses to transition to a lower carbon economy. In addition, pursuing carbon labelling for South Australian food products may assist in identifying opportunities for efficiencies and maintaining / exploiting market opportunities. This is of particular significance given the importance of exports to the industry, and South Australia's distance from many of its markets.

Complex and / or controversial options meriting further investigation

- Labelling food products with their carbon Footprint.
- Rewarding positive food consumption behaviour through lowered health premiums.
- Pursuing more energy efficient processing and packaging techniques.

Frame market conditions

Discussion of key issues

The externalisation of many of the costs associated with our current food system including obesity and poor nutrition, climate change and the over-exploitation of environmental resources represents significant market failure. Interventions conducive to better outcomes for human health and the environment are required.

Climate change and interventions designed to address greenhouse gas emissions currently dominate the political agenda in South Australia and across much of the world. In the food sector, as with every other sector of the economy, the likely introduction of measures to constrain and then reduce carbon emissions will affect market conditions. Australia is not currently involved in an emissions trading scheme, however it is being considered at a national level. Initiatives such as emissions trading will increase the cost of embodied carbon, increasing the incentives to adopt more efficient production processes.

Such initiatives will likely affect the choices that businesses make with respect to total energy use, and the source of the energy used for processing and transportation. Consumer behaviour will also be influenced by the resulting price adjustments. In the interim, while no price on carbon yet exists, fostering an appreciation amongst consumers of the numerous benefits of local and low carbon products will help to frame market conditions.

In South Australia, the vast majority of the population is located in one large city. Of crucial importance to diets and consumption behaviours is the structure of urban environments. The way cities are planned presently makes it hard to be healthy (Farley & Cohen, 2005). The costs of private health insurance and of administering South Australia's health system continue to grow. Yet many of our health problems could be averted by changes to the way we live, reducing the need for medication and hospital beds.

The environment that most of us inhabit on daily basis has been designed for us, and it serves to encourage particular food, travel and lifestyle choices, and discourage others. Much as changes in perceptions regarding the role of government in urban form and sanitation in the 19th century caused great reductions in disease, changes to urban form in the 21st century may help to reduce levels of obesity and address the size of our Footprint (Farley & Cohen, 2005). We must develop a vision for urban design that meets our health and ecological needs.

The rules regarding advertising are another key aspect of food governance, with research by the Cancer Council of New South Wales showing that 81% of all food advertisements on television in Australia are for foods high in fat, sugar and/or salt and of low nutritional value. The number of advertisements for unhealthy foods is at its highest during children's television programs (Chapman et. al., 2006).

In addition, the study found that, half of all food advertisements promoted foods high in sugar and fat and that confectionary and fast food advertisements were up to three times more likely to be played in children's viewing times than in adult viewing times. It would be rare to see an advertisement for carrots during the Saturday morning cartoons, but its likely there would be several for chocolate. A 1996 study of 13 OECD countries showed Australia as having the highest number of television food advertisements in children's programming

(CFAC, 2006). Heavy marketing of fast food and energy dense foods has been shown to be a probable risk factor for overweight and obesity (Swinburn et. al., 2004). It is also a risk factor for a large Ecological Footprint.

Changing the type of food available through publicly funded institutions is another important means to frame market conditions conducive to positive social and environmental outcomes. The ready availability of food with questionable nutritional value in many such institutions has been an unwelcome contribution to the problem. In particular, the availability of unhealthy food in school canteens and hospital food outlets including vending machines is in direct conflict with the mission these institutions are seeking to achieve. In recent years, public policy has begun to respond to this issue.

At present many value-added products involve a significant level of processing. A key challenge is to continue to strive for efficiency in the production of these products and to identify and encourage methods to add value to fresh, seasonal, local produce. Organic and biodynamic produce are an obvious current example, as are Farmer's markets.

Summary of key challenges for framing market conditions:

- Pricing carbon into the market
- Designing urban environments for healthy people and lower Footprints
- Curbing food advertising for EDNP foods
- Pricing healthy food into the market

Summary of policy options for framing market conditions

- Creating new retail opportunities including increasing the prevalence of farmer's markets and enhancing the willingness of consumers to buy local food. Facilitating closer links between regional food groups and local retailers, public procurers and communities may assist. Additionally, work must be done to make such retail markets more broadly accessible and attractive to groups of varying socioeconomic background.
- Pursuing new rules for advertising of EDNP foods, particularly to children and new rules with respect to food labelling for nutrition and embodied carbon.
- Provision of support for emerging market opportunities for products with a lower environmental impact, such as organic and biodynamic foods. Clearer / simpler guidelines for organic and biodynamic certification may assist, easing confusion regarding appropriate steps for certification, and make purchasing choices easier for consumers, by reducing the number of certification bodies.

- Introducing a price on carbon through emissions trading or a carbon tax would greatly assist with framing market conditions. In the short term, the provision of assistance with energy and Footprint audits and energy efficiency training for food businesses will assist.
- Pursuing new environmental and health criteria for food in publicly funded institutions.
- Rethinking the way in which urban design and planning rules can help to simultaneously achieve positive outcomes for community health and the Ecological Footprint. Access to food, either retail or urban agriculture, and opportunities for cycling and walking are key issues.

Complex and / or controversial options meriting further investigation

- Development of a 'Fat tax' on ENDP foods to factor in the presently externalised costs of overweight and obesity. Many products that are high in fat and / or sugar, and of poor nutritional value, are also among the cheapest foods. Where a fat tax of this nature could help to redress this imbalance, it would not necessarily address the problem of general over-consumption. Caution would also be required, as such an initiative may potentially have a disproportionately large economic impact on the very poor.
- A price on food miles, through the form of a tax or incentive, could assist in encouraging the consumption of local food. However, as noted previously, food miles are not the only contributor to embodied carbon. Additionally, a carbon emissions trading scheme including transport emissions may more effectively address this issue.
- Legislating for carbon labelling for all food products would represent a significant imposition for food businesses, but may assist with retaining and accessing markets.

Empowering Civil Society

Discussion of key issues

The human addiction to the convenience of labour saving technologies, combined with easy access to abundant, cheap and energy dense, nutrient poor foods has made South Australians overweight. Rather than using increasing affluence to improve our diets and devote time to the maintenance of physical fitness, wealth has been expressed through perverse food and mobility choices. Current attempts to change behaviour are an attempt to retrofit our culture to address this perversity.

Where food retailers and marketers are typically large and influential, food consumers are diverse and largely unorganised (Lang & Heasman, 2004).

There is a case for providing consumers not only with better information, but also empowering them to make choices that are better for their health and the environment. Effective behaviour change programs need to be theory-based and not only educate, but also provide individuals with the motivation, ability and opportunity to utilise their acquired knowledge (Nutbeam & Harris, 1999).

There are a number of social trends which exert an influence on our food consumption patterns. These may make attempts to improve our diets and reduce our Footprint more challenging. Decreasing household occupancy and increasing work hours are two such trends, as they result in a greater proportion of meals being eaten outside the home (Food SA, 2006; Barrett and Keech, 2004). Eating out of home has potential environmental and health impacts including greater food wastage, as restaurants and other food outlets must uphold strict food safety standards and accurately predicting demand can be difficult; increased packaging with takeaway meals; and the tendency to larger portion sizes and cheap bulky EDNP fast foods.

For those meals that are consumed at home, consumers increasingly demand greater convenience, including ready-made meals and pre-prepared vegetables. Evidence regarding the environmental impact of this trend is equivocal, and many variables are involved, including home appliance efficiency, preparation methods and processing and storage methods. Some analyses indicate roughly comparable impacts between home-made and 'convenience' meals, and others indicate a lower impact for home cooked meals (London Development Agency, 2006).

However, there are also social trends that may assist with the achievement of health and sustainability targets. As has been noted previously, climate change has vastly increased its standing in the public consciousness. It seems likely that this increasing awareness will precipitate an evolution in consumer behaviours. In combination with existing social factors such as parochialism, a desire for 'fresh' food and a desire to support local rural communities (particularly in light of the current drought in South Australia), perhaps a trend toward consumer demand for local food may emerge.

It is worth noting that considerable economic and social benefits accrue to regional communities from greater demand for their produce and the support of regional food groups.

Summary of key challenges for framing market conditions:

- Initiating a change in behaviour with respect to consumption patterns.
- Addressing prevailing social trends toward convenience and EDNP foods.

Summary of policy options for empowering civil society:

- Development of a comprehensive, integrated sustainability behaviour change strategy for climate change, waste avoidance and the Ecological Footprint. Where appropriate, this program should link with existing complementary work with respect to health promotion.
- Exploring opportunities to further support initiatives such as the Community Gardens Network and Slow Food Movement. Additionally, thought should be given to methods of introducing these programs to a mainstream audience, as a way of reconnecting individuals with healthy food culture.

Complex and / or controversial options meriting further investigation

- Consideration of the potential for litigation with respect to unhealthy food, or high carbon production practices.
- The development of Food co-ops and community supported agriculture as alternatives to the current system of food retail.
- Superannuation investment in healthy, sustainable food initiatives.

Conclusion

This paper has established clear complementary links between the health and environmental sustainability agendas with respect to food consumption. The case study of South Australia, a community in which over half the population is overweight or obese, and with a Footprint 3.9 times the available natural resources, shows considerable opportunity for policy linkages, and policy gaps that require attention.

The current public and political focus on climate change, and on the extraordinary levels of overweight and obesity, provides opportunities to address particular aspects of our food Footprint, and simultaneously achieve positive outcomes for health.

Running against the trends in Footprint and obesity, there exists a more positive undercurrent, including new forms of food retail, and rising demand for products with perceived lower environmental impact and / or health benefits. These trends must be supported and exploited. Furthermore, the knowledge we possess regarding the influence of urban form on human health and the environment must help to inform new thinking about the way we order our physical environments.

A significant opportunity presents for new policy, and better policy linkages to achieve a sustainable food system.

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