

Eating the Landscape: Aesthetic Foodscape Design and its role in Australian Landscape Architecture

Joshua Zeunert AILA

Lecturer

School of Architecture, Landscape Architecture and Urban Design

Faculty of Professions

The University of Adelaide

South Australia 5005 AUSTRALIA

Ph: +61 421 019 101

Ph: +61 8 8303 3476

e-mail: joshua.zeunert@adelaide.edu.au

ABSTRACT

This paper explores the relevance of 'Aesthetic Foodscape Design' (AFD) to current and future social and environmental challenges and argues for its integration into Australian landscape architectural design practice. It focuses on contemporary research into the fields of AFD and sustainability, AFD's potential role, challenges to AFD's realisation and current project work. AFD aims to contribute to overcoming the urban disconnection from growing food and also to increase awareness of food production and food systems. AFD seeks to create edible landscapes in highly visible public and civic locations and encourage ongoing participation in the growing and sharing of food. AFD sets out to embed edible plant species in the core planting palette of landscape architects and designers. It calls for design and spatial exploration of edible plant species in landscape architectural practice. Ultimately, AFD endeavours to create aesthetic, edible, public spaces that delight users. This paper is intended as a general introduction to raise many of the relevant challenges to implementation of AFD encompassing aesthetics, risk, knowledge, process and maintenance. AFD, if successfully realised, provides potential environmental, social, economic and health benefits to participants and to the wider sphere. This paper aims to briefly capture a divergent range of areas and does not cover the aforementioned areas in detail but rather presents a general introduction in an Australia urban design context.

KEYWORDS

Design; aesthetic; edible; landscape; Australia.

INTRODUCTION

There are only seven meals between civilization and anarchy.¹

Food is common ground. As the source of all life-sustaining nutrients, food is the great unifier of race, culture and creed. To state that ‘without food, we die’ is so simplistic a statement as to be almost redundant. Yet if the importance of food is a given truth, then why does food feature so minimally in design? If the work of the landscape architect is to “shape and makes sense of our experience of place and landscape” (Kaplan, 1998) and to seek solutions to a “problem which occurs over and over again in our environment” (Alexander, 1977), then surely the problem of food—the greatest of our existence—will be central to the landscape architect’s design practice. Food production and edible landscapes, however, feature very minimally in contemporary Australian landscape architecture. Food may be the source of our existence, but it is far from the centre of our design practice. This, therefore, is a call to begin the process of shifting the marginal to the centre—from the rural outskirts to the urban centre, and from the edges of design to the fore. Beyond this basic and primal need for food is an additional and far more recent concern, one that is urgently encroaching. The health and sustainability of the global food system (of which Australia is an integral participant) is under increasing threat (Roberts, 2008; Heinberg, 2005) largely due to the depletion of finite energy sources, together with massive population growth and economic pressures. This means that now—more than ever—is the time to rethink and update our design focus. Australian landscape architecture’s planting approaches have historically been and continue to be dominated by the use of ornamental plant species, whether exotic ornamentals, such as plane trees and lawn [Fig. 1], or native and indigenous ornamentals, such as *Eucalypts* and *Dianella*. These planting approaches typically explore landscape design traditions of formality, informality, sense of place and environmental agendas (such as indigenous biodiversity). These have cultural and environmental importance in Australia. Their maintenance regimes are established and understood. They do not, however, socially or environmentally connect Australian culture with our consumption of food. This paper advocates for a shift in focus to what might be considered Aesthetic Foodscape Design (henceforth referred to as AFD), a practice that marries the productive yields of edible plants with the aesthetics of landscape architecture’s spatial design practices. By utilising edible plant species and creating aesthetic landscapes of delight for users of public and civic space, AFD can play a role in the essential task of shifting Australian culture’s awareness of food practices towards a more resilient and local food system, which will be essential in a energy descent future (Holmgren 2009, p14; Kunstler, 2005; Heinberg, 2004; Heinberg, 2007; Hopkins, 2008; Heinberg & Lerch, 2010). AFD intends to compliment existing movements in urban agriculture that attempt to better establish food production in cities. By expanding the focus into a public domain design context, which has largely been underexplored, AFD aims to enable visible public prominence of edible landscapes in suitable locations in urban environments. AFD presents new opportunities for design exploration and this paper advocates that edible plant species should become embedded in core landscape architectural practice and the public domain in Australia. This paper attempts to briefly capture a divergent range of areas relevant to the topic to present a general introduction for Australian design

practice. Section 1 examines the need for AFD by examining the state of the global and national food systems and their reliance upon finite energy sources. Section 2 explores the role of Aesthetic Foodscape Design in contemporary landscape architecture. Section 3 assesses challenges to implementation of AFD and makes suggestions on how these may be overcome. The paper concludes with examples of AFD in Australian landscape architecture.



Figure 1: Even in the majesty of Uluru, Australians defy the arid environment and maintain lawn as a sense of connection to the landscape of the mother country.

SECTION 1: THE NEED FOR AESTHETIC FOODSCAPE DESIGN

Before discussing AFD in more depth, this section briefly examines the current state and resilience of the global and Australian food systems, with the intention of reinforcing the need for the addition of AFD to urban agricultural and design practice.

EATING FOSSIL FUELS

The unprecedented population growth over the past century [Fig 2]⁶ can be attributed to the untapping of eons of fossil fuel energy, primarily oil and natural gas. The ability of the industrial food system to exploit this cheap, readily available and finite energy source has created incredible efficiencies in agriculture, such as the Green Revolution, which increased the world population by approximately four billion since 1950. Lowe argues that the remarkable feat of increased food production in the last half-century does not mean that we can sustain it (Lowe, 2005, p60). A key problem with this

system of agriculture is its fundamental reliance on cheap fossil fuels.

To put it simply, [we] have been eating oil and natural gas for the past century, at an ever-accelerating pace. Without the massive 'inputs' of cheap gasoline and diesel fuel for machines, irrigation, and trucking, or petroleum-based herbicides and pesticides, or fertilizers made out of natural gas, [we] will be compelled to radically reorganize the way food is produced, or starve. (Kunstler, 2006, p239)

There is increasing evidence by a range of experts that global oil supplies have peaked—from university researchers; government advisors (Campbell, 1997; Campbell 2004; Campbell 2005); scientists; geologists (Deffeyes, 2002; Deffeyes, 2005; Deffeyes, 2010); documentary films; energy and peak oil experts (Kunstler, 2006; Heinberg, 2004; Heinberg, 2007; Godstein, 2005; Leggett, 2001; Leggett, 2005; Leggett, 2005); and wikileaks cables. Key bodies, such as the International Energy Agency (IEA) who have been criticised in the past for their political conservatism (Alekkett et al, 2010), have now acknowledged that peak oil is here—their chief economist Fatih Birol stating that the world's crude oil production peaked in 2006¹⁰. Global oil and energy peak spells the demise of cheap energy due to their increasing scarcity. As cheap fossil fuels (petroleum and natural gas in particular) are considered to be the lifeblood of our industrial food system [Fig 3], this means that the food system will be placed under increased pressure (Pollan, 2008; Roberts, 2008; Holmgren 2002) and food prices will rise in the distance 'from paddock to plate'. Furthermore, it has been calculated that about half of the world's population currently survives on the extra calories produced from synthetic nitrogen¹² (produced from natural gas), which is a staggering amount of the world's population dependent upon a finite resource. The use of synthetic nitrogen in industrial agriculture is further problematic as it accumulates in soil resulting in acidification, and the Food and Agriculture Organisation of the United Nations (FAO) estimates that nearly one-third of arable land worldwide is so acidic it can't support high-yielding crops¹³. Stewart states that rapid population growth has made farmland conservation a challenge throughout the world (Stewart & Duane, 2009) as the increasing population often undermines the land needed to feed itself by covering it with cities required to house itself! Cities are also where increasing populations are choosing to live—they are home to over half of the world's population (of nearly 7 billion). Conway suggests that there needs to be a 'Doubly Green Revolution' that increases food production while at the same time, taking care of the environment (Conway, 1998). This is essential as the environment has been rapidly degraded by the Green Revolution's approach to agriculture. Some utopian proponents (DeGregori, 2002) point to incredible developments and unprecedented efficiencies gained in food production during the Twentieth century and propose that continual technological developments by humanity will continue to increase food yields infinitely into the future, while others believe that human ingenuity will address future challenges (Simon, 1996). It is, however, difficult to see how a food system and world population that is so fundamentally reliant upon plentiful supplies of cheap oil and natural gas will find miraculous substitutes for their astonishing efficiencies. It seems likely that there will be a return to systems of agriculture that rely less on fossil fuel inputs. Richard Heinberg summaries this predicament with tacit

simplicity, "Food is energy. And it takes energy to get food. These two facts, taken together, have always established the biological limits to the human population and always will." (Heinberg, 2005, p1).

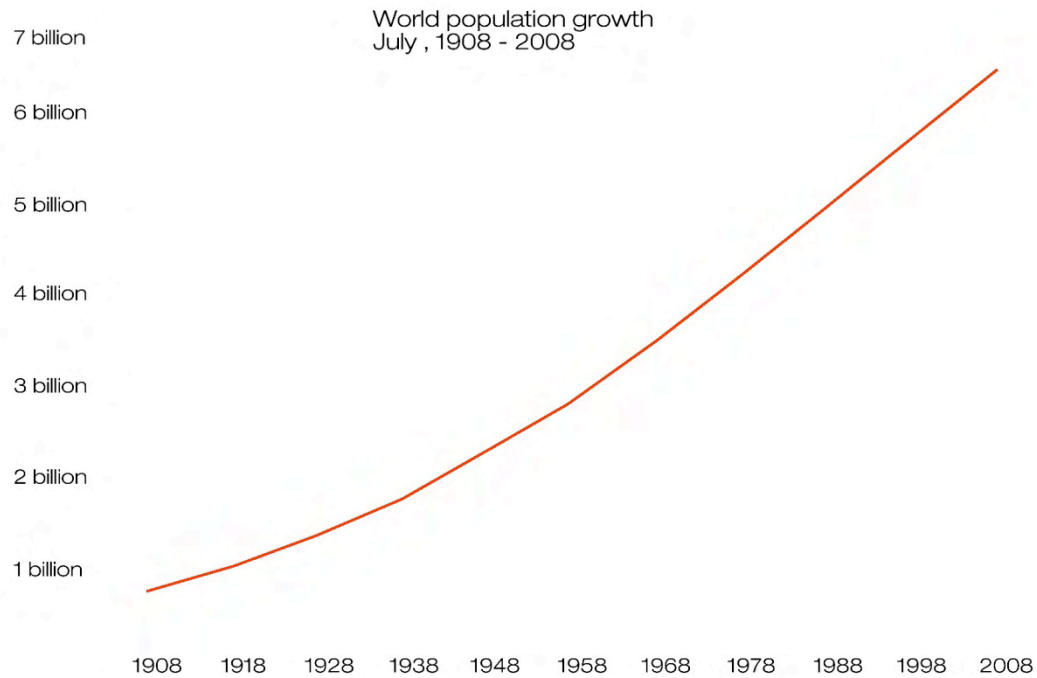


Figure 2: World population has skyrocketed in the past century from around 1 billion to almost 7 billion, coinciding with the untapping of the phenomenal energy source, oil, during this time. Future population and economic growth forecasts rely on the assumption of ongoing availability of cheap fossil fuel energy supplies.



Figure 3: A typical scene from the industrial agriculture system whereby fossil fuel inputs have superseded and substituted millennia of human inputs on the basis of cheap energy.

EATING MONEY?

The Twenty-first Century food system is a hyper-efficient, growth-dependent sector of the free trade economy, which reduces food—as the essential sustainer of humanity—to a mere economic commodity on par with all other commodities in the economy. This subjugates food—and the resultant sustenance of humanity—to the ebbs and flows of the economy. The flaws of this system are slowly being realised, as was evident in comments made by former US president Bill Clinton at the 2008 United Nations Food and Agriculture Organisation’s World Food Day:

We need the World Bank, we need the IMF, we need all the big foundations, we need all the governments to admit that for 30 years we all blew it, including me, when I was president. We blew it. We were wrong to believe that food is like some other product in international trade. And we all have to go back to a more environmentally responsible, sustainable form of agriculture. We should go back to a policy of maximum food self-sufficiency.

Due to the requirement of the capitalist economy to provide continual growth, the industrial food system must increase its output and efficiency every year. This continual food growth is inextricably linked with unchecked population growth, increasing obesity, and increased food waste—all which have occurred at alarming levels at a global

scale in the past half-century. Thus, there exists what Roberts has described as a 'grotesque symmetry', where almost one billion individuals in the world who are over-nourished, while one billion of the world are hungry and undernourished (Roberts, 2008).

AUSTRALIAN FOOD ISSUES

The global evidence suggesting the need for an improved and more resilient food system is particularly pertinent to Australia, especially if the concept of national food self-sufficiency was to be considered important. Tim Flannery outlines the infertile, ancient and fragile nature of Australia in *The Future Eaters* (Flannery, 1994) where he points to the limited availability of nutrients from our soils and oceans. This has also manifested in the dire state of Australia's food bowl, the Murray Darling basin (which produces forty percent of Australia's food), where ongoing environmental and political problems are fought on the land and in parliament. Despite Australia's consciousness of its water scarcity, it is the fifth largest exporter of water in the world by way of our export of food crops (and their embodied water) to world markets (Roberts, 2008) and this includes water intensive species such as cotton and rice. Add an increasingly unpredictable climate (Flannery, 2005, Downton, 2009) from global climate change into the mix and the recipe may prove to be disastrous for the food system, which is reliant on stable and predictable climate patterns for yields, efficiency, and returns on investment. It is not, however, just the carrying capacity of our soils, rivers and oceans that are of concern to sustaining our growing population during instable climatic patterns, but also problematic food policies as flagged by National Party MP De-Anne Kelly nearly a decade ago in parliament:

Australian agriculture's tragedy can be attributed to the elite thinkers who crafted what passed for "rural and regional policy" in a succession of governments spanning the past quarter century. Still frozen in a post-colonial theory that revolves around "get big or get out", economies of scale, point theory, and the cherished hope that eventually the world would adopt a truly free market philosophy, they have instead delivered an economically and ecologically unsustainable future. ... the old theories are now found wanting, and it is time for a new paradigm for agriculture.

Cebon presents empirical data showing that the state of the Australian food system has continued to deteriorate over the past few decades for seemingly all involved in it, including farmers (farm income; terms of trade; farm debt; total farm numbers; rising input costs; number of farm workers); the Australian economy (contribution to GDP); consumers (rising prices); and the undernourished (increasing) (Cebon, 2010). The notable exception to the dire state of the Australian food system is the shareholders of Woolworths Limited and Wesfarmers (owners of Coles etc), who have experienced exponential growth in the same period (Cebon, 2010), and who's expansive empires, creeping acquisitions, and anti-competitive practices have been subject to an intriguing expose on ABC's *Hungry Beast* program. The Woolworths and Coles retail duopoly controls around eighty-percent of the food market in Australia (Cebon, 2010). This trend in monopolisation of the food industry is a global issue, and it is occurring at both

scales of production (eg seed companies, [Fig. 4.1]) and supply (eg global organic industry, Fig. 4.2), and has large implications for the food industry's resiliency to shocks (through a lack of diversity) and food safety (increasing contamination due to decreased number of processing facilities of food, such as ecoli outbreaks). This is particularly relevant to Australia as our duopoly is significantly higher than that of other retail duopolies, such as the UK (48%) and USA (20%) .

Gross food wastage is an integral part of the global food industry in developed nations, where a staggering 25 - 50% of fresh produce is wasted for not meeting the generic (size/weight) and cosmetic demands of supply chains. Australia has a similarly disturbing record of food waste—in 2004 Australia threw away \$5.3 billion of food¹⁹, while more than 100,000 tonnes of Queensland bananas go to waste every year because the fruit does not meet cosmetic retail standards (Boland, 2010, 7). Food waste makes up around 40% of the domestic waste stream in Australia (Boland, 2010, p2). This wasteful food practice can be partially accounted for by the disconnect of the urban population from the realities of food production, for example, discarding food due to minor cosmetic blemishes or the presence of insects. The 'out of sight, out of mind' approach to agriculture is also a passive form of consent for industrial agriculture's copious applications of pesticides and chemical fertilizers to achieve cosmetic produce benefits (at significant cost to agricultural workers health and the environment). In addition, food wastage to landfill also misses the opportunity for essential nutrient recycling systems to improve soil health and edible plant vitality.

It is apt to note that in every civilisational decline, there is a clear point when their food source occurs too far away from the city (ASHE, 2007). As most Australian cities continue to grow, agriculture on the peri-urban fringe is being consumed by urban sprawl. This commonly results in pushing small farms and market gardens further away from the city and often into less productive land, or the farms ceasing to exist altogether. Allowance of urban sprawl to consume productive farmland—in a country where productive farmland is scarce—is poor planning policy,²⁰ especially considering the fact that that many Australian cities have been built on some of the best agricultural land in the country (for example, the Sydney basin, Melbourne, and the Adelaide plains) (Sinclair, 2009; Gill, 2008). Close proximity of our food production to where we live is increasingly important in an energy descent future, as evidenced through the awareness of food miles²¹ (which measures the embodied transport energy in food), the emergence of the concept of *locavore*²² (eating locally, often within a 100 mile radius), and the local food movement (which has manifest in various forms including farmers markets). The disappearance of agriculture from Australia's cities is a key focus for AFD, which aims to counter the visual disconnection and invisibility of food production from our cities—not necessarily through vast areas of agricultural production—but through reminders of the importance of food production in appropriate public locations.

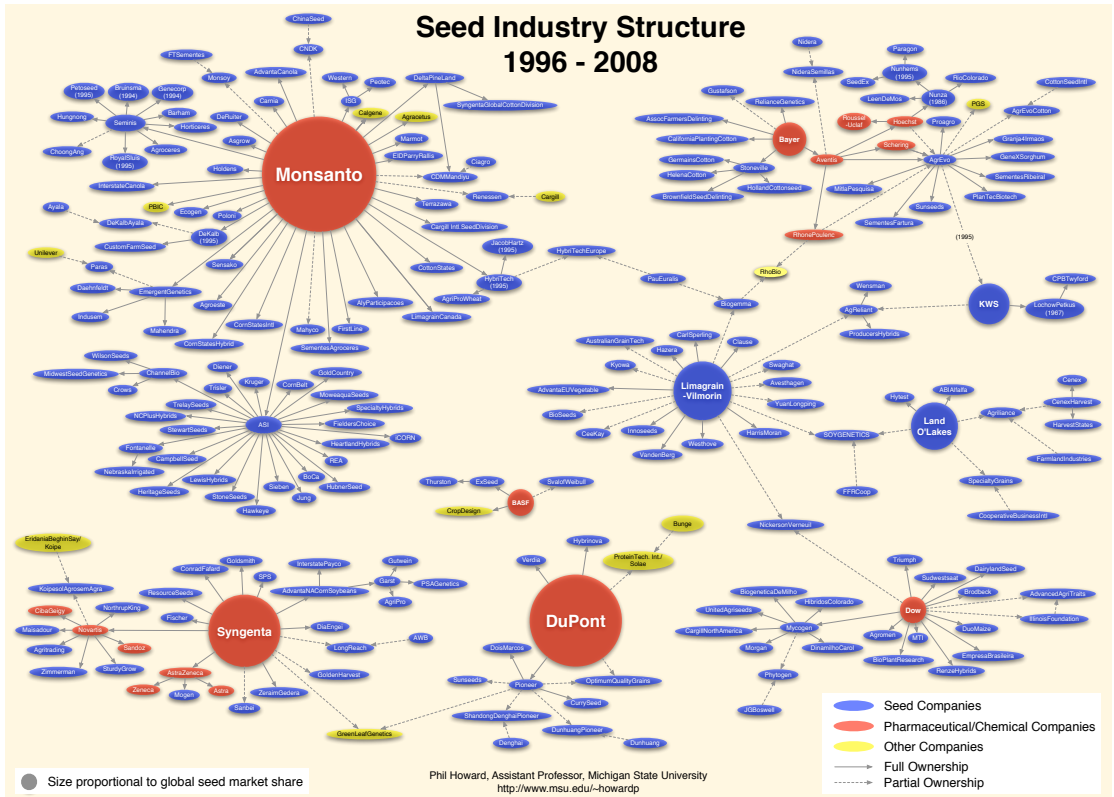


Figure 4.1: Seed Industry Structure 1996-2008 conveys the consolidation, monopolisation and loss of diversity within the seed industry. The largest companies are represented as circles, with size proportional to global commercial seed market share.

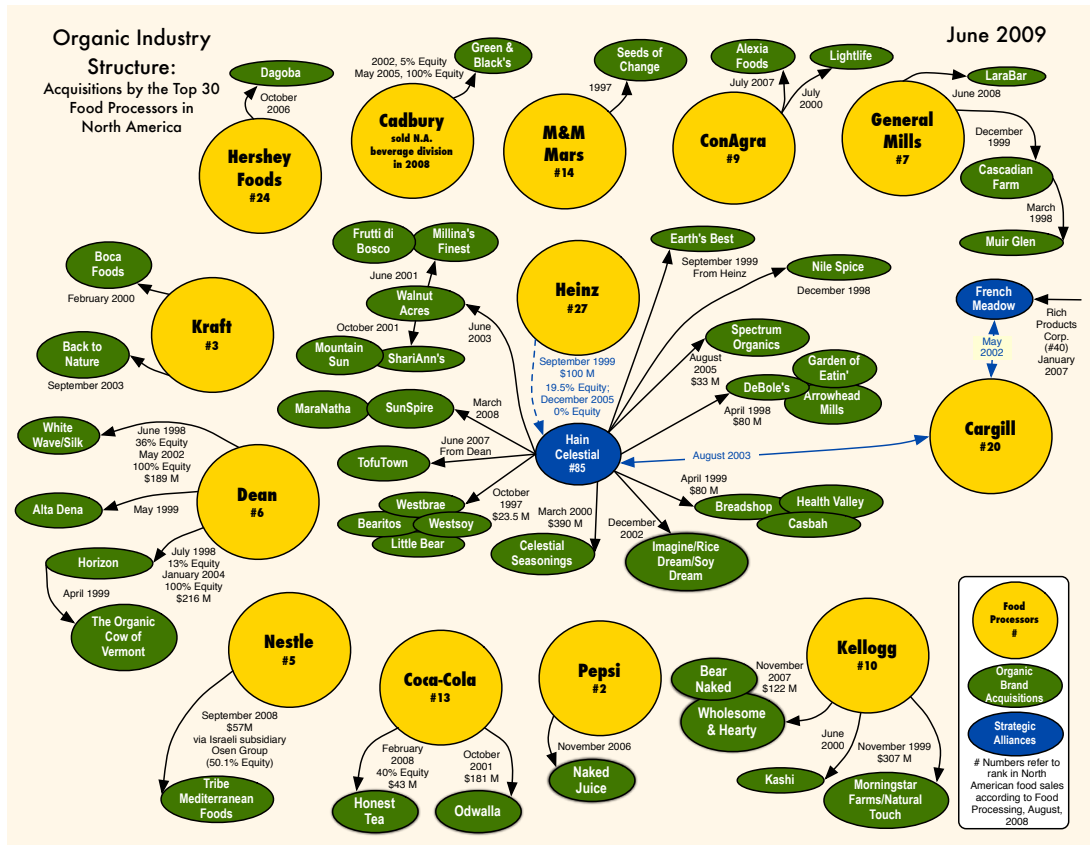


Figure 4.2: This diagram alludes to the fact that the organic food market is largely becoming a part of the global food system with its

domination by food giants.

SECTION 2: THE ROLE OF AESTHETIC FOODSCAPE DESIGN

KEY AIMS

AFD has several key aims.

1. To visibly or directly overcome the urban disconnect to the growing of food.
2. To help increase awareness of food production and in-turn, increase interest and advocacy in improving the Australian and global food systems.
3. To create edible landscapes in highly visible public and civic locations.
4. To encourage participation in growing and sharing of food.
5. To embed edible plant species in the core planting palette of landscape architects and designers.
6. To encourage design and spatial exploration of edible plant species in landscape architectural practice.
7. To create aesthetic, edible, public spaces that delight users.

THE ROLE OF LANDSCAPE ARCHITECTURE

Nordahl argues that “Landscape architects, as designers of our public spaces, have proven adept at using plants to address concerns of comfort, maintenance, aesthetics, and other socio-environmental factors. Adding food to that list is well within their regimen” (Nordahl, 2009, p8). In design terms, AFD is focused on producing high quality visual, aesthetic and experiential outcomes to enable visible social prominence of edible landscapes in all contexts of urban environments. AFD calls upon landscape architects in Australia to explore the design possibilities of edible species. The aesthetic agenda of AFD challenges the current agricultural and gardening approach for edible species that focuses on maximum yield for minimum input. Using design to feature edible species has the potential to increase consciousness, understanding, appreciation and skills in food production. In 1920, landscape architect Jens Jensen stated, “I believe the city should own tracts of land for the growing of vegetables and fruits, where the citizens can see and understand that their real existence comes out of Mother Earth, and that the merchant or the peddler is only a means of delivery”²³. AFD has the potential to connect the increasing demand for fresh, local and organic produce in highly visible, public places. This argument is reinforced by Gobster, who posits that people care for and act purposefully on phenomena at scales of human experience, namely, the ‘perceptible realm’ (Gobster et. al 2007). If food production is not a visible part of Australia’s highly urbanised societies on a day-to-day basis, it will remain an imperceptible phenomenon. Without ongoing perception of agricultural landscapes and food production, urban Australian society risks disconnection from the most fundamental practice to humanity—food production—since the agricultural

revolution gave rise to civilisation around 12,000 years ago. In the face of existing trends in the Australian agricultural and food industry, continued disconnection from food production would likely mean decreased food self sufficiency and increased reliance upon food imports.

DIVERGENT BUT UNITED?

AFD draws together the aims and practices of urban agricultural movements such as community gardening; school gardens; kitchen gardens; guerrilla gardening and permaculture, with the structured and aesthetic principles of landscape architecture. While these movements are already established in Australia, in general, they have remained at the margins of public space and society, and have had little growth or impact upon urbanised society, the public domain and civic space within Australia. Urban agricultural movements are usually relegated to abandoned and neglected public sites or private spaces and backyards and often lack social visibility. Their typical aesthetic outcomes [Fig. 5] are often perceived and dismissed as messy and inappropriate for the highly visual expectations of prominent sites in urban spaces—in particular, sites that are seen and accessible by large volumes of the public. Walker shares this view, and suggests that, “they tend to lose sight of the other roles of the garden—the magical ambience, the cultural significance, and the place of the spiritual within the landscape”.²⁴ AFD attempts to bridge this divide through formal design practice to create environmental and social solutions that break new ground. The application of AFD to a diverse range of scenarios (in addition to those outlined below) is limited by an assessment of risk, as discussed in the following section. To break new ground, AFD requires that:

Planners, urban designers, and even developers, are recognizing “farming as another mixed use that adds vitality to the community”. After a half-century hiatus, agriculture is finding a place next to public spaces, entertainment and cultural venues, employment opportunities, recreational amenities, educational institutions, and shops and markets as principal constituents of great communities. (Nordahl, 2009, p75)



Figure 5: A typical aesthetic of many community, school, kitchen, guerrilla, allotment and permaculture gardens. This aesthetic is a barrier to AFD as it is often dismissed by many as messy, ramshackle and inappropriate for the highly visual expectations of prominent sites in urban spaces.



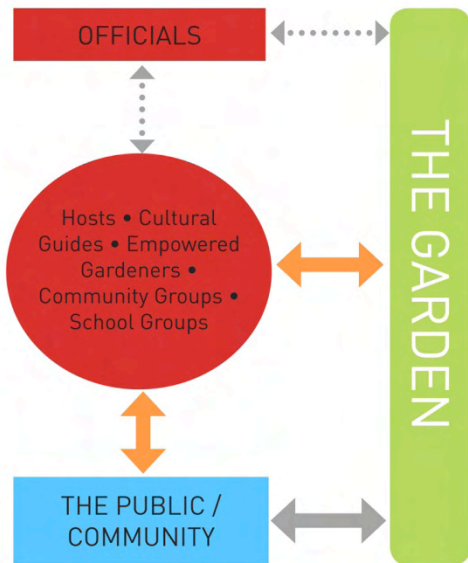
Figure 6: Parterres of vegetables at Château de Villandry in France demonstrate that food production can be orderly and aesthetic, even within

the strict formality of European landscape traditions.

DESIGN & YIELD

While yields are not the focus of AFD, there are minimal barriers to creating a highly productive and visually striking foodscapes, such as the vegetable gardens of Château de Villandry in France [Fig. 6]. There are two key strategies to mitigating maintenance requirements of this example. The first involves recruiting a volunteer workforce and the second, the utilisation of economic potential. The proposed re-design of Victoria Square/Tarndanyangga in Adelaide by Taylor Cullity Lethlean is an example of the former where a volunteer regime of garden hosts has been proposed to maintain the productive garden [Fig 7]. An example of the latter is WAX Design's proposed AFD for Jabob's Creek Winery and Visitor Centre [Fig 8], whose restaurant consumes large amounts of fresh produce on a daily basis. Initial calculations by WAX have aimed to supply 16,000 tonnes of fresh produce for the kitchen annually. The proposed AFD has been sized to meet this demand and it has been anticipated that maintenance costs to employ two full-time staff on the garden will result in reduced operational costs over the existing purchasing arrangement, in addition to the many added benefits ranging from immediately fresh and organic produce, to control over what is grown, marketing opportunities, reduced food miles and local employment. This project example demonstrates many of the potential benefits of AFD that utilise the skills of landscape architects in orchestrating projects of social, environmental and economic benefit to a client and community, with the aesthetic quality of the foodscape being central to the enhancement of the client's image, social standing and economic success. It is important to differentiate the aesthetic component of AFD from other forms of agriculture that focus on productivity and yield. AFD balances yield amongst other agendas outlined in this paper (such as spatial experience and visual performance) and it is not given the primary focus. Nonetheless, in certain scenarios, significant areas of food production for a suitable client can reduce operational costs while providing aesthetic amenity.

The Populated Garden



Sustaining the Square - Culture



Figure 7: Diagrams conveying the proposed cultural and social strategies for the proposed re-design of Victoria Square/Tarndanyangga in Adelaide. A volunteer regime of garden hosts will act as a conduit between officials and the general public. These hosts will act as 'empowered gardeners' to both maintain garden spaces while also providing interaction and visitor information to visitors to the square.

Landscape Master Plan

Drawing No. 07JAC-A02 Date of Issue 19/06/11 Scale 1:400



Figure 8: WAX Design's proposed foodscape for Jacob's Creek Winery and Visitor Centre aims to supply the restaurant with around 16,000 tonnes of fresh produce for the kitchen annually while providing an aesthetic environment suitable for a range of uses .

SUSTAINED ACTIVATION OF PUBLIC SPACE

AFD has the potential to activate public space and contribute to a new civic paradigm where participation in public space can be seen as an opportunity, such as the aforementioned proposed design for Victoria Square/Tarndanyangga. The ability to participate in public space without a commercial agenda (such as a shopping) is fundamentally important to a society that must reduce its consumerist addiction to mitigate the impacts of peak 'everything' (Heinberg, 2007), climate change (Flannery, 2005, Downton, 2009) and overshoot of carrying capacity (Catton, 1980). A significant proportion of urban public domain in Australia is barren and inactivated;²⁵ its periodic activation is often due to it being one of the last bastions of the smoker²⁵ rather than for the quality of urban space attracting sustained use. This critique of modern landscape architecture and urban design is broader than the Australian context, as is echoed by Alon-Mozes, who describes it as, "anonymous, standardized, unseen, and lacking in regional or human character and involvement". Alon-Mozes argues that "bringing agricultural practice to these gardens is both a critique and alternative strategy for contemporary practice"²⁶. AFD requires ongoing social participation in order to succeed as edible plant species require more ongoing input and care. Thus, AFD presents the opportunity to activate public space through increased social interaction. This also allows for the building of social capital²⁷ amongst potentially diverse age and cultural groups, enabling sharing of knowledge, skills and experiences through the growing of food in healthy and uplifting public environments. These benefits are likely to build upon similar successes experienced in many community gardens worldwide, although it is worth noting that the aesthetic agenda of AFD may appeal and attract a different demographic to that engaged in existing urban agriculture and community gardening networks. This area would benefit from further research pending realisation of AFD projects in Australia.

SECTION 3: CHALLENGES AND HOW THEY MIGHT BE OVERCOME

This section briefly explores challenges that need to be skilfully addressed and navigated in order for AFD to be successfully implemented within Australia public space. These challenges include the following areas: aesthetics; public liability/duty of care; horticulture; design; management and maintenance. Before exploring these challenges, it is worth considering our existing food system:

There will always be risks associated with growing and consuming food. Some concerns are valid, though most are based on naïveté. Nevertheless, these perceptions may prove to be formidable obstacles to implementing a public produce program in many communities. The truth is that farms today have few regulations in place to ensure absolute safety of fruits and vegetables, and there is perhaps greater potential for municipal government and citizenry to work together to ensure a healthier-and safer-food system. (Nordahl, 2009, p34)

AFD allows for more direct control, input and supervision of how food is grown, ultimately giving more peace of mind and satisfaction in this process.

AESTHETIC CHALLENGES

Foodscares are part of the Australian vernacular, including expansive wheat fields in southern Australia, sugar cane and banana palms in tropical areas, grapevines in wine regions, and fruit orchards on hill slopes and river valleys [Fig. 9]. These foodscares are synonymous with distinctive regional identities, however, they are rarely translated into the cities. There is a general perception that food exists 'out-there', in far-flung scenic and rural regions, whilst the persistent hangover of ornamental paradigms endures through the continued demand for lawn and exotic trees by a majority of Australians. This exotic, ornamental paradigm has been somewhat diminished in the last decade or so as many regions have experienced devastating droughts and have thus embraced the use of native and Mediterranean, low-water and low maintenance species. Foodscares have not achieved any significant infiltration to cities and urban centres in Australia, and food production has remained a hidden tradition in humble backyard gardens. Edible plants have not previously been deemed a worthy addition to public spaces that are typically dominated by formal order and low maintenance. These aesthetic practices are slowly shifting. Recent movements in urban agriculture and the popularity of related themes and activities are testament to the timeliness of AFD, including the resurgence of community, school and kitchen gardens; streetscape edible precincts (front yards, road verges, median strips and street trees); the resurgence of farmers markets and food swaps; freeganism and gleaning (the collection of produce from the public domain or by private consent); and guerrilla gardening (where ornamental and edible species have been planted in public space without permission, usually under the cover of darkness). There is widespread popularity of media personalities in this area (such as Peter Cundall, the *Gardening Australia* team, *Costa's Garden Odyssey*, Jamie Oliver, Hugh Fearnley-Whittingstall (*River Cottage*), and even cooking shows such as *My Kitchen Rules*, *Masterchef* and *Italian Food Safari* increase demand for quality, fresh produce. In spite of this, there has been no concerted effort to embed edible plants into the core palette of landscape architects in Australia, and to study and experiment with edible plants and their traits. Significant potential exists for landscape architects to merge this groundswell of urban agriculture and social activity with design practice. These movements may also indicate a society increasingly aware of the fundamental 21st Century need for local food security and thus more supportive of the differing requirements and maintenance regimes of foodscares.



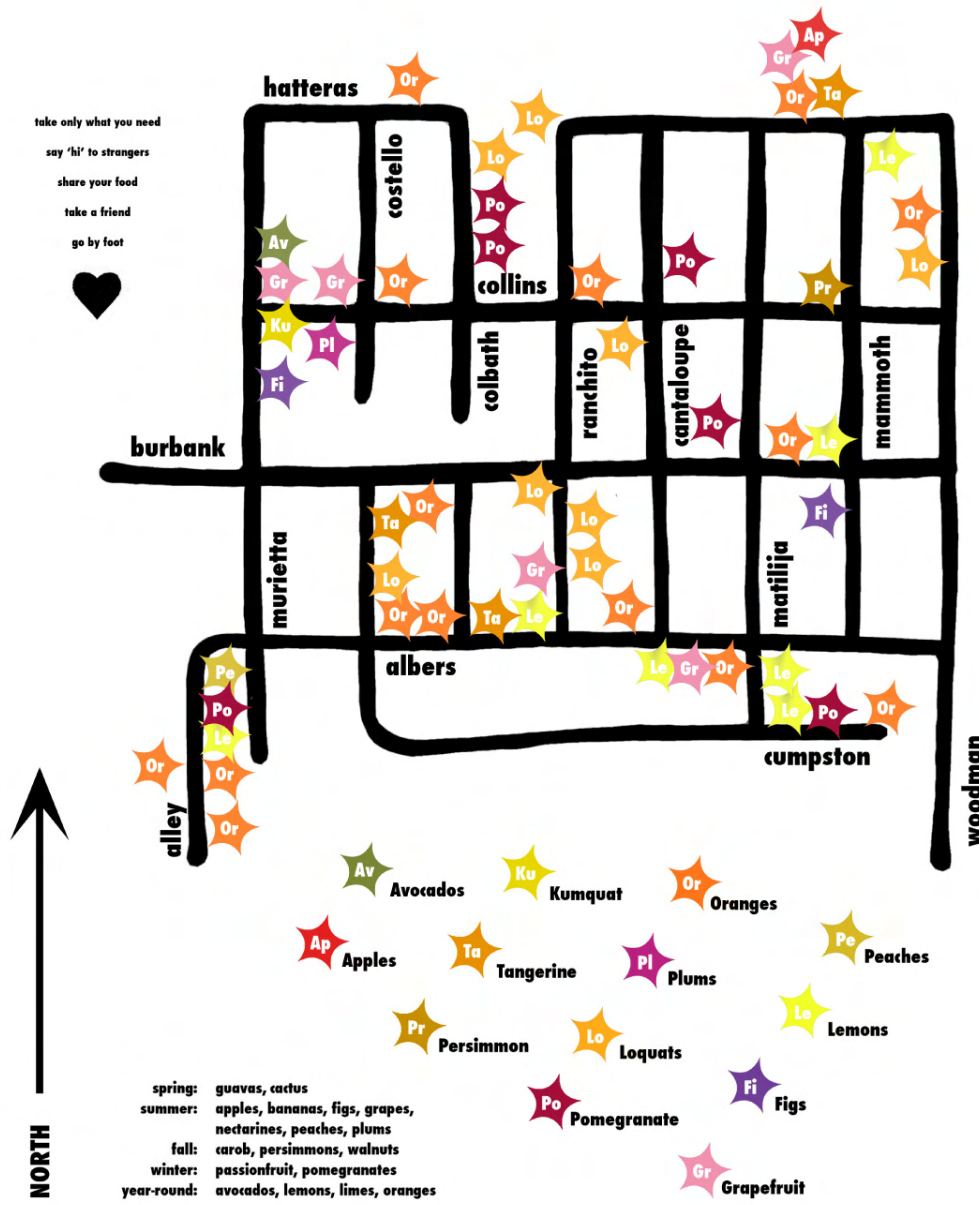
Figure 9: Iconic Australian foodscapes help to define place and regionalism. L-R: South Australian wheat field, north Queensland sugarcane and banana plantation, Barossa Valley grapevines, Western Australian orchard.

RISK CHALLENGES

Programs, policies, funding strategies, and maintenance regimens for AFD—regardless of whether the space is truly public or only semi-public—will be difficult to implement and sustain without the support of local government. There are numerous barriers to the uptake of AFD and most are based on unbalanced perceptions of risk and context. In summary, these barriers typically include: burdensome maintenance; risk of air/soil pollution to produce; theft or vandalism of produce; produce staining pavements; and produce creating a slip hazard and legal liability. While these concerns are valid, all design paradigms have traits, risks and maintenance regimes—it is a matter of researching, anticipating, and adjusting to the specific traits of AFD. Exotics generally require watering, mowing, more feeding, and leaf collection in autumn, where huge piles of wet leaves already create slip hazards. Generally speaking, the maintenance regime of ornamental exotics is only marginally different to that of edible species. Natives require specific maintenance, such as hard pruning of grasses and reeds to encourage new growth to maintain visual appeal, or fire to promote and allow seed dispersal and regrowth, such as banksias and grass trees. It is worth noting that dense plantings of natives in urban areas may introduce the risk of fire due to the highly flammable nature of many native species. Edible species require an understanding of when to prune, when to feed, when to dust, and when to harvest. The varied traits of annual vegetables and herbs should be understood, as too, the senescence of vines and fruit trees. AFD presents the benefit that the public may take on part of the maintenance regime due to the benefit of obtaining a yield, which in-turn, reduces the burden on local authorities. Ideally, fruit drop (and thus slip hazards) should be minimal due to harvesting by stakeholders and the local community, or also from foraging, gleaning and ‘freeganism’ by opportunistic members of the public. The receptiveness of the general public to AFD cannot be underestimated, for example, a group called *Fallen Fruit* who began in the U.S. generate maps of localities showing suitable locations for foraging of edible species [Fig 10]. The expense of fresh fruit and vegetables and the questionable nature of how they may have been produced is mitigated through the availability of ‘free’ public produce generated through AFD and the public nature of its production. AFD can help to alleviate community concerns over food safety and fulfil desires for healthy, organic food by allowing direct control and supervision over how produce is grown. The suitable demographics and social contexts for AFD need further research, nonetheless, AFD should be proposed and targeted for appropriate areas and land-use scenarios where there is possible public interest in food production and good design. Thus, part of the process of AFD should involve a collaborative process with a local community who are supportive of the proposal. Similarly, stakeholder and client engagement is fundamental to the success of AFD as most spaces require more frequent and ongoing maintenance than of standard designs for the public domain.

The contamination stigma associated with urban food production from factors such as air and soil pollution is commonly raised. These concerns may be relevant in highly polluted areas, as agricultural crops are injured when exposed to high concentrations

of various air pollutants (Griffiths 2003). In general terms, Australian cities have considerably cleaner air than most places that our 'fresh' food is being imported from including the USA, Thailand and China. These concerns are often petty in the face of commercial scale activities intrinsic with modern food production, and they reflect the 'out of sight, out of mind' disconnection of many people with food production. Most consumers lack of awareness about practices in the food industry put the risks associated with AFD in a more favourable light. Examples of practices in the food industry, in addition to chemical fertilisers, pesticides/insecticides²⁸ and herbicides, include food irradiation; cold storage of 'fresh' produce for extended periods of time (particularly by major retailers; gassing unripe fruit with ethylene to induce ripening (fruit is usually transported unripe to reduce losses); biotechnology practices such as gene splicing of animal and plant genes in 'fresh' produce to reduce crop loss to farmers and retailers²⁹; genetic engineering of seed and food products; and lackadaisical regulation in countries of 'fresh' food imports, such as China. These practices put risks concerning AFD in perspective, and education regarding these prevalent issues in the food industry will potentially increase demand for AFD rather than prevent it.



FALLEN FRUIT OF SHERMAN OAKS

this map is a template for free use. there is no copyright. learn your fruits!

Figure 10: A map from the organisation 'Fallen Fruit', showing locations for foraging edible plants in Sherman Oaks, USA. Fallen Fruit produces maps for various locations. <<http://www.fallenfruit.org>>

KNOWLEDGE/HORTICULTURAL CHALLENGES

As we accept a varied menu of food choices, landscape architects, as the principal designers or urban open space, will have to sharpen their agricultural acumen as well. Seasoned landscape architects have committed to memory hundreds of trees,

shrubs, and groundcovers—their botanical names as well as their common ones. The vast majority of their plant knowledge, however, is lopsidedly focused on ornamentals. Currently, edible landscapes are a niche market for the few landscape designers who wish to take it on. In the future, it will no longer be a niche. Landscape architects will need to be versed in ornamental and edible plants, and how to plant them in combinations that not only create beautiful compositions that realize the principles of integrated pest management and companion planting, while providing utility, joy, comfort, and relief to people in public space. (Nordahl, 2009, p29)

As suggested by Nordahl, landscape architects need to learn the traits of edible plant species over annual cycles to ensure that foodscapes meet aesthetic expectations all year around. This phenomenon is commonplace in beds of flowering annuals—such as pansies—which are everyday occurrences in most Australian towns and cities and they are also usually maintained by local authorities. Understanding edible species may also involve collaboration with horticultural experts to ensure that client and public expectations are met during transitions between seasonal cycles and possible fallow periods. In spite of the characteristics of edible plant species, the aesthetic component demands that foodscapes provide interest and perform successfully as spaces in their own right, regardless of the edible species. That is, the overall form and structure, the spatial qualities, attention to detail and materials selection should be well considered and executed [Fig. 11]. Most edible species require low salinity irrigation water and this may present an opportunity to link AFD with water sensitive urban design strategies such as stormwater filtration and storage to achieve the desired irrigation water quality and a sustainable water supply.



Figure 11: These AFD examples are projects where spatial quality, form and materials execution provide interesting outcomes regardless of the edible plant species. L-R: The Block of Amaranths, France; Valreas Family Gardens, France; The Passion Garden, Austria.

DESIGN/PROCESS/SYSTEMIC CHALLENGES

A challenge that may occur in AFD is overcoming the yield ‘obsession’ that is commonplace of those who possess knowledge of edible species and those who might maintain them. Replanting after the initial planting (eg annual vegetables) is likely to occur without the discretion of the landscape architect. This is a common scenario in design practice and is not unique to AFD. The importance of meaningful engagement with those responsible for maintenance of AFD’s may enable more successful communication of the design intent. Effective communication of an appropriate maintenance manual might also assist the ongoing realisation of the

design agenda. Conversely, a more 'hands-on' agenda may prove to be a more effective strategy. Successful AFD may also require the landscape architect to relinquish control and ownership over the design for the 'greater good' if the project becomes a community success. Relinquishing design control upon completion of contract is an inevitable process on most projects in practice.

In the same way that when we came to recognize the supreme ecological value of wetlands we erected high bars to their development, we need to recognize the value of farmland to our national security and require real-estate developers to do "food-system impact statements" before development begins. We should also create tax and zoning incentives for developers to incorporate farmland (as they do now for "open space") in their subdivision plans; all these subdivisions now ringing golf courses could someday have diversified farms at their centre. (Pollan, 2008)

Meaningful engagement with local government is essential to address zoning, legislative and development requirements that enable implementation of foodscapes.

MAINTENANCE CHALLENGES

A key challenge faced by AFD are the common barriers presented by local government, such as the desire for low maintenance and low-risk landscapes. Local governments provide a range of services for the community which do not commonly include edible plant species and food production. Many local governments in Australia have recently enabled establishment of community gardens within their jurisdiction and this is a positive sign for AFD. Education on the importance of local food production is key to enabling the shift in perception to allow foodscapes within public places in local government areas, to which maintenance regimes can follow (supported by the necessary skills in horticulture). Developing maintenance regimes that do not solely rely on the local government or client to maintain the edible species is important. AFD's are likely to thrive is where there is a local 'champion'—someone who takes the lead and ownership over the space and its ongoing operation, and who is understanding and sympathetic to the design agenda, the public context and stakeholder agendas. In many cases the issue of public liability is important, such as where liability and insurance arrangements need to be in place for volunteer workers. Technologies such as council GPS database of edible species with harvest times calendared and scheduled may provide valuable assistance as a more official and technological version of the *Fallen Fruit* catalogues shown previously. Additionally, it is worth noting that local governments may benefit from AFD, as Herbach states that maintenance costs of community gardens are typically less than those of traditional parks (Herbach, 1998). While AFD is a different typology to community gardens, further research in this area may indicate similar outcomes. For commercial and private clients and the ongoing maintenance of their AFD spaces, similar issues apply to that outlined for public scenarios, in that receptiveness to maintenance requirements need to be accommodated by the groups involved (such as strata and community bodies). It is also worth noting that some productive species, such as many fruit and nut trees, require little additional ongoing maintenance to that of many existing ornamental plant

species.

CONCLUSION

Australia's prejudice towards edible species in public space is paralleled in many countries, while being contradictory to some. In Israel, agricultural typologies are more commonly explored through landscape architecture practice, including prominent spaces such as the central airport (Alon-Moses, 2009). In many countries in the Mediterranean such as Greece, Croatia and Italy, edible species, such as citrus, commonly adorn parks and roadways. The Eden project in Cornwall has beautifully cultivated edible garden spaces [Fig. 12]. Fernando Caruncho's wheat garden parterre in Spain is a notable aesthetic composition of edible and ornamental species [Fig. 13]. There are numerous examples of AFD in design publications and journals from overseas (for example, Barboux, 2010). In Australia, outside of private gardens, there are some examples of the use of edible species in public space, including the 1854 design for Victoria Square in Adelaide that was planted with almonds and olives (amongst many ornamental species) and areas within the Adelaide Parklands that contain heritage olive groves³⁰. Energy Architecture's Adinga Arts Ecovillage south of Adelaide uses edible species based on permaculture principles in the streets, orchard and farm. Edible species have been increasingly used in non-designed public space in more recent years, especially in contexts with an environmental agenda such as Michael Mobbs's edible species in road verges and footpaths in Chippendale, Sydney; Mobbs has followed the activities of countless passionate gardeners throughout Australia who's guerrilla activities of planting edible species in public places are not considered legitimate by local authorities (who may turn a blind eye where a passionate community are dedicated to such public spaces). Since local authorities are usually the approval mechanism for landscape architectural projects (or often the client or instigator of a project), this partly explains the absence of AFD from landscape architectural outcomes. For AFD to be successful, local governments must be supportive of its agenda.

There has been a recent groundswell of landscape architectural projects in Australia that explore and propose AFD, perhaps indicating awareness of the importance of the merger of design and local food production. These cover a range of scenarios from greenfields, medium density residential, squares, parks and streetscapes, and include both private and public projects. McGregor Coxall's Atlas Apartments in Victoria Park in Sydney contains orange trees and aloe vera and was completed in 2001 [Fig. 14]. Several projects are currently under construction including as VicUrban's Meridian in Dandenong South in Melbourne that contains street tree orchards [Fig. 15] and Fifth Creek Studio's GP Plus Health Care Centre in Marion in Adelaide that features edible species on roof and vertical gardens with a public interface for the health commission's clients who will care for the space. Other projects are in design stages such as Taylor Cullity Lethlean's Victoria Square/Tarndanyangga in design development [Fig. 16]; McGregor Coxall's Callan Park masterplan [Fig. 17]; HASSELL's masterplan for Bowden Urban Village open space [Fig. 18]; and the aforementioned

Jacob's Creek Visitor Centre masterplan by WAX Design. Oxigen have explored a range of foodscape scenarios for both actual [Fig. 19] and hypothetic scenarios through photomontage [Fig. 20]. Weston Park masterplan in Canberra is an example of the former while the transformation of Torrens Lake in Adelaide into a rice paddy is one of their hypothetical scenarios! Oxigen's photomontages introduce the idea of animals into the system—a topic not covered by this paper—but an important area for further research and experimentation (as non-human animals are a fundamental component of organic agriculture and permaculture practices).

Aesthetic Foodscape Design requires an adjustment of the existing approach to landscape architectural design practice to accommodate edible plant species and their requirements within a public context. Successful uptake of AFD requires a shift by designers, local authorities and clients to accommodate and embrace the specific requirements of edible plant species, which differ from existing ornamental planting regimes. This includes a shift in perceptions to what are considered suitable and useful landscapes and planting approaches, ideally spurred from a wider understanding of the importance of local food production in a global context. This wider understanding of the importance of AFD may be macro or micro: the macro may include comprehension of the vast challenges faced by conventional food systems, while the micro might include an understanding of the local benefits in the growing and supply of fresh produce to the client and community. AFD requires an aesthetic shift to explore, understand and embrace the differing characteristics, qualities and traits of edible species. It also requires a perception and knowledge shift to successfully manage the maintenance requirements of edible species to mitigate risks through sustained community engagement that is backed by maintenance regimes of local authorities and private bodies. AFD presents an opportunity to expand the existing repertoire of landscape architects to appeal to a broader community of care, engaging communities in activities that can be sources of delight and wellbeing. In recent times, landscape architecture in Australia has been increasingly receptive to environmental challenges and AFD offers serious potential to expand the sustainability outcomes through a central element of practice—plant selection. AFD involves more than specifying edible species to succeed. Meaningful engagement with the client, approval authority, stakeholders and the local community is required to ensure there is commitment to the ongoing health and maintenance of the edible species. Further research and exploratory design practice into this emerging area will help to address the necessary challenges to ensure that edible species become embedded into the core of landscape architectural practice and the public domain in Australia. AFD, if successful, can result in positive outcomes for social and environmental sustainability. This will test the skills of landscape architects to navigate the challenges posed by AFD and to contribute to a more resilient and environmentally sound food system and even perhaps a more meaningful and fulfilling design practice.



Figure 12: The Eden Project's magnificent productive garden uses curved rows of annuals on a contoured slope adjoining its cafe, creating a direct link between growing and consuming. These images allude to the process of transformation during growing cycles.



Figure 13: Fernando Caruncho's wheat garden in Spain.



Figure 14: McGregor Coxall's Atlas Apartments in Victoria Park Sydney, completed in 2001, uses citrus trees and aloe vera within a private courtyard.



Figure 15: VicUrban's Meridian in Dandenong South in Melbourne uses productive species in a suburban context through orchards including fruiting trees and shrubs on nature strips.



Figure 16: Taylor Cullity Lethlean's developed design for Victoria Square/Tarndanyangga in Adelaide proposes new forms of civic engagement not usually expected in the city centre. A key focus of this strategy is the productive garden that has focused on a combination of visual performance through high quality design detailing and striking productive species.



Figure 17: McGregor Coxall's Callan Park masterplan proposes a terraced productive garden as one facet of the project's focus on local community health.



Figure 18: HASSELL's masterplan for Bowden Urban Village, Adelaide's first medium density village, includes productive streetscapes and gardens.



Figure 19: Oxigen's Weston Park masterplan at the head of Lake Burley Griffin in Canberra includes productive species in the design.



Figure 20: Oxigen's before and after shots explore productive and sustainable landscape hypotheticals that include animals for prominent Adelaide sites. L-R: Torrens Riverbank precinct; Victoria Park, Adelaide Parklands; Pt Wakefield Road; Lochiel Park.

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LIST OF FIGURES

- 1: Image courtesy of Taylor Cullity Lethlean.
2. Data attained from: The University of California, Berkeley, Dept. of Maths <http://math.berkeley.edu>
3. Viewed 21.6.10 <<http://www.flickr.com/photos/alaig/2977804344/>>
- 4.1. Viewed 31.5.11 < <https://www.msu.edu/~howardp/seedindustry.html>>
- 4.2. Viewed 31.5.11 <<https://www.msu.edu/~howardp/organicindustry.html>>
5. Image courtesy of Taylor Cullity Lethlean.
6. Image courtesy of Taylor Cullity Lethlean.
7. Images developed by Taylor Cullity Lethlean and Joshua Zeunert.
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10. Viewed 25.5.11 <www.fallenfruit.org/index.php/media/maps/>
11. Images from Barbaux, 2010.
12. Viewed 1.6.11:
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14. Image courtesy of McGregor Coxall.
15. Viewed 25.5.11
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16. Image courtesy of Taylor Cullity Lethlean.
17. Image courtesy of McGregor Coxall.
18. Bowden Urban Village Master Plan Report, p116
19. Image courtesy of Oxigen.
20. Images courtesy of Oxigen.

ENDNOTES

¹ Former President of Brazil, Lula da Silva, quoted by UN World Food Program Director Josette Sheeran, "Confronting the Challenge of the Global Food Crisis in the Americas." Speech delivered at the Organization of American States (Washington, D.C.: 29 Jul. 2008). <<http://www.oas.org/speeches/speech.asp?sCodigo=08-0075>>

² The lawn is so entrenched in Australian culture that it has been described by the popular and long-running ABC program Gardening Australia "as much an Australian icon as the Hills Hoist or the Victa mower". Viewed 8.05.2011 <<http://www.abc.net.au/gardening/stories/s1148898.htm>>

³ In an Australian context, refer to the works of George Seddon.

⁴ The work of biologist Tim Low (eg *Feral Future* and *The New Nature*) has demonstrated some fatal flaws in this approach, namely the assumption that native animals prefer native plants over the often more appealing exotic counterparts.

⁵ It is important to note that in Australia, there is legal obligation under the biodiversity convention to preserve agrobiodiversity (Holmgren, 2011), which is usually overlooked due to the dominance of indigenous biodiversity. This has commonly been achieved through seed banks of edible species. These are now nonexistent in Australia (c.f. Koanga Gardens in New Zealand). Adelaide Botanic Gardens has an excellent museum of Ethnobotany that documents many edible plant species.

⁶ Data sourced from The University of California, Berkeley, Department of Maths, Viewed 15 May 2007 <<http://math.berkeley.edu>>

⁷ There are various documentary films around peak oil, including:

- The End of Suburbia: Oil Depletion and the Collapse of the American Dream (2004)
- Crude Awakening: The Oil Crash (2006)
- The Power of Community: How Cuba Survived Peak Oil (2006)
- Crude Impact (2006)
- What a Way to Go: Life at the End of Empire (2007)
- PetroApocalypse Now? (2008)
- Collapse (2009)

⁸ The cables revealed that the world's largest oil exporter, Saudi Arabia, exaggerated oil reserves by as much as 40%, or 300 billion barrels. Viewed 4 June 2011, <<http://www.guardian.co.uk/business/2011/feb/08/saudi-oil-reserves-overstated-wikileaks>>

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¹⁰ Viewed 4 June 2011 <<http://www.abc.net.au/news/stories/2011/04/28/3202209.htm>>

¹¹ Richard Heinberg states that it takes on average, 10 calories of fossil fuel energy to produce 1 calorie of food energy (Heinberg, 2005).

¹² Erisman et al calculated that 48% of the world's population were reliant on synthetic nitrogen for their nourishment in 2008.

¹³ Cited in Roberts, 2009.

¹⁴ Bill Clinton, UN FAO World Food Day 2008, cited in Cebon, 2010, p30.

¹⁵ National Party MP De-Anne Kelly, 2002, cited in Cebon, 2010.

¹⁶ Viewed 24.5.2011 < <http://hungrybeast.abc.net.au/media/beast-file-woolies-and-coles>> OR <http://www.youtube.com/watch?v=lnQMOyGeP_I>

¹⁷ Research by Philip Howard at Michigan State University has tracked the food system and is also presented in accessible graphic formats, see < <https://www.msu.edu/~howardp./index.html>>

¹⁸ Viewed 24.5.2011 < <http://hungrybeast.abc.net.au/media/beast-file-woolies-and-coles>>

¹⁹ Australian Conservation Foundation, 2007 & <<http://www.acfonline.org.au/consumptionatlas/>>

²⁰ See (Sinclair, 2010) for a presentation on Planning for Australia's Food Security.

²¹ An Australian report on Food Miles presents alarming data that found that 29 of our most common food items traveled a total distance of 70,803km: Gaballa, S, Abraham, A.B, 2008, *Food Miles in Australia: A preliminary study of Melbourne, Victoria*, CERES, Victoria.

²² The word locavore was honoured the word of the year for 2007 in the *Oxford American Dictionary*.

²³ Jens Jensen, "A greater West Side Park System," West Chicago Park Commissioners (1920)

²⁴ Walker, 2009, p31

²⁵ Adrian McGregor, personal communication, 2007.

²⁶ Alon-Mozes, p168-69

²⁷ Refer to the work of Prof. Robert Putnam

²⁸ A typical broccoli crop is sprayed with pesticides 20-30 times, non-organic grain stores are continually sprayed with insecticides (Brookman, 2011).

²⁹ Splicing of animal and plant genes has been developed to avoid crop loss to farmers and retailers in transport, packaging and selling of produce. For example, the splicing of fish and tomato genes to increase the resiliency of the skin of the tomato.

³⁰ Self guided walking tours of Adelaide's Parkland groves are available. Former Lord Mayor of Adelaide Michael Harbison gave the Greek Prime Minister a bottle of olive oil from Adelaide's parklands.