

# Architecture, Planning and Food

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**Figure 1: A typical contemporary housing development, an environment that diminishes choice and requires unsustainable levels of consumption**

(Image: Wikimedia Commons)

## ABSTRACT

While architects and planners don't seek to disadvantage communities, the incremental impacts of the way towns and cities are designed is having exactly that effect when it comes to access to food. Modern cities make it harder for many – particularly the disadvantaged – to access quality food and are increasingly separating us from the places of food production. Dependencies on fossil fuels and water underpin the production and distribution of food, making food security increasingly tenuous as we progress into the 21st century.

This note seeks to suggest opportunities to ensure food, in its broadest sense, can be brought into the design process. It outlines some thoughts about how we can get more food production, better health outcomes, higher amenity and greater social inclusion for less land and resources, and it shows how architects and planners can help address this challenge.

## Introduction

What is good food? This question has many different answers depending on who you ask – restaurateurs, nutritionists, home keepers and observers of different cultures are likely to give different answers relating to different values. We take the view that good food is food that can provide the optimal conditions for individuals and communities to thrive and fulfil their potential, and this is best decided by individuals with wide choices and access to good information.

This note reflects the beliefs that food produced with lower levels of resource inputs is better than the equivalent amount of food produced with higher resource inputs; and food that is generally sourced locally with shorter and more direct supply chains is better than food from further afield (although additional access to food from further away is needed to safeguard against localised disruptions and seasonal disparities).

In its 2010 study 'Food Sensitive Planning and Urban Design' the Heart Foundation describes good food as that which is:

- required for a healthy and nutritious diet, and is adequate, safe, culturally appropriate and tasty
- produced, processed, transported, marketed and sold without adverse environmental impacts, and that contributes to healthy soils and waterways, clean air and biodiversity
- provided through means that are humane and just, with adequate attention to the needs of farmers and other workers, consumers and communities

## Food systems

The American Planning Association defines a food system as 'the chain of activities beginning with the production of food and moving on to include the processing, distributing, wholesaling, retailing and consumption of food and eventually the disposal of waste' (Heart Foundation 2010). The way we conduct each stage in the process has land-use implications that may be influenced by our planning and architectural decision.

## Producing food

This typically occurs on land dedicated solely to the purpose of producing food, on farms that are intensely managed and occupy highly modified landscapes. Land productivity is determined by factors that include availability and quality of labour, soil, water, nutrients and energy sources, and

diversity of plant species, as well as the biological health of collaborator species such as bees.

The impressive yields farms achieve are due to the hard work of farmers, industrialised farming techniques and the extensive use of agrochemicals. Australia, for example, is almost universally deficient in phosphorous and agriculture relies on mineral supplements. However, this method of food production is increasingly depleting finite resources and fossil fuels.<sup>1</sup>

## Processing and transporting food

Food rarely arrives on our plate in a raw and unprocessed state. Getting food from the farm gate to the table usually requires extensive infrastructure for processing, packaging and transport. For example, significant inputs of water are needed to service the food industry – it is estimated that 500 litres of water are required to produce a 1kg of potatoes; 140 litres of water to make a cup of coffee (Pryor 2011). In Australia, 28% of household greenhouse gas emissions are traceable to food (Australian Conservation Foundation 2007).

Access to suitable land and resources for production and other supply chain functions will have a strong influence on where food processing occurs. The integrated nature of modern economies, and readily available and inexpensive fossil fuels, have meant that food producers can look beyond their hinterlands to find a market. This has enabled wealthier communities in developed countries to access the cheapest food from anywhere in the global market.

## Consumer access and utilisation

For the first time in history, most of the world's population live in cities. This has been made possible by industrialisation and the development of longer and more sophisticated supply chains. It means that most people are both physically and culturally disconnected from the sources of their food, relying on food from stores, supermarket chains and restaurants. The paucity of alternatives and the patchy distribution of these points of access mean that many people suffer 'food poverty' and live in 'food deserts'. The Heart Foundation defines these as 'areas of limited or no access to food within walking

<sup>1</sup> It is interesting to note that 'over 80% of the phosphorus and nitrogen in household waste loads could be beneficially used on farmland' (Heart Foundation 2010). Urine-separating toilets installed in Sweden have shown that the fertilising effect of urine on cereals is close to that for chemical nitrogen fertiliser (90%), and the phosphorus is equal to that for chemical fertiliser.

distance of where people live or work'. These food deserts are found in many urban and rural areas, and in particular in the low-density, low-income suburban hinterlands to many Australian cities. They are characterised by 'substantial numbers of fast food outlets, service station 'road pantries' and food shopping based on high cost/low quality convenience stores' (Parham 2007).

Good food access and utilisation requires people to understand their choices about what to eat and the potential benefits and harms that can arise from those choices. This extends beyond the awareness of the food's health impacts to include the sense of autonomy and empowerment that comes from growing and/or preparing your own food, and the value of the connections made in cooperating to get food onto the table.

## Waste, re-use and post-use management

A lot of food is wasted at every stage of the food supply chain. FoodWise<sup>2</sup> claims that 'Australians throw away over four million tonnes of food per annum...equivalent to 178kg per person every

year'. In Eating the Landscape<sup>3</sup>, Joshua Zeunert says 'gross food wastage is an integral part of the global food industry in developed nations, where a staggering 25% to 50% of fresh produce is wasted for not meeting the generic (size/weight) and cosmetic demands of supply chains'. This happens due to such things as changed 'labelling regulations, end of season excess stock, production line changeover items, outdated packaging, discontinued product, as well as slight label or weight inaccuracies'.

The food that doesn't make it to our plates or that we scrape off our plates often ends up dumped on the environment, left to rot in rubbish tips or is dealt with in highly specialised dedicated facilities such as incinerators. Much of this material is organic matter that could be a highly useful resource to grow more food but instead rots in landfill, where it releases methane. This gas 'is 25 times more potent a greenhouse gas than the carbon pollution that comes out of your car exhaust'. The present food system is represented in Figure 2.

2 <http://foodwise.com.au>

3 [www.aila.org.au/lapapers/papers/transform/docs/Zuenert.pdf](http://www.aila.org.au/lapapers/papers/transform/docs/Zuenert.pdf)

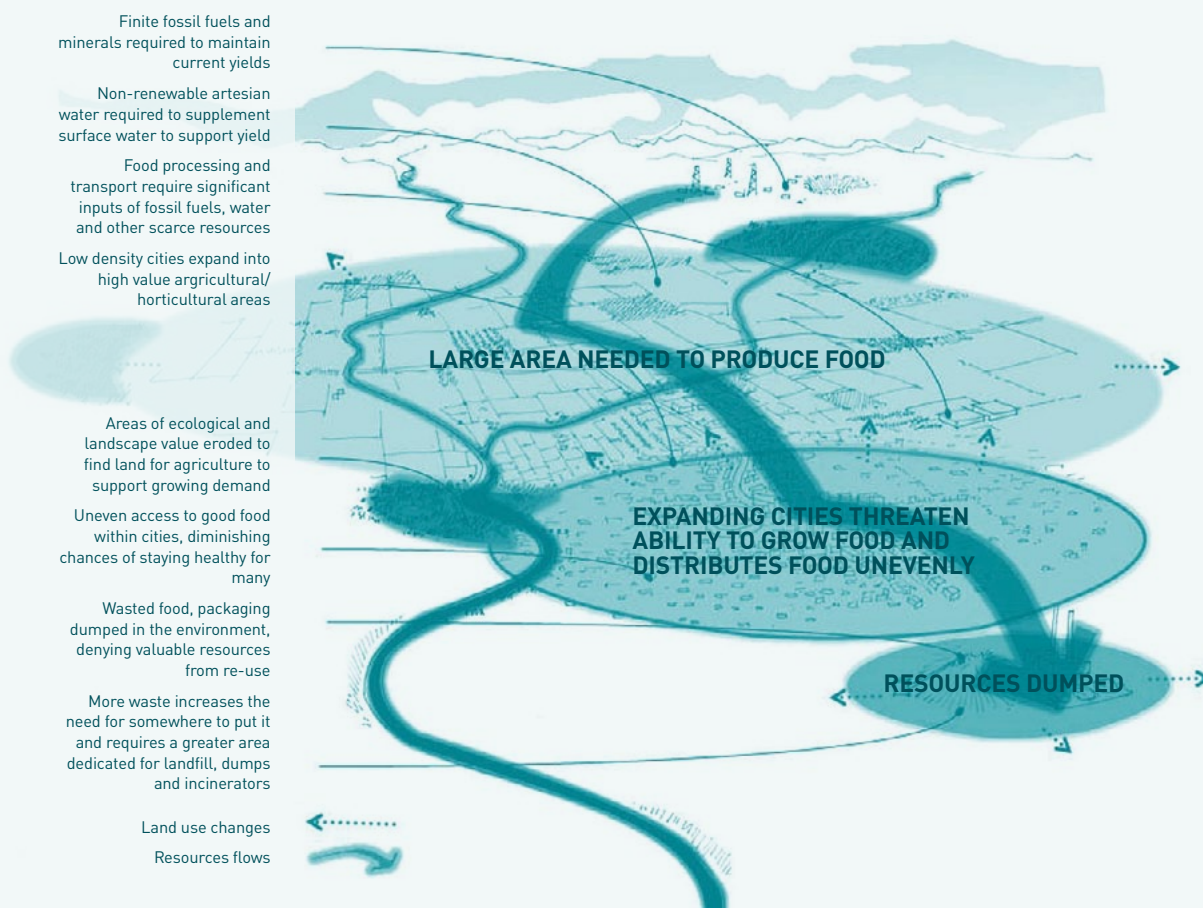


Figure 2: Conceptual model of the food system in Australian cities

# Why planning for food is important

*Civilisation and anarchy are only seven meals apart.*  
**Spanish proverb**

There are a number of factors that may diminish our ability to feed ourselves and increase the chances that disruptions to supply would result in significant upheaval and distress.

## Population growth

In 2011 the world's population passed the seven billion mark. It is estimated it will continue to grow until it surpasses nine billion by 2050. It is further estimated that if current consumption trends continue, humanity will be consuming global resources at double their replacement rate.<sup>4</sup>

## Increasing demand

'The average citizen of Planet Earth eats one-fifth more calories than he or she did in the 1960s.' (Cribb 2010) This creates a food footprint that continues to grow even faster than population growth would suggest.

While people in developing countries typically eat less and get their food from lower down the food chain than people do in the West, they are acquiring a taste for Western foods. 'In China, meat consumption trebled in less than 15 years, requiring a tenfold increase in the grain needed to feed the animals and fish. One way to visualize the issue is that growth in global food production of 1% to 1.5% a year has more or less kept pace with growth in population — but has fallen short of meeting the growth in demand.' (Cribb 2010)

## Competition for land

Productive land is a finite resource (Sinclair 1999) and is only kept productive by with significant investments in energy, water and effort.

Productive land is not easily replaced when it is lost to food production. Political and economic pressures can lead to arable land being turned over other uses, including non-food crops such as biofuels. According to the World Bank, biofuels may have caused as much as three-quarters of the hike in food prices between 2000 and 2008 (Cribb 2010). A study by the New England Complex Systems Institute<sup>5</sup> found that 'spikes in food prices in 2008 and 2011 came largely as a result of investor speculation and increased

ethanol conversion'. They expect another food bubble to occur by 2013, which 'may lead to major social disruptions' on par with the riots and unrest in North Africa and the Middle East in 2008 and 2011 (Priluck 2012).

Urbanisation is also threatening scarce food-production resources. Cities are growing to consume the land that formerly fed them. As Trevor Budge, associate professor in the Community Planning and Development faculty at La Trobe University puts it, for many highly productive peri-urban farms 'the last crop is a house'.<sup>6</sup>

## Depleting resources

As demand grows and the productive land near population centres is consumed by housing and non-food cash crops, inhabitants have become increasingly dependent on more distant food sources and more intensive agriculture. Getting enough food to market becomes more dependent on larger investments of energy.

Water supply also limits what can be produced. Pimentel et al (1996) found that 'half the world's people live in countries that rely in part on over-pumping aquifers to expand production' citing the US, China and India as examples. 'Once these aquifers are depleted and the rate of pumping is reduced to rate at which they are replenished by rain, the drop in food production will be dramatic.' Specifically, 'about 87% of the world's fresh water is consumed or used up by agriculture and, thus, is not recoverable' (ibid).

## Climate change

Changes in the world's climate will bring major shifts in food production. This will happen 'as temperatures and rainfall change and coastal flooding will reduce the amount of land available for agriculture' (Pimentel et al 1996) and projected changes in soil moisture, carbon dioxide and pests will also have an effect (Payne 2011).

In their paper delivered at the Sustainable Agriculture and Food Policy in the 21st Century conference, Lyndsey Hogan and Paul Morris (2010) quoted research that estimated that Australian production of key agricultural commodities (wheat, beef, dairy and sugar) could decline by 9% to 10% by 2030 and 13% to 19% by 2050. They also found that 'Australia is projected to be one of the most adversely affected regions from future climate change'.

<sup>4</sup> [http://esa.un.org/unpd/wpp/Documentation/pdf/WPP2010\\_Highlights.pdf](http://esa.un.org/unpd/wpp/Documentation/pdf/WPP2010_Highlights.pdf)

<sup>5</sup> <http://necsi.edu/research/social/foodprices/update/>

<sup>6</sup> [www.ecoinnovationlab.com/component/content/article/95--localised-solutions-conference-/293-localised-solutions](http://www.ecoinnovationlab.com/component/content/article/95--localised-solutions-conference-/293-localised-solutions)



Payne (2011) points out that the changes may also result in better yields in other places, but if we are to capitalise on this potential we will need to ensure we can respond fast to changing circumstances. However extremes in weather may make investment in agriculture more risky and expensive. 'In the previous 10 years there had been an average of 385 natural disasters a year. This was up from 258 a year in the 1990s, and 165 a year in the 1980s. And we are not just talking about heat' (Payne *ibid*). Flood, fire, drought, frost, hailstones and other extreme weather events also pose significant risks.

## Contamination

Land contamination will also diminish our ability to feed ourselves, and one of the main threats is soil acidification. The Australian Natural Resources Atlas<sup>7</sup> found that acidification is recognised globally as a serious soil degradation problem that is reducing agricultural production. In Australia, the report estimated that acidification affects an area eight to nine times larger than that affected by dry-land salinity.

One of the reasons for this is 'the use of synthetic nitrogen in industrial agriculture...accumulates in soil resulting in acidification, and the Food and Agriculture Organisation of the United Nations estimates that nearly one-third of arable land worldwide is so acidic it can't support high-yielding crops' (Zeunert, undated). Heavy metals, minerals (such as salt) and biological pollution also lead to severe land degradation, denying its ability to feed us without expensive and resource-hungry remediation.

## Erosion

Soil erosion far exceeds the rates of soil development, making soil a non-renewable resource. The Heart Foundation quotes research that suggests that 'during the past 40 years, nearly one-third of the world's cropland (1.5 billion hectares) has been abandoned because of soil erosion and degradation' (Wood et al 2006).

Soil erosion is a natural process but can be adversely affected by our actions. Changes to the soil surface, for example for development, clearing, or overgrazing, will increase the speed with which rainwater moves across the landscape and the ease with which wind can move surface material. These factors will increase the ability of run-off and wind to carry topsoil away, causing soil erosion. This can cause significant problems as valuable topsoil, nutrients and organic matter are lost and soil structure is destroyed. The material lost causes silting in rivers, dams and reservoirs and the

<sup>7</sup> [www.anra.gov.au/topics/soils/acidification/index.html](http://www.anra.gov.au/topics/soils/acidification/index.html)

nutrients can cause algal blooms that smother and destroy habitat, and render water unfit for drinking. 'Water-borne soil erosion is a major and continuing issue for Australian agriculture and catchment management'.<sup>8</sup>

## Urban food issues in Australia

For many people in Australia, the food people eat is contributing to alarmingly high levels of disease such as cardiovascular disease and cancer. The Heart Foundation (2010) quotes research that found that only 7.7% of Victorian females and 3.1% of males meet the recommended healthy eating guidelines for fruit and vegetables.

## Inequity

For many people food choices are informed by cost, conflicting information about food and health, and poor transport infrastructure. Many people are unable to make the healthy choices that would help protect them from diet-related diseases.

The Viclanes 'Place Does Matter' study found that people in low socio economic status (SES) areas are three times more likely (12%) than high SES areas (4%) to run out of food. They are also less able to buy more. The study also found that people in low SES areas were less likely to purchase fruit and grocery items consistent with current dietary guidelines and were more likely to purchase fast food for consumption at home. They were also less likely to be influenced by health considerations when buying food and more likely to be influenced by the price of food.

## Loss of food knowledge

Most city dwellers are within a generation or two of people who lived on the land and were aware of the variables that affected farm yield. However with urbanisation and increasing specialisation people have become detached from the production of food and the effort needed to make it happen. Long supply lines mean that people do not appreciate what they are eating and have little idea of what has gone in to making it. In this environment cosmetic considerations are foremost and lead consumer decisions, often causing people to discard perfectly edible but aesthetically imperfect fruit and vegetables.

<sup>8</sup> [www.anra.gov.au/topics/agriculture/pubs/summary\\_reports/ag\\_in\\_aust/aa\\_07.html](http://www.anra.gov.au/topics/agriculture/pubs/summary_reports/ag_in_aust/aa_07.html)

## Urban sprawl and population growth

A study by the Commonwealth government quoted research that 'historically, peri-urban areas have contributed to the total value of the national agricultural industry by an estimated 25%, despite comprising less than 3% of Australia's agricultural land'. (Australian Government 2010). A report by the National Institute of Labour Studies (2010) found that Sydney and Melbourne may each require more than 430,000ha of new land for housing. Much of this growth will occur in highly productive land, and the report suggests that this may turn Australia into a net importer of many types of food.

The reduction in our ability to feed ourselves has been described as a loss of 'food sovereignty'. This isn't just a matter of where the food is grown but who controls it, and the long and complex chains of inputs required to put it on our plates.

## Barriers to thinking about food in architecture and planning

There are a number of factors that have contributed to this situation that architects, planners and allied professions have inadvertently had a part in. These relate to the way decisions are made (process issues) and the design choices that arise (product issues).

### Process issues

Food often gets overlooked in the decision-making process because the scale and complexity of conventional food systems can obscure the effects of planning decisions on food supply. The Heart Foundation (2010) puts it this way: 'It is difficult to see how the re-zoning of a small site from a farming use to an urban use will affect a global food system that spans several international markets. Consequently, it is understandable that planners and the community in general see planning for food as a global issue rather than a local one, and so outside their control.'

Key decision makers may be deterred from implementing urban agriculture proposals because of insurance concerns, lack of precedents, need for engagement of multiple sectors, lack of regulation, competing priorities with other objectives for land use and the messy aesthetic of much urban agriculture (UA).

While the strategic planning that may underpin a land use may reference an aspiration to protect our

ability to produce food, this often gets lost as the design progresses. For example 'a planning scheme cannot require land zoned for farming to be used for agriculture; it can only prevent certain other uses and developments from taking place' (Heart Foundation 2010). If the developer and their agents do not share the aspirations of the intent of the zoning – or are aware of its potential – the land may not be used to make a contribution to our ability to feed ourselves.

### Physical product issues

The way we lay out our cities, with low density suburbs at the peripheries, effectively thins out the potential to support food shops in these areas and leads to widely scattered clusters of shops which lie out of walking and cycling range for many and are poorly connected by public transport. The streets in these areas – the conduits for movement – tend to be car-orientated. Local stores in these areas are often at the margins of viability and tend to cluster on main roads to be visible to their potential customers. They can keep their heads above water by concentrating on long-life processed and tinned food rather than the perishable fruit and vegetables. People dependent on these sources of food are going to find it difficult to access the range and quality of food they need to stay healthy.

### Unused and underused urban space

Cities constantly change with market pressures and social needs, resulting in buildings and spaces being abandoned as unsuitable. The derelict or unused land found throughout our towns and cities become 'urban voids' (Armstrong 2007). The limited commercial viability of developing these spaces leads developers to look elsewhere for developable land, and this adds to the pressure to convert rural to urban land.

To this unused space can be added land that is between uses – not planned for immanent development. There is also urban land of great aesthetic value but limited in other ways such as nature strips and many front gardens. These add character and give a place identity but are often maintained as monocultures of grass (or weeds), denying many opportunities to meet other needs.



**Figure 3: Unused and underused spaces providing opportunities for food sensitive urban design**

## Food sensitive planning and urban design

Food Sensitive Planning and Urban Design (FSPUD) is an approach to planning for the future that aspires to create the optimal circumstances for each stage in the food system to occur efficiently and responsibly, and reconcile these with the traditional concerns of planners such as:

- attractive, liveable surroundings
- a strong and competitive economy
- a reduced environmental footprint
- opportunities for community interactions
- shared spaces
- fair access to goods and services
- environments for active living
- resilience to challenges such as peak oil and climate change

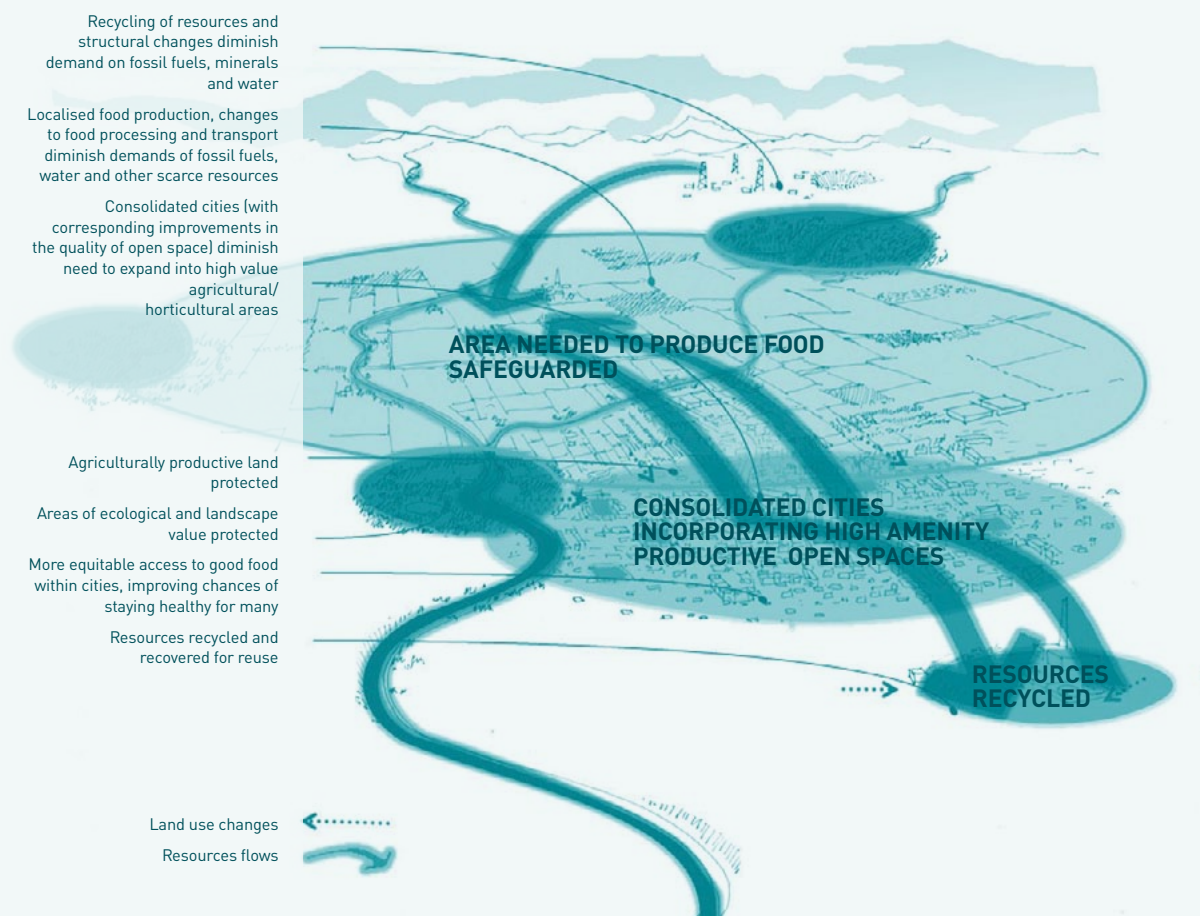
FSPUD outlines a number of opportunities for planners and urban designers to consider food in the decisions they make. It can be woven into decision-making processes, enabling informed consideration of; the supply of food, whether the environments we create foster enjoyment of food at all stages in

the food system; and the potential of careful design to enable people to meet their other needs while meeting their food needs.

## FSPUD principles

FSPUD is guided by 10 principles:

1. secure and equitable access to the food necessary for a healthy and fulfilling life
2. easy and convenient, healthy and sustainable food choices
3. spaces and places to meet diverse needs, reconciling food production and exchange with housing, open spaces and recreational areas, urban cooling, skills and jobs, socialising and community celebration
4. opportunities for growing, exchanging, cooking and sharing food
5. safe use and re-use of urban resources (soil, water, nutrients, waste) that can support viable and sustainable food production
6. increase and protection of biodiversity and ecosystems (including, but not limited to, bees, pollinating fruit trees and native vegetation)
7. community access to productive land and experienced producers



**Figure 4: Conceptual model of an FSPUD system (adapted from Heart Foundation 2010)**

8. secure tenure and supportive operating environments for community and commercial food enterprises
9. openness to change in future use of space and resources
10. diversity and sovereignty over what, how and where people produce and eat food

## Implementing FSPUD principles

At the heart of implementing these principals is the goal of designing towns and cities so a high standard of living can be fostered and maintained with less need to convert agricultural land to other uses.

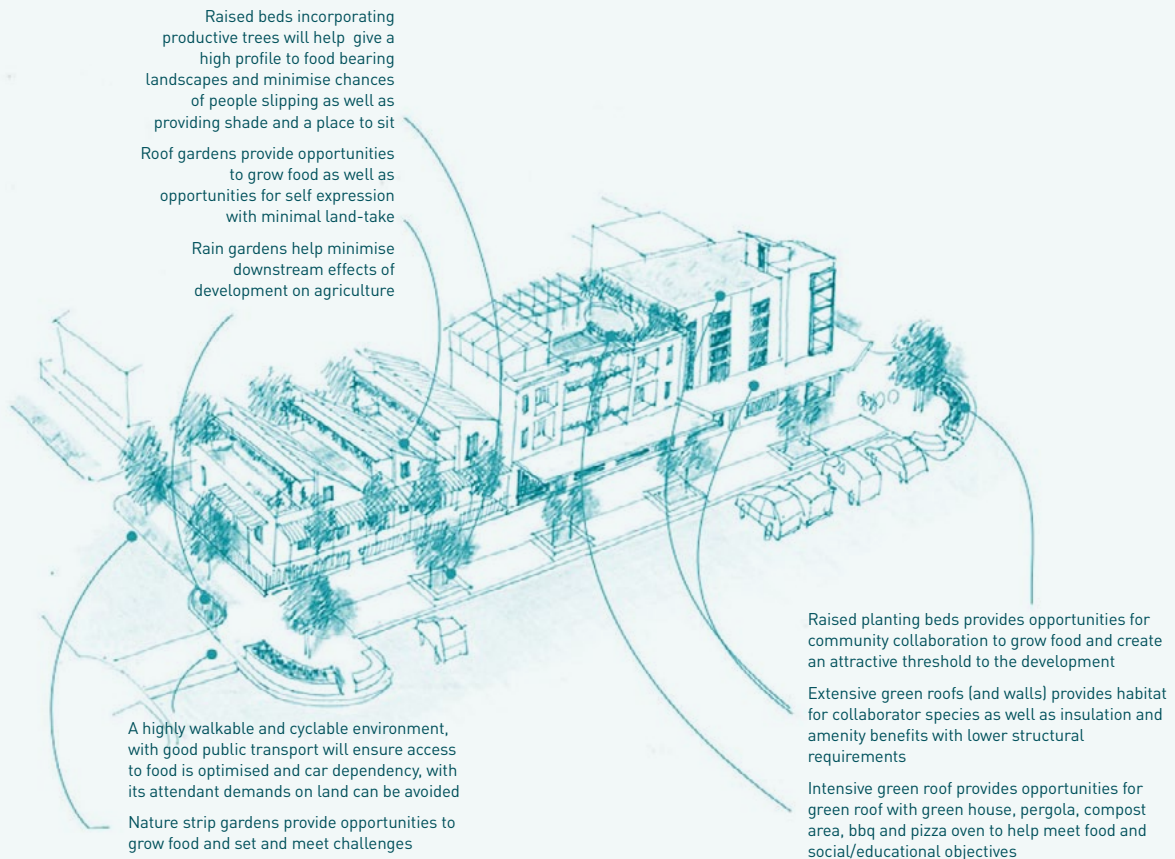
As Ian Sinclair (1999) put it:

Growth of urban areas can go in two directions: outwards (horizontal) or upwards (vertical).

Outward growth is called urban sprawl and upward growth is called urban consolidation. The basic fact is if we can achieve more vertical growth, there will be less need for horizontal growth. It is the balance between the vertical and horizontal which is what we strive for as planners.

Strategic planning provides opportunities to lobby responsible authorities to make food issues material considerations in planning processes across a range of policies including land use, retail and health plans. The City of Vancouver (2007) provides some interesting insights into how the opportunities created by urban consolidation can protect food growing land and utilise food production to improve the quality of life in our towns and cities.





**Figure 5: Conceptual development reconciling food and other objectives**

Much peri-urban land is not being effectively used because of uncertainty over its eventual use. Hence plans and a sense of political will that provide greater certainty may encourage continued investment. To this end, interested parties can make submissions in rezoning requests regarding the importance of maintaining agricultural land and reiterating commitments to urban consolidation.

Urban buildings can utilise walls, balconies and roofs as garden surfaces that contribute to growing food as well as providing insulation and adding character and habitat value. Vancouver encourages the creation of small studio spaces on load-bearing building roofs which can be used for tools and caretakers. Vancouver also promotes large rooftop greenhouses that can be used by residents and businesses 'such as restaurants in mixed-use buildings'. These gardens provide opportunities for occupants to get together and access good food and compost waste.

## Conclusion

If architects and allied professionals are to contribute to making a more equitable, sustainable food system they should seek to be more aware of the issues and use the information to ask themselves:

- How has this proposal considered food issues?
- What are the choices open to the occupants/ users of this building to access food?

By implementing Food Sensitive Planning and Urban Design (FSPUD) principles they will go a long way to resolving those questions.

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