

# **Issues facing vegetable production in peri-urban areas - review and scoping study**

Charles Drew  
Scholefield Robinson Horticultural Services Pty Ltd

Project Number: VG10059

## **VG10059**

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**Issues Facing Vegetable Production in Peri-Urban Areas  
Review and Scoping Study – VG10059  
Final Report and Recommendations**

**Prepared for : Horticulture Australia Limited**

**By : Charles M Drew and Gerard McEvilly**

**Date : 12 August 2011**



*Horticulture Australia*



**Project title:** Issues Facing Vegetable Production in Peri-Urban Areas  
– Review and Scoping Study

**HAL Project No:** VG10059

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**Purpose of Report:**

The primary outcome of this scoping study is information for the vegetable industry on R&D requirements to address the gaps in information required by planners. A secondary outcome is to improve the ability of the vegetable industry to influence the planning authorities to consider the establishment of long-term designated primary production zones.

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## CASE STUDIES

- Western Sydney Parklands
- Proposed Gosford Agribusiness Park
- The case for mushroom farming
- Centralised packing house/marketer
- D’VineRipe®

## MEDIA SUMMARY

This study, focussed on Sydney and Adelaide, has recommended actions to improve the productivity and security of the use of land for fresh food production in peri-urban areas. However, industry, the community and governments need to move fast to do so as many key policies are now being developed that could make or break this.

For example, a National Food Policy is in preparation as well as a national enquiry into urban water use. At state level, there is an increasing focus on protecting prime farming land from competing uses such as mineral and gas extraction and on encouraging regional development. Both Sydney and Adelaide recently have released long-term development plans, answering COAG's call for blueprints for future urban growth. This report concludes that industry must to urgently engage with these crucial discussions and contribute to policy development.

The market gardens on the fringes of cities have been the traditional source of fresh produce for urban residents. Since settlement, they have provided a ready supply of nutritious food for the markets, eateries and tables of city folk. However, as cities have grown and urbanisation expanded, farms have retreated, or moved far afield. Many peri-urban growers are also under intense pressure from new “tree-change” residents who imagined a rural idyll, rather than the noise and disruption of farming, around their bush blocks.

However, the retreat of peri-urban farming is increasingly recognised as a major problem, with the potential to affect both the security and the carbon footprint of our future diet. Many previous studies have been published and forums held, relating to primary production in peri-urban areas. However, there has been little progress in securing a place for vegetable production as a long-term land use activity in competition with other land uses such as residential development. The long-term plans for both Adelaide and Sydney signal the intention to develop housing in areas currently used for farming. In Sydney's case, the new growth corridors will displace half the existing growers.

A substantial and increasing proportion of rural areas surrounding cities and regional towns are now zoned rural residential which restricts adjoining farming operations. This trend reduces the capacity of these areas to increase production to compensate for production lost by urban expansion of the larger cities.

The report also identifies many opportunities for peri-urban farming to prosper, given current global concerns about food security and carbon emissions and a significant segment of consumers that actively seek healthy locally produced food. However, as the average farm size around Sydney is only 1.3 ha, many peri-urban growers are struggling to make a living. Intensive training and support programs that cater for the diverse range of cultures and languages present are needed.

In contrast, some growers are seeking to invest in the latest technologies that make horticultural crops some of the most productive and sustainable uses of scarce land and water. Some growers wish to adopt these changes on their current properties but can be hindered by lack of recognition of new technology in planning guidelines. Other growers may wish to relocate as a green-fields site may facilitate adoption of new technology. For this group, access to secure land that is well serviced with the clean water, power and gas is the primary need.

While the project used Sydney and Adelaide as case studies, most of the issues apply throughout Australia, as well as overseas. However, addressing these requires more than simply better engagement with planners. The report recommends that the vegetable industry plays a key role in the peri-urban issue through a program of Advocacy, Information & Analysis and Extension & Training, and that state governments increase their focus on improving the productivity of peri-urban intensive horticulture.

## TECHNICAL SUMMARY

### *What the report is about*

This report draws on discussions with many peri-urban vegetable growers in Sydney and Adelaide, as well as planners. The consultation focussed on the identification of issues affecting peri-urban intensive horticulture and methods to address these issues, but also identified many areas of synergy, where both growers and residents benefited from being in close proximity. Importantly, the report also identifies many other challenges and opportunities that apply to peri-urban growers and other stakeholders.

### *Who is the report targeted at?*

The report is targeted at individual growers, regional, state and national industry organisations, state and local government planning and policy development, as well as others concerned with peri-urban agriculture. In particular, the Vegetable Industry Advisory Committee and HAL should consider the recommendations in terms of future R&D priority-setting.

### *Background and Objectives*

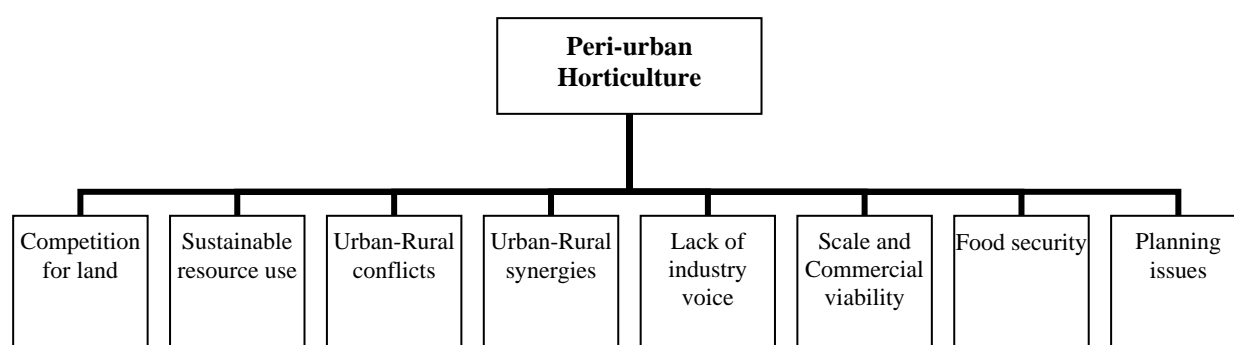
Industry perceives that planners lack the information and tools to enable them to foster the ongoing production of horticultural crops for their growing urban populations. This project was designed to draw on past studies, while engaging with both growers and planners in the two regions, to identify key issues. This was to inform recommendations about research, development, extension and training requirements to enable planners to give sufficient weight to intensive horticulture in the planning process.

### *Methods used*

Following preparation of an initial issues paper, the study employed a range of consultation methods including meetings with small groups of growers, individual farm visits and telephone contacts. Face-to-face and telephone discussions were also held with state and local planners, state Department of Primary Industry staff and other stakeholders, including industry associations.

### *Results/key findings*

The first objective of the study was to identify key issues. The growers consulted shared many examples of perceived issues including “border skirmishes” both between growers and with urban residents, and perceived issues relating to the planning process. However, a key finding of the study was that a wide range of issues were raised, many of which appear only indirectly related to peri-urban planning, but are critically important for the industry to address. These fell into a series of eight broad themes, which provided a framework (as below) to enable the second objective to be achieved, namely identifying strategies for industry to address this range of issues in an orderly way.





Each identified issue was then described and analysed and the opportunities and threats implicit in each issue identified, resulting in the development of the overall learnings about each theme. Strategies were then derived from these and were found to fall within four broad areas for recommended action – by industry: (1) Advocacy, (2) Information & Analysis and (3) Extension & Training – and by government: (4) Planning and Productivity Improvement. This stepwise process, and its recording in this report, provides transparency about the issues identified and the recommendations. This is designed to give the vegetable industry and HAL an ongoing and adaptable framework for acting on the recommendations and/or amending them in light of future developments.

***Implications for relevant stakeholders:***

- **Industry:** should allocate resources to monitor and manage the wide range of complex issues related to peri-urban horticulture, as well as engaging with the community and policymakers. Past history shows an inconsistent and inadequate commitment to these issues.
- **Communities:** increasingly demand the ongoing provision of locally grown fresh food, but are unaware of the threats to supply, both locally and in other production regions. Past history shows that community demand for urban expansion exceeds concern over peri-urban fresh food production.
- **Policy makers:** are considering several key areas related to peri-urban issues, some of which are high-profile, of major strategic significance to industry and need urgent attention. Past history suggests a lack of implementation of policy commitments relevant to peri-urban fresh food production.

***Recommendations***

1. **Advocacy - The vegetable industry should take advantage of current community and policymaker interest in a range of issues related to peri-urban farming to raise the industry profile and advocate for solutions to the issues facing growers**
  - 1.1 A positive and constructive advocacy campaign at state and national level
  - 1.2 Pursue policy development at State/Federal level to develop the means for land zoning and capital transfer that protects agricultural value without penalising exiting landholders.
  - 1.3 Use current Food Policy discussion to drive action on peri-urban issues
2. **Information and analysis - The vegetable industry should develop and expand intelligence-gathering about peri-urban resource use and constraints, including land and water**
  - 2.1 Develop land use intelligence through coordinated national mapping, monitoring and analysis regarding land use transfer trends and policy development
  - 2.2 Assess the feasibility of relocation for those regions where this is unavoidable
  - 2.3 Improve gathering and analysis of peri-urban industry data to underpin representation and advocacy.
  - 2.4 Develop water use intelligence through information-gathering and analysis and engagement with policy affecting water security, quality and price.
3. **Extension and Training - The vegetable industry should initiate a communication and engagement program with peri-urban growers and planners to address constraints to production and to engage with the strategic planning process of capital cities and regions.**

- 3.1 Provision of training and information support services relating to horticulture business viability.
- 3.2 Improve understanding by planners at all levels of the facts regarding loss of productive land and provide information about horticulture production practices relevant to planning criteria.
- 3.3 Develop and implement a communication program to improve understanding by growers and planners of planning processes and production issues, respectively.
- 4. **Planning and Productivity Improvement - State government functions of planning policy and agricultural policy should jointly inform the development of planning policies and implementation processes relevant to peri-urban horticulture and agriculture that give productivity maintenance and improvement a high priority.**
  - 4.1 Improve the understanding of the land use and relative contribution to the gross value of production of peri-urban horticulture by better data collection and analysis;
  - 4.2 Reduce the constraints to adoption of new technology and to adjustment including relocation by adopting compatible planning policy and processes and through improved infrastructure planning to increase the scope and range of options for relocation.

# 1 INTRODUCTION

## 1.1 Preamble

As illustrated by the imaginary statements below, a wide range of people have differing views on the future of peri-urban vegetable growing and intensive horticulture.

***Small field grower on leased land:*** “We arrived in Australia xx years ago and, through hard work our family have made a success of growing yyyy. The competition is tough between growers (many of whom we don’t trust) and the markets take their pound of flesh but we don’t want to move even though the urban sprawl means we have to put up with more theft and vandalism and the threat of violence than we would like.”

***Small field grower on owned land:*** “We have farmed this land for a couple of generations, but our kids aren’t interested in the long hours and hard work. We are looking forward to selling up at the prices the developers will pay and then retiring.”

***Large diversified field grower:*** “Our family is one of several large grower/packers in this area and a number of families grow for us. The area has good infrastructure and we are well serviced for supply of inputs and for transport. Any possible relocation must enable us to capitalise on the development value of our current property. Our re-establishment costs will be substantial and should not have to include infrastructure such as 3 phase power and good roads. This should be publicly funded for any new site, which must also have suitable soil and water”

***High/medium technology hydroponic grower:*** “We are happy to be in an established vegetable growing area with all the current infrastructure and input suppliers. However, we have had trouble getting the Council planning officer to understand the necessity for us to be able to build facilities which take advantage of the latest technologies.”

***Input or Service provider:*** “The cluster of growers here means that we can to service them more efficiently and economically. However, it’s difficult to get them to work together cooperatively to improve the overall returns to the industry.”

***Local Government Planner:*** “The growing population means that we are always short of urban land for residential and other purposes. Urban land also provides more income to the Council.”

***Local Government Economic Development Officer:*** “We want to foster economic development in our area across different industries including intensive horticulture to create a wide range of employment opportunities for local residents as well as access to fresh fruit and veges.”

***State Government Agri-Food Department Officer:*** “The Minister gives high priority to food security and improving productivity in the agri-food industries. The contribution of peri-urban intensive horticulture to the state is substantial, and my department wants to safeguard the contribution that industry clusters such as xxxx make to productivity. By the way, it’s good for urban people to be able to have a close association with fresh food production.”

***State Government Planning Department Officer:*** “My Minister wants to ensure that there is orderly urban development to accommodate our growing population. Clearly, the economic value of land for urban uses is far higher than for horticultural production and in any case, there are plenty of suitable areas a bit further out of the city, and the growers won’t mind cashing in on the higher prices for land rezoned for urban development.”

***Rural Lifestyler:*** “We moved out here so that we could enjoy the rural environment and become more self sufficient. However, the intensive vegetable growers spoil our lives by generating dust and noise at all times of the day and night and then there are the xxxx sprays!”

## 1.2 Context

Many peri-urban areas in Australia have the characteristics that favour land uses such as intensive horticulture including field and protected vegetable growing<sup>1</sup>. These characteristics include soil quality, climate, availability of water for irrigation including ground water and recycled water, transport and power infrastructure, and proximity to markets for products and for inputs such as labour. The growth of intensive horticulture is often accompanied by the establishment of service industries resulting in the development of industry clusters that enhance productivity. A cluster that has scale and coherence often imparts competitiveness, robustness and regional prosperity. However, the growth or decline of a cluster is not necessarily linear and tipping points can be reached – the critical mass issue works both ways.

The scale of vegetable production in the peri-urban areas of both Sydney and Adelaide is substantial. The production from both areas meets a substantial proportion of local demand and makes an important contribution to the Australian market.

Urban growth results in increased demand for peri-urban land to be used for housing and industry. This increases the economic value of the land above that which can be justified for horticulture. Planning decisions that allow these developments appear to take minimal account of the major economic and social contribution made by intensive horticulture in these areas. As well, these planning decisions appear to give little weight to, or acknowledgement of, issues involved in relocation. These issues include the level of suitability for vegetable growing of the areas proposed for relocation, as well as commercial constraints imposed on the growers in the existing clusters that reduce their capability to capitalise on the increased land values.

Peri-urban land use is also perceived to be relevant to many wider food issues such as food security and food quality and to the contribution of the rural environment to social well being particularly in urban areas.

## 1.3 Objectives

The proposal for this project identified the expected outcomes as follows:

“The primary outcome of this scoping study will be information for the vegetable industry on R&D requirements to address the gaps in information required by planners. A secondary outcome is to improve the ability of the vegetable industry to influence the planning authorities to consider the establishment of long-term designated primary production zones.”

These outcomes have been recast into the following objectives for this scoping study:

- Identify and describe the range of issues relevant to peri-urban vegetable growing and intensive horticulture through a review of selected reports and current projects and consultation in the two case study areas;
- Suggest research, development, extension and training requirements that will enable planners to give sufficient weight to intensive horticulture in the planning process; and
- Formulate recommendations to the vegetable industry and HAL.

A secondary (or subsequent) objective is to improve the capability of the vegetable industry to influence the planning authorities to consider the establishment of long-term designated primary production zones.

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<sup>1</sup> Intensive peri-urban horticulture includes plant nurseries and the production of food, flowers and turf.

The methodology used in this project may also provide a model for bringing planning authorities and growers together in other peri-urban regions, e.g. in Melbourne, Brisbane and Perth.

This project is designed to be a "first step" in moving from "research" towards practical implementation. The short-term nature of the project will enable a follow-on project to be devised and submitted, involving further steps to assist planners.<sup>2</sup>

## **1.4 Scope and Method**

### **1.4.1 Scope**

While the recommendations of this report are expected to be relevant to peri-urban vegetable growing and intensive horticulture generally throughout Australia, as this is a scoping study, the project investigations are focused on the Greater Sydney Basin and the Northern Adelaide Plains. Background information on the two study areas is attached in Appendix 1.

### **1.4.2 Method**

The method employed for this project had two major phases each comprised of a number of tasks.

Phase 1 focused on information gathering and comprised the following tasks:

- Initial review of selected reports and projects;
- Preparation of an initial discussion paper identifying and describing the relevant issues to form the basis for consultations with groups of growers, planners and other stakeholders;
- Consultation program; and
- Preparation of a milestone report describing the consultation process and a revision of the issues identified in the discussion paper.

Phase 2 focused on analysis of the information obtained and preparation of the final report and comprised the following tasks:

- Analysis of the information obtained from the initial review of reports and projects and of the consultation process;
- Identification of information gaps, deficiencies and industry opportunities;
- Development of recommendations to the vegetable industry and to HAL, and
- Preparation of the final report.

The project methodology is represented in Figure 1 below. It involved the collection and analysis of input from stakeholder consultations, together with drawing in key aspects of past work on this topic and integrating this with an awareness of current related initiatives.

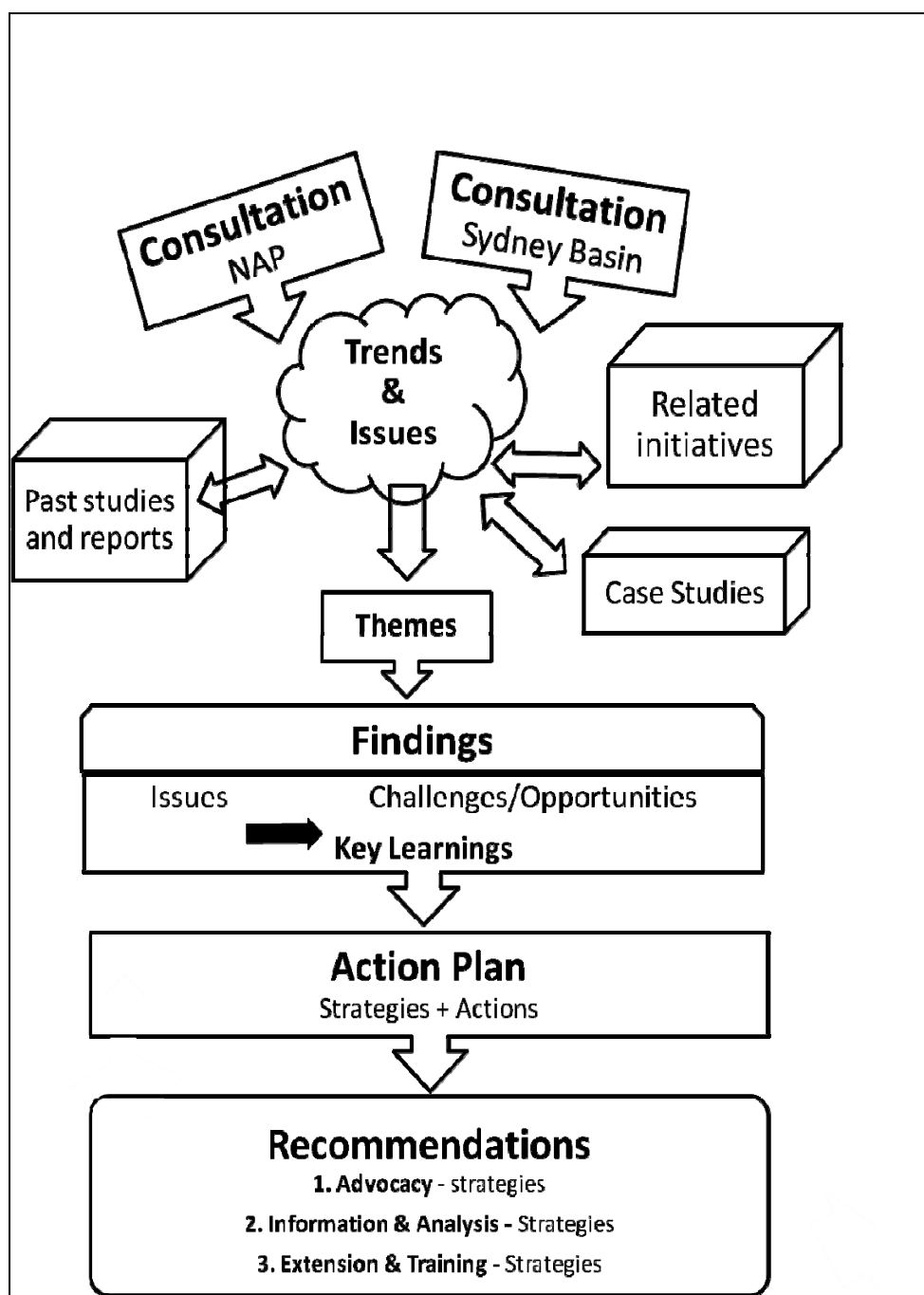
Key trends and issues were identified and collated under a series of overlapping themes as either challenges or opportunities. These were distilled into key learnings, which led to the development of strategies to address these.

These strategies form the basis for the broad recommendations, while more specific actions have also been developed for each one and key internal/external linkages identified to strengthen implementation.

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<sup>2</sup> These two paras are extracted from the proposal

**Figure 1 : Project Methodology**



## **2 CONSULTATIONS - NORTHERN ADELAIDE PLAINS**

### **2.1 Growers**

Prospective participants were identified in consultation with the Steering Committee member based on the Northern Adelaide Plains and in discussion with a number of extension officers, consultants and Natural Resources Management Board staff, some of whom also arranged the three grower group meetings. Meetings and consultations with a total of 21 growers were held between 21 March and 8 April 2011. Enterprises included soil based vegetables, hydroponic tomatoes (up to 60,000 square metres), soil based capsicum, egg plant and cucumbers, lettuce, potatoes, carrots, perennial crops including almonds, wine grapes and olives, and several growers also operated packing sheds.

### **2.2 Planners and other professionals**

Consultations were also conducted with 6 local government planners, 2 PIRSA<sup>3</sup> and 1 DPLG SA<sup>4</sup> planners, representatives of 2 horticultural organisations with specific interest in the Northern Adelaide Plains, and 2 state government advisors with local responsibilities.

### **2.3 Consultation Process**

The larger growers and planners and stakeholders other than growers were provided with a copy of the initial discussion paper and a summary prior to the consultation process. Consultation with the larger growers and with planners and other stakeholders was loosely based on the initial discussion paper or the summary but was essentially free flowing.

The remaining growers met in 3 small groups and were provided with lunch to recompense them for participation. The small group meetings started with a presentation based on a printed power point handout which was provided to each grower. The growers were guided through the handout which was used as a basis for discussion of the issues. The growers contributed actively to the discussion which lasted for 60 to 90 minutes and continued during lunch.

### **2.4 Grower Issues - State/Regional Scale**

#### **2.4.1 Increased land values**

Many larger growers saw urban encroachment on land used for intensive horticulture as an inevitable process of urbanisation increasing the capital value of their land asset, and providing them with increased funds to relocate (and diversify) their business or to exit the industry. Increasing land values also resulted in increased rates. Several growers acknowledged that the location, scale and concentration of intensive horticulture in the Northern Adelaide Plains and particularly the Virginia Triangle had enabled the development of an industry cluster including infrastructure and services that improved productivity but was threatened by incremental urbanisation.

Incremental urbanisation and increased land values also reduced opportunities for existing or new entrants to establish enterprises operations of sufficient size to reap returns to scale and to adopt new technology. Most looked to suitable greenfields sites less subject to incremental urbanisation for expansion, relocation and adoption of new technology. For example, potato and onion growing has substantially relocated to areas with suitable soil, water and transport infrastructure and location both in South Australia and in other parts of the country. The Hay plain is also the location for substantial expansion of large scale lettuce growing.

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<sup>3</sup> Primary Industries and Resources SA

<sup>4</sup> Department of Planning and Local Government SA



Several larger growers expressed the view that the opportunity to protect peri urban horticulture in the region from incremental urbanisation through planning controls had long passed and that this loss of opportunity was a clear indication of government priorities.

### **2.4.2 Infrastructure Planning**

The effectiveness of relocation resulting from incremental urbanisation and increased land values depends on the availability of suitable infrastructure (water, 3 phase power, gas, logistics) in the new areas. This clearly requires infrastructure planning by the relevant authorities and commercial entities. Many growers were sceptical about the level of infrastructure planning and whether the needs of intensive horticulture were being given adequate consideration.

### **2.4.3 Fragmented industry**

Most growers acknowledged that peri urban intensive horticulture on the Northern Adelaide Plains lacked a coordinated and united approach to industry issues. Several growers suggested that they would become involved in developing a coordinated and united approach if the issues demanded it, but in general, managing their own affairs was a higher priority.

## **2.5 Grower Issues - LGA and Property Scale**

### **2.5.1 Increased land values**

While larger scale growers were more likely to consider relocation and diversification, other growers (often smaller scale) adjusted to incremental urbanisation and increased land values by increasing the intensity of their operations. This was often achieved by increasing the level of technology and the proportion of their production using hydroponics.

### **2.5.2 Border skirmishes and waste management (Externalities)**

Incremental urbanisation increases the likelihood of border skirmishes between intensive horticulture enterprises and land used for urban residential or commercial uses. However, several growers also commented on border skirmishes between growers. Examples include the effects of different ways of managing waste on neighbours which can result in between property movement of pests and diseases, and also reduce the visual amenity of the area. Contamination of green waste with plastic is seen as a particular problem for the adoption of waste management programs. As well, restrictions on the burning of waste including trees and on the operation of bird scarers are seen as further operating constraints. The imposition of buffer zones also constrains the spatial location of farm operations.

The need for cost effective improvements in waste management programs including the development of best practice procedures appears to be a high priority and to provide an opportunity to make a difference.

Some growers also mentioned border skirmish issues between areas zoned for horticulture and areas zoned for rural living as well as differing opinions about suitable block sizes for family farms operating protected horticulture enterprises.

### **2.5.3 Compatibility of planning conditions with adoption of new technology**

Several growers mentioned examples of Local Government planning conditions and their implementation that negatively affected construction of new facilities incorporating the adoption of new technology, particularly in protected horticulture. Examples include restrictions on the height and construction methods for modern greenhouses and requirements for fire protection measures and emergency exits that do not appear to be practically justified in greenhouses.



## 2.6 Issues relevant to Planners and other Professionals

### 2.6.1 Inadequate industry understanding of the planning framework

During the consultation process, several local government planners suggested that many of the issues identified in the Initial Discussion Paper<sup>5</sup> were based on a poor level of understanding of the planning framework operating in South Australia. This framework is summarised in the introduction to the Development Plan for each Local Government Area<sup>6</sup> and the salient points are extracted follow.

The planning and development system in South Australia comprises three distinct but interrelated parts which are:

- Legislation;
- The Planning Strategy which provides the broad vision; and
- Development Plans for each LGA.

The legislative framework establishing the planning and development system and setting out its statutory procedures is provided by the *Development Act 1993* and its associated *Development Regulations 2008*.

The *Development Act 1993* is the core legislation establishing the planning and development system framework and many of the processes required to be followed within that framework (including processes for assessing development applications). The Regulations provide more details about the framework and are updated from time to time on the advice of the relevant Minister.

The broad vision of the State Government for sustainable land use and the built development of the state is outlined in the Planning Strategy. The relevant volume of the Planning Strategy for this Development Plan is “The 30-Year Plan for Greater Adelaide (February 2010)”. It covers a full range of social, economic and environmental issues and informs and guides policies both across Government and in local area Development Plans. The Planning Strategy is required under section 22 of the *Development Act 1993* and is updated by the State Government every few years.

Development Plans are the key on-the-ground development assessment documents in South Australia. They contain the rules that set out what can be done on any piece of land across the state, and the detailed criteria against which development applications will be assessed. There is a separate Development Plan for each one of the 68 local council areas, plus a handful of other Development Plans covering areas not situated within local government boundaries. Development Plans outline what sort of developments and land use are and are not envisaged for particular zones (eg primary production, residential, commercial, industrial), and various objectives, principles and policies further controlling and affecting the design and other aspects of proposed developments.

Local councils may also prepare strategic plans which guide the same matters as the state Planning Strategy, but they are not development assessment tools similar to Development Plans.

In summary, this means that the 30 Year Plan for Greater Adelaide defines the State Government’s view of sustainable land use in the Northern Adelaide Plains and that any development is required to comply with the Development Plan for the relevant LGA. Interpretation of the application of the requirements specified in the Development Plan to a proposed development is facilitated by specialist knowledge and understanding of planning.

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<sup>5</sup> Used as a basis for consultation

<sup>6</sup> Playford Council Development Plan (consolidated 23 December 2010), p5

Growers are unlikely to have that specialist planning knowledge and understanding. Compliance with government regulations in areas such OH&S and HazChem is also required.

### **2.6.2 Land uses other than urban**

Several planners mentioned that incremental urbanisation is not the only threat to land use remaining as intensive horticulture. Other land uses include “rural life-stylers”, horses and rural recreation, grazing etc.

### **2.6.3 Explicit Government support for peri urban intensive horticulture**

Several planners and other stakeholders suggested that Government has not made explicit statements of support for areas of peri urban horticulture. However, Primary Production Policy 13 in the 30 Year Plan states “Designate areas of primary production significance (see Map D11) in Development Plans and introduce a standard set of planning controls to protect the areas’ use”<sup>7</sup>. While this policy indicates support for specified areas of primary production, the areas shown in Map D11 have already been subject to incremental urbanisation and their continued use for intensive horticulture is compromised by the Northern Expressway. Similarly, explicit government support is required to ensure investment in infrastructure required in the areas designated for relocation of intensive horticulture.

As well, consultation with DPLG provided information that a bill is being prepared that will increase the certainty with which land for primary production will be protected by zoning.

### **2.6.4 Data and Information Requirements**

Some planners considered that the matching of asset ownership and business structures and operations was not possible given current data. Similarly, estimates of horticultural production, productivity and its gross value for the Northern Adelaide Plains while improved is still not sufficiently accurate for the purposes of supporting the designation of primary production areas in the face of pressure for urban use.

### **2.6.5 Inflexibilities in Development Plans**

Some planners with responsibilities for development in their LGA considered that future prosperity of peri-urban intensive horticulture depends on flexibility in the application of Development Plan rules. Particular areas include value adding enterprises (farm gate/cellar door sales, restaurants) and areas that enhance the aesthetics of the region and preserve the special characteristics of the region eg waste management, condition of shade houses, storm water management.

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<sup>7</sup>

Department of Planning and Local Government (2010). The 30-Year Plan for Greater Adelaide.: Government of South Australia., page 106

## **3 CONSULTATIONS - SYDNEY BASIN**

### **3.1 Growers**

Meetings with 22 Sydney Basin growers took place during April. Attendance, timing and venues were arranged by the state grower organisation (NSW Farmers Association). This ensured that grower preferences were met and enabled coordination with other activities.

It should be noted that relatively few horticultural growers in the Sydney Basin are members of NSW Farmers. Therefore, care was taken to ensure that other grower groupings, such as the NSW Freegrowers and the Greenhouse Vegetable Growers were included.

Discussions have also been held with proponents of a proposed “Gosford Agribusiness Park” in the Peats Ridge/Mangrove Mountain area in the north of the Sydney basin, where growers are attempting to work with the local authorities to manage the urban encroachment issue. (See case study.)

### **3.2 Planners and other professionals**

Face to face or phone discussions were held with ten planners from local councils and the State planning department as well as seven NSW DPI staff with a role in land use and agriculture planning. A meeting was also held with Ian Sinclair, a rural and environmental planning consultant with a strong background in peri-urban planning<sup>8</sup>.

Discussions were held with six other service providers with knowledge of the Sydney basin horticulture industry, including associations and consultants.

### **3.3 Consultation Process**

#### **3.3.1 Growers**

The Sydney meetings were delayed until April due to the demands created on NSW Farmers staff by duties related to the state election. (For example, Coal Seam Gas was a major focus during the election process). NSW Farmers staff arranged a dinner meeting and a lunch meeting with several growers at each. These enabled an informal presentation using slide printouts and the issues paper. On each occasion, there was active and candid engagement by all the growers, who represented a wide range of crops and situations. Some other growers were visited on their farms and/or followed up by phone.

#### **3.3.2 Planners and other professionals**

This included a mix of face-to-face and phone discussions spread through April to June. In most cases, the issues paper and/or a project summary was emailed with a request for insights from the planners perspective on how communication and understanding could be improved between industry and the planning community.

In addition, Gerard McEvelly attended two meetings of the Executive group for the Western Sydney Parklands Future Farming Program. This group has been convened by Western Sydney Parklands Trust (WSPT) to advise and collaborate on projects related to the leasing of 10% of the government-owned land in the WSPT area for agricultural uses. This is a very relevant initiative that is included as a case study below<sup>9</sup>. In addition, he attended a related workshop with local high schools about a proposed Trade Training Centre for horticulture.

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<sup>8</sup> <http://www.ruralplanning.com.au/>

<sup>9</sup> <http://www.westernsydneparklands.com.au/>

## Case Study: Western Sydney Parklands

The leasing of over 400ha of “new” land for farming in Western Sydney offers great opportunities, not only for horticultural production, but also for an innovative model for peri-urban horticulture that incorporates community engagement at many levels.

The Western Sydney Parklands cover 5,280 hectares, stretching 27 kilometres from Quakers Hill to Leppington. The need for open and special space corridors was first identified in the 1968 Sydney Region Outline Plan. At that time government initiated a major program to acquire enough lands to satisfy the demand for regional open space in the future. This space was required to provide corridors for transport and other infrastructure, as well as for sports, recreation and rural land use.

The Western Sydney Parklands Act (2006) set out the boundaries of the Parklands and established a Trust to manage the majority of lands within the Parklands as well as achieve the Management Vision objectives. The Act commenced on 1 January 2008.

The draft Plan of Management was released by the Trust in October 2010 and states (p36):

“The Trust will protect and promote the Parklands as a valuable urban agricultural setting, with benefits for recreation, tourism, education and the local economy”

The stated outcomes include an increase from 2 percent to 10 percent of public land in the Parklands being used for farming (an increase of 415 ha). In mid-2010, the Trust sought expressions of interest for the first areas to be offered on farming leases. Eventually, the income from lease payments will enable the Parklands to be self-funding.

In addition, the Trust aims to “increase the community interaction with urban farming in the Parklands by establishing produce markets, farm gates and educational programs”. To support this and its other goals related to farming, the Trust launched the Future Farming Initiative. This includes partnerships with research and industry organisations, including the University of Sydney, University of Western Sydney, NSW DPI, Calmsley City Farm and NSW Farmers. These organisations have been invited to provide advice and/or programs related to the expansion of farming in the Parklands.

However, a major challenge faced by the Trust and for interested parties is the lack of establishment funding for the Future Farming Initiative at present. None of the partner organisations have resources available for significant engagement in this initiative.

### 3.4 Grower Issues

#### 3.4.1 General

Many of the issues arising from grower discussions at the Sydney meetings have also been described in the notes above regarding Adelaide consultation and so will not be repeated in detail. These included issues regarding:

- Increasing land values;
- The need for essential infrastructure at alternative sites to render re-location viable;
- The fragmented nature of the industry;
- “Border skirmishes” with new, non-farming neighbours; and
- The lack of provision in planning guidelines for the realities of modern horticultural structures and practices.

#### 3.4.2 Failure to follow through on previous reports and initiatives

Discussions and other research identified a large body of past research, consultations, forums and other initiatives related to peri-urban horticulture, particularly in the Sydney basin. While it was outside the scope of this paper to undertake a detailed literature review, we have highlighted several key documents and current initiatives in Section 4: Trends, Issues and Themes. This material has been used to enrich the stakeholder discussions and better inform this final report and its recommendations.

However, there is common concern about the failure to implement actions and recommendations, either suggested or agreed, in these various reports, forums and workshops.

### 3.4.3 Land uses other than urban

The Sydney Basin growers raised some issues specific to the region, including:

- Flood-plain areas (eg along the Hawkesbury River) are the only land safe from urban development, but there is strong demand from other non-food rural land-uses such as turf farming and recreation eg polo;
- Sand-mining - There was an unconfirmed report that Bakers Lagoon near Richmond was bought up by Boral in 1950's. (The Penrith Lakes area resulted from extensive past excavations by building products businesses); and
- Coal Seam Gas (CSG) - this is high-profile issue, which is threatening Sydney Basin landowners as well as the more high-profile areas of broadacre country in NSW. Industry could use this high level of awareness to raise the profile of other land-competition issues such as peri-urban sprawl via the *Just Terms Compensation Act* and property rights in general.

### 3.4.4 Planning issues

The Sydney Basin growers raised some issues specific to the region, including:

- Overlaying regulations and increased requirements and reports for Development Applications and continuing agricultural enterprises indicate that councils do not want agriculture in the Sydney basin;
- Development Applications for a new farming enterprise are difficult and often requires the services of an expert planner;
- Instances of compulsory acquisition without either any or adequate compensation<sup>10</sup>;
- Rezoning practices e.g. Hills Council changed zoning to semi-urban (cost increased by \$200/yr)<sup>11</sup>; and
- Inadequate investment in infrastructure eg rather than maintaining rural roads, trend is to restrict use to 3t, meaning added costs/emissions in taking longer, approved and maintained routes.

### 3.4.5 Environmental constraints – noise, odour

As noted above, growers reported instances of “border skirmishes” with new, non-farming neighbours. Some of these introduced the perspective of compliance with environmental regulations, administered by the NSW Department of Environment and Heritage (now the Office of Environment and Heritage within the Department of Premier and Cabinet). While it has not been possible to confirm the facts in the following story, it provides an example of the concerns held by industry and the sense of disempowerment:

*“Following complaints from neighbours of a pre-existing mushroom farm, DEH officers carried out a noise monitoring exercise which involved interrupting the power supply to the farm in order to measure background noise levels. On reconnecting the power, the operating noise levels were measured and found to be more than the allowable 5db above the background sound level. This did not account for the fact that cooling fans needed to operate at maximum power on start-up to counteract the effects of the interruption. As a result, the operator had to relocate the cooling plant room at a cost of \$300,000.”*

<sup>10</sup> e.g. RTA compulsorily acquired a portion of a horticulturists land to build Hawkesbury Valley Way several years ago – still no compensation paid; Piggery at Bringelly acquired for railway. (NSW Farmers involved in raising with Minister for Planning)

<sup>11</sup> Comment “What is semi-urban? Rural should be rural.”

Odour levels are also covered by the environmental regulations. Odour complaints have been a major problem in the past for the mushroom industry (see Case Study). The industry has made significant practice changes, including bringing in prepared compost to avoid any odour release from compost preparation. However, increasing urbanisation changes the allowable limits (as below) and intensifies the challenge<sup>12</sup>.

It is noted that a revised Technical Framework - Assessment and Management of Odour from Stationary Sources in NSW, has recently been released.<sup>13</sup>

There was significant discussion about the issues noted above including descriptions of stressful experiences by growers with aggressive neighbours or planning bureaucracy. Nevertheless, for most growers these occurred only occasionally, or were relayed indirectly through friends or relatives.

### **3.4.6 Business viability issues**

Many growers raised concerns about the economic viability of producing vegetables or other crops in the Sydney Basin. Some of the specific concerns, such as lack of bargaining power, are well-known and generally agreed across the industry. Other concerns were observations or opinions that lacked clear evidence, but would be worthy of research as this may identify potential opportunities/solutions. Examples of the issues raised included:

- Land banking and competing high-value uses push up land values to point where it is unviable for new growers to enter the industry;
- Perceived inequitable share of retail dollar for growers;
- Particular concerns over the marketing system including the belief that wholesalers no longer acted as sellers agents;
- Little faith in ability of Horticultural Code of Conduct and the ACCC to improve things
- Sydney basin produce is under-valued by the markets compared with interstate produce of comparable quality; and
- Sydney was seen as a dumping ground for excess production from other states due to market size.

### **3.4.7 Advantages of peri-urban production**

Peri-urban horticultural production was seen as having the following advantages:

- Access to labour force (especially high labour use industries such as mushrooms) eg Windsor Farm Foods struggle to find labour at Cowra;
- Reduction in food miles eg relocation to west of range means additional 5 hours delivery distance so that a mushroom farm with four deliveries/day would need four trucks rather than one truck x four trips; and
- Reduction in carbon miles.

### **3.4.8 Ideas for retention of farming in the Sydney Basin**

Consultation with growers brought forth many ideas for the retention of farming in the Sydney Basin. For example, the relocation of existing capital-intensive agricultural farms within the Sydney Basin could be facilitated by providing:

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<sup>12</sup> [http://www.environment.nsw.gov.au/resources/consult/EPA/composting\\_draft\\_egs.pdf](http://www.environment.nsw.gov.au/resources/consult/EPA/composting_draft_egs.pdf)

<sup>13</sup> <http://www.environment.nsw.gov.au/air/odour.htm>



- Incentives via increased and accelerated tax depreciation for capital-intensive agricultural industries relocate to a new agricultural zoned site;
- Subsidies/rebates to convert to efficient practices;
- Implementation of Transferable Development Rights;
- Implementation of increased farming infrastructure in agricultural zoned areas eg gas, 3-phase electricity, roads etc;
- Further decreasing Council rates to retain farming in the Sydney Basin;
- Piloting Agribusiness Parks;
- Implementation of Right to Farm Legislation; and
- Strengthening RU1 Rural Zones.

### 3.5 Issues relevant to Planners and other Professionals

#### 3.5.1 Inadequate industry understanding of the planning framework

As was the case in the NAP, some planners noted that growers tended to lack an understanding of the planning framework and processes.

Development planning in the Sydney Basin involves both the state and local government. The Sydney Basin is covered by the Sydney Metropolitan Plan (SMP) 2036, and a suite of ten draft sub-regional strategies which followed from the earlier 2005 Metro Strategy and plan for 2031<sup>14</sup>. (There are also seven regional strategies in place for parts of the state outside Sydney, covering the entire coast. One of these (Central Coast) adjoins the North and North-Western subregion of the SMP.)

The SMP was launched in late 2010 after a review and update of the previous plan from 2005. A new element of the revised plan is section F entitled “Balancing land uses on the city fringe”<sup>15</sup>. This section provides a very positive assessment of the importance of peri-urban agriculture and proposes the following actions in support of it:

***“Objective F1: To contain Sydney’s urban footprint***

*Action F1.1: Focus land release in Growth Centres*

*Action F1.2: Simplify the land release process*

***Objective F2: To maintain and protect agricultural activities and resource lands***

*Action F2.1: Consider development of an agriculture policy for Sydney*

*Action F2.2: Undertake mapping to inform future strategic policy making with respect to agricultural activities and resource lands*

***Objective F3: To encourage investment in agriculture and resource lands***

*Action F3.1: Promote agricultural activities positively in Sydney to reduce land use conflict*

*Action F3.2: Prepare and release guidance on planning for agricultural activities*

*Action F3.3: Plan for the sustainable management of construction materials*

***Objective F4: To maintain Sydney’s soil health***

*Action F4.1: Finalise and implement the NSW Soils Policy”*

However, there has been a change of government in NSW since the release of the plan and there has been no clear endorsement of the Plan by the new government at this stage. As such, there is

<sup>14</sup> <http://www.metrostrategy.nsw.gov.au/>

<sup>15</sup> NSW Government 2010 Sydney Metropolitan Strategy F - Balancing land uses on the city's fringe

no guarantee that the appropriate resources and inter-departmental collaboration will be applied in order to undertake these actions. In any case, the actions require significant further development in terms of responsibilities, timeframes and linkages. Nevertheless, these objectives provide a strong basis for industry engagement with the new administration regarding peri-urban planning.

It should also be noted that, while section F of the SMP is very supportive of peri-urban agriculture in general, the focussed land release in the North-west and South-west growth centres is going to displace hundreds of growers. The ground-truthing study by Malcolm and Fahd states that 560 vegetable farms covering an area of 603 ha and producing 3-5% of the vegetables consumed in Sydney lie within the proposed growth centres. These comprise 53% of the vegetable farms in the Sydney basin and 30% of the land cropped for vegetables.

While the SMP provides a comprehensive high-level framework, the detailed consideration of specific developments occurs at the council level. The linkage between the councils and the Department of Planning and Infrastructure is through the Local Environment Plans (LEPs), which each council must develop and have approved. Development Control Plans (DCPs) are also drawn up by councils to supplement LEPs but are not submitted for State approval. Each LEP/DCP provides a planning framework that takes into account the situation of that particular council region. This means that each LEP/DCP is distinct, although the Department seeks to promote consistency through the application of the Standard Instrument with its set template and mandatory provisions. (One council planner stated that the template for LEPs was restrictive)

Therefore, while industry engagement is necessary at the State level of planning, it is also essential that industry engages at the local council level. Referring to the earlier example of Wollondilly Shire Council and its Rural Industry Liaison Committee, this has had significant influence on the council's recently released revised LEP/DCP, including:

- Buffer distance for igloos (plastic tunnel structures) reduced from 30m to 15m;
- Simplification of DCP controls relating to agricultural land uses;
- Intensive development on rural smallholdings no longer prohibited (offering opportunities for growers displaced by the South West growth corridor to relocate to Wollondilly Shire); and
- Shire's growth management strategy now has a stronger agriculture component.

In addition, to avoid having to deal with frivolous complaints, the council unanimously passed a resolution whereby no action will be taken for complaints regarding noise or odour caused by nearby farming activities, if it is found that the cause of the nuisance is the undertaking of activities considered necessary and reasonable to carry out a farming enterprise. Again, this is a position that other councils could be encouraged to consider adopting, given a concerted effort by industry.

### **3.5.2 Need for explicit government support for peri-urban horticulture**

As with the NAP, this was a consistent theme among the various local government planners consulted in the Sydney Basin. Some felt that there was a need for the Department of Planning to undertake strategic work on city fringe areas, as there is no compulsion for councils to have consistency in approaches to peri-urban development and approvals. They also felt that there was a role for the DPI to assist in coordination, given the number of councils and the number of different industries involved.

Some councils are making their own initiatives regarding peri-urban development. At least one has developed an employment lands strategy, which involved some communication between industry and the planning hierarchy. A draft residential (urban areas) study is currently on public exhibition. This council is aiming to develop a rural lands strategy next, but this could be 12 months away.



### **3.5.3 Data and information requirements**

Comments from Sydney planners were similar to those from the NAP. Most planners accepted that they lack detailed knowledge of horticulture industry operations and needs:

*“Planners are mostly focussed on urban issues – streetscapes, building height and so on, rather than on farming”*

(One exception to this rule is the case of Wollondilly Shire Council – see case study)

Planners noted that industries needed to be proactive and positive and felt that it would help the process if industry was to keep up a prominent profile. They need to be better able to provide reliable data and should consider engaging independent planning experts to help resolve planning issues. It was also noted that there is enormous public and political pressure to subdivide farms:

*“Developers do well because they take the trouble to understand the system and put up a logical case”.*

## **4 TRENDS, ISSUES AND THEMES**

### **4.1 Relevant Trends**

Several industry and social trends have substantial implications for the future location and development of peri urban intensive horticulture. These trends have been identified during the consultation process and in reviewing the literature. Selected trends and implications are discussed below.

#### **4.1.1 Adoption of increasingly high technology hydroponics**

Substantial investments have been made in high technology hydroponic facilities in several parts of Australia. For example, a facility with an initial 8 hectares under protection<sup>16</sup> has been established about 5 km north of the Gawler River in the Mallala Council area. It has subsequently been expanded to 17 hectares under protection. In the Sydney Basin, the Central Coast Plateau Agribusiness Park concept (see case study) is focused on high-tech hydroponics, while proposed developments in the Western Sydney Parklands and on the University of Sydney land at the Camden campus involve high-tech hydroponics and aquaponics. The University of Western Sydney is negotiating to establish a high-tech hydroponics research facility to support the expected increase in investment in the region.

In contrast to soil based intensive horticulture, soil type is not an important criterion for the selection of the location for these types of facilities. Consequently, these types of facilities do not need to be established in areas with the soil and other characteristics that favoured past establishment of intensive horticulture.

#### **4.1.2 Expansion of low technology hydroponics**

There is substantial expansion in the area of low to medium technology hydroponic production of suitable vegetables within the northern Adelaide plains area and the Sydney Basin. This more intensive form of horticulture provides more control over production and allows smaller areas to provide sufficient incomes for farm families. However, there are issues with waste management and visual amenity as well as increasing numbers of border skirmishes with adjoining producers.

#### **4.1.3 Plant breeding for specific growing conditions**

The international plant breeding industry has substantially increased its ability to breed a wide range of individual strains of horticultural plants that can be highly productive in many different specific growing conditions. This achievement has resulted in a substantially wider range of environments that are suitable for intensive horticulture and has relaxed the previously existing constraints to relocation.

#### **4.1.4 Rural life stylers**

An increasing number of families are moving to rural areas for lifestyle purposes. However, many of the desirable features of rural living as perceived by rural life stylers are incompatible with intensive horticulture and other types of agriculture. Consequently, this trend is likely to lead to increased frequencies of border skirmishes which may stimulate relocation of intensive horticulture.

#### **4.1.5 Returns to scale for some soil based crops**

Intensive horticulture, like all other primary production industries is continually changing in response to economic, environmental and social pressures. An example relevant to the Northern Adelaide Plains is the recent relocation of some soil based crops (particularly potatoes and

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<sup>16</sup> See <http://www.perfection.com.au/media/dvineripe.aspx> and D’VineRipe® case study in this report

onions) to areas which enable substantial returns to scale to be captured. As a result, the area grown and production of these crops in the Northern Adelaide Plains has reduced comparatively in the last 20 years or so.

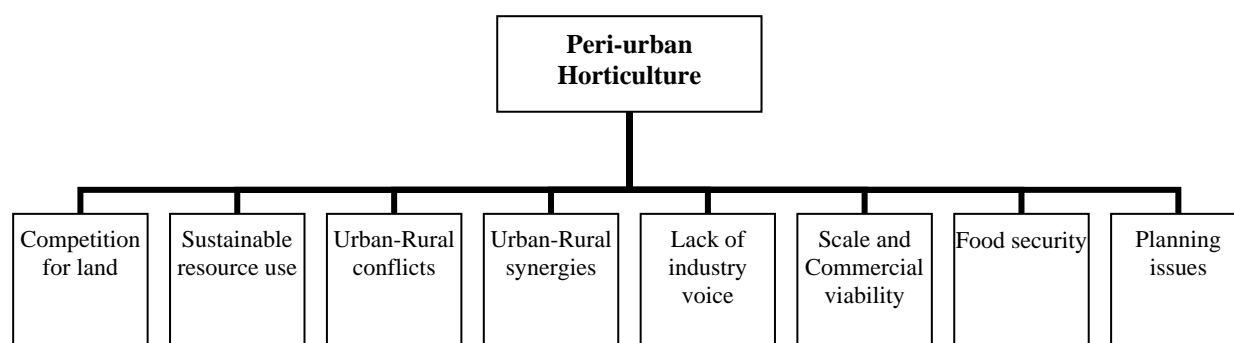
## 4.2 Factors affecting peri-urban horticulture

A wide range of issues were identified and discussed during the consultation phase and in the review of reports and projects. Due to the wide range of issues and perspectives identified, a mind-mapping approach was used to summarise and group these, to assist in analysis and recommendations<sup>17</sup>.

The issues were grouped under a series of themes, shown schematically in Figure 2 below. Most of the issues and themes are common to the Sydney and Adelaide situations and some examples are also included from other regions.

In this section, each theme is briefly discussed and some of the most significant references or current initiatives relevant to each one are highlighted. A more comprehensive list of references is in the bibliography, again sorted by theme. In the next section, the issues within each theme are listed, along with the challenges or opportunities they represent.

**Figure 2 : Themes – Peri-urban Horticulture**



## 4.3 Theme 1: Competition for land

### 4.3.1 Context

The peri-urban land use issue is often framed in simple terms as a competition between farming and development. However, there are many more actual and potential factors that have a major bearing on land use. Development uses may comprise areas dedicated to medium to high density housing, complete with schools, shopping centres and industrial areas (such as in Sydney’s NW and SW growth centres model). However, development also includes the less dramatic conversion of farming land into rural residential, “tree change” or hobby farm uses which can lead to circumstances where commercial farms are surrounded by low-density residential land<sup>18</sup>.

Many larger growers saw urban encroachment on land used for intensive horticulture as an inevitable process of urbanisation increasing the capital value of their land asset, and providing them with increased funds to relocate (and diversify) their business or to exit the industry. This introduces a contrary position to the concern about the threat of development, namely the potential threat of land being “locked in” for agricultural use. While on the one hand, some

<sup>17</sup> Current version available from Gerard McEvilly

<sup>18</sup> This can lead to many of the “border skirmishes” mentioned below under Urban-Rural conflicts.

growers would like to see land designated for agricultural use only, others fear that this would deny the owner the opportunity to sell all or part of the land to either invest in the farm business or for a retirement nest-egg. In essence, many in the industry would like to see a solution that ensured the availability of land for food production, but compensated the owner for being barred from capitalising the gain in land value enjoyed by land that undergoes urban development.

A literature review by Jewell<sup>19</sup> investigated this issue in some detail and assesses different approaches used around the world to deal with this issue. One option is called “Transferable Development Rights (TDRs)”:

*“TDRs appear relatively simple, development is transferred from one location to another, but they have often been hard to apply in practice. Among the approximately 140 TDR programs in existence in the United States, program designs differ greatly, and the results have varied from virtually no transfers at all to preservation of 20,000 hectares.”*<sup>20</sup>

TDRs do not appear to provide a widely applicable remedy.

Several growers acknowledged that the location, scale and concentration of intensive horticulture in the Northern Adelaide Plains and particularly the Virginia Triangle had enabled the development of an industry cluster including infrastructure and services that improved productivity but was threatened by incremental urbanisation.

Incremental urbanisation and increased land values also reduced opportunities for existing or new entrants to establish enterprises operations of sufficient size to reap returns to scale and to new technology.

Several larger growers expressed the view that the opportunity to protect peri urban horticulture in the region from incremental urbanisation through planning controls had long passed and that this loss of opportunity was a clear indication of government priorities. Consequently, most looked to suitable greenfields sites less subject to incremental urbanisation for expansion, relocation and adoption of new technology. For example, potato and onion growing has substantially relocated to areas with suitable soil, water and transport infrastructure and location both in South Australia and in other parts of the country. The Hay plain is also the location for substantial expansion of large scale lettuce growing.

Several planners mentioned that incremental urbanisation was not the only threat to land use remaining as intensive horticulture. Other land uses that compete with intensive horticulture include “rural life-stylers”, horses and rural recreation, grazing etc.

Urban development also involves the provision of infrastructure including transport and other corridors, which can take significant areas out of production, while also disrupting operations on properties divided by the road. Affected growers trying to obtain compensation may have to resort to litigation which can have uncertain results.

Other forms of competition for land can involve productive land uses, but in ways unrelated to food or fibre production. One example is that of the turf production in the Windsor area of the Sydney basin, along the floodplain of the Hawkesbury River. Turf production is essential to supply the parks, sports fields, landscapes and gardens of existing and new urban development. Turf needs to be cut and re-laid without delay and so location of production close to end use customers is important. Turf production is a prime competitor for peri-urban land, and is seen by

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<sup>19</sup> Jewell, 2008

<sup>20</sup> Walls and McConnell 2007

some as a more attractive business than production for the fresh vegetable market. This has seen a trend of changing land use from vegetable to turf production, accompanied by increasing cohesiveness and professionalism in the turf sector.

Another major example is the equine industry, where large areas of land (often peri-urban) are required for users ranging from pony enthusiasts to livestock breeders for the racing industry. These users tend to be more capable of out-bidding food producers for the land.

Another high value alternative land use is mining and drilling for resources, with coal seam gas (CSG) having a high profile at present. Unlike the other forms of development above, mining of agricultural land has triggered a significant policy response, including “Protecting Queensland’s Strategic Cropping Land: A policy framework” (Queensland Government (2011)). It has been noted by Growcom, the state fruit and vegetable association, that this only covers broad-scale agriculture. In NSW, the new government introduced a 60-day moratorium on mining and CSG in May 2011, with the government due to consider a bill for a 12 month moratorium as well as an overall regional land use policy.

Finally, and linked to the next issue of sustainable land use, is the use of land for conservation and natural resource management. This has led to reports from growers of restrictions that may be placed on farming practices for catchment management purposes, while there is an increasing focus on water stewardship in the Sydney Basin, as below.

#### **4.3.2 Key references and current initiatives**

##### ***Ground truthing of the Sydney vegetable industry in 2008<sup>21</sup>***

This report addressed the need for an improved understanding of the size, location and relative importance of Sydney vegetable industry to inform planning and development, allocation of natural resources, communication with and servicing of the industry and for biosecurity purposes. Additionally, questions had been recently raised about the size and importance of the Sydney vegetable industry including the possibility of a substantial overestimate apparently used to provide justification for the allocation of additional government services. Through the use of “wireless technologies, GPS, satellite imagery and cadastral mapping accompanied by on-ground verification”, the project identified and recorded 1,052 properties growing vegetables on about 2,025 hectares in the Sydney region. More than 50% of the properties were in areas proposed for subdivision.

The report concluded that there was an overwhelming impression that the Sydney vegetable industry was contracting and that it was “considerably smaller than many industry observers had previously suggested”. The report also suggested that ABS data is reasonably representative.

##### ***Peri-urban horticulture and land use planning: Literature Review and ‘Tool-kit’<sup>22</sup>***

The literature review of this project stated that “accurate data on the size and economic significance of horticultural production in peri-urban areas of Australia is not readily available”<sup>23</sup>. The report comments on changes (mostly increases) in land use intensity around large population centres and concludes:

*“as urban sprawl and growth juxtaposed against increasing intensity of peri-urban agriculture and horticulture is causing stress to the overall resource base, and producing a range of attendant planning and policy challenges”.*

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<sup>21</sup> Malcolm and Fahd, 2009

<sup>22</sup> Jewell 2008

<sup>23</sup> This issue is addressed under Theme 5, Lack of Industry voice

The report addresses the drivers of change in peri-urban areas and reviews the federal, state and local government context. It then discusses various policy responses in the context of “a cumulative decline in capacity ... to deal with the complexity and rapid rate of change in the peri-urban regions”. Policy options used in Australia include legislation, zoning (the principal method of controlling the development of land), and compulsory land acquisition. A range of mechanisms are used internationally including:

- Regulatory mechanisms such as “right to farm laws” and agriculture protection zoning;
- Market based mechanisms such as transfer or purchase of development rights; and
- Voluntary mechanisms such as agricultural district programs and community supported agriculture.

The final section of the report reviews a number of Australian and international case studies.

The review informed the production of a “tool kit” comprising short fact sheets outlining the key issues for those involved in policy making and other interested stakeholders. Fact sheet topics include:

- Basics of peri-urban land use planning in Australia;
- Challenges for peri-urban horticulturalists and typical sources of conflict; and
- Options for industry including urban growth boundaries, transfer of development rights and “right to farm” legislation.

### ***Protecting Queensland’s Strategic Cropping Land (SCL): A policy framework<sup>24</sup>***

This policy framework is highlighted for attention because it is currently under development and has been criticised for its failure to address threats such as peri-urban development. It may also be an important model for other states, particularly NSW, that are currently considering the issue of threats to agricultural lands. The framework has evolved in response to concerns raised about the impact of the Coal Seam Gas (CSG) industry on agricultural land. More generally, the development of the framework recognises the importance of finding a balance between agricultural, resource and development industries to achieve co-existence between the sectors in the long-term.

Two areas of SCL are identified on Figure 2 below. These are the Central Protection Area and the Southern Protection Area. These are the areas under intense and imminent development pressure. Land within the Strategic Cropping Protection Areas that meets the SCL criteria will be afforded the highest protection by the new legislation, which is planned to be introduced in late 2011.

The Strategic Cropping Management Area includes many regions that are important to Queensland's cropping and horticultural industries and so will have new development assessment obligations compared to current arrangements.

The framework, as currently drafted, is focussed primarily on broadacre farming land. Growcom questioned this in their submission<sup>25</sup> “Growcom says Government’s strategic cropping land criteria too narrow” to the issues paper, as follows:

*“If a narrowly focused policy based only on identification of high quality soils is pursued, highly productive horticultural regions such as the Granite Belt and growing districts for major crops such as pineapples, citrus and grapes may be afforded no protection at all. In addition, the needs of greenhouse horticultural production are entirely ignored.”<sup>26</sup>*

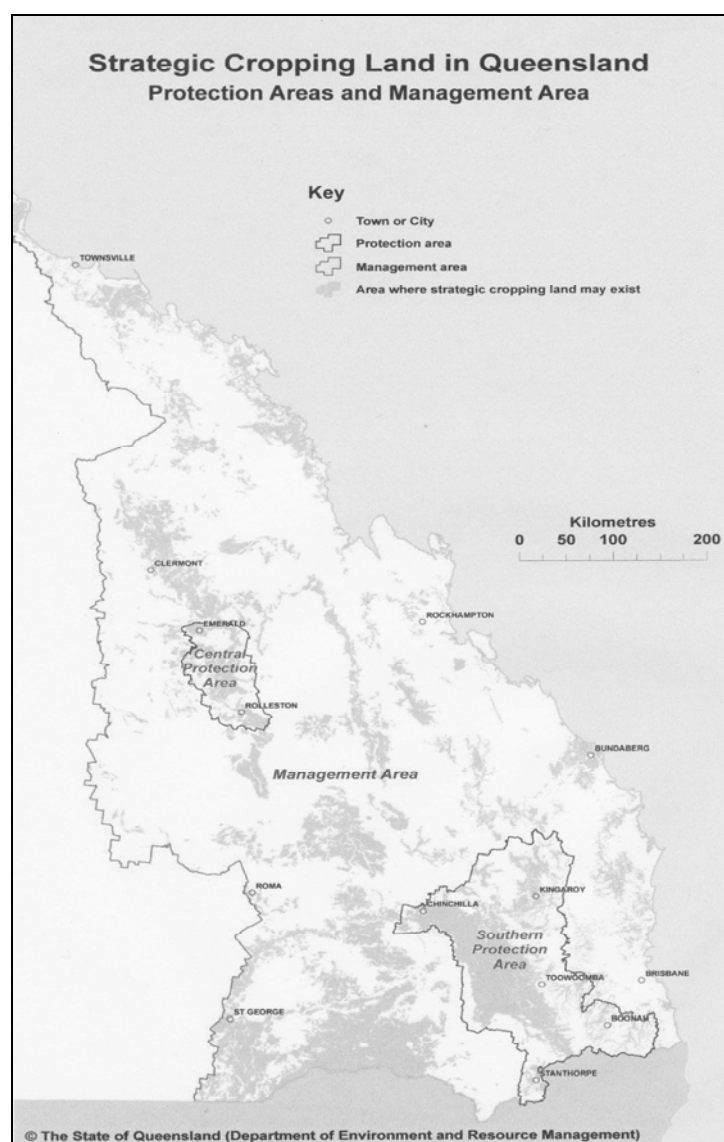
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<sup>24</sup> Queensland Government (2011)

<sup>25</sup> Growcom 2010

<sup>26</sup> [http://www.growcom.com.au/home/news\\_detail.asp?newsID=404](http://www.growcom.com.au/home/news_detail.asp?newsID=404)



**Figure 3 : Strategic Cropping Land in Queensland**

## Case Study: Proposed Gosford Agribusiness Park

A 2008 HAL-funded study tour enabled a group from the NSW Central Coast Plateau (the northern part of the Sydney Basin) to explore the concept of agribusiness parks in Holland and Belgium. The report (Lipscombe, 2008) states:

“Agribusiness Parks contribute to producing more food from less land, coupled with a reduced carbon footprint as well as being environmentally friendly. Agribusiness Parks are in close proximity to large cities ensuring that consumers are receiving fresh produce that has travelled less food miles.

The European Governments recognise the social, regional, and economic importance of agricultural clustering close to urban areas. This has led to the protection of key regions for intensive horticulture.”

The report suggested that the Central Coast Plateau region would be well-placed to emulate the European example, being “a traditional farming area that has the climate, water and location to be a major supplier of food”, with both Sydney and Newcastle within one hour by freeway.

Since this visit, a larger group of significant agricultural enterprises has established the Gosford Agribusiness Park concept and engaged with the Gosford Council to progress the proposal. A Central Coast Future of Farming Taskforce has been formed, comprising representatives of Regional Government Areas, Chambers of Commerce, NSW Farmers, Regional Development Australia and the state departments of planning and Primary Industries.

The land being proposed for the establishment of the Agribusiness Park is 67ha of state owned land at Somersby that has been used by the Department of Primary Industries as a research facility. With only limited research now being conducted at the facility, the land presently sits largely unused. Much like a traditional industrial estate, the proposed Agribusiness Park would consist of around 10-12 smaller 1-10 hectare lots with some shared infrastructure (water, energy, research) and would be protected from residential encroachment by regulation.

Importantly, the proposal would also benefit the existing well-established enterprises, by creating a profile for the region, economies of scale and facilitating R&D, training and an ongoing labour force. Former young Australian Vegetable grower of the year, Nathan Clackson, manages a major high-tech hydroponic production facility in the region for Barden Produce. “Growers on the Central Coast Plateau feel that by working together, we can create a lot of benefits for the region and also protect Sydney’s food supply” said Nathan, “we currently grow 15% of Sydney’s fresh produce in this region, worth about \$100m and its important that we can increase this, not be forced out by development.”

## 4.4 Theme 2: Sustainable Land use

### 4.4.1 Context

Horticulture has a significant role to play in enabling land use in peri-urban areas that produces economic and social benefits, while being sustainable. This includes the potential to utilise waste water and greenwaste generated from urban areas, while maximising water and nutrient use efficiency through the use of technology<sup>27</sup>. However, horticulture is also capable of generating waste where best management practices are not employed or through failing to recycle plastics and other consumables.

A major element of sustainable land use is the water supply, where reliability is essential for horticultural production and technology provides opportunities to optimise water use efficiency. Water is a key factor supporting the continuation or expansion of horticultural production in peri-urban areas. It should not be assumed that production can be relocated, without first assessing the comparative availability and price of water.

The two areas selected for this study provide contrasting examples of water use particularly in respect to recycled water.

In SA, the treated waste water pipeline from Bolivar to the North Adelaide Plains was specifically targeted at horticultural production to replace and augment other sources<sup>28</sup>. The d’Vine Ripe case study describes how, with further purification, this source is suitable for hydroponic production and is itself supplemented by rainwater collected from the extensive roof area. For field-grown crops, extensive research has developed systems to use the Bolivar water (which is already treated to A Class quality) while minimising any risk of harm to the crops or soil<sup>29</sup>.

Sydney Water has stated its intention to employ 12% recycling by 2015<sup>30</sup>. Currently, recycled water appears to be mainly used for irrigation of parks, sports fields and golf courses as well as at least one turf farm. Recycled water is also supplied to some new residential developments, for heavy industry and to augment river flows.

<sup>27</sup> These options are discussed further under Theme 4: Urban-Rural Synergies.

<sup>28</sup> Bolan, N et al (2008) Northern Adelaide plains recycling scheme – champion in the management of recycled water for sustainable production and environmental protection, Irrigation Australia Conference

<sup>29</sup> Kelly, J., van Der Weilen, M. and Stevens, D.P. (2001) Sustainable use of reclaimed water on the Northern Adelaide Plains. Growers Manual, PIRSA Rural Solutions, Adelaide, South Australia.

<sup>30</sup> <http://sydneywater.com.au/Water4Life/RecyclingandReuse/>



Historically, horticultural crops in the Sydney Basin have relied on water extraction for irrigation, with relatively generous allocations. However, the Hawkesbury Nepean River Recovery Project aims to secure 3.3 gigalitres of annual entitlements through its Water Smart Farms project. This is a \$17.7m project designed to increase the water use efficiency of irrigated agriculture across the Hawkesbury Nepean Catchment. A separate, but related Nutrient Smart Management project aims to significantly reduce nitrogen and phosphate export from farmlands to the river system.

In Victoria, the Bunyip Food Belt is to be established to include the cities of Casey, Cardinia and Mornington Peninsula Shire to the south east of Melbourne.<sup>31</sup> The Bunyip Food Belt is planned to use Class A recycled water from the Eastern Treatment Plant which is due to become available to the region from 2013.

Sustainable water use is an example of the increasing complexity of horticultural production, whether driven by market forces, regulations or the desire to improve practices and reduce waste. Further, small horticultural businesses find it difficult to deal with the increasingly complex technical, regulatory and market environment, a factor relevant to the discussions under Theme 6: Scale and commercial viability.

There is substantial expansion in the area of low to medium technology hydroponic production of suitable vegetables within the northern Adelaide plains area. This increasingly intensive form of horticulture allows smaller areas to provide sufficient incomes for farm families. However, there are issues with waste management and visual amenity as well as increasing numbers of border skirmishes with adjoining producers.

The international plant breeding industry has substantially increased its ability to breed a wide range of individual strains of horticultural plants that can be highly productive in many different specific growing conditions. This achievement has resulted in a substantially wider range of environments that are suitable for intensive horticulture and has relaxed the previously existing constraints to relocation.

Finally, there is considerable interest in whether peri-urban production comprises more sustainable or “environmentally-friendly” land use, due to the shorter distance to markets. This factor is not analysed in detail here, but it should be noted that “food miles” or distance to market have been shown to be a poor indicator of the total carbon footprint of a product, which can only be determined through rigorous lifecycle analysis (LCA)<sup>32</sup>. However, there is a market segment that derives intangible value from sourcing food locally and this provides opportunities that are discussed further under Theme 4: Urban-rural synergies - Marketing opportunities for locally-produced food.

#### **4.4.2 Key references and current initiatives**

##### ***WISER program (Water and Irrigation Strategy Enhancement through Regional Partnership in Western Sydney)***

All horticultural enterprises require access to a suitable water supply. However, in peri-urban regions, competition for water is increasing from urban and industrial users with more ability to pay for the resource than horticulture. An important approach to this issue was explored by the WISER group, which included four Western Sydney councils, universities, water dependent businesses and government agencies and community groups.<sup>33</sup>

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<sup>31</sup> [http://www.vgavic.org.au/communication/newsletters/bunyip\\_food\\_belt.htm](http://www.vgavic.org.au/communication/newsletters/bunyip_food_belt.htm)

<sup>32</sup> Hogan and Thorpe 2009

<sup>33</sup> <http://www.uws.edu.au/wisergroup/wiser>

WISER started from the premise that the region has adequate water supplies provided the usage of suitable water from all sources of such as potable water, stormwater, effluent and groundwater usage is harmonised through regionally ‘integrated water resources planning’. The group aimed to address the following challenges to this planning approach:

- Water is currently managed by numerous entities with limited co-ordination;
- There is limited understanding of the water cycle and water productivity; and
- There is a plethora of water data and reports, many of dubious quality.

A goal of the WISER program was to help stakeholders and agencies to work from a common platform with a shared water vision matched to regional sustainability, jobs and prosperity. It also aimed to help them develop long-term solutions and strategies for total water cycle management with community engagement at all levels of the water cycle.

WISER hosted a symposium - The Future of Water in Peri-Urban Landscapes: Options & Opportunities - in August 2010 and also presented some valuable insights to their work at the Irrigation Australia Conference in June 2010.<sup>34</sup>

*“One important outcome of the WISER project was that it provided a voice to a diverse group of local stakeholders and helped them to work with government agencies to work towards developing a clear, implementable, shared water vision to support regional planning. A process for stakeholder and community engagement and a set of models or frameworks for integrated water resources planning (e.g. hydrologic model for peri-urban water cycle analysis and policy risk assessment manual) are now available and can be adapted for use across peri-urban regions in Australia and beyond.”<sup>35</sup>*

Although a key partner in the WISER program, the CRC for Irrigation Futures ceased operations in June 2010, the WISER group intends to continue to research peri-urban water issues in the future, in partnership with the four councils and other partners.

### ***Enquiry into Australia's Urban Water Sector by the Productivity Commission*<sup>36</sup>**

This enquiry is current with the draft report having been published in April 2011 and the final report to be tabled in August. As the title suggests, the primary focus is on urban water, although the Commissioners were directed to include the following considerations:

- Emerging water management practices, such as the integrated management of water, wastewater, recycled water and stormwater; and
- Lessons from reform in the rural water and natural resource management sectors and from overseas reform.

The draft report contains no mention of horticulture *per se*, but does refer to rural water issues in terms of rural–urban transfers which are particularly relevant to peri-urban horticulture. The draft report states that:

*“Transfers of water from rural to urban areas have been increasingly undertaken in recent years. Transfers can be categorised as being either:*

- *Trades — water providers purchase water, usually by purchasing allocations or entitlements, from other water providers or users.*

<sup>34</sup> Maheshwari B et al 2010, Simmons, B Maheshwari, G Starkey 2010, Singh, B Maheshwari, B Simmons 2010, Nawarathna et al 2010, Martin P and Williams J 2010, Martin P et al 2010

<sup>35</sup> Maheshwari B 2011 pers.comm.

<sup>36</sup> Australian Government 2011

- *Non-price transfers — these can include administratively reallocating water among different users, indirect purchases, such as funding infrastructure upgrades in exchange for water, and borrowing water held in storage and paying it back later.”*

A relatively small amount of water for agricultural use can often represent a relatively large amount of water for urban users. However, the draft report comments in chapter 6 that there are barriers to rural–urban trade, including policy bans and other institutional barriers, and notes that many urban water systems are not geographically connected to rural systems.

The recommendations relating to rural-urban trade includes the following:

*DRAFT RECOMMENDATION 11.7: All remaining impediments to rural–urban trade, particularly volumetric restrictions and excessive termination fees, should be removed as soon as possible.*

The authors of this report make no judgement on the potential impact of the enquiry or its recommendations on the availability and pricing of water for peri-urban horticulture, but note the importance of the industry remaining engaged with the process.

### ***APVMA spray drift review process***

The Australian Pesticides and Veterinary Medicines Authority (APVMA) has introduced a new review process looking at each registered chemical from the perspective of potential spray drift issues.<sup>37</sup> This involves changes to previous label conventions for statements related to spray drift management.

*“These changes are an extension of the APVMA’s spray drift policy framework APVMA Operating Principles In Relation To Spray Drift Risk published in July 2008.”*

The review process is prioritising those chemicals more likely to cause problems if they drift and may lead to revised directions regarding droplet size and buffer zones. Guidelines are already available on minimising spraydrift<sup>38</sup>. However, the review process could result in changes that are restrictive to growers with residential neighbours.

## **4.5 Theme 3: Urban-Rural conflicts**

### **4.5.1 Context**

Consultation in both Sydney and Adelaide uncovered similar reports of conflicts due to incompatible practices and attitudes between farmers and non-farmers, and in some instances between farmers<sup>39</sup>. Some of these relate to topics raised under Competition for Land, including concerns over potential CSG extraction as well as creeping development through conversion to rural residential use. In some instances, growers reported the occurrence of threats to their physical security after disputes occurred with their new neighbours. These disputes were generally related to “normal” farming operations causing smells, dust or noise and especially when happening around the clock. Other problems included increased theft and vandalism.

Concerns were also raised about increased risks to biosecurity and weed problems from poor land management. Clearly these problems can result from the actions of neighbouring farmers as well as non-farmers and disputes between different farmers certainly occur. One example is poor

<sup>37</sup> [http://www.apvma.gov.au/use\\_safely/spray\\_drift/](http://www.apvma.gov.au/use_safely/spray_drift/)

<sup>38</sup> APVMA 2010

<sup>39</sup> Sometimes called “border skirmishes”

crop protection practices leading to pesticide resistance. Additionally, there appears to be evidence that a significant number of non-rural people are buying into the rural lifestyle without understanding the nature of management practices and operations involved in the existing rural industries. Numerous interviewees believed that these potential causes of conflict might be prevented if councils communicated with new residents about the realities of rural life.

A current suggestion is that, in NSW, purchasers should be clearly informed about adjoining land use when they are issued with the section 149 planning certificate (s149)<sup>40</sup>.

For example, for the past four years Wollondilly Shire Council has attached a 'notice to purchasers of rural land' to all section 149 planning certificates. The notice advises prospective purchasers that they are buying in an area where agricultural activities occur and that this should be considered in making a decision to purchase land in Wollondilly Shire. The notice provides a list of agricultural activities that occur in the Shire and advises purchasers to assess surrounding agricultural land uses and the impact these activities may have when being pursued in close proximity to their proposed purchase. The aim of the notice is to reduce incidents of rural land use conflict, where new rural residents move in and begin to complain about local farming activities.

Further initiatives to reduce rural land use conflict pursued by Wollondilly Shire Council include the addition of two publications in their new resident kits, "Living together in rural Wollondilly", developed by the Council and a "rural living handbook", developed by Council and the Sydney Catchment Authority. These are described below and the same, or edited, documents could be adopted by other peri-urban and rural shires in NSW and nationally.<sup>41</sup>

This issue is covered in more detail in the Planning Issues section below.

#### 4.5.2 Key references and current initiatives

##### *Biosecurity*

In recent years, horticulture has been affected by numerous serious incursions of exotic pests and diseases. These are costly to eradicate and/or manage and can threaten the viability of certain crops or require the use of controls that are disruptive to integrated pest management. Several recent publications have focussed on the particular threats to biosecurity emanating from the urban-rural interface. A review by DAFF<sup>42</sup> recognised that "the land uses and management practices of small landholders in peri-urban areas may pose risks to Australia's biosecurity in terms of agriculture and international trade". Through interviews, the researchers determined that there were gaps in knowledge among small landholders, particularly at the "lifestyle" end of the spectrum.

More recently, a scoping study has been completed for the development of a regional biosecurity framework for the Northern Adelaide Plains.<sup>43</sup> This may be a valuable model for other peri-urban areas where the mix of landholders and land uses increases the risk of introduction and spread of new pests.

<sup>40</sup> A certificate issued under Section 149(2) provides information about the zoning of the property, the relevant state, regional and local planning controls and other property affectations such as land contamination and road widening. A certificate issued under Sections 149(2) and 149(5) provides both the information available in a Section 149 (2) certificate and additional information such as advice from other authorities, subdivision history, easements etc <http://www.penrithcity.nsw.gov.au>, <http://www.cityofsydney.nsw.gov.au>

<sup>41</sup> The NSW Department of Planning and Infrastructure has indicated that they could routinely provide such information about the realities of rural industry across all councils using a circular with an appropriate pro forma.

<sup>42</sup> Maller 2007

<sup>43</sup> McMichael et al 2010

### ***Living Together In Rural Wollondilly factsheets***

An underlying factor in many urban-rural border skirmishes is the lack of awareness that new residents, with no rural background, may have of the realities of farming operations. Wollondilly council, in the south west of the Sydney basin, has developed a new resident kit, containing a rural living handbook and the following factsheets.<sup>44</sup>

Fact Sheet No. 1 – Welcome to Rural Wollondilly – What to Expect

Fact Sheet No. 2 – Agricultural Industries and their Impacts

Fact Sheet No. 3 – Agricultural Planning Controls in the Wollondilly Shire

Fact Sheet No. 4 – How to be a good neighbour in Rural Wollondilly

Fact Sheet No. 5 – Managing Weed and Animal Pests

Fact Sheet No. 6 – Safe Driving on Rural Roads

Fact Sheet No. 7 – Dispute Resolution Tips and Agricultural Contacts

## **4.6 Theme 4: Urban-Rural synergies**

### **4.6.1 Context**

Improving the links and understanding between rural and urban communities can provide many benefits beyond the mere avoidance of conflict. These include opportunities for hard commercial and environmental gains or softer community and attitudinal benefits which may be essential to underpin peri-urban horticulture in the future.

### **4.6.2 Key references and current initiatives**

#### ***Regional initiatives, employment and image***

In order to achieve these benefits, the Wollondilly Shire Council has convened the Wollondilly Rural Industry Liaison Committee. Grower members of this group have expressed appreciation for the opportunities to voice an industry perspective on issues affecting them.

Many rural councils claim to appreciate the importance of the farming that occurs in the often extensive areas for which they are responsible. Farming is a key element of the rural character that makes many of these shires so attractive and underpins their local tourism potential. However, the level of regional pride and industry collaboration is often less obviously visible in peri-urban areas than it is in some larger, more rural centres such as Mildura, Griffith and Bundaberg. Also, there is clearly a contrast between the high levels of regional pride and industry collaboration obvious in the Barossa Valley and McLaren Vale wine regions near Adelaide compared with the intensive horticultural areas of the Northern Adelaide plains.

Intensive horticulture (and other farming operations) also provides an important source of employment, while conversely horticulture cannot thrive without the labour force provided by residential areas. However, this is a double-edged sword as the jobs available in farming are often undervalued and seen as lacking in skills, status and salary.

There is potential for the horticulture sector to engage more effectively to demonstrate the varied and challenging roles in the industry, particularly at the “high-tech” end such as hydroponics and protected cropping. This could be linked to initiatives to interest school leavers in the industry, such as the Trade Training Centre currently proposed by Calmsley City Farm to provide links

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<sup>44</sup> <http://www.wollondilly.nsw.gov.au> Direct links to the handbook and each factsheet are included in the bibliography of this report



between local high schools and the horticultural enterprises under development through the Western Sydney Parklands Trust (see case study).

### ***Recycling and Waste***

As mentioned under Sustainable Land Use, the recycling of waste water from urban areas for horticultural applications provides an environmental service to urban residents, while underpinning the essential water requirements of industry. However, such schemes also carry risk and it is essential that the industry observes the safeguards required.

Urban centres also produce large volumes of greenwaste, which can pose significant disposal issues. However, effective composting and quality management can enable its use for improving soil quality in intensive horticulture and significant research is available to help develop appropriate standards and guidelines for use<sup>45</sup>. An extension to this use of green waste is the development of “city to soil” schemes such as Groundswell<sup>4647</sup> which are designed to intercept food waste and divert it from landfill into composting schemes and on to farms. Four rural councils in NSW have adopted such schemes.

### ***Urban horticulture***

In contrast to the concerns and conflicts that can accompany urban encroachment on horticultural lands, there is significant interest in the opposite – where horticulture enters the urban environment. This can and does occur at several levels and offers opportunities for interaction and appreciation of horticulture and its products. Leaving aside the (often unrecognised) value of parks and other urban greenery and the recent interest in green roofs and green walls, there is increasing interest in community gardening<sup>48</sup> in urban areas. This includes councils establishing designated areas, as well as the Landshare scheme, recently launched in Australia, which connects people keen to grow produce with others who have space to share<sup>49</sup>.

The promotion of horticulture in urban areas could be dismissed as a fringe activity or even as competition for commercial growers. However, it could also be seen as part of a spectrum of activity, starting from the various gardens in schools programs and through to the MasterChef phenomenon, that can help to raise awareness of the source and value of healthy food.

### ***Market opportunities for locally-produced food***

This leads to a central element of Urban-Rural synergy – namely the real and perceived value of producing farm products close to the consumer. As mentioned under Sustainable Land Use, the concept of “Food Miles” has been discredited as a valid way to compare the environmental impact of competing products. Nevertheless, there is a segment of consumers who intuitively prefer to source locally grown produce where possible. These may or may not be part of groups such as the Slow Food movement, the 100 Mile Diet or similar. One aspect of this issue is the phenomenon of Farmers Markets, while another is the box delivery of fresh produce, through organisations such as Aussie Farmers Direct. Neither of these channels necessarily offer only locally-grown food, but they are indicators of the attitudes and preferences of a particular consumer segment.

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<sup>45</sup> Vailia, A (in preparation) International Symposium on Organic Matter Management and Compost in Horticulture Proceedings <http://compost-for-horticulture.com/>

<sup>46</sup> <http://www.groundswellproject.blogspot.com/>

<sup>47</sup> <http://www.ecosmagazine.com/paper/EC10093.htm>

<sup>48</sup> <http://communitygarden.org.au/>

<sup>49</sup> <http://www.landshareaustralia.com.au/>

A related example of the opportunities arising from horticultural production close to cities is an initiative such as the Hawkesbury Harvest Trail<sup>50</sup>. This initiative has synergy with tourism, offering visitors a self-guided tour of the region and opportunities to see and sometimes pick the produce in situ. It also offers an outlet for growers who lack the time or resources to attend weekend markets.

The market for locally grown food appears to offer a significant opportunity for growers in peri-urban areas to add value to their produce. However, this can only be realised through a strategic approach that carefully manages the supply chain. This requires that local produce is identified as such and marketed through channels that are prepared to pay a premium. In return, these consumers will demand integrity regarding the source of the produce.

Some industry interviewees suggested that regional branding should be explored, but it is difficult to imagine how this could be achieved for such a diverse group of producers and product types. Future studies could investigate the establishment of existing regional produce programs such as YV Fruits in the Yarra Valley, Victoria, which is just one example:

### ***“YV Fruits Group Profile***

*YV Fruits Group was established in 1993 and comprises twelve medium sized fruit producing family businesses, supporting thirty-four families directly and up to 70 permanent and part time staff throughout the year. The origins of these family businesses can be traced back up to six generations. The wealth of experience that has been handed down through the generations has enabled the current operators to develop their farming operations which exist today.*

*Some businesses were part of the original selection process in the Yarra Valley district. Others progressed to the Yarra Valley after beginning in the Hawthorn, Doncaster, Vermont, Wantirna and Mooroolbark areas of suburban Melbourne. As the perimeter of the Melbourne metropolitan area expanded over the years, these farming businesses moved eastward and replanted their orchards. In addition to the orchards in Yarra Valley, YV Fruits Group members now also produce in Mornington Peninsula, North East Victoria and Tasmania.”<sup>51</sup>*

### ***Food literacy: Reconnecting the city with the country***

*“Every person in the city has a country experience three times a day – it’s called eating! Food is the common link connecting the city to the country. But our highly specialised industry, government and especially our science, has lost sight of this obvious and crucial dependency.”<sup>52</sup>*

Professor Bill Belotti’s paper describes “food literacy” as covering three areas:

- food, nutrition and health
- agriculture, environment and ecology, and
- social development and equity.

Belotti explains how this food literacy framework can be useful for addressing two major areas of challenge/opportunity. Firstly, the city’s growing interest in food and how it is produced, coupled with an “alarmingly low” general level of knowledge. Secondly, The country’s (farmers) pivotal role in both producing food and enabling the prosperity of enterprises along the food supply chain, coupled with a generally low share in the monetary value of the end product.

<sup>50</sup> <http://www.hawkesburyharvest.com.au/>

<sup>51</sup> <http://www.yvfruits.com.au/>

<sup>52</sup> Belotti 2010, see also Bellotti, B (2010) The future of horticulture in the Sydney Basin

### ***City to Soil***

According to the state government, over 1.1 million tonnes of food is thrown away each year in NSW.<sup>53</sup> This includes about 800,000 tonnes of food waste from households and 340,000 tonnes from businesses. The City to Soil initiative is designed to close the loop on the nutrient cycle by collecting food waste, composting it and returning it to farmland to improve agricultural soils. A project run by Groundswell and involving Goulburn, Mulwaree, Palerang, Lachlan and Queanbeyan City Councils has tested the viability of the City to Soil collection service and its capacity to engage communities to become part of the solution.<sup>54</sup> The project has included both agronomic and economic studies.

A grouping of Northern beaches councils in Sydney, SHORROC, have announced their intention to explore a similar scheme.<sup>55</sup> As well as recycling organic matter and nutrients back into crop production, the diversion avoids the methane produced by food waste in landfill.

### ***Australian Year of the Farmer, 2012***

This campaign is designed to provide positive messages about the importance and value of farmers.<sup>56</sup> It provides an important opportunity for the vegetable industry, and peri-urban producers, to gain some critical mass in engaging with the urban community. The overall objectives are as follows:

- Establish closer ties between Australia's rural and urban communities.
- Celebrate the broad range and fine quality of the produce our farmers grow and harvest.
- Share how Australia is leading the world in farming techniques and innovation.
- Highlight the essential role of Australian agriculture to the maintenance of national and global food security.
- Promote the role our farmers play as environmental managers, creating and delivering sustainability through best practice management.
- Recognise farmers for feeding the nation and sustaining our vital agribusinesses.
- Communicate to all Australians the importance of farming and rural communities to our national economy and social fabric.
- Encourage Australians to reflect on the origins of the food they consume and the fibre they use every day and perpetuate the call to buy Australian produce.
- Focus on -- and prepare for -- the future of farming in Australia by creating awareness of career opportunities in agriculture and related areas.

## **Western Sydney Parklands**

The leasing of over 400ha of “new” land for farming in Western Sydney offers great opportunities, not only for horticultural production, but also for an innovative model for peri-urban horticulture that incorporates community engagement at many levels.

The Western Sydney Parklands cover 5,280 hectares, stretching 27 kilometres from Quakers Hill to Leppington. The need for open and special space corridors was first identified in the 1968 Sydney Region Outline Plan. At that time government initiated a major program to acquire enough lands to satisfy the demand for regional open space in the

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<sup>53</sup> <http://www.lovefoodhatewaste.nsw.gov.au/>

<sup>54</sup> <http://www.groundswellproject.blogspot.com/>

<sup>55</sup> <http://shoroc.com/2011/love-food-hate-waste/>

<sup>56</sup> [www.yearofthefarmer.com.au](http://www.yearofthefarmer.com.au)



future. This space was required to provide corridors for transport and other infrastructure, as well as for sports, recreation and rural land use.

The Western Sydney Parklands Act (2006) set out the boundaries of the Parklands and established a Trust to manage the majority of lands within the Parklands as well as achieve the Management Vision objectives. The Act commenced on 1 January 2008. <http://westernsydneyparklands.com.au/>

The draft Plan of Management was released by the Trust in October 2010 and states (p36):

“The Trust will protect and promote the Parklands as a valuable urban agricultural setting, with benefits for recreation, tourism, education and the local economy”

The stated outcomes include an increase from 2 percent to 10 percent of public land in the Parklands being used for farming (an increase of 415 ha). In mid-2010, the Trust sought expressions of interest for the first areas to be offered on farming leases. Eventually, the income from lease payments will enable the Parklands to be self-funding.

In addition, the Trust aims to “increase the community interaction with urban farming in the Parklands by establishing produce markets, farm gates and educational programs”. To support this and its other goals related to farming, the Trust launched the Future Farming Initiative. This includes partnerships with research and industry organisations, including the University of Sydney, University of Western Sydney, NSW DPI, Calmsley City Farm and NSW Farmers. These organisations have been invited to provide advice and/or programs related to the expansion of farming in the Parklands.

However, a major challenge faced by the Trust and for interested parties is the lack of establishment funding for the Future Farming Initiative at present. None of the partner organisations have resources available for significant engagement in this initiative.

## **4.7 Theme 5: Lack of industry voice**

### **4.7.1 Context**

The lack of scale of individual enterprises carries through to generally poor support for industry associations. This makes it difficult to marshal the resources needed to engage effectively with government and the wider community.

The peri-urban horticulture industry is characterised by a large number of small-scale farmers and a small number of individual operators of a significant size. Large or small, many are from a diverse range of ethnic backgrounds, described as “culturally and linguistically diverse” or CALD growers. In the Sydney Basin, very few horticultural producers are members of the state organisation, NSW Farmers Association<sup>57</sup>. However, some are members of local associations such as the Chinese Vegetable Growers, Greenhouse Vegetable Growers or NSW Freegrowers. This severely limits the resources that NSW Farmers can devote to addressing issues on their behalf. A notable exception to this is the collaborative engagement with local planners by the Central Coast Plateau growers (see Proposed Gosford Agribusiness Park case study).

Nevertheless, grower representatives have been involved in the plethora of consultations and workshops regarding peri-urban agriculture over the past several years (see bibliography). While this comprises a major commitment by the individuals concerned, they lack the resources to ensure adequate and timely follow up to these various initiatives. Without such follow-up, history makes it clear that few commitments and plans made by government are likely to hold.<sup>58</sup>

Following the 2008 Penrith forum, “Sydney’s Agriculture – Planning for the Future” there has been a process to provide an inter-agency response to the actions identified at the forum. The work has been done by an Agency Working Group (comprising state planning and primary industries, plus rural councils) and an Agriculture Reference Group, comprising various industry

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<sup>57</sup> Similarly, a very small proportion of NAP growers are members of SAFF.

<sup>58</sup> Wilkinson 2010

representatives. Over the past two years, the Agency Working Group has been developing a report, which is currently due to be presented to the new minister for primary industries.

This has the potential to build on the existing work of the Intensive Agriculture Consultative Committee for the Sydney region (IACC). This is mainly focussed on the intensive animal husbandry sector, as indicated by the following scope, but does include the nursery and mushroom sectors:

- The Intensive Agriculture Consultative Committee (IACC) will cover all aspects of intensive animal industries including production, marketing (e.g. saleyards), processing and use of organic by-products (e.g. composting, mushroom media, use of untreated manure and effluent as organic fertilisers).
- The IAAC will focus on those issues associated with planning and environmental protection. The Committee may facilitate the referral of other issues such as biosecurity, welfare and food safety to appropriate organisations.

The IACC currently meets twice a year by teleconference giving people an opportunity to touch base to discuss issues common to intensive animal and plant industries which are also relevant to the Office of Environment & Heritage, Dept of Primary Industries and the Dept of Planning & Infrastructure.<sup>59</sup>

In addressing the lack of an industry voice, it is important to review the role of the state primary industries department regarding peri-urban horticulture. In NSW, valuable work has been undertaken by individual officers regarding improving industry data as well as supporting the development of the Hawkesbury Harvest marketing program, as referenced in this report. Useful resources are available online<sup>60</sup>, including the “Living and working in rural areas guide” and “Policy for protection of agricultural land (2004)”.

However, our consultations indicate that NSW DPI has adopted a role as an advisory service to the Department of Planning, rather than as a driver of policy, programs and resources regarding peri-urban agriculture. Consultations in SA also reveal a similar perception regarding the division of Agriculture, Food and Wine within PIRSA.

Industry has, therefore, taken the lead in advocacy for peri-urban horticulture and agriculture, but its contribution to such meetings has been hampered by limited time availability and the lack of reliable data. The 2010 study by James et al<sup>61</sup>, summarised below, analysed several previous studies of Sydney’s agricultural lands. James et al conclude:

*“Conducting complementary surveys and data collection exercises can improve understandings of Sydney Basin agriculture and allow for the development of longitudinal data sets to determine long term trends. Such detailed longitudinal data are vital for planning for Sydney’s agriculture into the future.”*

It should be noted that, for industry to be better heard in discussions about peri-urban agriculture, reliable data about other production regions is also essential. For example, it could be argued that the fresh food needs of Sydney or Adelaide could be met from other production regions. However, many of these other seemingly rural regions are themselves under pressure from creeping development. This steady attrition of horticultural lands around Australia needs to be factored in before assumptions such as this can be accepted.

<sup>59</sup> Liz Rogers, pers comm

<sup>60</sup> <http://www.dpi.nsw.gov.au/environment/landuse-planning/primary-industries>

<sup>61</sup> James, S O'Neill, P Dimeski, B (2010) Sydney’s Agricultural Lands: An Analysis. Urban Research Centre, University of Western Sydney

An example has been cited where Bowen, Qld, a major source of vegetables for southern states is also the site of a new coal exporting port and rail line. Some of the additional population have elected to purchase rural blocks in farming areas. A recent, as yet unpublished, study by Ian Sinclair has mapped these with a “circle of disruption” drawn around each, indicating the likelihood of a significant impact on future vegetable production.

#### **4.7.2 Key references and current initiatives**

##### ***Sydney's Agriculture - Planning for the Future: Forum Outcomes Report*<sup>62</sup>**

This report is highlighted as one of the more recent examples of many forums, research studies and reports that have addressed the issue of peri-urban agriculture. Industry members took part in developing a useful list of issues and ideas. However, an ongoing industry voice is needed in order to turn talk into action.

The report describes the “Penrith Forum” – arranged in December 2008 by the NSW Department of Primary Industries, with Penrith City Council and the NSW Department of Planning. Participants considered:

- key issues affecting the future of agricultural production in the Sydney Basin in the context of projected population growth, continued urban development and loss of productive agricultural land
- strategies for ensuring the sustainability of agriculture in Sydney to secure the supply of fresh foods to the city’s growing population.

The report lists some fifteen issues and nineteen strategies. Given that NSW DPI convened the forum, it would seem that the department also owns the responsibility for implementing the strategies. One of these, “3.19 - Establish an agricultural reference group” has been put in train as mentioned elsewhere, but little of substance has been achieved to date.

##### ***Sydney's Agricultural Lands: An Analysis*<sup>63</sup>**

This study focused primarily on land use but is listed here because access to sound data is a prerequisite for industry having an effective voice in discussions and policy development related to peri-urban farming. This need covers many different types of data, from farm numbers and land use type, as analysed in this study, to sales volumes and marketing channels, water use, labour requirements and many other factors. This poses a major challenge in an industry sector that is so diverse and where many farms are small enough to risk falling through outside the Australian Bureau of Statistics or industry-based systems.

James et al examined the reliability of the various data sources and estimates from historical ABS and non-ABS studies (including Malcolm and Fahd, covered under theme 1). Because of inconsistent collection and analysis methods by non-ABS analysts as well as changes in methods employed by ABS, it is difficult to illustrate trends over time with much reliability.

The report states that past horticulture data had “been systematically under-recognised by an ABS data collection methodology focused on broad scale agriculture”, while non-ABS studies had used a range of methodologies, making it impossible to determine trends. However, these studies have been useful in prompting an improvement in ABS data collection, but there is still a lack of data on land area. It suggests that ABS data should be complemented by ground truthing, as carried out by Malcolm and Fahd.

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<sup>62</sup> Elton Consulting 2009

<sup>63</sup> James et al 2010

## Case study: The case for mushroom farming.

This example illustrates an approach to ongoing engagement using sound industry data to address strategic goals of the local authority. It summarises the extensive information provided by the mushroom industry during the development of the Hawkesbury Employment Lands Strategy.<sup>64</sup>

Such engagement is crucial for the mushroom industry because of the difficulties of relocation and because of past problems with complaints about odours from compost-making facilities. Most compost is now produced in remote locations, packaged and trucked in, which removes this issue.

Despite this, there is still ongoing pressure to relocate multi-million dollar mushroom facilities away from the creeping development of urban and rural residences. Because mushrooms are highly perishable, regular (up to thrice-daily) deliveries are required. Remote production would substantially increase spoilage risks, transport costs and emissions.

*“Mushrooms are the second most valuable fresh vegetable crop in Australia, after potatoes. The mushroom industry has been identified as one of the three fastest growing crop industries established in Australia since the 1950’s.*

*Most mushroom farms are located in peri-urban areas close to capital cities, with 25 per cent of national production in the Hawkesbury district near Sydney and a similar level around the northern fringe of Melbourne. The mushroom industry is very labour intensive with every mushroom being picked by hand. Over 4,000 people are employed directly by the industry. With an economic multiplier factor of 5, mushroom businesses are important employers and economic generators with their local communities, particularly in the lower socio-economic segments. The industry also employs considerable numbers of people of non-English speaking background (NESB), as workers in the industry do not require high level English skills.*

*The Hawkesbury region has the greatest concentration of mushroom growers in Australia and is the birthplace of the modern mushroom industry. It has 15 of the State’s 23 growers, producing 11,335 tonnes of mushrooms per year. This amounts to 78% of NSW mushroom production and nearly quarter of the national figure.*

*The Hawkesbury mushroom industry is worth \$45 million at farm gate; \$90 million at retail and economic value to the community of around \$450 million each year. It is a significant employer, employing 600 people directly in the industry.*

*Domestic production expanded at an average annual rate of 10% per annum from the mid 70’s to the mid 90’s and still continues to grow. However, during the same period the annual per capita mushroom consumption increased from 0.6kg to almost 3.0kg”.*

## 4.8 Theme 6: Scale and Commercial Viability

### 4.8.1 Context

During the consultation phase of this project, many growers referred to the issue of the low profit margins associated with vegetable production. This is a key factor driving many growers to sell their land if possible, or to switch to other crops such as turf.

While this investigation is not scoped to review the extent, causes or implications of this in detail, it does merit some comment. One perspective is that of the ground-truthing study by Malcolm and Fahd<sup>65</sup>, which reported that the median size of Sydney’s 815 properties growing outdoor-field vegetables is 1.3ha. The accepted wisdom is that competitiveness either in the general market or in a niche market requires either lower costs or differentiation<sup>66</sup> of the product or service on offer. Any small-scale grower producing a “commodity” (undifferentiated) product

<sup>64</sup> SGS 2008 Hawkesbury Employment Lands Strategy Adopted Report 9 December 2008 p140

<sup>65</sup> Malcolm P and Fahd R (2009). Ground Truthing of the Sydney Vegetable Industry in 2008. Sydney: Horticulture Australia Limited. VG07073

<sup>66</sup> Porter, M, (1985), Competitive Advantage, New York, The Free Press, p 12

is likely to find it difficult to compete on the basis of lower prices, while still making a profit. This is because of the lack of economies of scale, which applies not only to lack of full utilisation of capital equipment, but also to the multiple capabilities required to run a farm operation (including the capacity to comply with quality assurance systems and government regulations while also maintaining technical and marketing knowledge).

Intensive horticulture, like all other primary production industries is continually changing in response to economic, environmental and social pressures. An example relevant to the Northern Adelaide Plains is the recent relocation of some soil based crops (particularly potatoes and onions) to areas which enable substantial returns to scale to be captured. As a result, the area grown and production of these crops in the Northern Adelaide Plains has reduced comparatively in the last 20 years or so. This is another example the continually changing levels of comparative and competitive advantage for specific crops in the Northern Adelaide Plains and brings into question the desirability of land use constraints in the face of economic realities.

A recent report by Growcom is discussed below under Food Security, but suggests the need for action “to address the problem of growers leaving the industry due to sustained low prices and government regulatory burdens”.<sup>67</sup>

One option for small-scale growers to achieve scaling effects is through collaboration with other growers. While this does occur to some extent through regional associations, it does not tend to incorporate collaborative marketing. Therefore, many small growers are faced with a buyers’ market offering little or no opportunity for negotiation, unless they are able to supply a differentiated product that can earn a price premium.

## **Case Study: Centralised packing house/marketer**

Another alternative for small-scale growers is to supply a centralised packing house/marketer. This is a form of collaborative marketing that can enable the marketer to establish market scale and branding, providing stable demand and pricing for the growers. An example is the Barden Produce vegetable packaging operation at Kemps Creek, west of Sydney. This prepares and packages large volumes of fresh vegetables for major supermarket customers. The produce is grown by local vegetable growers. However, in the case of certain Asian vegetable lines, Barden Produce has established its own large-scale hydroponic production system. This enabled it to meet supermarket requirements for “clean” leafy greens, through the development of novel production systems. Barden Produce has a similar operation at Gatton, near Brisbane, Queensland.

### **4.8.2 Key references and current initiatives**

#### ***Revaluing the Fringe: Some findings on the Value of Agricultural Production in Australia’s Peri-Urban Regions***

Using ABS data from 1992/3 to 1994/5, this report (Houston P, 2005) estimated the value of peri-urban agricultural production in the five mainland states using a new method based on a spatial frame derived from research into population change, and suggested that it accounted for almost 25% of Australian GVAP<sup>68</sup>. This higher than expected percentage was surprisingly uniform across the states and varied from 22.1% in Queensland to 25.8% in SA.

Houston suggests that this larger than expected estimated GVAP has a range of implications particularly focused on mediating competing interests of urbanisation and agriculture in peri-urban regions which if unchecked will continue to result in land use conflict.

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<sup>67</sup> Reeves (2011). Food Security Issues for the Australian horticulture industries.: Horticulture Australia Limited.

<sup>68</sup> Gross Value of Agricultural Production



### ***Supply chain skills***

Larger scale growers are more likely to be integrated into the supply chain and to have the necessary skills to manage supply chain issues. However, Malcolm and Fahd (2009) quote an average farm size of 1.3 ha in the Sydney Basin. This lack of scale clearly constrains business viability for many growers due in part to their relatively low productivity and also to their lack of market power.

Even large growers report serious challenges to profitability posed by increasing costs and a lack of transparency in the supply chain. A study by Rafferty<sup>69</sup> indicated that most potato growers lacked an understanding of the costs and value added/subtracted at each point on the supply chain. The same issue appears to apply in the vegetable industry, as it is mentioned in several industry plans, including the protected cropping plan, which contains the following Strategic Goals<sup>70</sup>:

- Develop education and training programs to improve business skills throughout the vegetable industry value chain (4.2.1); and
- Foster collaborative partnerships across the supply chain (4.2.2).

HAL has acknowledged the importance of training in a broad sense by funding the People Development program<sup>71</sup> with the following programs offered under the Business Skills area:

- Growing Business, a series of workshops designed particularly for the vegetable industry to improve learning in business and people management;
- Skills audit questionnaire, to create a personal training profile with a range of learning resources; and
- A database of business learning resources

The database reflects the fact that there is a wealth of supply chain training resources available, much of which is focussed on fruit and vegetable supply chain/value chain management. However, the reality is that small-scale vegetable growers often do not give sufficient priority to improving their business skills.

### ***Protected cropping/hydroponics***

Recent presentations by Protected Cropping Australia (PCA)<sup>72</sup>, have emphasised the potential for high-technology, intensive production to increase the scale of food production from a decreasing land area. A submission by Graeme Smith to the 2009 Victorian government inquiry into sustainable development of agribusiness in outer suburban Melbourne highlighted the current and future role of the industry in peri-urban areas<sup>73</sup>. Smith also noted the rapid pace of technology development in this area, largely driven by Israel and the Netherlands.

Smith cited a ten-fold higher saleable yield of tomatoes per square metre under glass, compared to field production, with a twenty-fold increase possible for lettuce grown using the latest moving gully technology. He also mentions other advantages such as improved reliability of cropping, lower water use per kg of yield and improved viability of biological pest control.

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<sup>69</sup> Rafferty, 2005

<sup>70</sup> Horticulture Australia Limited 2007

<sup>71</sup> <http://ausveg.com.au/intranet/people/overview.htm>

<sup>72</sup> previously the Australian Hydroponic and Greenhouse Association

<sup>73</sup> Victorian government 2009



However, in a recent presentation<sup>74</sup> Smith also notes the high levels of capital investment required to gain these benefits – around \$200/sq.m. While he emphasises that returns to capital invested at the high-tech end of protected cropping are favourable, there is clearly a role for government in ensuring that key infrastructure (high quality water, gas and three-phase power) are available on sites free from urban-rural conflict issues.

Smith's suggestions were supported in a 2010 presentation by Professor Bill Belotti, who advocates the creation of a "fertile crescent" stretching across Greater Western Sydney, focus on high-tech horticulture.<sup>75</sup> Belotti, who chairs the centre for Sustainable Agriculture and Rural Development at the University of Western Sydney (UWS), suggests that this could include some of the major landholdings in the area held by both UWS and the University of Sydney.

Leigh Taig, a specialist educator in greenhouse hydroponics, has been involved in the 'Pathways to Production' project, a collaboration between Goulburn Ovens TAFE, PCA, NSW DPI and funded by AusVeg. The report from his study tour focuses on the value of international linkages, to benefit from overseas expertise<sup>76</sup>. The report also identifies skill deficiencies in the Australian industry and opportunities to address these, both for existing growers, those who are upgrading technology and those wishing to convert to protected cropping.

## Case Study: D'VineRipe®

South Australia's \$65 million, state-of-the-art sustainable tomato glasshouse facility was built over two stages<sup>77</sup>. It is managed and operated by d'VineRipe, a joint venture company established in 2006. The joint venture company represents an alliance between Perfection Fresh Australia Pty Ltd and diverse investment company The Victor Smorgon Group.

Stage 1 of the facility, a \$35 million development which was the largest single glasshouse built in one stage in Australia, opened in 2007. Stage 2, a \$30 million expansion resulting in total glasshouse production of some 17 hectares, became operational in early 2011, boosting annual production capacity to some 10,000 tonnes of tomatoes.

Located at Two Wells, north of Adelaide, the glasshouse is a sustainable development incorporating innovative water reticulation solutions, energy efficient co-generation heating and an evaporative cooling system. It produces several varieties of tomatoes including specialty lines.

The facility comprises approximately 90,000 panes of strengthened glass on the roof and 30,000 panes on the walls. Each pane measures 1.8 by 1.2m - the largest so far used in glasshouse construction in Australia. Stage 2 incorporates specialized glass panes which filter UV rays and allow more useful light to reach the plants.

Some 200km of drip hose piping and 340km of heating pipe has been used throughout to irrigate and heat the glasshouse. Column heights of 6.3m, while still an industry standard, are above the usual range of 5.5 to 6m.

The glasshouse's seedlings are propagated off-site. Meticulous specifications require the propagators to produce grafted seedlings of a particular height and leaf span specific to each variety. At 35 days old, seedlings are packed and transported to Two Wells, where they are transplanted and grown hydroponically to maturity under the watchful eye of expert growers experienced in producing outstanding glasshouse tomatoes.

Producing tomatoes in a glasshouse environment means crops are less susceptible to disease than open-field crops; yields and quality are higher and more consistent and running costs are considerably lower.

The d'VineRipe® purpose-built glasshouse is a sustainable development which seeks to minimize its environmental footprint. It is the largest glasshouse in Australia to use pad and fan climate control technology. Key features include a co-generation plant which runs on natural gas to create electricity, heat and carbon dioxide (CO<sub>2</sub>). Once generated, heat and CO<sub>2</sub> is returned to the glasshouse. Excess is sold to the national grid.

<sup>74</sup> Smith, G 2011

<sup>75</sup> Bellotti, B (2010) The future of horticulture in the Sydney Basin

<sup>76</sup> Taig, L 2009

<sup>77</sup> Extracted from <http://www.perfection.com.au/about-us/joint-ventures/d'vineripe.aspx>

Most of the glasshouse's water is sourced from Adelaide's waste water which is diverted to the Bolivar Water Reuse Project, near Virginia, north of Adelaide, and treated before being piped to d'VineRipe's® specially designed water treatment plant. There, a reverse osmosis plant further filters the water, sending 85 per cent quality water to the crop and 15 per cent waste water to an evaporative pond. Installation of its own treatment plant represents a saving to the community of an estimated 520 megalitres a year - water which would have been supplied by Adelaide's potable supply.

Further augmenting the glasshouse's water supply is a closed watering system which collects rainwater from the facility's vast roof, then netting and treating the water before reusing it on the tomato crop. An evaporative cooling system maintains an optimum temperature - averaging 21°C over a 24-hour period - inside the glasshouse irrespective of outside temperatures.

The packing lines comprise an automated bulk line for produce weighing up to five kilograms and a pre-packing line for quantities up to one kilogram. The bulk line can produce 25, five kg trays a minute while the pre-packing line can process 84 packs of 500g a minute. Up to 40 people are employed within the glasshouse's packing department during peak periods. Produce is checked, weighed, labelled and flow-wrapped before being packed and sent to cold rooms in preparation for despatch.

**Figure 4 : Aerial View of d'VineRipe facility**



Consultations with the planner from the relevant Council<sup>78</sup> clarified some factors which led to the selection of the location for establishment of the facility. Apart from the availability of recycled water, other necessary infrastructure, and labour, a major factor was the availability of a suitable parcel of land.

## **4.9 Theme 7: Food security**

### **4.9.1 Context**

This topic has gained a high profile in recent times and a range of studies are noted in the bibliography. The following definition was listed in the 2010 report by the Prime Minister's Science, Engineering and Innovation Council.<sup>79</sup>

*"Food security is achieved when all people at all times have physical and economic access to sufficient, safe and nutritious food to meet dietary needs and food preferences for an active and healthy life."* (based on the Food and Agriculture Organisation (FAO) 1996 definition)

<sup>78</sup> H Mueller, DC Mallala, pers comm

<sup>79</sup> PMSEIC (2010). Australia and Food Security in a Changing World. Canberra, Australia: The Prime Minister's Science Engineering and Innovation Council.

Clearly, this is a major topic, but it is worth noting the inclusion of “nutritious” in this definition – a property that is particularly pertinent to fruit and vegetables, products that are widely advocated as essential to a balanced diet. This aspect is emphasised by organisations such as the Sydney Fair Food Alliance, a community advocacy group for peri-urban agriculture.

*“The Sydney Food Fairness Alliance is a network of consumers, rural producers, health professionals, community workers and community-based advocates active in promoting food security and developing a socially, economically and environmentally sustainable food system in the Sydney region.”<sup>80</sup>*

Malcolm and Fahd’s ground-truthing study states that Sydney already brings in a large proportion of its vegetables from outside the region. A horticultural perspective informed the 2011 study on food security by Growcom<sup>81</sup>. This points to the rising trends of imports of (mostly processed) produce, arguing against the common perception that, as a large food exporter (mainly grains and meat), Australia is food secure. The report refers to pressures on horticultural land, citing the following from a 2010 study:

*“Based on current levels of immigration of above 260,000 per year, research undertaken for the Department of Immigration and Citizenship found that by 2050, 430,000 hectares of agricultural land surrounding Melbourne and Sydney will be taken up by housing.”<sup>82</sup>*

While this is clearly of concern, it is important to note the potential of protected cropping to increase yields and reliability of some vegetable crops, using high-technology greenhouse operations. These usually incorporate hydroponic systems to maximise yields and this also enables production to be independent of soil quality. (see d’Vine Ripe case study). While protected cropping is increasing rapidly in Australia, it does require significant capital investment and technical expertise. There may also be a role for government in assisting with common infrastructure as well as ensuring land security to cover the payback period for investors.

Overall, government clearly has an overarching role in addressing food security issues. Some individual states have developed or are considering food policies, while a national food policy is also under development by the Federal government.

## 4.9.2 Key references and current initiatives

### *Australia and Food Security in a Changing World*<sup>83</sup>

The issue of food security has attracted worldwide attention in recent years and was seen as sufficiently important for the Prime Minister’s Science, Engineering and Innovation Council to commission a report its independent Expert Working Group on Food Security. This report should be seen as the most authoritative recent Australian report to address the issue.

The report in its forward from the Chair states:

*“In Australia, we have had an abundance of food. We can produce more food than we need and we have the resources to import food if necessary. However, we have faced*

<sup>80</sup> <http://sydneyfoodfairness.org.au/>

<sup>81</sup> Reeves (2011). Food Security Issues for the Australian horticulture industries.: Horticulture Australia Limited.

<sup>82</sup> National Institute of Labour Studies. 2010. Research into the long-term physical implications of Net Overseas Migration. Adelaide, Australia: Flinders University School of the Environment; CSIRO Sustainable Ecosystems, DIAC

<sup>83</sup> PMSEIC 2010

*crises for specific foods, such as the banana shortage after Tropical Cyclone Larry in 2006. Further, our food transport, distribution and storage systems are vulnerable to disruption. For example, a major epidemic could restrict movement of people and materials resulting in food shortages in some urban centres. Perhaps Australia's most serious food security issue relates to the ways in which we consume and use food. Poor nutritional choices made by many in our community are developing into an increasingly important public health issue."*

Further, on page 1, the report states that:

*"The likelihood of a food crisis directly affecting the Australian population may appear remote given that we have enjoyed cheap, safe and high quality food for many decades and we produce enough food today to feed 60 million people. However, if our population grows to 35-40 million and climate change constrains food production, we can expect to see years where we will import more food than we export."*

A further challenge is increasing "land degradation and soil fertility decline coupled with loss of productive land in peri-urban regions due to urban encroachment."

A major recommendation of the report (page 3) was for the "establishment of the Australian Food Security Agency" to "coordinate the development and implementation of policies and programs targeted to improving Australia's food security." Functions envisaged include data "collection on the environment, food production, food processing and distribution, and food consumption patterns, to support effective policy and program development."

While this report sees little or no danger of an overall food crisis in Australia in the foreseeable future, it does specifically highlight the loss of productive land in peri-urban regions due to urban encroachment.

### ***Global Food Security and Australia***<sup>84</sup>

This report concludes that for "Australia there is no immediate threat to the domestic food supply. Australia will continue to produce in excess of what it consumes and will therefore be able to contribute to the world's food needs. However, Australia faces its own challenges, namely climate change, diminishing water supplies and soil degradation, agricultural labour shortages and declining productivity"

The report also highlights areas where Australia can contribute to global food security including opportunities to share its technologies, its high quality agricultural R&D and through education and capacity building.

### ***Food security issues for the Australian horticulture industry***<sup>85</sup>

This review of food security issues by Growcom for HAL complements the above studies by focussing on the fruit and vegetable sector. This is important because, as stated in the report:

*"Australia exported about 60 per cent of food production in 2009-10 for an export surplus of \$14.2 billion (Foster et al. 2010) and 98 per cent of fresh produce consumed in Australia is grown locally (Ludwig 2010). These figures are often used to support arguments that there are no threats to Australian food security.*

*However, the figures used to support these arguments are biased by a small number of heavily export-focussed industries (e.g. meat and grains). If the goal is to maintain a*

<sup>84</sup> Sheales and Gunning-Trant, 2009

<sup>85</sup> Reeves 2011

*balanced and healthy diet which is nutritionally adequate and sufficiently diverse to support dietary preferences, it is necessary to consider food supply across all major commodity groups.”*

The report states that Australia currently imports 34 per cent of fruit consumed and 19 per cent of vegetables and that future food shortages overseas could threaten this source of supply. It suggests that all levels of Government, industry and research and development corporations need to collaborate in order to address this risk. To facilitate this, it recommends (consistent with the PMSEIC 2010 report above) that a central Food Security Agency be established.

### ***National Food Plan Issues Paper***

The Australian government has also given high priority to this issue as shown by its commitment to develop a national food plan. An issues paper to inform the development of the plan was published in June 2011<sup>86</sup> and submissions are currently being sought. Issues identified in the paper include investment in infrastructure and logistics, innovation and technological advancement, natural resource base, social and economic sustainability and environmental performance.<sup>87</sup>

## **4.10 Theme 8: Planning Issues**

### **4.10.1 Context**

Productivity maintenance and growth requires continual technological change and adjustment including in some cases, relocation which should be facilitated by rather than retarded by planning policy and implementation. The development of state planning policies and implementation processes to enhance productivity maintenance and growth in peri-urban intensive horticulture requires inputs from state departments responsible for both agriculture and planning. Consultations have suggested that this joint approach appears to be lacking.

As indicated above, government planning in the past has been focussed on (mostly urban) residential, commercial, industrial and infrastructure development appropriate to accommodate population growth, not on food production. However, opportunities may be developing to influence this focus towards food production. For example, the December 2009 meeting of the Council of Australian Governments (COAG) agreed to a “National Objective and Criteria for Future Strategic Planning OF Capital Cities”, with the following objective:

*“To ensure Australian cities are globally competitive, productive, sustainable, liveable and socially inclusive and are well placed to meet future challenges and growth.”*<sup>88</sup>

In accordance with this, States and Territories will have strategic plans for capital cities that meet criteria by January 2012. As part of the agreement, the Commonwealth will link its future investment in cities to these strategic plans. The COAG Reform Council is presently reviewing metropolitan planning systems for their adherence to the criteria.<sup>89</sup> (See also notes below on the Sydney Metropolitan Plan and The 30-Year Plan for Greater Adelaide).

<sup>86</sup> [http://www.daff.gov.au/agriculture-food/food/national-food-plan/issues\\_paper\\_to\\_inform\\_development\\_of\\_a\\_national\\_food\\_plan](http://www.daff.gov.au/agriculture-food/food/national-food-plan/issues_paper_to_inform_development_of_a_national_food_plan)

<sup>87</sup> These issues are clearly consistent with those identified in this report

<sup>88</sup> [http://www.coag.gov.au/coag\\_meeting\\_outcomes/2009-12-07/index.cfm#cap\\_city\\_strat](http://www.coag.gov.au/coag_meeting_outcomes/2009-12-07/index.cfm#cap_city_strat)

<sup>89</sup> <http://www.coagreformcouncil.gov.au/agenda/cities.cfm>



Of the many previous reports and forums regarding peri-urban horticulture, few if any have involved effective engagement with the planning community. Consultation with planners in this project was achieved through small group and one-on-one discussions. This proved effective in gaining input from a representative number of planners. Overall, according to one of these, planners tend to be more focussed on urban issues such as streetscapes and building heights, rather than farming, although there are exceptions.

The consultations with industry members revealed a wide range of issues, as discussed in the above sections. Overall, however, there was a sense that growers did not feel secure in their ability to continue to farm their land, due to the risk of urban encroachment restricting farming operations. Some argue that this should be addressed by declaring certain regions as designated agricultural areas. In theory, this would prevent the creeping development that can lead to border conflicts and the loss of the critical mass of farms in an area. Unfortunately, there are few, if any areas remaining within the Sydney Basin where such a declaration could be applied.

It was also noted by some growers that, while designating land as agricultural could offer some protection, it would not guarantee that agricultural production would actually occur there, unless other factors such as economic viability were favourable. Nevertheless, many instances were raised whereby the possibility of future urban development acted as a disincentive for growers to reinvest in their properties. This failure to upgrade infrastructure and technology can affect competitiveness, leading to a downward spiral for the farm business.

Many growers considered that local government planning departments showed little or no understanding of the industry or its operations. One example cited by several growers was of a development application for a high-roofed greenhouse being rejected because it exceeded the allowable height for a built structure. This decision ignored the fact that the green house was designed using modern engineering principles and incorporated current best practice in terms of temperature management as well as being favourable to Integrated Pest Management. This problem points to the need for industry to ensure that planners are provided with and understand relevant technical information regarding the adoption of new technology in intensive horticulture, and its implications for planning approval for development applications.

A further concern raised by growers about planning was the complexity and inconsistency seen to be surrounding the processes. Many examples were provided of differences in approach between different councils, or even between planning officers within a single council. (It should be noted that similar perceptions exist for urban residents involved in council planning processes as, after all, no two developments are identical.)

Some planners suggested that growers have a responsibility to learn about the processes and/or to employ professional advice for planning. However, one council planner related instances where, in meetings between growers and planners, some issues may be seen by the council as a state issue and by the state as a council issue. Again, this suggests that industry may need to engage an independent planning expert at such times, to facilitate a way forward.

#### **4.10.2 Key references and current initiatives**

##### ***Planning system - NAP***

The planning system relevant to the NAP is described in section 2.6.1 above.

##### ***Planning system – Sydney Basin***

The planning system relevant to the NAP is described in section 3.5.1 above.



***Development of Horticultural Industries on the Northern Adelaide Plains: A Blueprint for 2030***

The Blueprint report<sup>90</sup> was initiated in part by the Virginia Horticulture Centre (VHC). The Blueprint report was based on the following vision: “Adelaide Plains: a premier integrated horticultural region, utilising sustainable industry best practices, delivering high quality, clean, fresh products to the consumer”. It identified “several areas, which if correctly addressed, could lead to increased horticultural output, more employment, and growth of the South Australian economy”.

However, it stated that the “Adelaide Plains needs a plan. This plan needs to be driven by a body that has an overview of the entire region, and of all industries. The plan must have strong planning guidelines that provide confidence for the horticulture industry to invest in the future, as well as provide guidance for other industries or competing land uses. It must identify and provide for infrastructure needs.” It warned that the “absence of a plan will see sporadic, uncoordinated investment and inefficient use of resources continue while the horticulture industry slowly retracts under pressure from urban development.”

This scoping study was proposed in part in response to the lack of a plan and evidence of the consequences predicted above.

The VHC was opened in October 1996 as a joint project of the then Federal Department of Transport and Regional Development and City of Munno Para<sup>91</sup>. Its formation was an acknowledgement of the importance of the Virginia horticultural region in particular and horticulture on the NAP in general. The VHC was a focus for the development and servicing of horticulture in the area and it was a major participant in the development of the Blueprint report. Recently, the VHC (now renamed Grow SA) has extended its focus and has opened offices in several vegetable growing areas in SA. Consultations suggest that engagement of state and local government with Grow SA is declining.

***Agriculture in the Sydney Region: historical and current perspectives***<sup>92</sup>

This report was recently released by the NSW Parliamentary Library Research Service. It provides a valuable, concise summary of the approaches to urban and peri-urban development taken by record of successive post-war NSW governments.

This ranges from the *Cumberland Plan* of the McGirr (1947-1952) government, with its broad green belt, to the Unsworth Government’s *Sydney into its Third Century plan* of 1988, in which Planning Minister Bob Carr stated that “high quality agricultural lands...[should] be kept in use for as long as possible, for the economic benefit of the [Sydney] region”. (Under Carr as premier, the *Shaping Our Cities* plan of 1998 included “protecting primary production...from competing demands on resources and minimising conflicts from the incursion of incompatible land uses”.)

These and other examples in the report confirm the need for industry to devote resources to ensuring that governments are held accountable for their processes and policies regarding peri-urban agriculture.

***Change And Continuity In Peri-Urban Australia - State Of The Peri-Urban Regions***

This 2006-2008 research project was a collaboration between peri-urban experts at Melbourne’s RMIT and Griffith University in Brisbane. It produced four publications or monographs, the first being a bibliography of 980 references sorted by topic area. Monograph 1<sup>93</sup> is, therefore, a key

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<sup>90</sup> Lucas Group, 2007

<sup>91</sup> Now subsumed into the City of Playford

<sup>92</sup> Wilkinson 2011

<sup>93</sup> Buxton et al 2006

reference source for peri-urban initiatives by industry. It is focussed on Australia and any relevant comparisons and lessons from other developed countries.

The second<sup>94</sup> and third<sup>95</sup> monographs are case studies of the Bendigo corridor north-west of Melbourne and the Extended Western Corridor to the west of Brisbane.

*“These two case studies analyse spatial, land use, environmental, social and economic trends; describe and analyse governance, institutional, policy and management arrangements and evaluate their adequacy; and examine the implications of change for future land use and land management.”*

The fourth monograph<sup>96</sup> models possible future land use, development and management scenarios for South East Queensland and greater Melbourne.

### ***Planning and Food Security within the Commonwealth<sup>97</sup>***

This 2011 study is notable for the broad range of scenarios covered, ranging from developing to fully developed Commonwealth nations. Issues of urban sprawl and concerns about food security are common to both ends of the economic spectrum, and illustrate that peri-urban issues are global in nature. In addition, having been commissioned by the Commonwealth Association of Planners and written by planners, it focuses on the role of the planning community in addressing peri-urban issues. It states:

*“While the planning system has historically concerned itself with clean air, clean water, and the adequacy of shelter, minimal attention has been directed towards another basic human need: food.”*

The report concludes with a “call to action” containing ten recommendations on how the planning community should act to fulfil its crucial role in addressing food security. One of the authors is Sydney-based Ian Sinclair, a rural and environmental planning consultant with a particular focus on peri-urban issues. He has thirteen years of experience in Local Government planning in rural and peri-urban NSW and a similar time as an independent advisor. Mr Sinclair has also undertaken several US study tours and has written and presented widely in the US and Australia on the issues of preservation of agricultural land, metropolitan fringe issues and growth management.

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<sup>94</sup> Buxton et al 2007

<sup>95</sup> Low Choy et al 2007

<sup>96</sup> Low Choy et al 2008

<sup>97</sup> Commonwealth Association of Planners 2011

## 5 FINDINGS

Project findings have been developed from the wide range of issues which were discussed under each theme in Section 4 above, and which address the project objective: *“Identify and describe the range of issues relevant to peri-urban vegetable growing and intensive horticulture through a review of selected reports and current projects and consultation in the two case study areas”*.

The findings addressing the issues are categorised under “Challenges”, “Opportunities” and “Key Learnings” for each theme and are tabulated below.

**Table 1 : Theme 1 - Competition for Land**

Challenges	Opportunities	Key Learnings
<p>Development seen as economic driver with powerful advocates.</p> <p>Sydney growth areas will displace 53% of the area's vegetable farms.</p> <p>Creeping development by tree changers who then object to farming activity.</p> <p>Land price too high for entry to horticulture.</p> <p>Relocation requires infrastructure investment in the new area</p>	<p>Concerns over mining and CSG has raised profile of the issue of food land security. Peri-urban horticulture could lever off this.</p> <p>Consideration of Transferable Development Rights or similar approaches.</p>	<p>Alternative sites for relocation of intensive horticulture must have infrastructure in place for relocation to be viable.</p> <p>Growers want land security but also want to be able to cash in on land value for retirement.</p> <p>Competition for land is also affecting land price and availability in alternative (rural) production areas, as well as in peri-urban areas.</p>

**Table 2 : Theme 2 - Sustainable land use**

Challenges	Opportunities	Key Learnings
<p>Availability of fresh and recycled water is either already restricted or tightening and price is increasing thus reducing attractiveness to intensive horticulture</p> <p>Increasing need to comply with market-driven and regulatory “clean and green” standards.</p>	<p>Urban areas provide source of recycled waste water.</p> <p>Water may be even more limiting in alternative (rural) production areas.</p>	<p>Peri-urban horticulture is affected by the national water policy reform process, and is also developing to be a key user of recycled water.</p>

**Table 3 : Theme 3 - Urban-Rural Conflicts**

Challenges	Opportunities	Key Learnings
<p>Lack of understanding of realities of rural industry by tree-changers.</p> <p>Increased exposure to theft, vandalism, threats.</p> <p>Biosecurity and plant health risks from neighbouring rural residential as well as other farmers.</p>	<p>All councils could provide “Buyer Beware” advisory information for new residents.</p>	<p>Some significant distress from concerns over personal (physical and psychological) security.</p> <p>Consultation between farmers and planners and communication with new residents is needed.</p>

**Table 4 : Theme 4 - Urban-Rural Synergies**

Challenges	Opportunities	Key Learnings
<p>Levels of regional pride and industry collaboration require improvement.</p> <p>Jobs in farming are seen as lacking skills, status and salary.</p> <p>Planning departments of most councils have low engagement with and/or understanding of agriculture.</p> <p>Farms may be seen as a “dumping ground” for unwanted urban green waste, treated sewage etc.</p> <p>Horticulture skills and services oriented to food and to landscape and environment are under valued by the urban community.</p>	<p>Wollondilly Rural Industry Liaison Committee is a successful model.</p> <p>Urban work force and Rural skills demand offer win-win opportunity.</p> <p>Waste water re-use is a win-win (but industry must be party to managing risks involved)</p> <p>Compost from greenwaste and food waste recycling programs can boost soil health and provide nutrients – if the price is right.</p> <p>A segment of consumers values locally-grown food (with potential tourism links).</p> <p>A segment of urban residents appreciates and wants to understand plants, eg school gardening programs, green roofs on buildings.</p>	<p>Rural industries provide many real and potential benefits to nearby urban communities, but these are not well-understood or valued.</p>

**Table 5 : Theme 5 - Lack of Coordinated Industry Voice**

Challenges	Opportunities	Key Learnings
<p>Small farm size. (eg av. 1.3ha in Sydney Basin).</p> <p>Diverse range of ethnic backgrounds – “culturally and linguistically diverse” or CALD.</p> <p>Generally a lack of grower collaboration and involvement in industry associations.</p> <p>NSW DPI acts as an advisory service to industry, state and councils on planning issues rather than as a pro-active advocate for peri-urban agriculture.</p>	<p>Growers have been involved in multiple studies and forums regarding peri-urban farming over the years.</p> <p>Sydney’s Intensive Agriculture Consultative Committee has an Industry Reference Group.</p> <p>Central Coast Plateau growers have developed dialogue with planners re agriculture precinct.</p>	<p>Overall failure of growers to drive issues at strategic or local level or to follow through on initiatives, due to size, diversity, resources.</p> <p>State growers association has potential to advocate for peri-urban growers (across multiple products) but lacks grower membership or other resources.</p> <p>Possible role for national organisation to coordinate across regions and drive issues Federally.</p>

**Table 6 : Theme 6 - Scale and Commercial Viability**

Challenges	Opportunities	Key Learnings
<p>Low profit margins associated with vegetable production were a higher priority issue to most respondents than planning issues.</p> <p>Small scale restricts capability to maintain multiple skills or investment levels required to run a farm competitively.</p> <p>Fragmentation makes it hard to maintain essential services to farms, eg input suppliers, produce marketers.</p>	<p>Product differentiation.</p> <p>Coordinated production and marketing, including through a processor/pre-packer.</p> <p>Intensification (eg high-technology protected cropping), but capital is required.</p> <p>Agriculture precincts could restore critical mass of growers and service providers, with potential scale efficiencies.</p>	<p>The commercial realities of vegetable production and options to address these should be addressed alongside the other issues specific to peri-urban horticulture.</p>

**Table 7 : Theme 7 - Food Security**

Challenges	Opportunities	Key Learnings
<p>Urban sprawl and future population growth results in loss of land.</p> <p>Most of Sydney's vegetables are from outside the area.</p> <p>Many other production regions are under similar development pressure.</p> <p>Lack of reliable data on production levels and trends.</p> <p>Food imports (mainly processed) are increasing.</p> <p>Global demand for food is predicted to increase in medium term.</p>	<p>High-visibility issue at present, internationally, nationally and at state level.</p> <p>Involves quality (nutrition), not just quantity (calories) of food.</p> <p>Non-industry advocacy groups are promoting sustainable (social, economic and environmental) food systems.</p> <p>Horticulture can increase production per unit of land by intensification and new technology.</p>	<p>Policy responses to the food security issue are being prepared. The horticulture sector has a strong case for being at the table.</p> <p>Horticulture is equipped with some analysis (eg Growcom report), but must refine production data.</p>

**Table 8 : Theme 8 - Planning Issues**

Challenges	Opportunities	Key Learnings
<p>Government planning focussed on urban development issues, rather than food production.</p> <p>Productivity maintenance and growth requires continual technological change and adjustment including in some cases, relocation.</p> <p>Creeping urbanisation leads to perceived lack of land security resulting in a disincentive for investment.</p> <p>Most councils have limited understanding of the horticultural industry or its operations.</p> <p>Industry has little understanding of planning framework or processes.</p> <p>A sometimes ad hoc planning process leads to development creep.</p> <p>Some inconsistencies between councils.</p>	<p>Development of planning policies and implementation processes that improve productivity require inputs from state planning and agriculture departments.</p> <p>Agricultural precincts could be established with land use security and essential infrastructure (if not already too late).</p> <p>Industry or individuals could hire necessary outside expertise to address complex planning process.</p> <p>Sydney Metro Strategy is positive about "Balancing land uses on the city fringe", including food production.</p> <p>At least one example of a rural council developing effective consultation systems and policies favourable to farming – could gear off this.</p> <p>New (2011) NSW Premier O'Farrell has taken responsibility for Western Sydney which indicates a high political priority but unclear implications for horticulture</p>	<p>Option to link land security issue to the high profile issue of strategic cropping land and mining/CSG impacts.</p> <p>Importance of peri-urban farming is captured in Sydney Metro Plan 2036 and is also subject of Sydney's Intensive Agriculture Consultative Committee, but sentiments need to be turned into action.</p> <p>Simple, practical approaches have been developed for improving industry/planner communication at council level. This could be a national goal for adoption, with grassroots impact.</p>

## 6 ACTION PLAN

The key learnings identified for each theme have formed the basis for a draft action plan tabulated below. The draft action plan illustrates how the opportunities and threats identified from the consultation process may be addressed by industry, in order to address the project objective:

*“Suggest research, development, extension and training requirements that will enable planners to give sufficient weight to intensive horticulture in the planning process”.*

These strategies have also been captured in the summary of recommendations that follow this section.

The suggested linkages in the right-hand column provide opportunities to maximise the impact of this plan, by partnering with other relevant stakeholder groups and initiatives.

**Table 9 : Action Plan – Competition for Land**

Key Learnings	Strategies	Actions	Linkages
Alternative sites for relocation must have infrastructure in place for relocation to be viable. Growers want land security but also want to be able to cash in on land value for retirement. Competition is also affecting land price and availability in alternative (rural) production areas, as well as peri-urban.	Assess the feasibility of relocation for those regions where this is unavoidable.  Pursue policy development at State/Federal level to develop the means for land zoning and capital transfer that protects agricultural value without penalising exiting landholders.  Develop land use intelligence through coordinated national mapping, monitoring and analysis regarding land use transfer trends and policy development	Identify potential alternative sites for relocation at a regional level, determine and address infrastructure requirements.  Maintain watching brief of global developments regarding options to recompense landholders for development opportunities foregone. Eg TDRs  Develop communication program to educate all stakeholders about these options for potential future campaign.	AusVeg State vegetable/ horticulture associations Other national and regional horticulture organisations State Farming organisations through NFF (for intensive livestock) Vegetable industry economist

**Table 10 : Action Plan – Sustainable Land Use**

Key Learnings	Strategies	Actions	Linkages
Peri-urban horticulture is affected by the national water policy reform process, and is also developing to be a key user of recycled water.	Develop water use intelligence through information-gathering and analysis and engagement with policy affecting water security, quality and price.	Requires linkage by regional grower organisations with water authorities, suppliers and irrigation associations.	Ausveg Irrigation Australia Ltd Horticulture Water Initiative WISER

**Table 11 : Action Plan – Urban-Rural Conflicts**

Key Learnings	Strategies	Actions	Linkages
Some significant distress from concerns over personal (physical and psychological) security. Consultation between farmers and planners and communication with new residents is needed.	Evaluate nature and extent of problem and develop options for supporting affected growers, using lessons from drought support programs.  (Refer strategies under planning)		Ausveg Rural Counselling Service See actions below



**Table 12 : Action Plan – Urban-Rural Synergies**

Key Learnings	Strategies	Actions	Linkages
Rural industries offer many real and potential benefits to nearby urban communities, but these are not well understood or valued.	A positive and constructive advocacy campaign at state and national level. Maximise impact by leveraging off current and future debates and policy initiatives relating to agriculture to deliver: (i) improved community appreciation of the benefits delivered by peri-urban horticulture; (ii) systems of communication and education to improve understanding between growers and planners; (iii) ongoing engagement on the key issues identified; (iv) linkage with other affected horticulture and intensive agriculture sectors; (v) accountability against overarching peri-urban horticulture/farming plan.	Urgent action required regarding: - National Food Plan - State Land protection policies - Capital cities strategic plans for COAG and current review - Urban water review - spray drift buffer review - National Year of the Farmer - new government in NSW	Ausveg  Other key peri-urban industries eg nursery, turf, protected cropping, flowers, also chicken, egg, pork.

**Table 13 : Action Plan – Lack of Industry Voice**

Key Learnings	Strategies	Actions	Linkages
Overall failure of growers to drive issues at strategic or local level or to follow through on initiatives, due to size, diversity, resources.  State growers association has potential to advocate for peri-urban growers (across multiple products) but lacks grower membership and other resources.  Possible role for national organisation to coordinate across regions and drive issues federally	Develop a peri-urban vegetable industry development program with regional delivery and national coordination, driven by information and analysis.	Comprehensive actions and responsibilities to be developed, but including those listed below for other themes.	AusVeg  HAL Across-industry committee (note other industries such as macadamia do get affected by rural-urban issues)  PMA_ANZ  Farmers Markets association  NFF

**Table 14 : Action Plan – Scale and Commercial Viability**

Key Learnings	Strategies	Actions	Linkages
The commercial realities of vegetable production and options to address these should be addressed alongside the other issues specific to peri-urban horticulture.	Provision of training and information support services relating to horticulture business viability.  Develop extension and training program for both growers and planners	Business management roadshow using the wealth of available training materials	Ausveg People Development Program Private training providers FarmReady

**Table 15 : Action Plan – Food Security**

Key Learnings	Strategies	Actions	Linkages
Policy responses to the food security issue are currently being prepared. The horticulture sector has a strong case for being at the table.  Horticulture is equipped with some analysis (eg Growcom report), but must refine production data.	Use current Food Policy discussion to drive action on peri-urban issues  Improve gathering and analysis of peri-urban industry data to underpin representation and advocacy.	(Advocacy strategy above extends to food security, which may become a key rallying cry for the strategy)  Prepare NFP submission and media campaign	Ausveg  Parties involved in development of National Food Policy, including NFF.

**Table 16 : Action Plan – Planning Issues**

Key Learnings	Strategies	Actions	Linkages
Option to link land security issue to the high-profile issue of strategic cropping land and mining/CSG impacts.  Importance of peri-urban farming is captured in Sydney Metro Plan 2036 and is also subject of Sydney's Intensive Agriculture Consultative Committee, but sentiments need to be turned into action.  Simple, practical approaches have been developed for improving industry/planner communication at council level.	Improve understanding by planners at all levels of the facts regarding loss of productive land and provide information about horticulture production practices relevant to planning criteria.  Develop and implement a communication program to improve understanding by growers and planners of planning processes and production issues, respectively.	(Advocacy strategy extends to engaging in strategic cropping land policy development and extending consideration beyond mining/CSG to urban encroachment)  (Advocacy strategy extends to engaging with State departments to encourage implementation of SMP Section F)  Work with State planning departments to adapt and implement best practice in industry/ planner communication at council level , based on Wollondilly model. This could be a national goal for adoption, linked to advocacy strategy  Consider developing a roadshow, video series or other communication tactics targeting high level planning managers.	Ausveg  State vegetable/ horticulture associations  Other national and regional horticulture organisations  State Farming organisations through NFF (for intensive livestock)  Vegetable industry economist  Planning Institute of Australia  Relevant councils and Regional government associations eg WSROC

## 7 RECOMMENDATIONS

Elements of the draft action plan have been condensed into recommendations for industry and government.

### 7.1 Recommendations for Industry

#### 7.1.1 Advocacy

**Recommendation 1:** The vegetable industry should take advantage of current community and policymaker interest in a range of issues related to intensive horticulture and other farming and related rural activities in peri-urban areas to raise the industry profile and advocate for solutions to the issues facing growers.

The following strategies are suggested:

- A positive and constructive advocacy campaign at state and national level;
- Pursue policy development at State/Federal level to develop the means for land zoning and capital transfer that protects agricultural value without penalising exiting landholders; and
- Use current Food Policy discussion to drive action on peri-urban issues.

#### 7.1.2 Information and analysis

**Recommendation 2:** The vegetable industry should develop and expand the gathering of intelligence and data about peri-urban resource use and constraints, including land and water.

The following strategies are suggested:

- Develop land use intelligence through coordinated national mapping, monitoring and analysis regarding land use transfer trends and policy development;
- Assess the feasibility of relocation for growers in those regions where urbanisation is unavoidable;
- Improve gathering and analysis of peri-urban industry data to underpin representation and advocacy; and
- Develop water use intelligence through information gathering and analysis and engage with the policy development process affecting water security, quality and price.

#### 7.1.3 Extension and Training

**Recommendation 3:** The vegetable industry should initiate a communication and engagement program with peri-urban growers and planners to address constraints to production and to engage with the strategic planning process of capital cities and regions.

The following strategies are suggested:

- Provide training and information support services for growers relating to business viability in peri-urban intensive horticulture;
- Provide training and information support services for growers relating to the planning process and issues; and
- Provide training opportunities for state and local government planners to improve their understanding of the relevant factors affecting the productivity, scale and contribution of peri-urban intensive horticulture including technological advances relevant to planning considerations.

## **7.2 Recommendations for Government**

### **7.2.1 Planning and Productivity Improvement**

**Recommendation 4:** State government functions of planning policy and agricultural policy should jointly inform the development of planning policies and implementation processes relevant to peri-urban horticulture and agriculture that give productivity maintenance and improvement a high priority.

The following strategies are suggested:

- Improve the understanding of the land use and relative contribution to the gross value of production of peri-urban horticulture by better data collection and analysis;
- Reduce the constraints to adoption of new technology and to adjustment including relocation by adopting compatible planning policy and processes and through improved infrastructure planning to increase the scope and range of options for relocation.

## 8 TECHNOLOGY TRANSFER

This project comprised a short-term scoping study to identify future activities and so it did not involve an R&D adoption process. The report recommendations involve a substantial amount of industry/HAL investment in R&D, much of which is directed at better informing both growers and planners. This is outlined in the actions recommended within the report.

However, as stated in the recommendations, it is important that industry acts on some of the report's findings with urgency, while there is an opportunity to engage with several policy agendas relevant to peri-urban horticulture. This activity would take place at an industry representative level, but could link to the recommended programs at grower level. However, the latter should not be allowed to cause any delays in the former, given the narrow window of opportunity for much of the policy engagement.

Ideally, this would be linked to activities already undertaken as part of the Vegetable Industry Development Project (VIDP). This should be developed as an integrated communication plan, involving briefing of, and feedback from, the VIDP team, including opportunities to adapt or expand the recommendations and actions according to local situations,

Options include a range of VIDP communication channels, such as factsheets, newsletters, workshops, People Development program, Marketing Insights and the website, as well as the AUSVEG produced Vegetables Australia magazine and the AUSVEG annual conference. This study identified several experts in the field of peri-urban farming/development who could be informative speakers at seminars or conferences.

There would also be significant benefits to sharing the report findings with other stakeholders, outside the vegetable industry. These range from other horticultural industries and agricultural industries to city-based advocates for peri-urban farming and food literacy. There has been a long history of failure by the farming sector to achieve equitable and accountable management of peri-urban development. Any campaign run as a result of this scoping study will need to marshal all available resources in order to maximise its impact and prospects for success.

## **9 ACKNOWLEDGEMENTS**

The authors would like to record their grateful thanks for the advice and assistance provided by the project reference team – Danny De Ieso in Adelaide and Alison Anderson in Sydney. Frances Tolson of NSW Farmers and Tony Burfield and Tony Fox of the Hortex Alliance arranged productive meetings with growers. Numerous very busy growers gave up their valuable time on behalf of the wider industry to provide input, as did members of the planning community, state departments of primary industry and other stakeholders, for which we are very grateful. We also acknowledge the vegetable levy-payers and HAL for funding the project and Ravi Hegde of HAL for his assistance.



## 10 BIBLIOGRAPHY

Detailed literature reviews have been undertaken in the recent past and so were not repeated within this project (one of these, by Buxton et al (2006) contains 980 references). The following list includes references from the literature or that relate to current initiatives. These have either been noted in the report or are included to assist in any follow-on projects and to demonstrate the breadth of issues involved in peri-urban horticulture. For this reason, they are classified according to the main themes identified in this study. Some key references and current initiatives have been summarised in section 3 of this report and these are highlighted below.

Specific topic	Reference	Online address	Focus area
<b>Theme 1</b>	<b>Competition for land</b>		
Mapping	ABARES (2010) ABARE-BRS releases its latest national land use map for 2005–06	<a href="http://www.abare-brs.gov.au">www.abare-brs.gov.au</a>	National
	Egan C (2009). <u>Urban Sprawl: Hort Alert</u> . Good Fruit and Vegetables December 2009 pp 12-13		National
	Gardiner, Lucadou-Wells & Miller (2009) Warning on horticultural land, Cranbourne Journal 28 September		Melbourne
	Gill J (2008). <u>The Effect of Urban Sprawl on Sydney's peri-urban agricultural region - Case Study</u> .: University of NSW HPSC 5500 Society, Environmental Policy and Sustainability.	<a href="http://jeremygilldesign.com/Documents/The%20Effect%20of%20Urban%20Sprawl%20on%20Sydney%27s%20peri-urban%20agricultural%20region.pdf">http://jeremygilldesign.com/Documents/The%20Effect%20of%20Urban%20Sprawl%20on%20Sydney%27s%20peri-urban%20agricultural%20region.pdf</a>	Sydney
Literature review and tool-kit	Jewell L, (2008). Peri-urban horticulture and land use planning: Literature Review & "Tool-kit". Sydney: Horticulture Australia Limited and GHD. AH07031		National
Land protection	Livingstone, A 2010 Growcom Strategic cropping land submission	<a href="http://www.growcom.com.au/_uploads/52516Strategic_Cropping_Land_Discussion_Paper_March_2010.pdf">http://www.growcom.com.au/_uploads/52516Strategic_Cropping_Land_Discussion_Paper_March_2010.pdf</a>	Queensland
Data	Malcolm P and Fahd R (2009). Ground Truthing of the Sydney Vegetable Industry in 2008. Sydney: Horticulture Australia Limited. VG07073		Sydney
Land protection	NSW Government (2004) Policy for protection of agricultural land	<a href="http://www.dpi.nsw.gov.au/environment/landuse-planning/agriculture/protection">http://www.dpi.nsw.gov.au/environment/landuse-planning/agriculture/protection</a>	NSW
Land classification	NSW Government 2002 agricultural-land-classification Agfact AC 25.pdf	<a href="http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/189697/ag-land-classification.pdf">http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/189697/ag-land-classification.pdf</a>	NSW
Information	NSW Government 2006 Preparing-development-application-for-intensive-agriculture-nsw.pdf	<a href="http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0008/194399/preparing-development-application-intensive-agriculture-nsw.pdf">http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0008/194399/preparing-development-application-intensive-agriculture-nsw.pdf</a>	NSW
DPI guidelines	NSW government 2009 Farm-subdivision-assessment-guideline Primefact 972.pdf	<a href="http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0005/313565/farm-subdivision-assessment-guideline.pdf">http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0005/313565/farm-subdivision-assessment-guideline.pdf</a>	NSW
DPI guidelines	NSW Government n.d. (post-2004) Minimum-lot-size-methodology.pdf	<a href="http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/189733/minimum-lot-size-methodology.pdf">http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/189733/minimum-lot-size-methodology.pdf</a>	NSW
Land protection	Queensland Government (2011) Protecting Queensland's Strategic Cropping Land: A policy framework	<a href="http://www.derm.qld.gov.au/land/planning/strategic-cropping/index.html">http://www.derm.qld.gov.au/land/planning/strategic-cropping/index.html</a>	Queensland
Planning perspective	Walls, M & McConnell, V.(2007) Transfer of Development Rights in U.S. Communities evaluating program design, implementation, and outcomes	<a href="http://www.rff.org/documents/Walls_McConnell_Sep_07_TDR_Report.pdf">http://www.rff.org/documents/Walls_McConnell_Sep_07_TDR_Report.pdf</a>	US
Biodiversity	Website: NSW government Bioregions of NSW - C H A P T E R 1 5 The Sydney Basin Bioregion	<a href="http://www.environment.nsw.gov.au/resources/nature/sydneyBasin.pdf">http://www.environment.nsw.gov.au/resources/nature/sydneyBasin.pdf</a>	NSW
Geology	Website: NSW government. Sydney Basin - Geological Overview	<a href="http://www.dpi.nsw.gov.au/minerals/geological/overview/regional/sedimentary-basins/sydbasin">http://www.dpi.nsw.gov.au/minerals/geological/overview/regional/sedimentary-basins/sydbasin</a>	NSW
<b>Theme 2</b>	<b>Sustainable land use</b>		
Spray drift	APVMA 2010 Factsheet on avoiding spraydrift issues	<a href="http://www.nswfarmers.org.au/_data/assets/pdf_file/0018/61443/Spray_Drift_fact_sheet_v1_4.pdf">http://www.nswfarmers.org.au/_data/assets/pdf_file/0018/61443/Spray_Drift_fact_sheet_v1_4.pdf</a>	National
Spray drift	APVMA 2010 Operating Principles in Relation to Spray Drift Risk	<a href="http://www.apvma.gov.au/use_safely/docs/spraydrift_op_principles.pdf">http://www.apvma.gov.au/use_safely/docs/spraydrift_op_principles.pdf</a>	National
Water	Australian Government 2011 Enquiry into Australia's Urban Water Sector Draft Report. Productivity Commission	<a href="http://www.pc.gov.au/projects/inquiry/urban-water">http://www.pc.gov.au/projects/inquiry/urban-water</a>	National
Recycled water	Australian government n.d. Guidelines for developing recycled water schemes in horticulture. National Heritage Trust	<a href="http://www.environment.gov.au/water/publications/urban/pubs/water-use-recycling-hort-guidelines.pdf">http://www.environment.gov.au/water/publications/urban/pubs/water-use-recycling-hort-guidelines.pdf</a>	National
	Campbell A (2009). <u>Paddock to plate – food, farming and Victoria's progress to sustainability</u> . Australian Conservation Foundation.		Victoria

Specific topic	Reference	Online address	Focus area
Water	Gahan M (2010). <u>Water Sustainability for the Future</u> .: Bundaberg Fruit and Vegetable Growers and Horticulture Australia Ltd.		Queensland
Water	Gartley et al 2010 Assessing the economic impacts of allocating water Presentation at IAL conference	<a href="http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702">http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702</a>	National
Small farm perspective	Hollier C and Reid, M (2007) Small Lifestyle Farms Improving delivery mechanisms for sustainable land management RIRDC Publication No 07/098		National
Water	IAL 2011 Submission to enquiry into Australia's Urban Water Sector Irrigation Australia Ltd	<a href="http://www.pc.gov.au/_data/assets/pdf_file/0003/109236/subdr112.pdf">http://www.pc.gov.au/_data/assets/pdf_file/0003/109236/subdr112.pdf</a>	National
Planning perspective	Land & Water Australia (2007). <u>Periscoping: Outcomes of an expert workshop scoping social and institutional research issues for NRM</u> .: Land & Water Australia.		National
Water	Mareshwari B et al Western Sydney: A laboratory for understanding peri-urban water issues. <u>Irrigation Australia</u> , (undated), pp 22-23.		Sydney
Water	Martin P and Williams J 2010 Policy risk assessment of peri-urban water strategies: a case study of Western Sydney Presentation at IAL conference	<a href="http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702">http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702</a>	Sydney
Water	Martin P et al 2010 Learnings from system harmonisation: the WISER experience Presentation at IAL conference	<a href="http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702">http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702</a>	Sydney
	Merson, J et al (2009) Urban Expansion and Sensitive Environments Assessing the role of agri-industries as landscape buffers to the neighbouring Greater Blue Mountains World Heritage Area RIRDC Publication No 09/025		Sydney
Water	National Growth Areas Alliance 2011 Good models and opportunities in growth areas.pdf	<a href="http://www.ngaa.org.au/media/1576/good%20models%20and%20opportunities%20in%20growth%20areas.pdf">http://www.ngaa.org.au/media/1576/good%20models%20and%20opportunities%20in%20growth%20areas.pdf</a>	Melbourne
Water	Nawarathna et al 2010 Water cycle modelling for system harmonisation in the South Creek Peri-urban Catchment. Presentation at IAL conference	<a href="http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702">http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702</a>	Sydney
Training	NSW Government (2000) Education and Training Plan for Sustainable Agriculture in the Sydney Region.		Sydney
Planning perspective	NSW Government 1998 Strategic plan for sustainable agriculture in the Sydney region	<a href="http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0005/189653/strategic-plan-ag-sydney.pdf">http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0005/189653/strategic-plan-ag-sydney.pdf</a>	NSW
Language barriers	Parker, F (2000) The Safe Use of Farm Chemicals by Market Gardeners of Non- English Speaking Background. RIRDC Publication No 00/180		National
Water	Simmons, B Maheshwari, G Starkey 2010 Systems harmonisation in Western Sydney: The WISER Story - Presentation at IAL conference	<a href="http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702">http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702</a>	Sydney
Water	Singh, B Maheshwari, B Simmons 2010 Modelling hydrological impacts of water cycle management activities in a peri-urban catchment. - Presentation at IAL conference	<a href="http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702">http://www.irrigation.org.au/index.cfm?event=&amp;pageuid=44FD5F05-95F8-8584-4F8E654E66264702</a>	Sydney
Recycled water	Victorian government n.d. Using recycled water - a growers guide. Department of Primary Industries	<a href="http://www.recycledwater.com.au/uploads/File/documents/Growers%20Guide%20web.pdf">http://www.recycledwater.com.au/uploads/File/documents/Growers%20Guide%20web.pdf</a>	National
Spray drift	Website: APVMA site regarding spraydrift label review process	<a href="http://www.apvma.gov.au/use_safely/spray_drift/">http://www.apvma.gov.au/use_safely/spray_drift/</a>	National
Recycled water	Website: Bunyip Food Belt - water re-use	<a href="http://www.vgavic.org.au/communication/newsletters/bunyip_food_belt.htm">http://www.vgavic.org.au/communication/newsletters/bunyip_food_belt.htm</a>	Melbourne
Water	Website: Horticulture Water Initiative	<a href="http://www.horticulture.com.au/water">www.horticulture.com.au/water</a>	National
Recycled water	Website: Recycled Water in Australia	<a href="http://www.recycledwater.com.au/">http://www.recycledwater.com.au/</a>	National
Information	Website: Smartfarms program	<a href="http://www.dpi.nsw.gov.au/agriculture/resources/smartfarms">http://www.dpi.nsw.gov.au/agriculture/resources/smartfarms</a>	Sydney
Water	Website: WISER - Water and Irrigation Strategy Enhancement through Regional Partnership in Western Sydney	<a href="http://www.uws.edu.au/wisergroup/wiser">http://www.uws.edu.au/wisergroup/wiser</a>	Sydney
Water	White, S. 2011 Submission to enquiry into Australia's Urban Water Sector Institute for Sustainable Futures	<a href="http://www.pc.gov.au/_data/assets/pdf_file/0009/109719/subdr137.pdf">http://www.pc.gov.au/_data/assets/pdf_file/0009/109719/subdr137.pdf</a>	National
Spray drift	Woods N 2011 New APVMA Spray drift regulations background. HAL presentation	<a href="http://www.planthealthaustralia.com.au">www.planthealthaustralia.com.au</a>	National
<b>Theme 3</b>	<b>Urban-Rural conflicts</b>		
Biosecurity	Aslin HJ & Mazur NA (2005). Biosecurity awareness and peri-urban landholders: a case study approach. Canberra, ACT: Bureau of Rural Sciences, Australian Government.	<a href="http://adl.brs.gov.au/brsShop/data/periurbanreport.pdf">http://adl.brs.gov.au/brsShop/data/periurbanreport.pdf</a>	National

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	Bunce M and Maurer J (2005). <u>Prospects for agriculture in the Toronto Region: the farmer perspective</u> . Toronto, Ontario, Canada: Neptis Foundation.		Toronto
	California Agriculture (2010) Life at the edge - Farming, Growth & Conflict. July September issue 64_3		California
Biosecurity	Conkey, H (2008, February 22). <u>Emerging biosecurity implications of peri-urban farming - study tour report</u> . Canberra, ACT: DAFF.		Canada, US & UK
Case study (poultry)	Gierke, S 2009 Government and Industry - poultry case management presented at sydney-agriculture-planning-for-the-future-forum		Adelaide
Water	Hassall & Associates, Ross, H., and Mary Maher & Associates (2003) Scoping Study: Social Impact Assessment of Possible Increased Environmental Flow Allocations to the River Murray System, Stage 1, Volumes 1 and 2. Report prepared for the Murray Darling Basin Commission		National
Biosecurity	Hollier, C Reid, M Curran, E (2008) Small Landholders - An assessment of potential biosecurity and land management risks. RIRDC Publication No 08/186		National
	Kelleher, F Chant, F and Johnson, N (1998) Community expectations and perceptions of agriculture in peri-urban regions 9th Australian Agronomy Conference	<a href="http://www.regional.org.au/au/asa/1998/7/205kelleher.htm">http://www.regional.org.au/au/asa/1998/7/205kelleher.htm</a>	Sydney
Biosecurity	Maller C et al (2007). <u>Biosecurity and Small Landholders in Peri-Urban Australia</u> . Canberra, ACT: Bureau of Rural Sciences, Australian Government.	<a href="http://adl.brs.gov.au/brsShop/data/biosecurity_and_small_landholders.pdf">http://adl.brs.gov.au/brsShop/data/biosecurity_and_small_landholders.pdf</a>	National
Biosecurity	McMichael, PM et al (2010). <u>Scoping Study to Develop a Regional Biosecurity Framework for the Northern Adelaide Plains</u> . Adelaide SA: Scholefield Robinson Horticultural Services Pty Ltd.		Adelaide
Guidelines	NSW Government 2007 <u>Living-and-working-in-rural-areas-complete.pdf</u>	<a href="http://www.dpi.nsw.gov.au/research/alliances/centre_for_coastal_agricultural_landscapes/living-and-working-in-rural-areas">http://www.dpi.nsw.gov.au/research/alliances/centre_for_coastal_agricultural_landscapes/living-and-working-in-rural-areas</a>	NSW
Information	Wollondilly SC 2008 <u>The_Rural_Living_Handbook_2009.pdf</u>	<a href="http://www.wollondilly.nsw.gov.au/files/67003/File/Wollondilly_Rural_Living_Handbook_2009.pdf">http://www.wollondilly.nsw.gov.au/files/67003/File/Wollondilly_Rural_Living_Handbook_2009.pdf</a>	Sydney
Information	Wollondilly SC n.d. LIVING TOGETHER IN RURAL WOLLONDILLY Fact Sheet No. 3 – Agricultural Planning Controls in the Wollondilly Shire	<a href="http://www.wollondilly.nsw.gov.au/files/13509/File/FactSheetNo3-AgriculturalPlanningControlsintheWollondillyShire.pdf">http://www.wollondilly.nsw.gov.au/files/13509/File/FactSheetNo3-AgriculturalPlanningControlsintheWollondillyShire.pdf</a>	Sydney
Information	Wollondilly SC n.d. LIVING TOGETHER IN RURAL WOLLONDILLY Fact Sheet No. 4– How to be a good neighbour in Rural Wollondilly	<a href="http://www.wollondilly.nsw.gov.au/files/13508/File/FactSheetNo4-HowtoBeaGoodNeighbourinRuralWollondilly.pdf">http://www.wollondilly.nsw.gov.au/files/13508/File/FactSheetNo4-HowtoBeaGoodNeighbourinRuralWollondilly.pdf</a>	Sydney
Information	Wollondilly SC n.d. LIVING TOGETHER IN RURAL WOLLONDILLY Fact Sheet No. 5– Managing Weed and Animal Pests	<a href="http://www.wollondilly.nsw.gov.au/files/13507/File/FactSheetNo5-ManagingWeedandAnimalPests.pdf">http://www.wollondilly.nsw.gov.au/files/13507/File/FactSheetNo5-ManagingWeedandAnimalPests.pdf</a>	Sydney
Information	Wollondilly SC n.d. LIVING TOGETHER IN RURAL WOLLONDILLY Fact Sheet No. 6 – Safe Driving on Rural Roads	<a href="http://www.wollondilly.nsw.gov.au/files/13506/File/FactSheetNo6-SafeDrivingonRuralRoads.pdf">http://www.wollondilly.nsw.gov.au/files/13506/File/FactSheetNo6-SafeDrivingonRuralRoads.pdf</a>	Sydney
Information	Wollondilly SC n.d. LIVING TOGETHER IN RURAL WOLLONDILLY Fact Sheet No. 2 Agricultural Industries and their Impacts	<a href="http://www.wollondilly.nsw.gov.au/files/13510/File/FactSheetNo2-AgriculturalIndustriesandtheirImpacts.pdf">http://www.wollondilly.nsw.gov.au/files/13510/File/FactSheetNo2-AgriculturalIndustriesandtheirImpacts.pdf</a>	Sydney
Information	Wollondilly SC n.d. LIVING TOGETHER IN RURAL WOLLONDILLY Fact Sheet No. 1 – Welcome to Rural Wollondilly – What to Expect	<a href="http://www.wollondilly.nsw.gov.au/files/13511/File/FactSheetNo1-WelcometoRuralWollondilly-WhattoExpect.pdf">http://www.wollondilly.nsw.gov.au/files/13511/File/FactSheetNo1-WelcometoRuralWollondilly-WhattoExpect.pdf</a>	Sydney
Information	Wollondilly SC n.d. LIVING TOGETHER IN RURAL WOLLONDILLY Fact Sheet No. 7 – Dispute Resolution Tips and Agricultural Contacts	<a href="http://www.wollondilly.nsw.gov.au/files/13505/File/FactSheetNo7-DisputeResolutionTipsandAgriculturalContacts.pdf">http://www.wollondilly.nsw.gov.au/files/13505/File/FactSheetNo7-DisputeResolutionTipsandAgriculturalContacts.pdf</a>	Sydney
<b>Theme 4</b>	<b>Urban-Rural synergies</b>		
	Bellotti, B (2010) The future of horticulture in the Sydney Basin. NSW Farmers Horticulture conference presentation	<a href="http://www.orangefruitgrowers.com.au/sitebuildercontent/sitebuilderfiles/billbellottihortconf2010.pdf">http://www.orangefruitgrowers.com.au/sitebuildercontent/sitebuilderfiles/billbellottihortconf2010.pdf</a>	Sydney
	Belotti W (2010). Food Literacy: Reconnecting the City with the Country. <u>Agricultural Science</u> , 23(3), 29-34.		National
Composting	Biala, J. 2009 Regional organic waste and resource inventory. South East Resource Recovery Regional Organisation of Councils	<a href="http://www.serrroc.nsw.gov.au/InTuneFiles/resources_reports/files/1_Organic%20Waste%20and%20Resource%20Inventory%20Report.pdf">http://www.serrroc.nsw.gov.au/InTuneFiles/resources_reports/files/1_Organic%20Waste%20and%20Resource%20Inventory%20Report.pdf</a>	NSW
	Executive Summary of the summary report of the PLUREL project	<a href="http://www.plurel.net/images/PLUREL%20synthesis%20report%20-%20SUMMARY.pdf">http://www.plurel.net/images/PLUREL%20synthesis%20report%20-%20SUMMARY.pdf</a>	Europe
Review	Houston, P. (2005) Revaluing the Fringe: Some Findings on the Value of Agricultural Production in Australia's Peri-Urban Regions. <u>Geographical Research</u> 43(2): 209–223		National

Specific topic	Reference	Online address	Focus area
WSPT	Kirkland, D (2010) Western Sydney Parklands Future Farming, Information Session presentation – 7th September, 2010		Sydney
	Mason, Docking, Knowd (2005)The continuum of Urban Agriculture in the Sydney Region and associated values/benefits. Agriculture in Urbanising Landscapes – A Creative Planning Opportunity Conference. Melbourne: Planning Institute of Australia Congress.		Sydney
Urban horticulture	NSW Government (2004) Support our Rural Activities Sydney Futures Forum Working Group on Green Landscapes and Urban Greenspace.		Sydney
WSPT	NSW Government (2010) Draft 1 Year Program Plan for Western Sydney Parklands - workshop outcomes. (unpublished)		Sydney
Small farm perspective	RIRDC (2007) RIRDC Corporate plan 2007 - 2012 08-001A.pdf		National
	University of Copenhagen, 2010 Managing the Urban Rural Interface Strategies and Tools for Urban Development and Sustainable Peri-urban Land Use Relationships Conference 19 – 22 October, 2010 Book of abstracts	<a href="http://www.plurel.net/images/book%20of%20abstracts_web.pdf">http://www.plurel.net/images/book%20of%20abstracts_web.pdf</a> <a href="http://www.plurel.net/Default.aspx?id=96">http://www.plurel.net/Default.aspx?id=96</a>	Europe
Advocacy	Website: Australian Community Foods	<a href="http://www.communityfoods.org.au/">http://www.communityfoods.org.au/</a>	National
Advocacy	Website: Australian year of the farmer	<a href="http://www.yearofthefarmer.com.au">www.yearofthefarmer.com.au</a>	National
Health	Website: Centre for Health Innovation and Partnership (CHIP)	<a href="http://swahs.elcom.com.au/CHIP/CHIP-Homepage/default.aspx">http://swahs.elcom.com.au/CHIP/CHIP-Homepage/default.aspx</a>	NSW
Recycling	Website: city to soil	<a href="http://www.groundswellproject.blogspot.com/">http://www.groundswellproject.blogspot.com/</a>	National
Recycling	Website: city to soil	<a href="http://www.ecosmagazine.com/paper/EC10093.htm">http://www.ecosmagazine.com/paper/EC10093.htm</a>	National
Recycling	Website: Compost symposium	<a href="http://compost-for-horticulture.com/">http://compost-for-horticulture.com/</a>	International
Tourism	Website: Hawkesbury Tourism	<a href="http://www.hawkesburytourism.com.au/index.html">http://www.hawkesburytourism.com.au/index.html</a>	NSW
Urban horticulture	Website: Landshare	<a href="http://www.landshareaustralia.com.au/">http://www.landshareaustralia.com.au/</a>	National
Composting	Website: NSW Govt .lovefoodhatewaste campaign	<a href="http://www.lovefoodhatewaste.nsw.gov.au/">http://www.lovefoodhatewaste.nsw.gov.au/</a>	NSW
Composting	Website: Sydneys SHOROC group of councils intention to collect household food waste	<a href="http://shoroc.com/2011/love-food-hate-waste/">http://shoroc.com/2011/love-food-hate-waste/</a>	NSW
Advocacy	Website: video for AYOF - Australian Agriculture - The Greatest Story Never Told	<a href="http://www.youtube.com/watch?v=fFUZ_j2cCe0&amp;feature=youtu.be">http://www.youtube.com/watch?v=fFUZ_j2cCe0&amp;feature=youtu.be</a>	National
<b>Theme 5</b>	<b>Lack of industry voice</b>		
Data	AMGA 2010 Submission to Productivity Commission enquiry into Rural R&D Australian Mushroom Growers Association	<a href="http://www.pc.gov.au/__data/assets/pdf_file/0013/100615/sub155.pdf">http://www.pc.gov.au/__data/assets/pdf_file/0013/100615/sub155.pdf</a>	National
Data	Australian Farm Institute 2011 (in press) A Comparative Study of Agricultural Statistics Systems in Australia, the US and Europe	<a href="http://www.farminstitute.org.au">http://www.farminstitute.org.au</a>	National
Information	Ausveg (2010) New Toolkit for growers Vegetables Australia 5.5 Mar_Apr 2010 pp22,23		National
Information	Ausveg (2010) Peri-urban toolkit in full issue of Vegetables Australia 5.5 Mar_Apr 2010		National
Consultation	Carson, L. & Hart P. 2005, 'What Randomness and Deliberation can do for Community Engagement', Paper presented at International Conference on Engaging Communities, Brisbane, Australia, 15 August	<a href="http://www.activedemocracy.net/articles/engag-comm.pdf">http://www.activedemocracy.net/articles/engag-comm.pdf</a>	National
Data	Central Coast Plateau Chamber of Commerce 2009 Economic Profile of Agriculture on the Central Coast Plateau		NSW
Data	Da Silva 2011 Vegetables feel the squeeze Good Fruit & Vegetables march2011		Sydney
Language barriers	Dang and Malcolm, P (2007) Impact of a Bilingual Extension Officer. RIRDC Publication No. 07/131		Sydney
Consultation	Elton Consulting (2009). <u>Sydney's Agriculture - Planning for the Future: Forum Outcomes Report.</u> : NSW Department of Primary Industries.	<a href="http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0009/274914/sydneys-agriculture-planning-for-the-future-forum-outcomes-report.pdf">http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0009/274914/sydneys-agriculture-planning-for-the-future-forum-outcomes-report.pdf</a>	Sydney
Data	Hassall & Co 2003 Asian Vegetable Industry Situation Assessment RIRDC Publication No. 02/168		National

Specific topic	Reference	Online address	Focus area
Data	Houston P (2010). <u>Virginia Horticultural District data: PowerPoint presentation</u> . Adelaide: PIRSA		Adelaide
Data	James, S O'Neill, P Dimeski, B (2010) Sydney's Agricultural Lands: An Analysis. Urban Research Centre, University of Western Sydney	<a href="http://www.metroplansydney.nsw.gov.au/Portals/0/pdf/sydney_agricultural_lands.pdf">http://www.metroplansydney.nsw.gov.au/Portals/0/pdf/sydney_agricultural_lands.pdf</a>	Sydney
Data	Lee, B 2011 Taking Stock of the Australian Asian Vegetables Industry RIRDC Publication No.10/211		National
Consultation	Macarthur Future Food Forum (2010) Brochure	<a href="http://www.sectorconnect.org.au/assets/pdf/resources/macfood/Brochure_Ap10_Draft3.pdf">http://www.sectorconnect.org.au/assets/pdf/resources/macfood/Brochure_Ap10_Draft3.pdf</a>	Sydney
Consultation	NSW Government (2005) Planning for rural activities and resource lands. Workshop report		Sydney
Information	NSW Government (2010) Assistance for investors. Handout at Future Farming event		Sydney
Consultation	NSW Government 2003 Intensive Agriculture Consultative Committee Terms of Reference		Sydney
Information	NSW Government 2005 Guidelines for the development of controlled environment horticulture pt 1	<a href="http://www.dpi.nsw.gov.au/agriculture/horticulture/greenhouse/start/guidelines">http://www.dpi.nsw.gov.au/agriculture/horticulture/greenhouse/start/guidelines</a>	NSW
Information	NSW Government 2005 Guidelines for the development of controlled environment horticulture pt 2	<a href="http://www.dpi.nsw.gov.au/agriculture/horticulture/greenhouse/start/guidelines">http://www.dpi.nsw.gov.au/agriculture/horticulture/greenhouse/start/guidelines</a>	NSW
Data	NSW Government nd Value-of-agricultural-production-data-2001-2006.xls		NSW
Local food	Parker F, (n.d.) Making Periurban Farmers On The Fringe Matter UNSW	<a href="http://www.fbe.unsw.edu.au/cityfutures/SOAC/makingperiurbanfarmersonthefringematter.pdf">http://www.fbe.unsw.edu.au/cityfutures/SOAC/makingperiurbanfarmersonthefringematter.pdf</a>	Sydney
Consultation	Penrith City Council (2009) Forum: Invigorating Town Centres through Alternate Local Fresh Food Marketing Strategies. Program and speakers for event 4 May 2009		Sydney
Innovation	Stone, G (2009) Maximising the Connection between Research, Development and Extension Providers and Agribusiness. RIRDC Publication No 08/180		National
Language barriers	Tobin H 2010 Better Communication with Vegetable Growers with a Language other than English RIRDC report 10-002		National
Data	Website: Analysis of 2006 ABS Population Census and Agriculture Census Data for Sydney Statistical Division	<a href="http://www.dpi.nsw.gov.au/environment/landuse-planning/agriculture/analysis-census-data">http://www.dpi.nsw.gov.au/environment/landuse-planning/agriculture/analysis-census-data</a>	Sydney
Data	Website: NSW DPI Landuse planning & development	<a href="http://www.dpi.nsw.gov.au/environment/landuse-planning/primary-industries">http://www.dpi.nsw.gov.au/environment/landuse-planning/primary-industries</a>	Sydney
Information	Website: Presentation on Sydney "Fertile Crescent" concept by Prof Bill Bellotti, 2010	<a href="http://www.orangefruitgrowers.com.au/sitebuildercontent/sitebuilderfiles/billbellottihortconf2010.pdf">http://www.orangefruitgrowers.com.au/sitebuildercontent/sitebuilderfiles/billbellottihortconf2010.pdf</a>	NSW
Research	Website: UWS Centre for Plants and the Environment	<a href="http://www.uws.edu.au/centre_for_plants_and_the_environment/centre_for_plants_and_the_environment/academic_staff_profiles/professor_bill_bellotti">http://www.uws.edu.au/centre_for_plants_and_the_environment/centre_for_plants_and_the_environment/academic_staff_profiles/professor_bill_bellotti</a>	NSW
Consultation	Wollondilly SC 2011 Charter - Rural Industry Liaison Committee-1		Sydney
<b>Theme 6</b>	<b>Scale and Commercial viability</b>		
Small farm perspective	Hollier C and Reid, M (2007) Small Farms Valued contributors to healthy rural communities RIRDC Publication No 07/187		National
Protected cropping	Horticulture Australia Limited 2007 Australian Vegetable Protected Cropping Industry Strategic Plan 2006-2020	<a href="http://outernode.pir.sa.gov.au/_data/assets/pdf_file/0016/51226/Protected_Cropping_Strategic_Plan_final.pdf">http://outernode.pir.sa.gov.au/_data/assets/pdf_file/0016/51226/Protected_Cropping_Strategic_Plan_final.pdf</a>	National
Precinct concept	Lipscombe, P (2008) Researching the development, planning and protection of Agribusiness Parks, Netherlands and Belgium, Horticulture Australia Limited. HG07079		Netherlands, Belgium
	Lucas Group (2006). <u>Value Adding Adelaide Plains - Evaluation</u> . Adelaide SA		Adelaide
Supply chain coordination	Rafferty, T 2005 Potato Value Chain Analysis, (Report-PTO5022) Sydney: Horticulture Australia Limited .		National
Precinct concept	Singapore Government (2011) Singapore's Agrotechnology Parks	<a href="http://www.ava.gov.sg/AgricultureFisheriesSector/FarmingInSingapore/AgroTechParks/">http://www.ava.gov.sg/AgricultureFisheriesSector/FarmingInSingapore/AgroTechParks/</a>	Singapore
Protected cropping	Smith, G. 2011 Overview of the Australian Protected Cropping Industry. Presentation for Yarra Valley Agribusiness Summit	<a href="http://www.agribusiness-yarrawalley.com/newsletter/summit/ProtectedCropping.pdf">http://www.agribusiness-yarrawalley.com/newsletter/summit/ProtectedCropping.pdf</a>	National
Supply chain analysis	Spencer, S & Kneebone, M 2007, FoodMap - A comparative analysis of Australian food distribution channels, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra.	<a href="http://www.daff.gov.au/_data/assets/pdf_file/0003/298002/foodmap-full.pdf">http://www.daff.gov.au/_data/assets/pdf_file/0003/298002/foodmap-full.pdf</a>	National

Specific topic	Reference	Online address	Focus area
Protected cropping	Taig, L 2009 Protected Cropping fellowship report International Specialised Skills Institute	<a href="http://www.agrifoodskills.net.au/uploads/file/ISS%20FEL%20REPORT%20L%20TAIG%20low%20res.pdf">http://www.agrifoodskills.net.au/uploads/file/ISS%20FEL%20REPORT%20L%20TAIG%20low%20res.pdf</a>	International
Protected cropping	Victorian government 2009 Inquiry into sustainable development of agribusiness in outer suburban Melbourne. Graeme_Smith submission	<a href="http://www.parliament.vic.gov.au/images/.../Graeme_Smith_President.doc">www.parliament.vic.gov.au/images/.../Graeme_Smith_President.doc</a>	Melbourne
Capability building	Website: Agriculture\al Value Chains Knowledge Base (Tasmanian Institute of Agricultural Research)	<a href="http://www.tiar.tas.edu.au/valuechains/knowledge-base">http://www.tiar.tas.edu.au/valuechains/knowledge-base</a>	National
Capability building	Website: Ausveg People Development program	<a href="http://ausveg.com.au/intranet/people/overview.htm">http://ausveg.com.au/intranet/people/overview.htm</a>	National
Supply chain coordination	Website: International year of cooperatives 2012	<a href="http://social.un.org/coopsyear/index.shtml">http://social.un.org/coopsyear/index.shtml</a>	International
Small farm perspective	Website: The Trouble with Small Farms 17 May 2011. ABC Big Ideas Broadcast	<a href="http://www.abc.net.au/tv/bigideas/stories/2011/05/17/3218040.htm">http://www.abc.net.au/tv/bigideas/stories/2011/05/17/3218040.htm</a>	National
<b>Theme 7</b>	<b>Food security</b>		
Horticulture perspective	Reeves (2011). <u>Food Security Issues for the Australian horticulture industries</u> . Horticulture Australia Limited.		National
Life cycle assessment	Cleveland D A, et al (2011). Effect of Localizing Fruit and Vegetable Consumption on Greenhouse Gas Emissions and Nutrition, Santa Barbara County. <i>Environmental Science &amp; Technology</i> 45 (10), pp 4555–4562	<a href="http://www.sciencedaily.com/releases/2011/05/110519135116.htm">http://www.sciencedaily.com/releases/2011/05/110519135116.htm</a>	California
Local food	Champion, M (2009) TERRA MADRE, the biannual conference and workshop co-ordinated by the international "Slow Food" movement, Turin, Italy, Sydney: Horticulture Australia Limited. HG08044		Global
Local food	Sector Connect (2009) Future Food - A declaration developed at the Hungry for Change Food Summit 2009.	<a href="http://www.sectorconnect.org.au/assets/pdf/resources/macfood/Food_Policy_Declaration.pdf">http://www.sectorconnect.org.au/assets/pdf/resources/macfood/Food_Policy_Declaration.pdf</a>	Sydney
Local food	O'Neill P et al (2009). <u>Sydney's food value chain: A Discussion Paper</u> . University of Western Sydney: Urban Research Centre		Sydney
Local food	Penrith City Council (2009) Forum: Invigorating Town Centres through Alternate Local Fresh Food Marketing Strategies. Background paper for event 4 May 2009		Sydney
Local food	Millen 2011 Sydney Fair Food Alliance Response to Our Cities Discussion Paper Feedback Survey	<a href="http://sydneyfoodfairness.org.au/wp-content/uploads/2011/03/SFFA-response-to-Our-Cities.pdf">http://sydneyfoodfairness.org.au/wp-content/uploads/2011/03/SFFA-response-to-Our-Cities.pdf</a>	Sydney
Local food WSROC	WSROC 2010 URBAN ADAPT Initiative - food security for Western Sydney - WSROC URGES GREATER FEDERAL GOVERNMENT ACTION ON URBAN AGRICULTURE	<a href="http://www.wsroc.com.au/index.php?option=com_content&amp;view=article&amp;id=44:wsroc-urges-greater-federal-government-action-on-urban-agriculture&amp;catid=7:2010-april-media-releases&amp;Itemid=7">http://www.wsroc.com.au/index.php?option=com_content&amp;view=article&amp;id=44:wsroc-urges-greater-federal-government-action-on-urban-agriculture&amp;catid=7:2010-april-media-releases&amp;Itemid=7</a>	Sydney
Organics	Cornish, P. (2010) Organic Agriculture - an ethical alternative for some but not all Agricultural Science 3_10		National
Planning perspective	Sinclair I (2009). Planning for Sydney's Food Security - Issues. <u>New Planner</u> , 81(December 2009),		Sydney
Policy	Australian Government 2011 National Food Plan Issues Paper	<a href="http://www.daff.gov.au/_data/assets/pdf_file/0009/1926315/nfp-27june.pdf">http://www.daff.gov.au/_data/assets/pdf_file/0009/1926315/nfp-27june.pdf</a>	National
Policy	PMSEIC (2010). <u>Australia and Food Security in a Changing World</u> . Canberra, Australia: The Prime Minister's Science Engineering and Innovation Council.		National
Public Health	Rychetnik, L et al (2003) Food Security Options Paper. A planning framework and menu of options for policy and practice interventions. NSW Centre for Public Health Nutrition and NSW Health	<a href="http://sydney.edu.au/science/molecular_bioscience/cphn/pdfs/food_security.pdf">http://sydney.edu.au/science/molecular_bioscience/cphn/pdfs/food_security.pdf</a>	NSW
Strategic cropping land	Growcom 2011 Qld Govt strategic cropping land criteria too narrow Fruit and Vegetable news May		Queensland
Urban horticulture	International Symposium on Urban and Peri-urban Horticulture in the Century of Cities, Dakar, Senegal, Dec. 6-9, 2010		International
Urban horticulture	1st Summit on Metropolitan Agriculture		International
Urban horticulture	Urban Agriculture Digs In: Ploughing Ahead, in the City		International
Urban horticulture	Ryerson University Offers Three Distance Learning Education Courses		International
	Commonwealth Association of Planners 2011 Planning and Food Security within the Commonwealth - Discussion Paper	<a href="http://www.commonwealth-planners.org/papers/food.pdf">http://www.commonwealth-planners.org/papers/food.pdf</a>	Global
	AIAS (2011) Dinner in 2050: Who is at the table, what's on the menu, how will we produce it and at what cost? Seminar flier. University of Western Sydney (UWS), Richmond	<a href="http://aias.com.au/upload_docs/NSW%20Seminar%20Dinner%20in%202050%20Program.pdf">http://aias.com.au/upload_docs/NSW%20Seminar%20Dinner%20in%202050%20Program.pdf</a>	Sydney



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	Jopson, D (2011) Let them eat coal - Time to talk about food security Sydney Morning Herald 01Mar11.pdf		Sydney
	3 Pillars Network (2011). <u>National Sustainable Food Summit - Conference Report 5-6 April 2011</u> . Melbourne	<a href="http://www.3pillarsnetwork.com.au/p3_Events-Resources.html?&amp;event=68">http://www.3pillarsnetwork.com.au/p3_Events-Resources.html?&amp;event=68</a>	National
	Sheales T and Gunning-Trant C (2009). <u>Global food Security and Australia</u> . Canberra: ABARE.		National
Policy	Australian Government 2011 Issues paper to inform development of a national food plan	<a href="http://www.daff.gov.au/_data/assets/pdf_file/0009/1926315/nfp-27june.pdf">http://www.daff.gov.au/_data/assets/pdf_file/0009/1926315/nfp-27june.pdf</a>	National
Policy	Senate Select Committee on Agriculture and Related Industries (2010). <u>Food Production in Australia Final Report</u> .	<a href="http://www.aph.gov.au/senate/committee/agric_ctte/food_production/report/index.htm">http://www.aph.gov.au/senate/committee/agric_ctte/food_production/report/index.htm</a>	National
Local food	Hogan, L and Thorpe, S 2009, Issues in food miles and carbon labelling, ABARE research report 09.18, Canberra, December.		National
Stats	Ludwig, Joe. 2010. Australia maintains strong position as food exporter. DAFF, December 1. 2010	<a href="http://www.daff.gov.au/ludwig/mediareleases/december/australia_maintains_strong_position_as_food_exporter">http://www.daff.gov.au/ludwig/mediareleases/december/australia_maintains_strong_position_as_food_exporter</a> .	National
Stats	Foster, Max, James Fell, Henry To, Gwen Rees, and Bruce Bowen. 2010. Overview of the Australian food industry, 2009-10. ABARE.	<a href="http://www.daff.gov.au/_data/assets/pdf_file/0003/1866171/afsoverview- aust-food-industry.pdf">http://www.daff.gov.au/_data/assets/pdf_file/0003/1866171/afsoverview- aust-food-industry.pdf</a> .	National
Campaigning	Website: Sydney Food Fairness Alliance	<a href="http://sydneyfoodfairness.org.au/">http://sydneyfoodfairness.org.au/</a>	Sydney
Campaigning	Website: Sector Connect (SW Sydney NGOs)	<a href="http://www.sectorconnect.org.au/about-us">http://www.sectorconnect.org.au/about-us</a>	Sydney
Campaigning	Website: WSROC "Urban Adapt" initiative: Press Release - Loss of farms puts health of the community at risk	<a href="http://www.wsroc.com.au/index.php?option=com_content&amp;view=article&amp;id=17:loss-of-farms-puts-health-of-the-community-at-risk&amp;catid=2:releases">http://www.wsroc.com.au/index.php?option=com_content&amp;view=article&amp;id=17:loss-of-farms-puts-health-of-the-community-at-risk&amp;catid=2:releases</a>	NSW
Local food	Website: Australian City Farms and Community Gardens Network	<a href="http://communitygarden.org.au/">http://communitygarden.org.au/</a>	National
Local food	Website: Hawkesbury harvest	<a href="http://www.hawkesburyharvest.com.au/">http://www.hawkesburyharvest.com.au/</a>	Sydney
Urban horticulture	Website: cityfarmer (Vancouver)	<a href="http://www.cityfarmer.info/">http://www.cityfarmer.info/</a>	Vancouver
Urban horticulture	Website: ETC-Urban Agriculture (ETC-UA)	<a href="http://www.etc-urbanagriculture.org">www.etc-urbanagriculture.org</a>	International
Urban horticulture	Website: Resource Centres on Urban Agriculture and Food Security (RUAF)	<a href="http://www.ruaf.org">www.ruaf.org</a>	International
Life cycle assessment	<a href="http://brisbane.foodconnect.com.au/wp-content/uploads/2011/05/ARUP-Tomato-report.pdf">http://brisbane.foodconnect.com.au/wp-content/uploads/2011/05/ARUP-Tomato-report.pdf</a>		Brisbane
<b>Theme 8</b>	<b>Planning</b>		
SMP2036	ACFCGN 2010 Submission-to-Metro-Strategy-May2010.pdf	<a href="http://communitygarden.org.au/wp-content/uploads/2010/06/Submission-to-Metro-Strategy-May2010.pdf">http://communitygarden.org.au/wp-content/uploads/2010/06/Submission-to-Metro-Strategy-May2010.pdf</a>	Sydney
City planning	Australian government 2011 Our Cities, Our Future - A national urban policy for a productive, sustainable and liveable future	<a href="http://www.infrastructure.gov.au/infrastructure/mcu/files/Our_Cities_National_Urban_Policy_Paper_2011.pdf">http://www.infrastructure.gov.au/infrastructure/mcu/files/Our_Cities_National_Urban_Policy_Paper_2011.pdf</a>	National
Food security	Budge, T and Slade, C 2009 Integrating land use planning and community food security Victorian Local Governance Association	<a href="http://www.vlga.org.au/site/DefaultSite/filesystem/documents/Land%20Use%20Planning/TNT%202009%20Oct%208%20VLGA%20Report%20on%20Food%20Security_Final.pdf">http://www.vlga.org.au/site/DefaultSite/filesystem/documents/Land%20Use%20Planning/TNT%202009%20Oct%208%20VLGA%20Report%20on%20Food%20Security_Final.pdf</a>	Victoria
	Bunker, R and Houston, P (2003) Prospects for the Rural-Urban Fringe in Australia: Observations from a Brief History of the Landscapes around Sydney and Adelaide. Australian Geographical Studies Volume 41, Issue 3, pages 303-323, November 2003	<a href="http://onlinelibrary.wiley.com/doi/10.1046/j.1467-8470.2003.00236.x/abstract">http://onlinelibrary.wiley.com/doi/10.1046/j.1467-8470.2003.00236.x/abstract</a>	Sydney, Adelaide
	Buxton et al (2008) Planning Sustainable Futures for Melbourne's Peri-urban Region. RMIT University, Melbourne	<a href="http://www.periurban.org.au/references/Planning%20Sustainable%20Futures%20for%20Melbourne%20Dec%2011th.pdf">http://www.periurban.org.au/references/Planning%20Sustainable%20Futures%20for%20Melbourne%20Dec%2011th.pdf</a>	Melbourne
Case Study	Buxton, M et al (2007) Change and Continuity in Peri-urban Australia, Peri-Urban Case Study: Bendigo Corridor, <b>Monograph 2</b> RMIT University, Melbourne	<a href="http://www.griffith.edu.au/_data/assets/pdf_file/0003/76827/rmit-urp-rm02-buxton-et-al-2007.pdf">http://www.griffith.edu.au/_data/assets/pdf_file/0003/76827/rmit-urp-rm02-buxton-et-al-2007.pdf</a>	Melbourne
Case study	Buxton, Michael, and Darryl Low Choy. 2007. Change in Peri-urban Australia - Implications for Land Use Policies. State of Australian Cities Conference, Adelaide, 28-30 November	<a href="http://www.fbe.unsw.edu.au/cityfutures/SOAC/changeinperiurbanaustralia.pdf">http://www.fbe.unsw.edu.au/cityfutures/SOAC/changeinperiurbanaustralia.pdf</a>	Melbourne, Brisbane
Literature review	Buxton, M et al (2006) Change and Continuity in Peri-urban Australia - Review of literature <b>Monograph 1</b> RMIT University, Melbourne.	<a href="http://www.periurban.org.au/references/LandandWaterSubjectBibliography.pdf">http://www.periurban.org.au/references/LandandWaterSubjectBibliography.pdf</a>	National
City planning	Council of Australian Governments (COAG) 2009 National Objective And Criteria for Future Strategic Planning OF Capital Cities	<a href="http://www.coag.gov.au/coag_meeting_outcomes/2009-12-07/index.cfm#cap_city_strat">http://www.coag.gov.au/coag_meeting_outcomes/2009-12-07/index.cfm#cap_city_strat</a>	National

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Blueprint 2030	Department of Planning and Local Government (2010) The 30-Year Plan for Greater Adelaide.: Government of South Australia.	<a href="http://www.dplg.sa.gov.au/plan4adelaide/html/files/plan/01_Introduction.pdf">http://www.dplg.sa.gov.au/plan4adelaide/html/files/plan/01_Introduction.pdf</a>	Adelaide
Residential expansion	Hassall 2010 Hawkesbury Residential Land Strategy Executive Summary	<a href="http://www.hawkesbury.nsw.gov.au/_data/assets/pdf_file/0009/27378/ExecutiveSummary.pdf">http://www.hawkesbury.nsw.gov.au/_data/assets/pdf_file/0009/27378/ExecutiveSummary.pdf</a>	Sydney
Residential expansion	Hassall 2010 Hawkesbury Residential Land Strategy Section 4 Key Issues		Sydney
SMP2036	Jewell, L. (2004) The Sydney Metropolitan Strategy and Rural Land Use Submission NSW Farmers Association		Sydney
SMP2036	Knowd, 2008 Submission to the Metropolitan Strategy Subregional Plans For the North and South West	<a href="http://hawkesburyharvest.com.au/imagesDB/news/MetroStratSubRegionalPlan_HawkesburyHarvestsubmission.pdf">http://hawkesburyharvest.com.au/imagesDB/news/MetroStratSubRegionalPlan_HawkesburyHarvestsubmission.pdf</a>	Sydney
Case Study	Low Choy, D et al (2007) Change and Continuity in Peri-urban Australia, Peri-Urban Case Study - SE Queensland <b>Monograph 3</b> Griffith University, Nathan	<a href="http://www.periurban.org.au/references/GU_M3_Peri-UrbanCaseStudySEQ%28Secure%29.pdf">http://www.periurban.org.au/references/GU_M3_Peri-UrbanCaseStudySEQ%28Secure%29.pdf</a>	Brisbane
Case Study	Low Choy, D Sutherland, C Gleeson, B Sipe, N and Dodson, J (2008) Change and continuity in peri-urban Australia - peri-urban futures and sustainable development. <b>Monograph 4</b> , Griffith University, Brisbane	<a href="http://periurban.org.au/references/monograph4.pdf">http://periurban.org.au/references/monograph4.pdf</a>	National
Blueprint 2030	Lucas Group (2007). <u>Development of Horticultural Industries on the Adelaide Plains - A Blueprint for 2030.</u>		Adelaide
Population trends	National Institute of Labour Studies. 2010. Research into the long-term physical implications of Net Overseas Migration. Adelaide, Australia: Flinders University School of the Environment; CSIRO Sustainable Ecosystems, DIAC	<a href="http://www.immi.gov.au/media/publications/research/_pdf/physical-implications-migration-fullreport.pdf">http://www.immi.gov.au/media/publications/research/_pdf/physical-implications-migration-fullreport.pdf</a>	National
SMP 2036 Leppington	NSW government 2005 Leppington Plan	<a href="http://www.metrostrategy.nsw.gov.au/dev/uploads/SW-Section4_Leppington.pdf">http://www.metrostrategy.nsw.gov.au/dev/uploads/SW-Section4_Leppington.pdf</a>	Sydney
Infrastructure	NSW government 2005 South West railway link Overview Report	<a href="http://www.planning.nsw.gov.au/plansforaction/pdf/swr1.pdf">http://www.planning.nsw.gov.au/plansforaction/pdf/swr1.pdf</a>	Sydney
SMP2036	NSW Government 2010 Sydney Metropolitan Strategy - Summary of Strategic Directions, Objectives and Actions		Sydney
SMP2036 Strategy A	NSW Government 2010 Sydney Metropolitan Strategy A - Strengthening a City of Cities		Sydney
SMP2036	NSW Government 2010 Sydney Metropolitan Strategy Appendices		Sydney
SMP2036 Strategy B	NSW Government 2010 Sydney Metropolitan Strategy B - growing and Renewing Centres.pdf		Sydney
SMP2036 Strategy C	NSW Government 2010 Sydney Metropolitan Strategy C – Transport		Sydney
SMP2036 Strategy D	NSW Government 2010 Sydney Metropolitan Strategy D - Housing Sydney's Population.pdf		Sydney
SMP2036 Strategy E	NSW Government 2010 Sydney Metropolitan Strategy E - Growing Sydney's Economy.pdf		Sydney
SMP2036 Strategy F	NSW Government 2010 Sydney Metropolitan Strategy F - Balancing land uses on the city's fringe	<a href="http://metroplansydney.nsw.gov.au/portals/0/pdf/METR02036_F_BALANCING_LANDUSE.pdf">http://metroplansydney.nsw.gov.au/portals/0/pdf/METR02036_F_BALANCING_LANDUSE.pdf</a>	Sydney
SMP2036 Strategy G	NSW Government 2010 Sydney Metropolitan Strategy G - Tackling Climate Change and Protecting Sydney's Natural Environment		Sydney
SMP2036 Strategy H	NSW Government 2010 Sydney Metropolitan Strategy H - Achieving Equity, Liveability and Social Inclusion		Sydney
SMP2036 Strategy I	NSW Government 2010 Sydney Metropolitan Strategy I - Delivering the plan		Sydney
SMP2036	NSW Government 2010 Sydney Metropolitan Strategy Introduction	<a href="http://www.metrostrategy.nsw.gov.au/">http://www.metrostrategy.nsw.gov.au/</a>	Sydney
City planning	Our Cities - the challenge of change Background and research paper 2010	<a href="http://www.infrastructure.gov.au/infrastructure/mcu/files/NUPBP_Ch1_Intro.pdf">http://www.infrastructure.gov.au/infrastructure/mcu/files/NUPBP_Ch1_Intro.pdf</a>	National
	Presentation on Copenhagen finger plan	<a href="http://www.plurel.net/images/MURI_Vejre.pdf">http://www.plurel.net/images/MURI_Vejre.pdf</a>	Copenhagen
Employment	SGS 2008 Hawkesbury Employment Lands Strategy Adopted Report 9 December 2008 p140	<a href="http://www.hawkesbury.nsw.gov.au/_data/assets/pdf_file/0003/15339/AdoptedReport9Dec2009_CouncilAmendments.pdf">http://www.hawkesbury.nsw.gov.au/_data/assets/pdf_file/0003/15339/AdoptedReport9Dec2009_CouncilAmendments.pdf</a>	Sydney
Integrated approaches	Sinclair I (2010). Planning for Sydney's Food Security - Policy Responses. <i>New Planner</i> , 82(March 2010),	<a href="http://www.ruralplanning.com.au/library/newsletter/march10.shtml">http://www.ruralplanning.com.au/library/newsletter/march10.shtml</a>	Sydney
LEP	Sinclair I 2003 Rural Local Environmental Plans.pdf	<a href="http://www.ruralplanning.com.au/">http://www.ruralplanning.com.au/</a>	National

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City planning	Verwer 2011 Promise of our cities is broken : The Australian January 22, 2011	<a href="http://www.theaustralian.com.au/news/opinion/promise-of-our-cities-is-broken/story-e6frg6zo-1225992600051">http://www.theaustralian.com.au/news/opinion/promise-of-our-cities-is-broken/story-e6frg6zo-1225992600051</a>	National
Research	Website: Griffith University - Environment, Planning and Architecture	<a href="http://www.griffith.edu.au/environment-planning-architecture/griffith-school-environment">http://www.griffith.edu.au/environment-planning-architecture/griffith-school-environment</a>	Brisbane
Regional	Website: Hawkesbury council	<a href="http://www.hawkesbury.nsw.gov.au/">http://www.hawkesbury.nsw.gov.au/</a>	NSW
Regional	Website: MACARTHUR REGIONAL ORGANISATION OF COUNCILS (MACROC) Campbelltown, Camden & Wollondilly Councils	<a href="http://www.macroc.nsw.gov.au/">http://www.macroc.nsw.gov.au/</a>	Sydney
Advocacy	Website: National Growth Areas Alliance	<a href="http://ngaa.org.au/">http://ngaa.org.au/</a>	National
Research	website: Peri-urban Research at RMIT University, Melbourne	<a href="http://www.periurban.org.au/">http://www.periurban.org.au/</a>	Melbourne
Advocacy	Website: Planning Institute Australia	<a href="http://www.planning.org.au">www.planning.org.au</a>	
City planning	Website: Review of Capital city strategic planning systems by COAG reform council	<a href="http://www.coagreformcouncil.gov.au/agenda/cities.cfm">http://www.coagreformcouncil.gov.au/agenda/cities.cfm</a>	National
Literature review (ongoing database)	Website: Urban Agriculture Bibliographic Database	<a href="http://www.ruaf.org/node/38">http://www.ruaf.org/node/38</a>	Global
Research	website: UWS Centre for Plants and the Environment	<a href="http://www.uws.edu.au/centre_for_plants_and_the_environment/centre_for_plants_and_the_environment/academic_staff_profiles/professor_bill_bellotti">http://www.uws.edu.au/centre_for_plants_and_the_environment/centre_for_plants_and_the_environment/academic_staff_profiles/professor_bill_bellotti</a>	Sydney
Regional	Website: Western Sydney Parklands Trust (WSPT)	<a href="http://www.westernsyneyparklands.com.au">www.westernsyneyparklands.com.au</a> ( <a href="http://www.westernsyneyparklands.com.au/">http://www.westernsyneyparklands.com.au/</a> )	Sydney
Regional	Website: Western Sydney Regional Organisation of councils (WSROC)	<a href="http://www.wsroc.com.au">www.wsroc.com.au</a>	Sydney
Processes	Website: Wollondilly Local Environmental Plan 2011	<a href="http://www.legislation.nsw.gov.au/maintop/view/inforce/epi+85+2011+cd+0+N">http://www.legislation.nsw.gov.au/maintop/view/inforce/epi+85+2011+cd+0+N</a>	Sydney
History	Wilkinson, J (2011) Agriculture in the Sydney region: historical and current perspectives. E-brief. New South Wales Parliamentary Library Research Service	<a href="http://www.parliament.nsw.gov.au/prod/parlment/publications.nsf/key/AgricultureintheSydneyregion:historicalandcurrentperspectives/\$File/Agriculture+in+the+Sydney+region+2.pdf">http://www.parliament.nsw.gov.au/prod/parlment/publications.nsf/key/AgricultureintheSydneyregion:historicalandcurrentperspectives/\$File/Agriculture+in+the+Sydney+region+2.pdf</a>	Sydney
DCP	Wollondilly SC 2010 Development Control Plan	<a href="http://www.wollondilly.nsw.gov.au/files/217249/File/DCP2010Volume2PrimaryagriculturalandRuraluses.pdf">http://www.wollondilly.nsw.gov.au/files/217249/File/DCP2010Volume2PrimaryagriculturalandRuraluses.pdf</a>	Sydney

## 11 APPENDICES

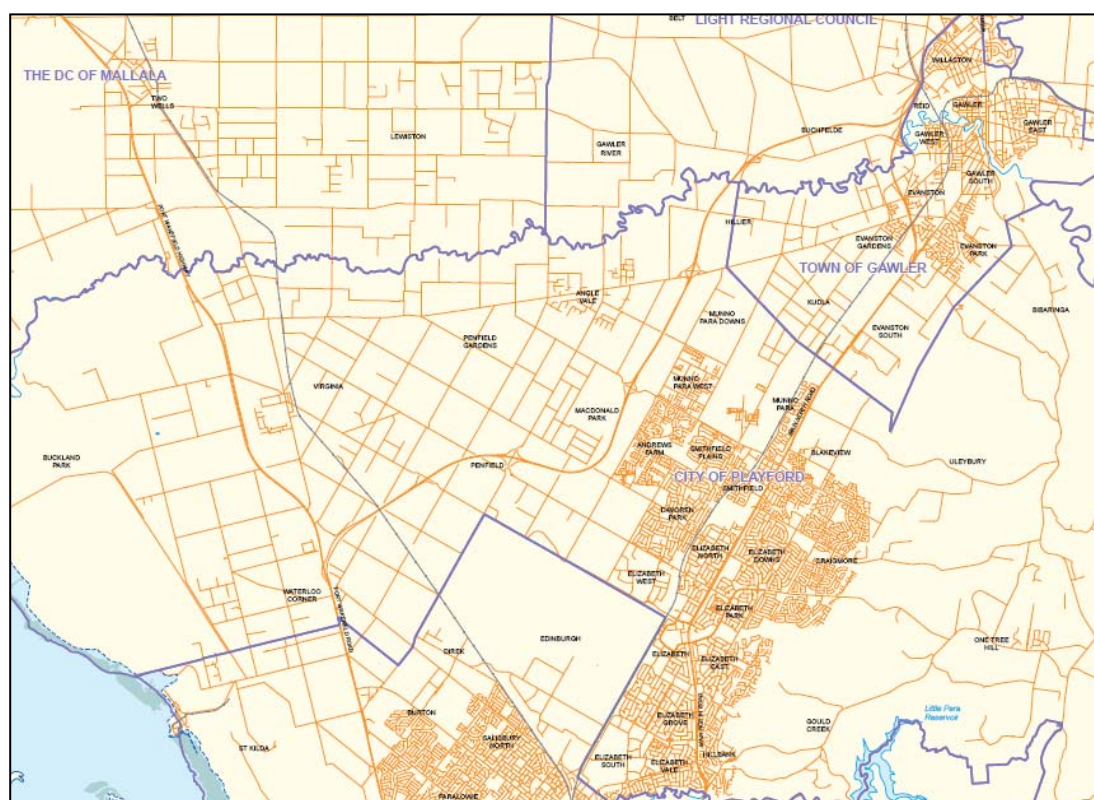
### 11.1 Appendix 1 - Study Areas

#### 11.1.1 Northern Adelaide Plains

The area known as the Northern Adelaide Plains (NAP) is situated on the northern boundary of Adelaide and encompasses urban areas, areas currently used for intensive horticulture and rural living and it extends north into areas used for broadacre agriculture. The Virginia horticulture district forms a major part of the area used for intensive horticulture.

Intensive horticulture is conducted in parts of 5 local government areas (LGAs) in the NAP: District Council of Mallala, Light Regional Council, the City of Playford and a small portion of the City of Salisbury and of the Town of Gawler. A map of the relevant area has been extracted from the map of Local Government Areas published by the Department of Environment and Heritage SA and is shown in Figure 5 below.

**Figure 5 : Map of Northern Adelaide Plains by Local Government Areas**



Source: Department of Environment and Heritage, 2009. Digital map—metro\_LGA\_AO.pdf

This region has a high proportion (around 80%) of land used for primary production. Primary production in the Playford and Salisbury LGA's is dominated by horticulture which is extending north of the Gawler river into areas mostly used for broadacre farming and grazing and small rural living allotments.

The NAP is suited for intensive horticulture because of its suitable soils and Mediterranean climate, adequate water (mains, bore and treated, recycled) supply, reasonable utility infrastructure and workforce availability, adequate transport and shipping facilities nearby and its proximity to the major market of Adelaide. However, there is continuing generally northerly urban encroachment onto land used for intensive horticulture, and responding relocation of

intensive horticulture immediately north (eg into the area between Two Wells and Mallala) and to broadacre sites in the Riverland, Murraylands, south east SA and interstate (eg Hay plains).

The NAP accounts for about 17% of South Australia's horticultural production, excluding wine. According to the 2005-06 Score Card (PIRSA, 2006), NAP horticulture contributed \$92.7m farm gate value, and \$203.1m wholesale processed value. There appears to be potential for horticulture in the NAP to double production to \$200m Farm Gate Value by 2030, with associated increases in income and employment. However, many in the industry perceive conflicting planning priorities and an uncertain longer term commitment to NAP horticulture by state and local government. This perception is reinforced by major projects such as the Northern Expressway which cuts through areas of intensive horticulture in the region, and there are reports that horticultural expertise and contributions to horticultural services and resources are being diminished.

The NAP has diverse land use, including perennial horticulture, annual protected and open field horticulture, nurseries, annual/broadacre grain cropping; animal (livestock, pigs, poultry, alpacas) production and grazing, and other relevant commercial (or entertainment-focussed) activities including horse and dog breeding and racing. There are an estimated 30 processors or value-adding enterprises in the region and they process produce grown on the NAP, as well as potatoes, carrots and onions grown in other parts of SA. Some vegetables and bunch lines are also field-packed.

The majority of horticultural production on the NAP is greenhouse-grown vegetables (tomatoes, capsicums and cucumbers). Substantial quantities of broad acre vegetables (potatoes, carrots, lettuce, onions, *Brassica* spp.) are also grown on the NAP. Nurseries on the NAP produce vegetable seedlings, potted colour and landscape plants. There are also floriculture (especially roses and cut flowers from bulbs), turf, mushroom, Asian vegetable and melon operations. Perennial horticulture (olives, almonds, wine grapes) is also important in the region.

The demographic information available on the LGA websites is sourced predominately from the 2006 Census, and it provides insight on employment and the importance of agriculture to the region. Within one market gardening area of the LGA (Virginia-Waterloo Corner-Buckland Park), in 2006 27.5% of residents were employed in agriculture, forestry or fishing. Of this area's residents, 34% were born overseas with the majority speaking Vietnamese at home. Many farm and allied industry workers are from non-English speaking backgrounds and therefore efforts to improve technology adoption and advance biosecurity awareness must specifically accommodate CALD participants. Amongst NAP residents and workers, the Vietnamese, Italian, Greek, Khmer (Cambodian), Turkish and more recently Burmese clusters need specific engagement. The NAP farming community from English-speaking backgrounds is an aging group and that also has implications for awareness efforts and engagement.

The region includes little native vegetation but natural resource management is active in relation to water (flood management, erosion, excessive drawing from aquifer), weed control and biodiversity. Three water sources are relied upon in the region – bore, mains, and re-cycled. Horticulture currently uses around 30 gigalitres (GL) of water, with 18 GL extracted from underground sources and 12 GL of re-cycled water from the Bolivar wastewater treatment plant, via the Virginia Pipeline Scheme. Natural gas is available for heating greenhouses and for some processing operations but current supplies are considered limiting and too localised to allow expansion of horticulture on the NAP. Three phase electricity is available through most of the area.

The state's major Produce Market is 20 minutes north of Adelaide's CBD, within the NAP region. This market receives and distributes produce from around Australia (including from/to the NAP). It has been estimated that 80 SA growers; 50 wholesalers and 1000 individuals use the market everyday. A Sunday market also operates in the area and has fruit and vegetable stalls amongst craft and entertainment stalls.







*being drilled in the basin....The Sydney Basin has favourable geological attributes for the development of a coal seam methane industry.<sup>101</sup>*

**The conservation perspective:** *“The Sydney Basin Bioregion lies on the central east coast of NSW and covers an area of approximately 3,624,008 ha (IBRA 5.1). It occupies about 4.53% of NSW and is one of two bioregions contained wholly within the state. The bioregion extends from just north of Batemans Bay to Nelson Bay on the central coast, and almost as far west as Mudgee.... As well as Sydney itself, the Sydney Basin Bioregion encompasses the towns of Wollongong, Nowra, Newcastle, Cessnock, Muswellbrook and Blue Mountains towns such as Katoomba and Mt Victoria.....It includes a significant proportion of the catchments of the Hawkesbury- Nepean, Hunter and Shoalhaven river systems, all of the smaller catchments of Lake Macquarie, Lake Illawarra, Hacking, Georges and Parramatta Rivers, and smaller portions of the headwaters of the Clyde and Macquarie rivers..... The Sydney Basin Bioregion is one of the most species diverse in Australia. This is a result of the variety of rock types, topography and climates in the bioregion.<sup>102</sup>*

Taking a vegetable production focus, within the area covered by this study, there is an area of about 2025 ha planted in outdoor-field, greenhouse and outdoor hydroponic vegetables. This constitutes 1052 holdings with an average size of 1.9 ha. For the 815 properties growing outdoor-field vegetables the median size is 1.3 ha. However, twenty five percent of these constituted 65% of the outdoor –field vegetable land area. These figures are summarised from the recent “ground-truthing” study undertaken by Malcolm and Fahd for the vegetable industry.<sup>103</sup>

A wide variety of other horticultural crops are produced in the study area, including fruit, nuts, mushrooms, floral, nursery and turf, but the diversity and scattered nature of these holdings makes it difficult to assess the area covered or production trends.<sup>104</sup>

The Sydney Metropolitan strategy identifies the North West and South West Growth Centres for concentrated development. The aim is to concentrate urban sprawl in these areas as well as focussing on existing built-up areas, thereby implementing a “City of cities” strategy for Sydney.<sup>105</sup> Malcolm and Fahd have noted that half of the vegetable farms they identified are in these growth centres and will be paved with roads and houses over the next 25 years or so. There does not appear to be any coordinated approach to managing this displacement of vegetable production. Although the plan for Sydney also includes Strategy F - Balancing land uses on the city's fringe, there are currently only limited resources available to implement any action on these ideas.

A key factor in considering the role of farming in Sydney’s peri-urban fringe is that, according to Sinclair (2007), the metropolitan fringe is mostly rural residential, not rural. This runs counter to the visual impression of this area and helps to explain why the Malcolm and Fahd study found a relatively low area under cultivation. Sinclair states:

*“A land use survey conducted in 2003 of the immediate fringe (Western Sydney Rural Land Use Study - Baulkham Hills to Blue Mountains to Campbelltown) found that 78.3% of the land use was rural residential. Land use surveys conducted recently for Councils further out has shown that the proportion of rural residential is higher than 60% of the total number of lots. It should be pointed out that a lot of this land has been subdivided for a number of years - sometimes in excess of 50 years.*

<sup>101</sup> NSW government. Sydney Basin - Geological Overview

<sup>102</sup> NSW government Bioregions of NSW – C H A P T E R 1 5 The Sydney Basin Bioregion

<sup>103</sup> Malcolm and Fahd (2009)

<sup>104</sup> James (2010)

<sup>105</sup> NSW Government 2010 Sydney Metropolitan Strategy A - Strengthening a City of Cities

*Whilst the majority of these rural residential uses are on lots of less than 3 ha, the Western Sydney Rural Land Use Study found that 20 % of them are on lots greater than 3 ha. This trend is also evident in areas further out. A fragmentation analysis conducted in association with the Western Sydney Rural Land Use Study found that 76.6% of all land comprises lots less than 3 ha.<sup>106</sup>”*

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<sup>106</sup>

Sinclair 2007