From Paddock to Campus

Exploring the potential role of health promotion in addressing food security from an environmental sustainability perspective

by

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I love food – but not just any food. Meals that have been crafted using fresh, ecologically grown produce from a garden or local farmer, or eating a cherry tomato straight from the vine. Nothing can beat the taste, freshness or enjoyment from such food. It brings health and vitality to people and the earth. I want to share this with everyone I meet and inspire their interest in creating a new paradigm around food and food systems in the same way that I have been captured. As such this topic was perfect for me. With that being said, I would like to thank my supervisors Dr Rebecca Patrick and Honorary Associate Professor Mardie Townsend for all their outstanding support and enthusiasm during my PhD. You have been so supportive even through all life’s challenges including having a baby in the middle of it all! I appreciate your guidance through this journey – you have both challenged me to deepen my thinking, remain critical and to be open to new possibilities.

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ABSTRACT

Background: It is well documented that industrialised food systems, including within Australia, pose significant threats to ecosystems through practices that contribute to soil degradation, climate change and food waste. This is of significant concern as ecosystems are essential for future food security. Ecosystem degradation and climate change, for example, threaten the production of food at global and national levels. It is also indicated that, in such a circumstance, human health will be compromised as access to fresh, healthy food is a requirement for optimal health and wellbeing.

Health promotion forms a key part of the public health sector in Australia and is tasked with addressing food insecurity for vulnerable populations. The sector, generally addresses food insecurity using a food availability and food supply framework through a social determinants perspective. Such an approach, however, has been criticised for lacking environmental sustainability considerations, including the impacts on ecosystems due to current food system practices. An environmental sustainability approach recognises that a continuous food supply now and into the future relies on environmentally sustainable practices from production through to consumption. It has been argued that health promotion should broaden its approach to address significant health issues using an ecological public health perspective – this includes the incorporation of environmental sustainability considerations at two levels 1) within practice and 2) tertiary education. This would ensure current and future practitioners are furnished with the appropriate skills and knowledge required to address significant health issues in the 21st century. Despite these calls for a reorientation of practice and education, there appear to have been no studies to explore whether the health promotion sector is reorienting practice towards environmental sustainability to address food insecurity. This study contributes to this understanding through exploring the potential role of the Australian health promotion sector in addressing food security from an environmental sustainability perspective.

Methods: A mixed-methods approach guided by a pragmatic framework was adopted for this study. A sequential explanatory design with three phases was undertaken, with a national online survey (n=61) (Phase 1) and semi-structured interviews (n=16) (Phase 2) targeting health promotion practitioners. Semi-structured interviews with Australian university level academics (n=15) who teach food security through an environmental sustainability framework were also undertaken to explore opportunities for health promotion education
(Phase 3). This was augmented by document analysis of associated university units (n= 26). Non-probability and purposeful sampling strategies were used to target practitioners and academics for this study.

A descriptive research design was used to analyse the data from the quantitative and qualitative elements of the study. The quantitative data was analysed using descriptive statistics such as frequency distributions, standard deviations and confidence intervals. The qualitative data was explored using thematic analysis to develop complex theme connections of practitioner and academic experiences. In keeping with a pragmatic approach, abduction, which entails deductive and inductive coding to draw theory from the raw data, was used to guide this process. Triangulation from the quantitative and qualitative phases was guided by Onwueguzie and Teddlie’s (2003) framework involving seven stages to develop points of convergence and corroboration of the phenomena under study.

*Findings:* This study demonstrated that some practitioners were broadening their approach with addressing food insecurity through the adoption of environmental sustainability principles to guide practice. Environmental sustainability principles were considered vital for addressing food insecurity and protecting ecosystems for future food security. The study also provided insight into the development of practitioner competencies to address food insecurity through an environmental sustainability perspective. These learnings were developed primarily through informal learning opportunities.

Informal learning opportunities also progressed knowledge and understanding among practitioners to address food insecurity using systems thinking. Food insecurity and ecosystem degradation were considered interconnected issues within the food system that could not be addressed adequately in isolation. Despite involvement in informal learning opportunities, this study identified competency gaps among practitioners with addressing food insecurity through a systems perspective, one that also ensured environmental sustainability. Although tertiary education can provide a key role with developing graduate competencies with addressing significant sustainability issues, interviews and document analysis with Australian academics, however, revealed few tertiary health oriented programs that utilise systems thinking and environmental sustainability to address food insecurity.

This study provided insight into the potential use of Education for Sustainability (EfS) within health promotion degrees to achieve a reorientation of practice towards systems thinking and environmental sustainability. EfS was an unknown approach for most academics, however,
its utilisation was apparent, albeit informally. Beyond EfS, another educational approach was identified during this study, namely Sustainable Food Systems Education (SFSE). The aim of SFSE is to reorient practice to address the multifaceted issues within the current food system through systems thinking. The other goal of SFSE is to ensure that food systems are environmentally sustainable. SFSE may therefore be more relevant for the health promotion sector for reorienting practice towards this new paradigm.

*Conclusion:* This study revealed that some Australian health promotion practitioners were guided by environmental sustainability principles in the development of their food security initiatives. A reorientation of practice was also apparent where practitioners were utilising systems thinking for addressing food insecurity. This is significant for the health promotion sector which generally addresses food insecurity from a food availability and food supply framework using a social determinants perspective. This study, however, also identified barriers and competency gaps among health promotion practitioners. There also appeared to be a shortage of health promotion degree pathways for existing practitioners and pre-service graduates within Australia to address this competency gap. The adoption of SFSE within Australian health promotion degree pathways appears to be a promising educational approach to achieve the required transformation in practice.
GLOSSARY OF TERMS

This section provides a definition of key terms that are used throughout the thesis. They have been outlined below to provide clarity to the reader regarding their meaning in relation to this research.

Ecological Footprint – This definition is based on Venetoulis et al. (2004, p. 7) who state that ‘The Ecological Footprint is a tool for measuring and analysing human natural resource consumption and waste output within the context of nature’s renewable and regenerative capacity (or biocapacity). It represents a quantitative assessment of the biologically productive area (the amount of nature) required to produce the resources (food, energy, and materials) and to absorb the wastes of an individual, city, region, or country’.

Education for Sustainability – This thesis was guided by Education for Sustainability (EfS) teaching and learning approaches espoused by the Australian Research Institute in Education for Sustainability (ARIES) at Macquarie University in New South Wales (NSW), Australia. EfS moves beyond traditional teaching approaches that focus on education about the environment where it seeks to shift the values, beliefs and mindsets of society towards sustainability. The following statement at the fourth International Conference on Environmental Education that was held in 2007 describes the purpose of education in the 21st century and the role of EfS in achieving goals for sustainability. ‘We must reconsider our tools, methods and approaches, our politics and economics, our relationships and partnerships, and the very foundations and purpose of education and how it relates to the lives we lead ... [EfS] encourages a shift from viewing education as a delivery mechanism to a lifelong, holistic and inclusive process’ (The Ahmedabad Declaration 2007, p. 1).

Environmental Sustainability – the term has multiple definitions and is also referred to as ‘sustainability’ and ‘ecological sustainability’. For this thesis, the research was guided by the definition provided by the Commissioner for Environmental Sustainability Act (2003, p. 4) due to its acknowledgement of the interdependence of human health and wellbeing on flourishing ecosystems. ‘Ecologically sustainable development is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. The objectives of ecologically sustainable development are:

   a) to enhance individual and community wellbeing and welfare by following a path of economic development that safeguards the welfare of future generations;
b) to provide for equity within and between generations;

c) to protect biological diversity and maintain essential ecological processes and life support systems.

Food Citizenship – this thesis uses the term food citizenship as developed by Caraher and Coveney (2004) and Renting et al. (2012). Accordingly, food citizenship is where the community are active participants in shaping the food system rather than passive consumers.

Food Desert – Food deserts in this thesis ‘... can be described as geographic areas where residents’ access to affordable, healthy food options (especially fresh fruits and vegetables) is restricted or non-existent due to the absence of grocery stores within convenient travelling distance’ (Food Empowerment Project 2017, p. 1)

Food Insecurity – this term is based on the definition provided by the NSW Centre for Public Health Nutrition (2003, p. iv): ‘food insecurity can consist of one of the following: ‘not having sufficient food; experiencing hunger as a result of running out of food and being unable to afford more; eating a poor-quality diet as a result of limited food options; anxiety about acquiring food; or having to rely on food relief’.

Food Miles – Food miles refers to the ‘geographic distance food products are transported, between their cultivation, processing and the consumer at point of sale’ (Gaballa & Abraham 2008, p. 7).

Food Security – the use of the term food security is based on the Food and Agriculture Organisation’s (FAO) (2003, p. 28) definition where ‘Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life’. This thesis ascribes to the four pillars of food security: food access, food availability, food use and stability over time.

1. Food Access: sufficient quantities of food available on a consistent basis;
2. Food Availability: having sufficient resources to obtain appropriate foods for a nutritious diet; and
3. Food Use: appropriate use based on knowledge of basic nutrition and care, as well as adequate water and sanitation
4. Stability: stability refers to the continuous availability and access of food by individuals (FAO 2006; WHO 2013).
Food Sovereignty – Food Sovereignty in this thesis is defined as ‘... the right of peoples to nourishing and culturally appropriate food produced and distributed in ecologically sound and ethical ways, and their right to collectively determine their own food and agriculture systems’ (Australian Food Sovereignty Alliance 2017, p. 1).

Food Swap – Food Swaps are classified as ‘...local gatherings where people swap excess home-grown produce and gardening extras. Items may include fruit, vegetables, herbs, eggs, seeds, seedlings, gardening tips and worm juice, but may easily extend to skills shares, stories and seasonal recipes’ (Local Harvest n.d, p. 1).

Food System – Food system in this thesis refers to ‘an interconnected web of activities, resources and people that extends across all domains involved in providing human nourishment and sustaining health, including production, processing, packaging, distribution, marketing, consumption and disposal of food. The organization of food systems reflects and responds to social, cultural, political, economic, health and environmental conditions and can be identified at multiple scales, from a household kitchen to a city, county, state or nation’ (Chase & Grubinger 2014, p. 1). This thesis refers to a food system shaped by the industrialisation, often referred to as an industrialised food system (FAO 2016). Local food systems are also referred to in this thesis and are similar to industrialised food systems with regards to the various stages, however, ‘local food systems differ from [industrialised food systems] due to their short supply chain, minimally processed food supplied by local farmers, and local consumption’ (FAO 2016, p. 1).

Health Promotion – this term is based on the definition outlined by the World Health Organisation (WHO) (1986, p. 1) where ‘health promotion is the process of enabling people to increase control over, and to improve, their health’. It also recognises that ‘health is a resource for everyday life, not the objective of living... a positive concept emphasizing social and personal resources, as well as physical capacities’. Often referred to as a ‘social movement, akin to other movements fuelled by a concern with social justice and with injustice’ (Dixey 2013, p. x), health promotion is recognised within Australia and internationally as a professional discipline that falls under the banner of public health (Baum 2009; Dixey 2013).

Paddock to Plate – refers to initiatives and activities that consider all the key processes in the food system (i.e. production, processing, distribution, consumption and waste). A Paddock to Plate perspective takes into account environmental sustainability considerations in the
development of initiatives and activities at each level of these key processes. It also seeks to develop partnerships with local Australian small-scale farmers in the development of initiatives and activities (Public Health Association of Australia (Campbell 2009; PHAA 2009).

Permaculture – According to the Permaculture Research Institute of Australia, ‘Permaculture is the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems. It is the harmonious integration of landscape and people — providing their food, energy, shelter, and other material and non-material needs in a sustainable way. The philosophy behind permaculture is one of working with, rather than against, nature; of protracted and thoughtful observation rather than protracted and thoughtless action; of looking at systems in all their functions, rather than asking only one yield of them; and allowing systems to demonstrate their own evolutions’ (Permaculture Research Institute 2017, p. 1).

Primary Care Partnership – Primary Care Partnerships ‘are established networks of local health and human service organisations working together to find smarter ways of making the health system work better, so that the health of their communities is improved’ (Victorian Primary Care Partnerships 2016, p. 1).

Slow Food – Slow Food in this thesis is based on the definition provided by Slow Food Melbourne. The movement was ‘established in Italy in 1986, seeks to preserve local food traditions and reignite people’s interest in the food they eat – where it comes from, how it tastes and the impact of their food choices’ (Slow Food Melbourne n.d, p.1).

Sustainable Food System – the term sustainable food system refers to a food system that is both healthy and environmentally sustainable. It also encompasses social and economic dimensions ‘...that promote health — the current and future health of individuals, communities, and the natural environment’ (American Planning Association, 2010, p. 1).

Sustainable Food Systems Education – this term is also referred to as food systems pedagogy. The aim of Sustainable Food Systems Education (SFSE) is ‘to support post-secondary students across a range of disciplines in developing the knowledge, skills and dispositions to effectively address complex challenges in the food system’ (Valley et al. 2007, p. 1). Through SFSE graduates are said to ‘engage in collective action towards transforming the food system’ (Valley et al. 2017, p. 1).
Systems thinking – systems thinking in this thesis was used as a guiding framework with the development of the research questions and methodology (section 3.3). It is also used to describe an approach used by practitioners to address food insecurity. ‘Systems thinking is aimed at understanding the underlying structure of the connections, not just the individual parts. It’s an approach that focuses on interactions, cycles, flows and patterns rather than characteristics of separate pieces’ (Chase & Grubinger 2014, p. 10).

Urban Agriculture – urban agriculture is based on the definition used by the FAO. ‘Urban and peri-urban agriculture (UPA) can be defined as the growing of plants and the raising of animals within and around cities. Urban and peri-urban agriculture provides food products from different types of crops (grains, root crops, vegetables, mushrooms, fruits), animals (poultry, rabbits, goats, sheep, cattle, pigs, guinea pigs, fish, etc.) as well as non-food products (e.g. aromatic and medicinal herbs, ornamental plants, tree products)’ (FAO 2017, p. 1).
**ABBREVIATIONS**

AHPA – Australian Health Promotion Association  
AIHW – Australian Institute of Health and Welfare  
ARIES – The Australian Research Institute in Education for Sustainability  
CALD – Culturally and Linguistically Diverse Groups  
CCA – Climate Council of Australia  
CSIRO – Commonwealth Scientific and Industrial Research Organisation  
CVD – Cardiovascular Disease  
DAA – Dietitians Association of Australia  
EfS – Education for Sustainability  
FAO – Food and Agriculture Association of the United Nations  
GMOs – Genetically Modified Organisms  
MA – Millennium Ecosystem Assessment  
NHPAC – National Health Priority Action Council  
NCDs – Non-Communicable Diseases  
NGO – Non-government Organisation  
OCHP – Ottawa Charter for Health Promotion  
PAR – Platform for Agrobiodiversity Research  
PHAA – Public Health Association of Australia  
SFSE – Sustainable Food Systems Education  
SOE – State of the Environment  
UN – United Nations  
UNDESD – United Nations Decade of Education for Sustainable Development
UNESCO – United Nations Environmental, Scientific and Cultural Organisation

USEPA – United States Environmental Protection Agency

WHO – World Health Organisation
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1 INTRODUCTION

The Global Footprint Network (2015, p. 1) asserts ‘humanity has been in ecological overshoot with annual demand on resources exceeding what the Earth can regenerate each year since the 1970s. It currently takes the earth one year and six months to regenerate what is used in a year’. Across the globe, the entire food system from production through to consumption is contributing significantly to this ecological overshoot, impacting heavily on the health of people and the planet (Caraher & Coveney 2004; Clay 2011; Gaballa & Abraham 2008; Lang 2009; Lenzen & Murray 2001). Research has demonstrated that the current food system is unsustainable with ecosystems becoming increasingly degraded (Nellemann et al. 2009; Edwards 2011; Food & Agriculture Organisation of the United Nations (FAO) 2013; Lawrence et al. 2012; Sheridan et al. 2016). Ecosystem degradation presents a significant challenge for food security, and consequently, human health. The Millennium Ecosystem Assessment (MA) (2005) demonstrated that the continued production of food is underpinned by a healthy, flourishing ecosystem. If ecosystems continue to be degraded, there will be a decrease in the production of food at global and national levels (Ericksen et al. 2009; Foley et al. 2005; MA 2005; Tilman et al. 2002). Under these circumstances, human health will be compromised as access to fresh, healthy food is a requirement for optimal health and wellbeing (Ericksen et al. 2009; MA 2005; Wilkinson & Marmot 2003; World Health Organisation (WHO) (2016).

Within the health promotion sector, addressing food security for at-risk groups is a common activity for ensuring optimal health for vulnerable populations (Booth & Smith 2001; McIntyre 2003; Wilkinson & Marmot 2003; Story et al. 2008). At the same time, it has been recognised by leaders within the field of health promotion that environmental sustainability underpins the health and wellbeing of populations (Brown et al. 2005; Hancock 2000; Macdonald 1992; Parkes & Horwitz 2009; Talbot & Verrinder 2010). Stable ecosystems and sustainable use of resources, for example, have been acknowledged as pre-requisites for health since the development of the Ottawa Charter for Health Promotion (OCHP) in 1986 (Kickbush 1989b; WHO 1986). What appears to be lacking, however, is the embedding of environmental sustainability frameworks within health promotion practice, including action around food security (Friel 2010; Hanlon & Carlisle 2008; McMichael 2006; Public Health Association Australia (PHAA) 2009; Talbot & Verrinder 2010; von Schirnding 2002).
Literature has indicated that the health promotion sector continues to address food security from a food availability and food supply approach within a social determinants framework (Caraher & Coveney 2004; Neff et al. 2009; PHAA 2012). Although this perspective is critical for addressing the complex social and economic factors contributing to food insecurity (Booth & Smith 2001; Meedeniya et al. 2000; Riches 2011; Walker et al. 2010), environmental determinants are generally not considered (PHAA 2009; Story et al. 2009). Thus, it could be argued that food insecurity remains a significant issue within Australia.

Reports from Australia’s emergency food relief providers indicate that an estimated 2 million Australians are food insecure (Food Bank 2014; Food Bank 2016; Second Bite 2014). In addition, food insecurity is rising within Australia, as evidenced by Australia’s largest emergency food relief provider, Food Bank. Food Bank (2014) indicate being unable to meet the current demand for food, as well as facing increasing demand for food each year.

Accordingly, an understanding of the environmental determinants of health have been suggested to compliment health promotion practice, including food security. An environmental determinants framework, which also includes an environmental sustainability perspective recognise that a healthy food supply now and into the future relies on the preservation and enhancement of ecosystems (Ackerman-Leist 2013; Kickbush 2011; Pinstrup-Andersen & Pandya-Lorch 1998; Pretty 2000). Such an approach captures the idea that food security is dependent on a food system that is environmentally sustainable at all levels from production, processing, distribution and consumption through to waste (Beddington et al. 2012; PHAA 2009; Story et al. 2009; Tansey & Worsley 2008; United Nations Taskforce on Global Food Security 2012).

Supporters of environmental sustainability within health promotion practice argue that it must be incorporated at two levels: 1) at the practitioner level (Brown et al. 2005; Rayner & Lang 2015; Talbot & Verrinder 2010); and 2) within tertiary education (Brown et al. 2005; Rayner & Lang 2015; Talbot & Verrinder 2010). At the practitioner level, Hamm (2008) argues that current strategies for assuring current and future food supply need to be reconsidered, moving from a sufficiency/excessiveness model to a perspective where preservation of the natural environment is prioritised. Caraher and Coveney (2004) also argue for health promoters to be furnished with the skills to be able to create alliances and advocacy, develop public policy that addresses the ecological aspects along the entire food system, and create an approach based on ‘food citizenship’ among the community rather than a model based on food
consumerism (e.g. promoting healthy eating). Within higher education, an environmental sustainability framework is said to provide graduates from health based disciplines with a more holistic understanding of the complexity surrounding significant health issues (such as food security) (Brown et al. 2005; Talbot & Verrinder 2010).

Despite these calls for a reorientation of health promotion practice and tertiary education to address significant health issues (such as food insecurity) from an environmental perspective, there appear to have been few studies undertaken to explore whether the Australian health promotion sector is responding to these calls for change. Literature from public sources, including policy and strategy directives within community level organisations and local government indicate the use of environmental sustainability considerations; however, there is a lack of detail and depth of information about the extent of such change. Two research studies undertaken by Patrick and Capetola (2011) and Patrick and Kingsley (2016) concluded that the Australian health promotion sector is attempting to address environmental sustainability issues. These two studies, however, did not specifically explore whether the Australia health promotion sector was incorporating environmental sustainability considerations to address food security. Publications by Patrick and James (2011) and Patrick et al. (2012) indicate that the health promotion sector already has a core set of competencies to address environmental sustainability issues. Patrick et al. (2012), however, indicate that additional competencies and frameworks (i.e. understanding of ecological footprint and environmental justice) is also required to work effectively on environmental sustainability issues. There appear to be no existing studies, however, undertaken to explore the specific competencies health promotion practitioners require to address food security from an environmental sustainability perspective.

The need for environmental sustainability considerations to address food security is supported by Food Secure Canada (2011), Parfitt et al. (2013) and Wahlqvist (2015). Tagtow and Harmon (2009) state that a new generation of practitioners (including those in health) is required – practitioners who can address food security through an ecological approach and thus ensure future food security. Clearly this has implications for education, including Australian health promotion degrees.

It is evident that tertiary programs that address food security through an environmental sustainability perspective are few within Australia, including within health promotion degrees (William Angliss 2015). The importance of integrating environmental sustainability
frameworks within health promotion tertiary education, internships, and research agendas to address significant health issues (such as food insecurity) has been highlighted by several experts in the field (Brown et al. 2005; Rayner & Lang 2015; Talbot & Verrinder 2010). One potential teaching and learning approach to achieve this end is Education for Sustainability (EfS), which has been recognised as a model to achieve transformation within societies towards environmental sustainability (Cotton et al. 2009; Holdsworth & Thomas 2015; Leihy & Salazar 2011; Scott et al. 2012; Tilbury & Wortman 2004). EfS contends that for systems level change to occur, graduates must acquire a change in attitudes, values and behaviours in addition to knowledge (Bonnett 2002; Holdsworth & Thomas 2015; Parker & Wilding 2012; Shephard 2008; Tilbury & Wortman 2004). A search of the literature indicates that there have been no studies undertaken to ascertain the applicability of the EfS approach to address food insecurity. The majority of the literature focuses on EfS more generally (Beynaghi et al. 2015; Cotton et al. 2009; Holdsworth & Thomas 2015; Leihy & Salazar 2011; Scott et al. 2012; Tilbury & Wortman 2004). Moreover, the potential use of EfS within Australian health promotion degrees to develop student competencies and a shift in mindset towards environmental sustainability approaches to address food insecurity has not been explored. Two papers by Masterman-Smith et al. (2010) and Patrick et al. (2012) indicate that EfS has been incorporated within some health science and health promotion units; however, these are not specific to food security.

This study addresses current knowledge gaps through exploring the potential role of the health promotion sector in addressing food security from an environmental sustainability perspective. The study was undertaken in Australia and sought the views of health promotion practitioners who were integrating environmental sustainability considerations within food security initiatives. In addition, the study invited health and sustainability academics throughout Australia to discuss their experiences with utilising the Education for Sustainability approach to address food security within teaching programs. Document analysis was undertaken of associated units and courses that academics discussed within the interviews.

This thesis begins with a literature review (Chapter 2) that provides an overview of the issues inherent within the industrialised food system, its impacts on ecosystems, human health and ultimately food security. The literature review then demonstrates the need for environmental sustainability considerations within the current food system to address food insecurity and the role of health promotion at the practitioner and tertiary education level in achieving this goal.
Chapter 3 discusses the theoretical underpinnings of the research, including its suitability for framing the research study. Presented in Chapter 4 is the study Methodology. A mixed methods approach combining quantitative (online survey) and qualitative (interviews and document analysis) inquiry through a pragmatic framework was used to guide this study. A discussion of the limitations of the study are also included in Chapter 4. The researcher has included a chapter on reflexivity to demonstrate its importance in mixed methods inquiry and for the current study (Chapter 5). The findings from the quantitative and qualitative research are then presented in Chapter 6. A discussion of the findings is then presented in Chapter 7. The conclusions and implications follow in Chapter 8 and form the basis for a set of recommendations for an alternative approach within health promotion practice and tertiary education degrees. Chapter 8 provides a discussion on what future research could be undertaken to enhance knowledge in this area.
2 LITERATURE REVIEW

2.1 Health Promotion’s response to the challenges of food security

Healthy eating, food and nutrition have been recognised as key components of public health and health promotion (Baum 2008; Desjardins et al. 2002; VicHealth 2013; Webb 2008; Wilkinson & Marmot 2003). From the 19th century, an environmental health perspective was introduced in relation to food production, handling and retailing in many parts of the developed world (Baum 2008). This approach focused on food safety standards and guidelines, educational programs, food and premises audits and enforcement of laws (Desjardins et al. 2002). In the late 1970s and 1980s public health and health promotion moved into the sphere of nutrition education using a ‘lifestyle’ approach, targeting individual behaviour to improve nutrition outcomes (Desjardins et al. 2002; Baum 2008). The focus also shifted towards the prevention of chronic diseases as these became more prevalent in the community (Desjardins et al. 2002). In 1980, Nutrition Australia introduced the Healthy Eating Pyramid to address nutritional imbalances and over consumption (Wahlqvist 2011). During the 1980s when the Ottawa Charter for Health Promotion (OCHP) was developed and the significance of social and economic determinants were acknowledged, a determinants of health approach was developed and adopted (Wilkinson & Marmot 2003; WHO 1986). A determinants approach recognised that social and economic factors contributed to diet and food supply (Wilkinson & Marmot 2003).

At the same time, it became clear that those who were food insecure would not pay attention to educational messages on healthy eating if they had insufficient food to eat (Wahlqvist 2011). At the World Food Conference in 1974, which was held in response to the severe famine in Bangladesh, the focus on food security was limited to food supply, as it was believed that assuring the availability and price stability of basic foodstuffs at the international and national level would be adequate (FAO 2006). Subsequent meetings, however, revealed that this was not sufficient, as food insecurity was still problematic (FAO 1996). As a result, methods to address food security have evolved over the years to include strategies that address food security at the household and individual level as well as tackling social and economic factors that influence food security (FAO 2006; Shaw 2007). According to Desjardins et al. (2002) a determinants of health paradigm broadened the issue of food security in the public health sector. It was then recognised that multiple influences can affect food security such as: social isolation and exclusion, poverty and income security, access to
healthy, culturally appropriate food and food preparation and literacy skills (Desjardins et al. 2002; Wilkinson & Marmot 2003). In 2003 the FAO emphasised that food security was more than the provision of nutrition and energy, but that food also had important social, cultural, symbolic and political aspects (FAO 2003). A reconceptualization of food security was based on the revised definition that was developed and agreed to by governments across the world at the World Food Summit in 1996 (FAO 1996):

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO 1996, p. 1).

Inherent in this definition are four overarching pillars or dimensions that stipulate the conditions required for food security: availability, access, utilisation and stability (FAO 2006). Food availability refers to the physical ‘availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports’ (FAO 2006, p. 1); food access denotes the ability for communities to access food that is safe, affordable, culturally acceptable and nutritious and is available within walking distance or public transport (Wood 2001); utilisation ‘refers to one’s access to cooking equipment and the ability to safely prepare food’ (McKay & Dunn 2015, p. 344); stability refers to the continuous availability and access of food by individuals (FAO 2006).

In Australia, the field of health promotion utilises this definition and four dimensions within food security and policy development as common practice (McKay & Dunn 2015; Nolan et al. 2006; Rosier 2011). Food availability, for example, is most often addressed through emergency food relief or school breakfast programs (VicHealth 2011). Criticism, however, has ensued regarding the current definition of food security. Rosset (2003, p. 1) argues that food security has been stripped of real meaning, contending ‘food security means that every child, woman, and man must have the certainty of having enough to eat each day; but the concept says nothing about where that food comes from or how it is produced’. De Schutter and Frison (2016) concur with Rosset (2003) regarding the current definition and dimensions of food security.

The way we define food security and the way we measure success in food systems tends to reflect what industrial agriculture is designed to deliver... Measuring the yields of specific crops, or productivity per worker, tends to favour large-scale
It could be argued that the current definition and four dimensions of food security contrast with health promotion’s core tenets of practice and values which are raised in the OCHP. The OCHP subscribes to ‘caring, holism and ecology as essential issues in developing strategies for health promotion’ (WHO 2016, p. 2). The OCHP also recognises environmental sustainability and food as prerequisites for health (WHO 1986). It could be argued that a lack of reference to these core elements (caring, holism, ecology) within the dominant definition of food security has resulted in few health promotion initiatives that address food security adequately. This is evidenced by the rising prevalence of food insecurity in Australia.

2.1.1 Food insecurity in Australia

According to the New South Wales (NSW) Centre for Public Health Nutrition (2003, p. iv), food insecurity can consist of one of the following: ‘not having sufficient food; experiencing hunger as a result of running out of food and being unable to afford more; eating a poor quality diet as a result of limited food options; anxiety about acquiring food; or having to rely on food relief’. Although it has been acknowledged that food insecurity affects millions of people in developing nations (estimates are 795 million people) (FAO et al. 2015; Horlings & Marsden 2011), food insecurity is also pervasive in many developed nations, including Australia. Reports by Australia’s largest emergency food relief providers indicate an estimated 2 million Australians are food insecure, with half of them children (Food Bank 2014; SecondBite 2014). According to Food Bank (2016, p. 7) ‘food insecurity in Australia is hitting a crisis point’.

Food Bank (2016) also reports that 75 percent of agencies have experienced an increased demand for food relief between 2015 and 2016 with many not being able to meet the demand (Food Bank 2016). Food Bank (2014) also reports the distribution of approximately 24.8 million kilograms of food to agencies in 2012-13, a significant increase compared with the 5 million that was distributed in 2003-04 (Food Bank 2013). Other agencies such as SecondBite (2014) report distributing 5.2 million kilograms of food in 2013-14 and supporting 1,179 food programs Australia wide, while OzHarvest (2014) redistributed 2.5 million kilograms of food and supported 678 charities throughout Australia in 2014.
These trends in rising demand for food relief are consistent with research that demonstrates increasing stress for low-income groups relating to basic costs of living (including food). Food Bank (2016) reports that the majority of people (72%) seeking emergency food relief are from low income households or are unemployed. This is also supported by Anglicare (2012, p. 12) which states that, ‘of all socio-demographic characteristics of food-insecure people, lack of income predominates’. Other commentators such as Foley et al. (2010), Lee (2011) and Rosier (2011) also support the notion that food insecurity is more prevalent in low income households.

In addition to low income households, other at-risk groups for food insecurity include those with mental illness, homeless people, those living with a disability, those living in a single-parent household, indigenous people, the aged, people who have compromised health, women, children and young people, asylum seekers/refugees and culturally and linguistically diverse groups (CALD) (Anglicare 2012; Booth & Smith 2001; Burns 2004; Foley et al. 2010; Lindberg et al. 2015; Rosier 2011). Although food insecurity is more prevalent among at-risk groups, peer reviewed literature also demonstrates that the factors within neighbourhood and community settings can increase the risk of food insecurity among these vulnerable populations. Some of these settings are captured in Figure 1.

**Figure 1. Determinants of Food Security**

![Determinants of Food Security Diagram](image)
A lack of access to nutritious food due to cost or resources (e.g. transport), poor access to nutritious food outlets due to distance and/or remoteness, and quality and variety of food within stores are critical factors (Foley et al. 2010; Lee et al. 2011; Lindberg et al. 2015; Nolan et al. 2006; Rosier 2011). In addition, individual factors such as lack of knowledge about preparation or cooking of nutritious meals, or lack of motivation or time, increase the risk of food insecurity (Foley et al. 2010; Nolan et al. 2006; Rosier 2011). Furthermore, those who are food insecure are typically obtaining foods that are largely poor in nutrient quality, which in many cases is resulting in deficiencies (PHAA 2009; Pretty 2000). Although this is due in part to the unaffordability of fresh food, the PHAA (2009, p. 5) believes that this is also a result of a food supply chain that is ‘overly abundant and skewed to inappropriate and overly processed foods, high in sugar, fat and salt’. One example is the prevalence of fast food outlets in low socio-economic areas (Reidpath et al. 2002). Pretty (2000) also supports this view, stating that having both an adequate and an appropriate food supply is a necessary condition for eliminating food insecurity.

Paradoxically, the world including Australia is facing an obesity epidemic (Elinder 2005; Kickbush 2011; Thorburn 2005). According to Caraher (2009, p. 3), ‘the groups who were previously hungry and ill-fed have become the overweight and obese, due to a new and complex shifting interaction of environment and ecology’. Approximately 60 per cent of the Australian adult population were overweight or obese in 2011 and 25 per cent of children were overweight (Australian Institute of Health & Welfare (AIHW) 2016). It has been noted that overweight and obesity are precursors for food insecurity and vice versa, although the association is more complex than first thought (Bhattacharya et al. 2006; Eisenmann et al. 2011; Franklin et al. 2012; Laraia 2013; Ramsey et al. 2012). According to Ivers and Cullen (2011, p. 1741S) weight status and obesity studies among women produce varied results. For example, one study in the United States of America (USA) indicated no significant differences in the percentage of women ‘who gained a clinically significant amount of weight, based on food-insecurity status’ (Ivers & Cullen 2011, p. 1741S). Other studies, however, indicate a causal association between food insecurity and obesity among women (Franklin et al. 2012).

The Australian Institute of Health and Welfare (AIHW) (2016) also indicate that overweight and obese adults and children have a greater risk of developing chronic diseases including type two diabetes, coronary heart disease, stroke, kidney disease, musculoskeletal conditions, some cancers and mental health issues. In many cases, countries including Australia are
facing dual health problems, managing hunger and malnutrition on the one hand and battling health issues associated with obesity on the other (Elinder 2005; PHAA 2009; Kickbush 2010; Tanumihardjo et al. 2007). Figure 2 demonstrates the food insecurity-obesity paradox and related health issues.

**Figure 2. Food insecurity-obesity paradox**

![Food insecurity-obesity paradox diagram](image)

The long and short term effects of food insecurity on the development of physical, mental, social and spiritual health of adults and children have been documented in the literature. Research indicates that children who are food insecure generally have poorer academic achievement including impaired cognitive functioning, lower school test scores, repeating grades in school, absenteeism, tardiness and school suspension (Anglicare 2012; Jyoti et al. 2005; Rosier 2011). In addition, such children demonstrate psychological and behavioural issues such as aggression, hyperactivity, anxiety and passivity (Anglicare 2012; Melchior et al. 2012; Whitaker et al. 2006). Mental health implications are also apparent among food insecure adult population groups, however, the literature is unclear regarding the pathway. According to Siefert et al. (2004) the majority of studies indicate that long term food
insecurity leads to mental illness (i.e. anxiety, depression and poor self-rated health). With regards to women, however, the direction and causality between mental health and food insecurity is unclear. According to Ivers and Cullen (2011) evidence suggests that food insecurity among women can also be a result of pre-existing mental illness such as anxiety and depression.

Physical health implications are also indicated among adults and children alike. International studies indicate that food insecure groups have higher frequencies of chronic disease than food secure groups, such as type two diabetes, chronic heart disease and some cancers (Booth & Smith 2001; Laraia 2013; Seligman et al. 2010; Tarasuk et al. 2013; Turrell & Kavanagh 2005). According to Laraia (2013) food insecurity may also compound the challenges adults and families with existing chronic health conditions have. Commentary also indicates that some adults who are food insecure also experience nutrient inadequacies and malnutrition at higher rates than food secure groups (Laraia 2013; Muldoon et al. 2013). In addition, poor nutrition of mothers during pregnancy is associated with low birth weight and an increased risk of diabetes and coronary heart disease for those children later in life (Laraia 2013; Wahlqvist 2011).

Although there is significant commentary regarding the impacts of food insecurity on health and wellbeing (Booth & Smith 2001; Rosier 2011; Turrell & Kavanagh 2005), there appears to be minimal discussion within health literature regarding the impacts of the ‘western diet’ on food insecurity. A ‘western diet’ in this thesis is characterised by highly industrialised meat production, processed food high in sugar, trans fats, salt and hydrogenated vegetable oils as well as processed refined grain and wheat products such as white flour (Cordain et al. 2005; Carrera-Bastos et al. 2011). This involves a move away from traditional diets where food was sourced locally and based on whole foods that were predominantly of plant origin or meat from wild animals (Cordain et al. 2005; Lindeberg 2012).

Research, however, demonstrates that chronic health conditions (e.g. heart disease, bowel disorders which are associated with ‘western diets’) increase ‘the odds of household food insecurity independent of household sociodemographic characteristics’ (Tarasuk et al. 2013, p. 1785). An increased risk of household food insecurity is often due to reduced labour force participation among those with chronic health conditions. The AIHW (2009), for example, demonstrates that an increasing number of Australians with chronic disease are not able to participate in the work force, are less likely to be employed full-time, and more likely to be
unemployed than those without chronic disease. Food insecurity among these groups can therefore become a reality where, according to Food Bank (2013), forty percent of people seeking food relief in Australia are those who have compromised health. Figure 3 demonstrates the relationship between western diets and food insecurity.

**Figure 3. The relationship between western diets and food insecurity**

Another important factor contributing to food insecurity in Australia, is the current industrialised food system. Although minimally discussed within health promotion literature, the industrialised food system is associated with ecosystem degradation (FAO 2013; Nellemann et al. 2009). The literature indicates, however, that flourishing ecosystems are a pre-requisite for food security and subsequently human health (including chronic disease prevention) (MA 2005). Figure 4 demonstrates that ecosystems provide essential provisioning services (i.e. food) and that access to such services provides the constituents for wellbeing (e.g. food security, sufficient nutritious food, health and good social relations).
The following section will discuss some of the implications of the current industrialised food system for food security and ecosystems. In recognising these implications, the literature review will demonstrate the need for environmental sustainability considerations to be integrated within health promotion practice and education.

### 2.2 The industrialised food system

Similar to other developed nations, the majority of Australia’s agricultural farmland is currently managed using an industrialised process to produce food (Mason & Knowd 2010; Oosterveer & Sonnenfeld 2012; Pritchard 2005). This model of agriculture was slowly introduced throughout the developed world during the 18th and 19th centuries and became widespread by World War II, including within Australia (Federico 2005; Hesterman 2012; Lang & Heasman 2015). Industrialised agriculture relies on chemical inputs (e.g. pesticides, fertilizers), large scale monocrops and high-tech machinery, crop genetics and animal intensification systems to produce food (Hesterman 2012; Lang & Heasman 2015; Oosterveer & Sonnenfeld 2012). Since the inception of industrialised agriculture there has been great progress. McMichael et al. (2007) note: large increases in food production; improvements in maternal and child nutrition in high-income populations and groups;
increased health and life expectancies; year-round access to healthy foods for many populations due to refrigeration, transport and open markets. According to the Union of Concerned Scientists (n.d) industrialised agriculture was hailed as a technological breakthrough for producing food of mass quantities to feed a rapidly expanding population.

Despite great progress, the entire food system from production through to consumption is impacting negatively on the health of people and the environment (Federico 2005; Hesterman 2012; Lang & Heasman 2015; Tansey & Worsley 2008). Figure 5 provides a basic model of the current industrialised food system. It provides a pictorial of the key processes as well as inputs and externalities that take place within most industrialised food systems.

**Figure 5. The Industrialised Food System**

![Diagram of the Industrialised Food System](image)

(New Hampshire Food Alliance n.d, p. 1)

According to the WHO (2003, p. 1) ‘food and food products have become commodities produced and traded in a market that has expanded from an essentially local base to an increasingly global one’. The food system in most developed countries including Australia is

It could be argued that an industrialised food system contrasts with the basic tenants within the OCHP. The OCHP ‘reconceptualised health as a “resource for living”’ and shifted the focus from disease prevention to “capacity building for health”’ (Kickbush 2003, p. 384). The OCHP ‘stresses the importance of enabling people to achieve their full health potential’ (Baum 2008, p. 36) and has a strong emphasis on participatory processes that enable and empower people (Dixey 2013; Gregg & O’Hara 2007). This emphasis on empowerment has important implications, as Farrant (1994, p. 15) states that empowerment processes imply, at the very least, ‘acknowledging inequalities in power, ownership and control and vested interests in maintaining inequalities’. The OCHP also recognises that a stable ecosystem and sustainable use of resources are prerequisites for health (Baum 2008; WHO 1986).

Section 2.3 – 2.8 discusses some of the issues presented above to demonstrate the implications of the industrialised food system for ecosystems, food security and subsequently human health. According to Caraher and Coveney (2004, p. 595), ‘… health promotion [has] concentrated on the later aspects of the food chain when food reaches people and as it enters their mouths. In short, we need to move our focus from ‘post-swallowing’ food and nutrition interventions to ‘pre-swallowing’ conditions’. This section will be structured using the key processes in Figure 5 (i.e. Food Production and Harvesting, Processing and Manufacturing, Distribution and Access, Consumption and Waste) to demonstrate some of these impacts.
2.3 Industrialised food production and harvesting – implications for the environment, food security and human health

Industrialised food production methods have been criticised for their impact on the environment (including ecosystems and biodiversity), food security and subsequently human health (Nellemann et al. 2009; Parfitt et al. 2013). It has been acknowledged that the natural environment comprises the entire basis for food production through ecosystems, water, nutrients, soils, climate, weather and insects for pollination and controlling infestations (Nellemann et al. 2009). Industrialised agriculture within Australia, however, has led to extensive damage of all these essential services. The resultant effects have included extensive wind and water erosion, soil compaction and soil salinization as well as water pollution due to contaminant run-off from farms (Marx et al. 2014; Moss 2008; Rengasamy 2006; Saunders et al. 1991). Figure 6 demonstrates the cycle of soil and land degradation and threat to future food production. Within Australia, land degradation and water pollution present serious concerns for Australia’s future food supply as literature indicates a decline in available arable land throughout the nation (AIHW 2012; Lawrence et al. 2012).

Figure 6. The cycle of soil and water degradation within industrialised food systems

Significant loss of biodiversity has also resulted from industrialised agricultural practices around the world including Australia, such as loss of plant genetic resources, livestock, insects, soil organisms, native vegetation and fauna (FAO 1997; Munzara 2007; Thrupp 2000). According to the FAO (2004) 75 percent of plant genetic diversity has been lost as
farmers worldwide have transitioned from multiple local varieties to genetically uniform, high-yielding varieties (an issue referred to as genetic uniformity); 30 percent of livestock breeds are at risk of extinction; and 75 percent of the world’s food is generated from only 12 plants and 5 animal species, including rice, maize and wheat. Taken together, these changes are evidence of a loss of agrobiodiversity.

The significance of agrobiodiversity loss for food security has rarely been articulated within health promotion; however, literature demonstrates that biodiversity has supported human food production for thousands of years (Altieri 1999; FAO 1997; Nellemann et al. 2009; Thrupp 2000). According to Altieri (1998) and Gonzalez (2011) agrobiodiversity provides protection against climate and market fluctuations and outbreaks of disease and pests. Agrobiodiversity also contributes to resilience in farming systems, productivity and income generation (De Shutter & Frison 2016; Gonzalez 2011; Thrupp 2000). According to Frison et al. (2011, p. 245) agrobiodiversity would also improve micronutrient deficiencies in human populations, delivering ‘improved nutrition, with not only micronutrients but also other important components such as fibre, and hence better health’. A diversified and more balanced diet also ensures exposure to nutrients and bioactive non-nutrients which have antioxidant, anti-cancer and other beneficial effects (Frison 2016; Hunter et al. 2016). Thrupp (2000, p. 266), provides a detailed account of the value that agricultural biodiversity provides for food security (Table 1).

Table 1. Agricultural biodiversity as a basis for food production and food security

<table>
<thead>
<tr>
<th>Agricultural biodiversity</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic resources</td>
<td>Provide essential living materials of plants and animals.</td>
</tr>
<tr>
<td>Edible plants and crops</td>
<td>Supply traditional varieties of plants and crops, cultivars and hybrids.</td>
</tr>
<tr>
<td>Livestock</td>
<td>Provide a diversified protein diet including small and large lineal breeds or thoroughbreds and freshwater fish.</td>
</tr>
<tr>
<td>Soil organisms</td>
<td>Vital to soil fertility, structure, quality and health.</td>
</tr>
<tr>
<td>Naturally occurring insects, bacteria and fungi</td>
<td>Control insect pests and diseases of domesticated plants and animals.</td>
</tr>
<tr>
<td>Agroecosystem components and types</td>
<td>Indispensable for nutrient cycling, stability and productivity.</td>
</tr>
</tbody>
</table>


2.3.1 Industrialised food production and harvesting – implications for farming communities and food security

It has been argued that the adoption of neo-liberal philosophy within government economic policy has impacted significantly on rural communities and farmers (Lawrence et al. 2012). The basic tenet of neo-liberalism is that ‘the free market should determine all economic transactions… ensuring a ‘level playing field’ and promoting deregulation’ (Baum 2008, p. 87). The adoption of productivist farming (based on the principles of efficiency, rationality and minimal government support); the reduction of import tariffs; deregulation of the finance and banking sector; and removal of government support with regards to farm subsidies in the 1980s (Argent 2002; Dibden et al. 2009; Lawrence 1999; Vanclay 2003) are a few changes that have occurred since the introduction of neo-liberal philosophy (Lawrence 1999). It could be argued that the adoption of a neo-liberal approach has contributed in part to rising food insecurity in Australia. It has also impacted negatively on many rural communities and farmers in Australia and damaged ecosystems (Lawrence et al. 2012). The adoption of productivist farming will be used as an example to demonstrate the impacts of such changes on food security and farming communities.

Productivist approaches to farming that were adopted in the 1980s were based on the idea that intensive farming leads to increased food production, thus assuring food security in the population (Dibden et al. 2009). According to Altieri (2009) productivist farming is based on a misguided premise that small ecologically-based family farms are largely unproductive and backward. Conversely Boyce (2004), Nellemann et al. (2009) and Tscharntke et al. (2012) argue that small scale farming, has been the backbone of food security for many regions around the world.

Small-to-medium scale farms are thought to address the first goal of ‘food availability’ (as defined by the FAO definition of food security) through higher food yields than conventional large-scale farms (Altieri 2009). In addition, small farm holders have greater food sovereignty and thus food security. ‘Food sovereignty is the right of peoples to healthy and
culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems’ (Nyéléni 2007, p. 1). Food sovereignty and food security is achieved through: 1) possession of intimate knowledge of the diversity of crop varieties and species; knowledge of landscape, biota and ecological processes (Johns et al. 2013); and 2) having greater knowledge of working with various soil types and micro-environments (Amekawa et al. 2011; Johns et al. 2013). In addition, small farm holders assure a greater level of ecosystem protection and genetic diversity of species (which are fundamental elements of food security as outlined in section 2.2) (Amekawa et al. 2011; Boyce 2004). Large scale, industrialised production and harvesting, on the other hand, undermine fundamental health promotion goals with regards to food security through erosion of local and traditional cultures, knowledge and skills (in all aspects of cultivation as well as through loss of native seed varieties through hybridisation and other technological advancements, such as genetic engineering) (Amekawa et al. 2011; Hendrickson & James 2005; Frison 2016). Genetic engineering, another outcome of neoliberalism, has received increasing attention over the years with regards to its impact on food security, the environment and human health.

2.3.2 Genetic engineering and its implications for food security

Genetic engineering, also referred to as biotechnology, has been the subject of much debate over the years (Hails 2000; Jacobsen et al. 2013; Smith 2007; United Nations 2009). Although this is a complex topic, it is pertinent to raise its use as an issue for health promotion, including future food security. ‘Genetically modified organisms (GMOs) are the by-product of splicing genes from one species into the DNA of another’ (White 2011, p. 58). Proponents of GMOs claim that these foods are the only way to end hunger, to reduce the reliance on herbicides and pesticides and achieve future food security (Agricultural Biotechnology Council of Australia (ABCA) 2012; Borlaug 2000; Jauhar 2006; Reis et al. 2006; Weil 2008). It has also been claimed that biotech foods are safe and healthy for human consumption as well as the environment (Jauhar 2006; Lawrence et al. 2010; Reis et al. 2006; Weil 2008). According to Hilbeck et al. (2015) biotech firms have led the public to believe that scientific consensus exists on the safety and efficacy of GMOs. GMO foods are also often found in more processed foods (Antoniou et al. 2012), which are regular items consumed by food insecure groups (Booth & Smith 2001). It could be argued that exposure to such foods among at-risk groups, may intensify or exacerbate the poor health that many of these groups already have.
Table 2 outlines some of the issues raised by commentators concerned about the safety and efficacy of GMOs. Some of these concerns will be discussed below in relation to food security.

Table 2. GMOs and their impacts on the environment, food security and human health

<table>
<thead>
<tr>
<th>GMOs</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>• Development of “superweeds” and secondary pests which require further applications of herbicides and pesticides (Fagan et al. 2014).</td>
</tr>
<tr>
<td></td>
<td>• Reduction in agrobiodiversity due to increased pesticide and herbicide use (Mortensen et al. 2012).</td>
</tr>
<tr>
<td>Food security</td>
<td>• Loss of local and traditional knowledge systems, e.g. seed saving (de Melo-Martín &amp; Meghani 2008).</td>
</tr>
<tr>
<td></td>
<td>• Disempowerment of local communities and decision making in food systems (de Melo-Martín &amp; Meghani 2008).</td>
</tr>
<tr>
<td></td>
<td>• Intellectual property rights and patents of GM seeds resulting in fixed prices (Middendorf et al. 2000).</td>
</tr>
<tr>
<td>Human health</td>
<td>• Lack of long term epidemiological studies in humans (Antoniou et al. 2012; Hilbeck et al. 2015).</td>
</tr>
<tr>
<td></td>
<td>• Studies in animals reveal toxic effects and immunological reactions (Antoniou et al. 2012; Hilbeck et al. 2015).</td>
</tr>
</tbody>
</table>

Increased use of herbicides and pesticides within GMO farming systems has resulted in a reduction of agrobiodiversity (Antoniou et al. 2012; Mortensen et al. 2012). Agrobiodiversity (as outlined in section 2.3), however, underpins food security. A number of social and ethical impacts have also been identified since the inception of GMOs that have the ability to impact on health promotion goals for food security (e.g. availability of culturally appropriate food, social and economic access to sufficient, safe and nutritious food). Some of these are listed below and replicate the concerns expressed in section 2.3.1. They include: 1) the loss of knowledge with regards to small-scale traditional farming systems, i.e. seed saving (de Melo-Martín & Meghani 2008); 2) disempowerment of local communities and local decision making regarding local food and food systems (de Melo-Martín & Meghani 2008); and 3) intellectual property rights and patents of genetically modified (GM) seeds which result in
fixed prices and increased dependency of farmers on corporates for seed (Middendorf et al. 2000). In addition, de Melo-Martin and Meghani (2008) raise ethical concerns of GMOs such as ‘the increasing levels of ownership of the world’s food resources by a handful of corporations’. Hendrickson and James (2005) and Pretty (2007) also raise concerns of the increasing level of corporate ownership of food.

2.4 The implications for food security and the environment from the food processing and manufacturing sector

The industrialisation of the food system has also resulted in significant changes to the way food is processed. According to Kornelsen (2009) the 1920s and 1930s saw vast changes in food processing and manufacturing which incorporated labour rationalisation in which every dimension of work was reorganized to be more efficient, predictable and calculable. As a result of these changes, fewer local food processors within many nations, including Australia, exist today (Halweil 2002; Parfitt et al. 2013). It is now common for multinationals to dominate food processing and manufacturing (Dixon et al. 2007; Food & Drink Business 2016; Halweil 2002; Prime Minister’s Science Engineering and Innovation Council (PMSEIC) 2010b). The milk and meat processing sectors, for example, are each dominated by two major companies (Food & Drink Business 2016; Spencer & Kneebone 2012). A further two companies control more than half of the flour milling, bread and bakery markets in Australia (Parfitt et al. 2013).

Discussions within health promotion literature regarding the health impacts of food processing and manufacturing tend to focus on products that are generally high in sugar, salt and fat content (Monteiro 2008; Stuckler et al. 2013; Waxman 2005; Williams et al. 2003). Although challenging the impacts that processed foods have on human health has merit, there appears to be a substantial omission with regards to food security and the environmental and health implications of other key aspects of the food processing stage. The literature indicates that small, ecologically based local food producers and food processors bring health and vitality to communities through various social, economic and environmental pathways (Budge et al. 2010; Lyson 2005). They also contribute to food security, with health promotion literature indicating that culturally appropriate food is vital for food security (Lindberg et al. 2015; McKay & Dunn 2015; NSW Health 2003; VicHealth 2011). According to Lyson (2005, p. 96), ‘small, local food producers and processors are able to cater to local
tastes, meet the demand for varieties and products that are often unique to a particular region or locality’.

There is also potential for health promotion to address the dual issue of deskillling and unemployment that has arisen since the industrialisation of the food system (e.g. within food processing and manufacturing) (Halweil 2002; Hendrickson & James 2005). According to Blay-Palmer et al. (2013), Budge et al. (2010) and Martinez et al. (2011) skill transfer, development and employment are possible for communities that focus on local, self-sufficient food systems. Dixon et al. (2009) provide promising examples of urban agriculture and local food processing initiatives, food distribution centres, healthy food market services, and urban planning that provides for multiple modes of transport to food outlets. These initiatives have the potential to meet food security goals of ‘food availability’ and ‘food access’ through addressing the immediate need for food (e.g. exchange of labour for produce) and long term need of income and employment (Levkoe 2006; Lovell 2010; Golden 2013; Pearson et al. 2010). Other important health promotion priorities such as social capital and environmental sustainability could also be addressed through local, self-sufficient food systems. Budge et al. (2010) indicates that ‘local food systems and those that participate in them report enhanced levels of community participation, community wellbeing and social gains’. There are also potential environmental benefits including fewer greenhouse gas emissions associated with the transport and processing of food in a local community (Deelstra & Girardet 2000; Knowd et al. 2006; Lovell 2010).

2.5 The role of food distribution systems for food security and the environment

Distribution of and access to food are key areas within the current food system (Figure 5) and will be discussed in relation to their impact on food security and the environment in this section. Increasing access to healthy, fresh food is also a key health promotion priority to address food insecurity among at-risk groups (Burns & Inglis 2007; Kleparska & Reimers 2012; Story et al. 2008). A range of health promotion strategies are often utilised to increase access to fresh food for vulnerable groups; for example, increasing the number of grocery stores in a ‘food desert’, and/or reducing the cost of food or increasing the provision of emergency food relief to name a few (Butcher et al. 2014; Radcliffe et al. 2005; Story et al. 2008; Tsang et al. 2007). Although these are important strategies in meeting the immediate
needs of food insecure groups, there appear to be little discussion within health promotion regarding the source of such produce.

The term ‘food miles’ describes the ‘geographic distance food products are transported, between their cultivation, processing and the consumer at point of sale’ (Gaballa & Abraham 2008, p. 7). In Australia, for example, food is regularly grown in states such as Queensland or internationally (e.g. USA, Europe) and transported to other states such as Victoria to ensure a constant supply of fresh fruit and vegetables regardless of their seasonal or local availability (Gaballa & Abraham 2008). One of the factors fostering year-round available foods is consumer expectations. According to Colquhoun and Lyon (2001) and Freishtat (2007) consumers expect fresh foods to be available throughout the year, even if they are not in season in the region within which they live.

Although the convenience of year-round food has its benefits, there are health, environmental and food security implications associated with food miles. Health promotion literature indicates that food security is assured through readily accessible food that is fresh and of nutritional value (Innes-Hughes et al. 2010; Tasmanian Food Security Council 2012; VicHealth 2011). Although not conclusive, some literature indicates that some nutrients in fruit and vegetables are highly susceptible to nutrient loss through excessive transportation and storage (Barrett 2007; Bellows et al. 2003; Carey et al. 2011). A lack of evidence for nutrient loss, however, may in part be attributed to few studies that have been undertaken on this topic. Despite the lack of studies regarding nutrient loss of fresh fruit and vegetables, there are other identifiable benefits of local food production for food security and human health. Bellows et al. (2003), Budge et al. (2010) and McCormack et al. (2010) indicate that access to and consumption of fresh, healthy food is greater among populations that are involved with their local food system. Examples include involvement in community gardens, community supported agriculture and urban agriculture (Alaimo et al. 2008; Bellows et al. 2003; Graham et al. 2004; Quandt et al. 2013).

The lengthy distances in the food supply chain also contribute to disconnections between consumers and their food as well as consumers and farmers (O’Kane 2012; Renting & Van Der Ploeg 2001; Scrinis 2007). Scrinis (2007, p. 122) describes the ‘the availability of out-of-season imported fresh foods [which] creates a disconnection from local seasons and climatic conditions’. In addition, O’Kane (2012) states that urban consumers have become removed socially and physically from farmers and disconnected from nature, including how food is
produced. According to Levkoe (2006) these disconnections take place when eaters are defined primarily as consumers rather than food citizens (i.e. economic benefit takes precedence over food security, nutrition or health). The implications for food security include decreased food literacy and deskilled consumers who are increasingly reliant on industrial food products (Kornelsen 2009).

Accessing local food also reduces environmental impacts. Food miles can result in excess carbon dioxide emissions that contribute to climate change (which in turn exacerbates food insecurity) (section 2.8.2 for further discussion) (Dixon et al. 2009; Carey et al. 2011). Gaballa and Abraham (2008) and Carey et al. (2011) also state that dependence on other regions to provide fresh food reduces the resilience of the current food system if external events such as rising petrol prices or extreme natural weather events increase, for example, bushfires, storms and floods.

2.6 Consumption – the implications for food security and ecosystems

*All diseases begin in the gut – Hippocrates 460-370BC*

A ‘western diet’ (described in section 2.1.1) is one of the main factors contributing to the development of many chronic health conditions including diabetes, coronary heart disease, osteoporosis, cancer as well as rising obesity rates (AIHW 2016; WHO 2003). It could also be argued that the rise in chronic disease is exacerbating food insecurity among the population (discussed in section 2.1.1). In 2011 the UN held a high-level meeting calling for a sustained global movement on non-communicable diseases (NCDs), due to the increasing recognition that the world is at crisis point with regards to premature death and morbidity related to NCDs (Beaglehole et al. 2011). The AIHW (2016, p. 257) has expressed similar concerns to the UN:

...chronic diseases are the leading cause of ill health and death in Australia... [and] strategies to help reduce the impact of chronic disease and associated risk factors are a focus for all Australian governments.

In addition, healthcare costs due to the treatment of chronic conditions are rising each year. The AIHW (2016) reports spending of approximately $155 billion between 2013 and 2014, an increase of 3.1 per cent since 2003-2004. Although government expenditure on healthcare has improved the health and wellbeing of many, governments around the world including Australia have raised serious concerns about the sustainability of healthcare provision in the
future (AIHW 2016; Deloitte 2017; Organisation for Economic Co-operation and Development (OECD) 2015). An environmental sustainability response, however, within health promotion could address the multiple challenges of rising chronic disease, food insecurity and ecosystem degradation.

Although this thesis is not calling for a return to “simplistic” hunter-gatherer forms of food production and consumption, observing the diets of traditional peoples provides some important insights for health promotion action with regards to chronic disease prevention, food security and ecosystem protection. Carrera-Bastos et al. (2011) demonstrate that groups of people from hunter-gatherer and traditional societies exhibit superior health markers compared to their western counterparts, including a low incidence of chronic degenerative diseases such as type two diabetes, cardiovascular disease (CVD) and cancer. With regards to food security, Loring and Gerlach (2009) demonstrate that traditional Alaskan communities were food secure for millennia due to their close connection and knowledge of their community food system including the climate, landscape and weather. ‘This lifestyle connected Alaskan natives in physical and cultural ways to the land and wildlife, through activities such as food sharing and shared food preparation… [Alaskans] were also secure in the knowledge that they had access to foods that were abundant, available and healthy’ (Loring & Gerlach 2009, p. 467).

Food security and superior health of traditional societies, however, are not only attributed to the types of foods consumed. According to Hertz and Gibson (2007) and Lipski (2010) extensive knowledge of local foods, combined with appropriate preparation and preservation methods to enhance nutrient availability and an understanding of the types of foods that serve to provide medicinal qualities, are all contributing factors. The following quote demonstrates this point.

*Traditional and indigenous peoples lived in harmony with nature and based their food choices, hygiene practices, medicine, and lives on nature. Food and medicine were interwoven. All cultures used special or functional foods to prevent disease. Food could be used at different times either as food or medicine. Foods, cultivation, and cooking methods maximized community health and well-being. With methods passed down through generations, cooking processes were utilized that enhanced mineral and nutrient bioavailability (Lipski 2010, p. 585).*
Fermentation, soaking, sprouting and other traditional methods were some of these common practices that were utilised throughout the world (Battock & Azim-Ali 1998; Hortz & Gibson 2002; Kabak & Dobson 2011; Quave & Pieroni 2014). Traditional methods of food preparation and preservation contribute to food security through: 1) consistent provision of food that requires minimal processing and refrigeration (Battock & Azim-Ali 1998); 2) enhancing the nutritional content of food (Hortz & Gibson 2002); and 3) developing and/or maintaining ‘local knowledge concerning environmental resources involved in food production’ (Quave & Pieroni 2014, p. 29). These traditional methods can also lead to reduced food waste (Quave & Pieroni 2014) which is a significant factor in food insecurity (section 2.7). The traditional preparation method of fermentation will be used to demonstrate the potential for food security using the four pillars discussed by the FAO (Table 3).

Table 3. Food security pillar and fermentation

<table>
<thead>
<tr>
<th>Food security pillar</th>
<th>How fermentation process contributes to food security pillar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food availability</td>
<td>“Waste” foods can be salvaged for consumption</td>
</tr>
<tr>
<td>Access</td>
<td>Local wild resources can be detoxified and modified into nutritious foodstuffs</td>
</tr>
<tr>
<td>Utilization</td>
<td>Potable beverages can be created</td>
</tr>
<tr>
<td>Stability</td>
<td>Shelf-life of homemade foods can be increased for use during periods of seasonal food insecurity</td>
</tr>
</tbody>
</table>

(Quave & Pieroni 2014, p. 40)

Some of these food preparation methods can also provide positive environmental and economic benefits through the reduced need for refrigeration (Battock & Azim-Ali 1998). The PHAA (2009, p. 9) supports the idea of reducing the environmental impact of food through reduced refrigeration, stating that ‘food policy needs to include actions to reduce dependency on refrigeration through local food production, more appropriate food choices, improved food literacy and effective food storage techniques’.

The industrialisation of the food system, however, has resulted in deskilling of preparation and cooking aptitude in most households, including Australia (Kornelsen 2009). According to Scrinis (2007, p. 122) the global agri-food system has resulted in ‘a decline in home-based food production...the shift from unprocessed whole foods and home prepared meals to
increasingly processed, prepared and convenience foods... the loss of traditional and locallydistinct foods, cuisines and farming practices... and a decline of cooking and food preparation skills’. Kornelsen (2009) states that most consumers do not know how to preserve or store food, cannot create traditional dishes and lack holistic nutritional knowledge or understanding of the social and environmental impacts of food choices. These commentators also argue that an understanding of these key aspects of food preparation and the food system contribute to food security and food sovereignty (Kornelsen 2009; Scrinis 2007). Such knowledge would also contribute to health promotion goals since preparing and cooking healthy meals has been a significant activity within food security initiatives (Tasmanian Food Security Council 2012; VicHealth 2011).

2.6.1 Industry influences on consumption and food policy

It has been argued that food industry has a vested interest within public health policy (including health promotion) around healthy eating and nutrition. (Caraher & Coveney 2004; Katan 2007; Lesser et al. 2007; Nestle 2013). Industry influence has been reported by Stanton and Scrinis (2005) and Simon (2015) who critique the involvement of Meat and Livestock Australia in the development of initiatives such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO) wellbeing diet and Healthy Weight Week, due to the large emphasis on meat consumption. It has also been suggested that the food industry may be implicated within nutrition and health research, such as the reporting of more favourable results of food and beverages that involve industry sponsorship (Bes-Rastrollo et al. 2013; Katan 2007; Lesser et al. 2007). Simon (2015) also questions food industry involvement (including Meat and Livestock Australia, Nestle and Unilever) within professional associations, such as the Dietitians Association of Australia (DAA). Similar concerns have also been raised within health promotion, including the power of the food industry to influence health promotion activities and food policy (Caraher & Coveney 2004).

Critics of food industry involvement in the public health arena also highlight the development of dietary guidelines that reinforce eating habits that have large social, health and environmental impacts. Lang et al. (2010, p. 2), for example, note that ‘official dietary recommendations in many developed countries still advise populations to consume at least two portions of fish a week, without reference to fish stocks being at best under stress or at worst in terminal decline’. According to Selvey and Carey (2013, p. 18), ‘to meet these recommended intakes, fish consumption in Australia would need to increase by 40 percent’.

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Dietary recommendations of fruit and vegetable consumption also do not take into account seasonal variation or the carbon footprint from food transported large distances (Hamm 2008; Lang et al. 2010; Selvey & Carey 2013). Although there has been opportunity to align current Australian dietary guidelines towards ecological values, according to Carey et al. (2016), revision of the current Australian dietary guidelines which was completed in 2013 failed to consider the environmental sustainability implications of current food production. The environmental impact of food production and consumption, however, will continue to threaten future food supply if not taken into consideration (Hamm 2008; Selvey & Carey 2013).

2.7 Food waste – implications for food security and ecosystems

A report written by Gustavsson et al. (2011) for the FAO estimates that around 1.3 billion tonnes of food is lost or wasted annually on a global scale. Food waste occurs at all levels of the food system, from the farm or pond, during transportation of food to the supermarket and at home (Eascaler & Teng 2011; Larsen et al. 2008; Mason et al. 2011). For example, the food and drink manufacturing and processing sectors in the United Kingdom (UK) produce an estimated 20 per cent or 3.2 million tonnes of food waste per year (Foresight 2011). Figures are unavailable for Australia due to the resistance of food manufactures to share information on the quantity and type of waste they generate (Morgan 2009). This should flag concern for public health as excessive food loss at all stages of the food system has potential implications for food security (Lipinski et al. 2013). Food waste due to aesthetic standards demonstrates this point well.

It has been established that food waste can result from aesthetic standards imposed by retailers and the food industry (Bariacto & Di Nunzio 2014; Garnett 2006; Larsen et al. 2008; Mason et al. 2011). According to Garnett (2006) and Mason et al. (2011), retailers and the food industry can impose restrictive guidelines on food producers regarding the size, shape and appearance of food. This often results in excessive food waste and economic loss for farmers. Garnett (2009), for example, reports 10-30 percent of strawberries and 19 percent of organic carrots in the UK are considered inappropriate for supermarket sale as they do not meet retail standards in appearance and size. Food waste due to aesthetic standards, however, places increased pressure on ecosystems to produce food and hence threatens future food security. According to Gille (2013), ‘food left on the farm unharvested, or food abandoned in warehouses due to having failed such aesthetic tests has not only caused economic losses but
has also wasted the energy, water, soil and human labour that could have been harnessed to produce food for subsistence’. Escaler and Teng (2011, p. 1) support this view, stating that a reduction in food waste at the farm level ‘could help moderate the amount of increase in food production that is needed to meet growing food demand, which would alleviate the pressure on resources [i.e. water, soil] and help lower greenhouse gas emissions’. In addition, reducing food loss and food waste is pertinent to meeting the rising demand for food for a growing world population projected to reach 9.5 billion by 2050, particularly in a world that is facing multiple natural resource challenges (section 2.8) (Lipinski et al. 2013; Papargyropoulou et al. 2014).

Household food waste is another food security issue and consequently a health promotion concern. The Australia Institute estimates that $5 billion worth of food is wasted by Australian households each year (Baker et al. 2009). According to Morgan (2009) and Papargyropoulou et al. (2014) household food waste includes food being left uneaten on plates, cooking and preparing too much food, food smelling or tasting bad or going mouldy. Food wastage also occurs due to date labelling confusion (Lipinski et al. 2013; Papargyropoulou et al. 2014). Declining food preparation and handling skills have also resulted in edible food being thrown away (Escaler & Teng 2011). The loss of food preparation and preservation skills and their effects on household food security is outlined in section 2.6. In addition, the associated costs of food waste (predominantly fresh fruit and vegetables) for households is high, averaging $616 per year (Baker et al. 2009). This has economic and health implications for food insecure groups who already struggle to purchase healthier food items (Morgan 2009). It could be argued that a reduction in food waste at the household level could provide multiple benefits for food insecure groups in the short and long term: 1) reducing food waste in the short term may alleviate the costs associated with food purchasing (Lipinksi et al. 2013), although further research is required to determine whether food insecure groups have high levels of waste; and 2) reducing the pressure on ecological systems to provide for future levels of food production and consumption.

2.8 Natural Resource Constraints in the Australian context

2.8.1 Fresh water, food security and health

Current evidence indicates that approximately 70 per cent of the world’s water use is attributed to agricultural practices (Horrigan et al. 2002; MA 2005; PMSEIC 2010b). In addition, global water use within agriculture is on the rise, including within Australia
The impacts of water stress on food security may be severe. Literature indicates that reduced food yields have resulted due to water stress, drought and climate change, which have the potential to impact on Australia’s domestic food supply (Climate Council of Australia 2015; Marangos & Williams 2005; Qureshi et al. 2013). The impacts of climate change on agriculture, including a reduction in food availability and supply, will be discussed further in section 2.8.2.

Although there has been much focus on the effects of water use on food security and on ecosystems from food production (i.e. irrigation), a significant volume of water is also used in other stages of the food system, which have the potential to further exacerbate water availability in Australia. The food processing stage in Australia uses ‘… approximately 215 gigalitres of water a year. This includes the water used to process meat, dairy, fruit, vegetables, oil and fat, grains, bakery, confectionery and beverage products’ (Bradbear & Friel 2011, p. 6). Water loss also exists at the household level and is associated with food waste. According to Lundqvist et al. (2008) 40 trillion litres of irrigation water is potentially wasted if household food waste levels reach up to 30 percent.

2.8.2 Climate change and the impacts on food security

According to the Climate Council of Australia (CCA) (2015) climate change poses serious threats to Australia’s food security. Paradoxically, Australia’s food system contributes heavily to climate change through significant greenhouse gas emissions from paddock to plate. The agricultural sector alone emits approximately 16 per cent of greenhouse gas emissions annually (PMSIEC 2010b). It has also been estimated that further emissions are related to other practices within the food system including diesel use associated with on farm equipment and transportation, and electricity use associated with storage, refrigeration and food processing at the factory, retail and consumer end (Bradbear & Friel 2011; Commonwealth of Australia 2016; PMSEIC 2010b).

Although some regions will benefit from increased warming (e.g. through extended growing seasons), it is likely that the food production phase of the food system in most nations will be vulnerable to climate change (McMichael et al. 2007). According to Edwards (2011) climate change impacts on human health via the food system through fluctuating temperature, rainfall and humidity and severe weather events such as heatwaves, floods, drought and storms. Literature indicates declining food yields, the potential for increased numbers of pests and disease vectors and a decline in soil nutrient and water quality (Altieri 2008; Edwards 2011;
McMichael et al. 2007). McMichael et al. (2007), for example, indicate that rice, maize, barley and wheat production are compromised by higher temperatures. Tapsell et al. (2011) also note macronutrient changes in certain foods due to climate change.

The food security impacts of climate change should be of concern for the public health sector, including health promotion. The food-related objectives of health promotion include ensuring the affordability of staple food items for food insecure groups, yet a decline in food yield often correlates with increased prices of food. A report released during the most recent drought in Australia (1996-2010), often referred to as the ‘Millennium drought’, demonstrates that fruits increased in price by an average of 43 percent and vegetables 33 percent (Quiggin 2010). Price increases of staple food items have repercussions for food security, particularly for low socio-economic status groups and others at risk for food insecurity (Campbell 2015; Friel 2010). According to Friel (2010) Australians who are welfare dependent or on low incomes will notice the impacts as the cost of food comprises a greater proportion of their weekly budget. The effects on food purchasing practices may, in turn, be compromised as foods that are highly processed and contain large quantities of trans-fats, sugar and salt are generally cheaper (Edwards 2011; Hodges 2005). The risk for chronic disease due to consumption of such foods may increase among the food insecure (refer section 2.1.1).

2.8.3 Peak oil and food security implications

Reduced yield and increased costs of food due to climate change may also result in Australia sourcing food from imports in some years (PMSEIC 2010b). According to Carey and McConell (2011), dependence on imports for domestic food supply poses risks and reduces Australia’s resilience if resource shortages were to occur, such as peak oil. According to Smith (2013) it is highly likely that the world’s oil production has peaked and that we face a future of rising oil prices and frequent supply disruptions. Australia’s food system, however, is highly dependent on oil for fertilizer use, on-farm machinery, transportation and equipment used in food processing (Aleklett & Lardelli 2012; Neff et al. 2011). Australian cities are also highly car dependent (and reliant on oil) for accessing basic services including food (Burns & Inglis 2007; Dodson et al. 2006). This is of particular concern for food insecure groups, many of whom currently have difficulties accessing food via private transport on a regular basis, particularly in remote or rural areas (Edwards et al. 2011; Friel 2010; Lawrence et al. 2011).
Accordingly, it could be argued that the risk of food insecurity will increase among at-risk groups if oil prices continue to rise.

2.8.4 Health promotion: a response to food security in an era of climate change and peak oil

Due to the potential impacts of climate change on future food production and food supply, Friel (2010) proposes that climate change should be recognised as an additional determinant to food insecurity. Similarly, peak oil could be included as an additional determinant to food insecurity. Several commentators provide the rationale for a localised and environmentally sustainable food supply to address the dual challenges of climate change and peak oil (Aleklett & Lardelli 2012; Hopkins 2008; Shiva 2016). Although referring to the United Kingdom (UK), Garnett (2006) demonstrates the reduction in greenhouse gas emissions from fruits and vegetables that are seasonal and field-grown locally. Horrigan et al. (2002) also argue that local food production systems such as urban agriculture reduce energy costs due to their close proximity to consumers. Urban food production systems also reduce pollution and greenhouse gas emissions from transport and storage, reduce packaging and spoilage, as well as providing economic, cultural and social benefits such as local employment and food security (Armar-Klemesu 2000; Dixon et al. 2009; Horrigan et al. 2002). According to Neff et al. (2011, p. 1587) the public health sector will have an essential role in promoting a healthy and equitable transition to an oil-independent, more resilient food system. The following section explores the role of health promotion with creating a food system to alleviate food insecurity and environmental degradation.

2.9 Health promotion: exploring the sectors role with addressing food security from an environmental sustainability perspective

... a narrow perspective on food security in terms of production and supply is no longer sufficient. It’s time to take a broader perspective incorporating the steps from growing crops in the field to consuming a meal at home, that is, a field to fork perspective (Lundqvist et al. 2008, p. 20).

Although Australia’s domestic food supply has assured a level of food security for many Australians, food insecurity is widespread and on the rise within the nation (section 2.1.1). According to Caraher and Coveney (2004) health promotion has had limited engagement with ‘upstream’ policy or the determinants of food supply, having instead focused on dietary
guidelines and lifestyle factors. Neff et al. (2009) state that interventions to improve diet related health outcomes have largely focused on targeting individual knowledge, attitudes and behaviour. In addition, Story et al. (2009, p. 222) state that issues such as ‘where food comes from, how it is produced, how it is priced, whether or not it is subsidized, how it is distributed, or how labour is treated are typically not addressed’. The PHAA (2009; 2012) argue a similar point to Story et al. (2009) stating that the way food is sourced and its method of production has not been considered by the public health sector.

It could be argued that public health policies and goals (including health promotion) have contributed to food security approaches that contravenes planetary limitations. Brown et al. (2005, p. 21) state that public health strategies have ‘unintentionally and unwittingly contributed to the breaching of the planet’s natural systems… [and] have tended to disregard the ecological consequences of their various interventions’. As highlighted above by Story et al. (2009) this includes increasing access to food without regard for how it was produced. The OCHP (WHO 1986, p. 3), however, explicitly states that ‘any health promotion strategy should include protection of the natural and built environments and the conservation of natural resources’. It has also been argued that policy decisions around health to decrease hunger and malnutrition or improve child health and nutrition have been achieved through increasing the supply of food by raising output and reducing prices (Kickbush 2011; Lang 2009). This has resulted in many farmers changing their production practices to meet demand, which often contributes to ecological degradation and other destructive farming practices (Tscharntke et al. 2012).

Accordingly, it has been suggested that the public health sector (including health promotion) should consider both health and the environment with regards to decision making (Baum 2008; Brown et al. 2005; Lang 2009). This could include how the health promotion sector addresses food security. Reframing within public health, including health promotion, is not uncommon. Health promotion is familiar with responding to pressing global issues that are apparent at any given time (Baum 2008; Brown et al. 2005). In the 21st century, some of the most pressing public health and environmental issues are found within the industrialised food system (Caraher & Lang 2005; Kickbush 2011; Lang 2009; Waltner-Toews 2009). In response, it has been argued that public health, including health promotion, integrate environmental sustainability considerations to address food security (Rayner & Lang 2015; Story et al. 2009). This involves taking into account all the key processes of the current industrialised food system and alleviating their impacts on ecosystems and human health.
The PHAA (2009, p. 9) states that ‘every stage of the food chain needs to be considered when assessing the environmental impact of our food choices, including agriculture, manufacturing, refrigeration, transport, packaging, retail, home and food waste’.

Kickbush (2011, p. 14) also supports this view, stating that ‘from a health promotion perspective, the long-standing concern with food, nutrition and diet must be widened to an approach that is concerned with the food system in its many dimensions’. Kickbush (2011) and Pollard and Bornman (2012) highlight the environmental impacts of the current food system, encouraging the health promotion sector to address unsustainable patterns of food production and consumption to achieve positive health gains and food security. These proposed actions would recognise that future food security entails a ‘stable environment and natural resource base consisting of stable ecosystems, including flora and fauna, land, marine, water, air quality and weather’ (Pollard & Bornman 2012, p. 25). Although these proponents call for environmental sustainability considerations within health promotion decision making, the response surrounding its integration has been slow. The following section will discuss the benefits for health promotion, food security and ecosystems when environmental sustainability considerations are taken into account.

2.9.1 Health promotion, food security and ecosystems – an environmental sustainability approach

The dependence of human health on a flourishing natural environment has been discussed extensively over the years (Brown et al. 2005; Butler & Friel 2006; Hales et al. 2004; Hancock 2015; MA 2005). According to Kickbush (2011), the health promotion and environmental sustainability agendas are often dealt with separately and there has not been a deep enough effort to link the two to ensure they support each other. This can be seen within food policies and practices within the health promotion sector, which have largely neglected the environmental aspects (Caraher & Coveney 2004; Kickbush 2011; PHAA 2009; PHAA 2012; VicHealth 2011).

Improved food security, however, will only manifest if all sectors, including health, take into account environmental sustainability considerations along the entire food system (Food Alliance & National Heart Foundation 2012; Kickbush 2011). The capacity for the health promotion sector to address complex problems, including those found in the food system, is strong (Jackson et al. 2006; WHO 2005). This is based on training and education that is
founded on well-developed theories and frameworks including the OCHP (WHO 1986), Bronfenbrenner’s Socio-Ecological Systems Theory (Bronfenbrenner 1994) and the Mandala of Health (Hancock 1993). The OCHP, for instance, which was developed over three decades ago can be readily applied to current food systems issues (Kickbush 2011). Table 4 demonstrates how the three strategies of health promotion (advocate, enable, mediate) could be used to create a food system that alleviates food insecurity and ecosystem degradation.

Table 4. Potential application of health promotion strategies in creating an environmentally sustainable food system

<table>
<thead>
<tr>
<th>Health Promotion Strategy</th>
<th>Strategy applied to food system</th>
</tr>
</thead>
</table>
| Advocate                  | Health promotion could advocate for a food system that promotes sustainability, improves health and ensures equity by:  
  • Urging the public health community to increase engagement in the creation of a healthy & environmentally sustainable food system & seek allies at all levels of governance: global, regional, national & local.  
  • Encouraging adoption of principles of food justice, food security & food sovereignty & links back to health promotion principles.  
  • Supporting environmentally sustainable & just agriculture  
  • Including sustainable food policies in development policies.  
  • Promoting local, sustainable, Fair Trade food production.  
  • Empowering individuals, communities & consumers.  
  • Making healthy, sustainably produced foods the affordable & convenient choice. |
| Enable                    | Health promotion could recognise the need to empower communities to engage for healthy food production & consumption by:  
  • Reinforcing health promotion strategies that contribute towards food security.  
  • Encouraging diet patterns to align with health & sustainability goals.  
  • Involving consumers in the development of healthy & environmentally sustainable food systems. |
- Promoting the concept of sustainable & healthy diets as an integral part of education about food choices.
- Educating consumers on the impact of current food consumption patterns on the environment, e.g. water, biodiversity, climate change.

Mediate

Health Promotion could recognise the need to engage policymakers, media, food & related industries, public health, nutrition, environment & development professionals to contribute to solutions associated with the food system, including issues related to sustainability, nutrition & equity, by:
- Mediating between the many actors around key healthy public policy issues such as meat & dairy consumption & plant based diets.
- Making unsustainable water use, soil depletion, biodiversity loss, GM foods & pesticide use a major health promotion issue, drawing the links back to food security.

(Adapted from Kickbush 2011 and Parfitt et al. 2013)

A report by Patrick et al. (2011) argue that both health promotion and environmental sustainability goals focused on food can be adapted to address complex health issues such as food insecurity as well as reducing the impact on the environment. Table 5 demonstrates this point.

**Table 5. Food systems: health issues and related health and environmental goals**

<table>
<thead>
<tr>
<th>Health Issue</th>
<th>Health Promotion Goal</th>
<th>Environmental Sustainability Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention of obesity, cardiovascular disease, diabetes and other chronic health conditions</td>
<td>Increase consumption of sustainably produced fruit &amp; vegetables. Decrease meat consumption, foods high in fat, sugar, salt &amp; processed foods.</td>
<td>Decrease resource intensive food production at all stages in the food system. Support urban food production. Sustainable agriculture.</td>
</tr>
</tbody>
</table>
| **Social inclusion, mental health and wellbeing** | **Physical involvement in food production (primary produce).** | **Community gardens & food sharing initiatives.**  
Farmers markets.  
Education of consumers.  
Physical involvement in food production & preparation (primary produce). | **Increase knowledge of sustainable food production.**  
Farmers markets.  
Education of consumers.  
Food Sovereignty. |
|---|---|---|---|
| **Food Security: promotion of local supply** | **Reduce waste through promotion of local & seasonal food.**  
Access to cheap produce otherwise wasted at farm during peak production. | **Retain & protect land for peri-urban sustainable food production.**  
Reduced dependence on fossil fuels.  
Reduced waste, including local sale/u pick etc. for over production.  
Food recycling. |
| **Demand for ‘cleaner’ food** | **Reduced exposure to pesticide residues.**  
Higher food/husbandry standards for animals. | **Improved biodiversity & ecosystem health.**  
Reduced risk of disease.  
Long term land health/sustainability. |
| **Access to safe, clean water** | **Increase in drinking water.**  
Reduce pollution of waterways by reducing pesticide use.  
Access to nature for improved health, e.g. recreation at rivers & bays. | **Healthy rivers & catchments.**  
Decreased bottled water (waste & energy use in production/transport). |

(Adapted from Patrick et al. 2011)

What appears to be missing, however, are studies that explore whether food security is currently being addressed by the Australian health promotion sector through an environmental sustainability framework. One study undertaken by Patrick and Kingsley
(2015) investigated current practice around environmental sustainability initiatives. Food was one emergent theme, however, the level of detail regarding activities was limited to a few case studies.

Although some grey literature indicate that the health promotion sector is integrating environmental sustainability considerations to address food security (City of Darebin 2016; McCluskey 2009; Oudendijk 2012; Tasmanian Food Security Council 2012), the extent of application varies, as does reference to how both health promotion and environmental sustainability goals will be achieved. It also appears that the sector is not leading conversations for a change in practice towards an environmental sustainability framework.

Health promotion, however, is renowned for its ability to create significant change, as witnessed by action against the tobacco industry (Baum 2008; Chapman & Wakefield 2001). According to Borland and Balmford (2006), it was too easy to put comprehensive tobacco control in the too-hard basket; however, anti-smoking action – initiated by the health promotion sector – has continued in Australia since the 1970s. Today, Australia is ranked high in its efforts to reduce the burden of tobacco-related death and disease (Chapman & Wakefield 2001). According to Stuckler and Nestle (2012) ‘Big Food’ uses similar tactics to the tobacco industry, yet public health’s response has been minimal. Over two decades ago Labonté (1991) argued that health promotion professionals should not wait to be invited to participate in to sustainable development debates; that their discipline roots and foundations would enrich the discussions.

A study undertaken by Patrick et al. (2012) supports the idea that health promotion already has a set of core competencies to work effectively on complex sustainable development issues. Although the focus was on climate change related health impacts, it could be argued that these skills are transferable to address food security as food production is predicted to be impacted by climate change (section 2.8.2). The study, however, also indicated that a new set of ideas and frameworks, borrowed from other disciplines including environmental sustainability, would be required (Patrick et al. 2012). Patrick et al. (2012) also suggest changes to current practices for practitioners to be able to work effectively on environmental sustainability issues.

Similarly, Caraher and Coveney (2004, p. 595) stated over a decade ago that ‘health promotion workers need different orientations, additional skills and professional leverage backed by wider social forces’. With regards to addressing food insecurity and environmental
problems created by the current food system, Caraher and Coveney (2004) argue that health promoters require skills to be able to create alliances and advocacy, to develop public policy that addresses the ecological aspects along the entire food chain, as well as creating food citizenship among the community rather than adopting a model based on food consumerism (e.g. promoting healthy eating). According to Renting et al. (2012) the shift in discourse around food citizenship will help address the issue of corporate control and the loss of food skills (‘deskilling’) within the public. Food citizenship also uses localised food production to develop and strengthen communities (Dixon et al. 2009). Insights for such endeavours can also be drawn from an evolving area of public health practice: planetary health. This will be explored briefly.

### 2.9.1.1 Planetary Health

Horton et al. (2014) discuss a shift in discourse for health professionals – from public health to planetary health. The authors discuss the need for a shift in philosophy, values and practices where threats to the natural and human-made systems (such as food insecurity and ecosystem degradation) that support us are responded to. The following quote captures the essence of planetary health:

> An urgent transformation is required in our values and our practices based on recognition of our interdependence and the interconnectedness of the risks we face. We need a new vision of cooperative and democratic action at all levels of society and a new principle of planetism and wellbeing for every person on this Earth—a principle that asserts that we must conserve, sustain, and make resilient the planetary and human systems on which health depends by giving priority to the wellbeing of all (Horton et al. 2014, p. 847).

Horton and Lo (2015, p. 1922) argue that a view of planetary health has the potential to ‘demand more creative imagination among scientists and practitioners working in health: redefining the meaning of human progress, rethinking the possibilities for human cooperation, and revitalising the prospects for the health of human civilisations’. Another indication of this shift is the recently created Lancet Planetary Health Journal and the appointment of the first Professor in Planetary Health (Professor Anthony Capon – with a health promotion background) at the University of Sydney.

In addition, the Canadian Public Health Association (2015, p. 15) outlines the co-benefits of adopting an ecological determinants approach in public health for both human health and the
planet, stating ‘the shift to a more ecologically sustainable society could result not only in health gains from avoiding harm, but also in a healthier way of living’. Due to the large ecological footprint of the current food system, it has been asserted that ‘if we can get it right on food, we will have come a long way to getting it right for people and the planet’ (Demaria & Rockström 2015, p. e37). Whitmee et al. (2015, p. 1974), however, state that:

*Present systems of governance and organisation of human knowledge are inadequate to address the threats to planetary health. We call for improved governance to aid the integration of social, economic, and environmental policies and for the creation, synthesis, and application of interdisciplinary knowledge to strengthen planetary health.*

This need is particularly apparent with regards to food security where complex and multifaceted issues cross disciplinary boundaries. To achieve planetary health, it could be argued that a new generation of health practitioners, including health promoters, is required. These health promotion practitioners require an ability to work within a planetary health discourse, and in the process, integrate environmental sustainability considerations in practice. This includes the integration of environmental sustainability frameworks at all levels of the food system to address food insecurity and ecosystem degradation (Horton & Lo 2015; Orr 2004; Tagtow & Harmon 2009). Furthermore, this has implications for education, where it has been argued that the notion of planetary health should be incorporated at the tertiary level, into university courses, internships, and research agendas (Canadian Public Health Association 2015; Horton & Lo 2015; Whitmee et al. 2015). Furthermore, the Canadian Public Health Association (2015) advocates for a revision of core competencies for public health professionals, including training requirements and licensing of curriculum, and the fostering of an interdisciplinary and multi-sector approach to social change.

The type of education that will be required to achieve such transformational change will need to move beyond current approaches (Blewitt 2006; Blewitt & Cullingford 2004; Orr 2004; Jones et al. 2010). One educational approach that has been purported to achieve such change is Education for Sustainability.

**2.10 Education for Sustainability**

Education for Sustainability (EfS), also referred to as Education for Sustainable Development or Sustainability Education, was developed at the World Summit for Sustainable
Development in 2002 by the United Nations General Assembly (UNGA) in recognition of the role that education plays in achieving a sustainable world (United Nations Education, Scientific and Cultural Organisation (UNESCO) 2006). The power of education has been reiterated over the years by various proponents for sustainable development. Mayor (1999, p. xi), for example, states that ‘education is the force of the future because it is one of the most powerful instruments of change’. The United Nations (UN) has also echoed these sentiments through various calls for action. Agenda 21, an international voluntary action plan on sustainability is one example, highlighting that the fundamentals of basic education need to consider sustainable development so that human beings can reach their full potential (UN 1992). Orr (2005, p. xi) states that ‘all education is environmental education…by what is included or excluded we teach the young that they are part of or apart from the natural world’.

Although written almost two decades ago, Huckle (1996) argued that current educational approaches tend to reinforce dominant discourses that lead to scientific and technological solutions without any consideration of social-political and economic causes. Similarly, Morin (1999) stated that society would need to rethink education to achieve a sustainable world, one that is characterised by democracy, social justice, equity, peace and harmony with the natural environment. Little seems to have changed since this time, with Williams and Brown (2012, p. 8) stating that the following characteristics of modern education are in complete contrast with living systems and sustainability, further perpetuating unsustainable values and lifestyles: ‘decontextualisation of learning; loss of curiosity and wonder; acceptance of mechanical and industrial scale; homogenization of curriculum and learning; privileging of abstract ideas; perpetuation of individualism and autonomy; and stimulation of only certain senses’. Sipos et al. (2008, p. 70) state that the lack of focus on qualities such as ‘intuition, common sense, creativity, ethics, memory and spirituality’, which are virtually non-existent in curricula, facilitates rationalistic thinking and a focus on technology which has contributed to conflict between people and the environment. Williams and Brown (2012, p. 11) refer to the ‘disconnection of education from life’ which, they claim, ‘undermines the relevance of education to life’.

Criticism regarding current definitions of ‘sustainability’, however, does exist and appears to impact on the uptake and use of educational approaches such as EfS. According to Stables and Scott (1999) the term ‘sustainable development’ and all its variations within education (including EfS) can be problematic.
'Its potential meaning is so broad as to be potentially all-embracing, leaving open the question, ‘sustainability of what or of whom?’ Additionally, in all these definitions, the term ‘sustainable development’ carries implications of a prior commitment to economic growth which raises doubts about the meaning of accompanying phrases such as: ‘living within the carrying capacity of supporting ecosystems’, ‘in harmony with nature’, ‘protecting and enhancing the environment now and for the future’ (Stables & Scott 1999, p. 146).

Although sustainable development has been applied in a way that prioritises the economic dimension, the United Nations Decade of Education for Sustainable Development (UNDESD) 2005-2014 emanated (UNESCO 2006). According to Jones et al. (2010, p. 2), ‘higher education was designated as having a particular role to play during the decade’. Universities were called to function as places for research and teaching in sustainable development (Jones et al. 2010). Today, the UNDESD has been replaced with an equally progressive vision for EfS: The Global Action Programme (GAP) on Education for Sustainable Development (ESD) (UNESCO 2014) and the Education for Sustainable Development Goals (UNESCO 2017). According to UNESCO (2014, p. 7) ‘there is now a growing international recognition of ESD as an integral element of quality education and a key enabler for sustainable development’. UNESCO broadly defines Education for Sustainable Development as:

>a concept that goes far beyond environmental education. Education for Sustainable Development is the educational process of achieving human development (economic growth, social development, and environmental protection) in an inclusive, equitable and secure manner. It thus includes education for poverty alleviation, human rights, gender equality, cultural diversity, international understanding, peace and many more.... the vision of education for sustainable development is a world where everyone has the opportunity to benefit from quality education and learn the values, behaviour and lifestyles required for a sustainable future and for positive societal transformation (UNESCO 2008, p.1).

Tilbury et al. (2005) state that EfS encourages learners to think in a systemic manner, challenging current ideologies and the values of learners, and encourages them to reflect on how they currently live and work. EfS is ‘a process that uses education to equip people with the skills necessary to be leaders and engagers in the change process towards sustainability’
(UNESCO 2005, p. 16). This process creates learners that are engaged in a ‘new way of seeing, thinking, learning and working’, one where they become ‘active participants and decision-makers in the change process’ (Tilbury & Wortman 2004, p. 9). EfS programs use various educational approaches to achieve this end, including: reflective practice; transformative learning; experiential learning; systems thinking; critical thinking, futures thinking; partnerships and participation (Tilbury & Wortman 2004). Figure 7 illustrates the EfS approach.

**Figure 7. Education for Sustainability teaching approaches**

The Australian Government responded to the call to implement the goals of the UNDESD in 2005 through the development of a national strategy on EfS (Commonwealth of Australia 2007). The vision within the strategy document states:

> At the end of the decade, the Australian community will have the understanding, knowledge, skills and capacity to contribute to sustainable development and will embrace the intrinsic value of sustainability as a national aspiration. Our ultimate vision is a sustainable Australia (Commonwealth of Australia 2007, p. 4).

Subsequently, the Australian Government developed a National Action Plan – *Living Sustainably: the Australian Government’s National Action Plan for Education for*
Sustainability. This document aligns with international sentiments that EfS is the preferred framework to shift societies towards sustainability (Department of the Environment, Water, Heritage and the Arts 2009). Objective 2 of the Action Plan states that ‘Education for Sustainability [will be] integrated into all university courses/subject areas and campuses [will be] managed in a sustainable way’ (Department of the Environment, Water, Heritage and the Arts 2009, p. 21). Criticism, however, has ensued regarding the Australian Government’s commitment to EfS within formal education, including the tertiary sector. The Australian Education for Sustainability Alliance (AESA) states that ‘Australia currently lacks the vision and leadership to provide high quality and integrated EfS through formal education and lifelong learning’ (Australian Association for Environmental Education (AAEE) n.d, p. 1). A lack of leadership at the government level is apparent since the end of the UNDESD, with diminished support for EfS within formal education in Australia (Smith & Stevenson 2017). Smith and Stevenson (2017) note: 1) withdrawal of policy documents on EfS; 2) the elimination of positions that were established within central office to develop EfS programs; and 3) the disbanding of government programs such as the Australian Sustainable Schools Initiative (AuSSI) and Earth Smart Science Programs.

According to Smith and Stevenson (2017) these changes in government approach reflect a neo-liberal agenda within formal education, including the tertiary sector. The resulting policy decisions within government have created further challenges for formal education bodies to implement EfS programs within the curriculum (Hill & Dyment 2016; Smith & Stevenson 2017). This is problematic if societies are to progress towards sustainability; it is also in direct contrast to current international agendas on EfS (International Association of Universities (IAU) 2016; UNESCO 2014). A lack of policy imperative also leaves the responsibility to individual tertiary institutions to establish EfS within their degree programs. This is evidenced by a mixed response to the call for EfS within the Australian tertiary sector, including criticism regarding the slow response to integrate EfS in all teaching and learning programs (Christie et al. 2015; Fisher & Bonn 2017; McMillin & Dyball 2009; Poon 2016; Thomas & Nicita 2002; Sherren 2006). The literature notes numerous factors that are contributing to a slow uptake of EfS within curricula, including: 1) negligible support for curriculum implementation (Christie et al. 2015; Moore et al. 2005; Ralph & Stubbs 2014; Tilbury et al. 2005); and 2) minimal to no teacher training to develop understanding and integration of the approach within existing curricula (Christie et al. 2013; Holdsworth & Thomas 2015; Noonan & Thomas 2004). McKeown (2002), Thomas (2004) and Velazquez
et al. (2005) also found that most academics lacked knowledge and awareness of the EfS approach. In addition, Tilbury et al. (2005) state that the most innovative universities in Australia have progressed as far as campus greening initiatives such as environmental management systems, establishing sustainability policies or signing international declarations and charters; however, there is still a lack of integration with the curriculum.

Despite the lack of government support and slow uptake within the tertiary sector, non-government organisations (NGOs) for tertiary educators such as AESA, the Sustainability Education Practitioner Network (SUSTAINed) and Learning and Teaching Sustainability (LTS) were developed between 2012-2014 (AESA n.d; LTS n.d; SUSTAINed n.d). AESA, LTS and SUSTAINed could be categorised as having either one of two aims: 1) to increase awareness and uptake of EfS within formal education; or 2) to advocate and lobby for government support for EfS that aligns with international agendas. The LTS and SUSTAINed Network, for example, have been developed as communities of practice within tertiary education to demonstrate how EfS can be incorporated into any discipline curricula (SUSTAINed n.d). In addition, SUSTAINed have established a Health and Wellbeing discipline hub to demonstrate how EfS can be incorporated into health and healthcare degrees (SUSTAINed n.d). It could be argued, however, that the advancement of EfS within tertiary education has been and will continue to be limited to: 1) a dependence on academics with an interest in sustainability to join AESA, LTS or SUSTAINed and progress EfS within their university; and 2) discipline specific integration of EfS within faculty rather than a holistic uptake throughout all aspects of university life (e.g. curriculum, campus operations, culture and community).

This literature review also found limited information with regards to integrating environmental sustainability considerations for addressing food security within these communities of practice. For example, information on the LTS website consists mainly of a few case studies that focus predominantly on food waste (LTS n.d). Minimal reference is made to food insecurity or environmental impacts caused by an industrialised food system within EfS programs or EfS literature. Section 2.10.1 will therefore discuss the potential of an EfS to develop graduates that are prepared to challenge traditional approaches of food security towards a more holistic paradigm around environmental sustainability.
2.10.1 Education for Sustainability and health promotion practice – towards an ecological approach for addressing food security

EfS has the potential to shift health promotion food security practice towards an ecological paradigm. This idea is predicated on the notion that the educational approaches within EfS can lead to transformation of mindsets, values, attitudes and thus behaviour (Orr 2004; Sipos et al. 2008; Tilbury et al. 2005). There appear to be few studies, however, to indicate whether EfS holds potential for transforming health promotion practice with addressing food insecurity. The majority of the literature, focuses on EfS more generally rather than providing specific reference to its applicability for addressing food insecurity and ecosystem impacts from an industrialised food system (Cotton & Winter 2010; De La Harpe & Thomas 2009; Holdsworth & Thomas 2015).

It could be argued that an EfS approach within health promotion degrees could shift the current discourse from the dominant productivist view of food and food security towards an ecologically integrated approach to health (Figure 8). Lang and Heasman (2015, p. 40) argue that the current productivist paradigm ‘will be unable to deliver enough food for burgeoning world populations, or not without unbearable dislocation’. The ecologically integrated view, however, takes into consideration all key aspects of the food system and endeavours to increase understanding and working of systems and cycles and their relationship to human health, including food security (Lang & Heasman 2015).
The potential for EfS to shift student competencies and values within health promotion to challenge current approaches around food security is promising. This will be discussed in section 2.10.2.

2.10.2 Education for Sustainability within Health Promotion degrees: the potential to shift public health practice towards ecological public health to address food security

Although the literature suggests that EfS is the preferred framework within education (including at the tertiary level) to generate a shift in societies towards sustainability (Fien & Tilbury 2002; Tilbury 2005; UNESCO 2014), it is apparent that EfS is not integrated uniformly or consistently. It is largely missing in health promotion courses, generally focusing instead on health science degrees, rather than health promotion specifically (Sherren 2006; Masterman-Smith et al. 2010). A more recent study undertaken by Patrick et al. (2015) also confirms a lack of EfS support within public health degrees, including health promotion.
One of the findings that emanated from the Patrick et al. (2015, p. 200) study was ‘a lack of articulation for the value of the EfS approach to public health workforce development’. Insignificance of EfS within disciplines other than environmental science has also been documented by other observers (Christie et al. 2015; Hopkinson et al. 2008; Noonan & Thomas 2004). Commentary from Schiro (2008), however, indicates that EfS and health promotion share similar philosophies and values, including a social reconstructionist ideology. ‘Social reconstructionists believe that education should not be used as a vehicle for merely fixing the flaws within our society, but should be used to transform the existing society into a new society that is just, moral, satisfying, and empowering for everyone’ (Fundi 2013, p. 1). It could be argued that EfS is also founded on notions of social change similar to those evident in health promotion. According to Huckle and Stirling (1996) EfS frequently uses concepts such as citizenship, peace, health, multiculturalism, global human rights and anti-racist education. Similar concepts are found within the OCHP: peace, shelter, education, food, income, a stable eco-system, sustainable resources, social justice and equity (WHO 1986). It could be argued, therefore, that the OCHP is the framework for health promotion practice while EfS is the tool that brings it all together for students in the classroom.

Patrick et al. (2012; 2015) argue that EfS can be used to bridge the gap between health promotion and environmental sustainability. This would also include developing graduate competencies and a shift in mindset with addressing complex issues such as food insecurity within the food system. Considering the dearth of literature in the health promotion and EfS space regarding the use of EfS for shifting practice, a key question arises: what is the potential use of the EfS approach within Australian health promotion degrees to address food insecurity? At present, the literature indicates that public health (including health promotion) uses a food availability and food supply framework through a social determinants lens to address said issue (Caraher & Coveney 2004; Hamm 2008; Kickbush 2011; PHAA 2009; PHAA 2012). In addition, minimal evidence exists in Australia whether environmental sustainability principles are used to guide the development of food security programs within health promotion degrees. This study will seek to address some of these gaps in the literature through the following aim and research questions.
2.11 Aim

*To explore the potential role of health promotion in addressing food security from an environmental sustainability perspective.*

2.11.1 Research Questions

1. What are the perceptions of Australian health promotion practitioners concerning their capacity to address food security using environmental sustainability principles?
2. How are current Australian health promotion practitioners and the initiatives they deliver addressing food security?
3. To what extent are environmental sustainability principles used when developing and delivering such health promotion food security initiatives in Australia?
4. What role do EfS-based approaches within university programs have in the development of Australian health promotion graduate competencies to address food security using environmental sustainability principles?
5. What are the implications of the findings for Australian university health promotion degrees?

Chapter 3 will discuss the theoretical underpinnings of this study, followed by the methodology in Chapter 4.
3 THEORETICAL FRAMEWORKS

‘The theoretical framework is the structure that can hold or support a theory of a research study. The theoretical framework introduces and describes the theory that explains why the research problem under study exists’ (University of Southern California 2016, p. 1). The following chapter will discuss the key theoretical frameworks that underpin this study, which are:

a) Socio-ecological theory  
b) EcoHealth theory  
c) Systems thinking

A general explanation of each theory is provided, including their applicability for this study of health promotion practice and education that attempts to address food security using an environmental sustainability framework.

3.1 Socio-ecological theory

Socio-ecological theories are frequently used in health promotion practice and health education to address complex and multifaceted health issues (Kok et al. 2008; Stokols 1996; Stokols et al. 1996; Sallis et al. 2008; VanLeeuwen et al. 1999). They serve as useful models in health to explore the multiple factors that influence health and wellbeing, and to develop more effective interventions (Richard et al. 2011; Sallis et al. 2008; Stokols 1992). Bronfenbrenner’s socio-ecological theory is a popular model that has been applied in health promotion. Figure 9 demonstrates that a socio-ecological approach moves beyond individual and lifestyle factors to consider the social, economic, cultural, physical and natural environments in which people live and the interactions between these environments (Grzywacz & Fuqua 2000; Richard et al. 2011; Sallis et al. 2008).
Figure 9. Bronfenbrenner's Socio-ecological Theory

(Santrock 2009, p. 29)

Socio-ecological theories have developed and expanded over the years as research has demonstrated that health and wellbeing outcomes are attributable to wider social and environmental determinants (Dakubo 2011; Richard et al. 2011; Stokols 1992). Environmental determinants have received increasing attention over the years due to growing recognition that flourishing ecosystems are constituents for optimal human health and wellbeing (Brown et al. 2005; Gnanakan 2010; Kickbush 1989a; Labonté 1991; MA 2005; Maller et al. 2005). According to Hancock (2000) the functioning of the many ecosystems and natural cycles that constitute earth’s life support system is best understood using a socio-ecological framework. The use of a socio-ecological approach within a study of health and environment was therefore considered to be highly relevant, particularly due to its recognition that ecosystems are important factors for optimal health and wellbeing.

A socio-ecological approach was also considered appropriate for this topic of study due to its interdisciplinary focus. Socio-ecological theories recognise that progress towards healthy and sustainable societies requires involvement by various sectors (Cote & Nightingale 2012; Kickbush 1989b; Forget & Lebel 2001). Socio-ecological theories have evolved from many
disciplines including public health, sociology, biology, education and psychology and are still used widely in various fields including health promotion, education and environmental sustainability (Colucci-Gray et al. 2006; Golden & Earp 2012; Lehtonen et al. 2008; O’Connor et al. 2012; Richard et al. 2011; Kyburz-Graber et al. 2006; Stokols 1992; Rauch 2002). Interdisciplinary engagement also underpins health promotion, education and the environmental sustainability fields, where involvement from other disciplines is encouraged to achieve desired outcomes (Blewitt & Cullingford 2004; Jones et al. 2010; Misra et al. 2009; Stokols et al. 1996; WHO 1978). According to Brown and Ritchie (2006) complex problems (such as food security and environmental sustainability) require a range of perspectives from multiple sources and collaboration with various interest groups. For this study, the adoption of socio-ecological theory and the use of an interdisciplinary approach to the investigation were prompted by the study’s scope (crossing health promotion, education and sustainability disciplines), its methodology (pragmatic paradigm) and methods (interviews with academics from various disciplines). Figure 13 (page 61) demonstrates the theoretical underpinnings of this study and its application in the development of the research questions, methodology and methods.

Socio-ecological approaches also utilise systems thinking for addressing issues that are complex and multifaceted (Grzywacz & Fuqua 2010; McLeroy et al. 1988; Richard et al. 2011; Stokols 1992; Stokols 1996). Stokols (1996, p. 286) highlights the value that systems thinking brings to socio-ecological theories: ‘(e.g., interdependence, homeostasis, negative feedback, deviation and amplification) for understanding the dynamic relations between people and their environments’. Systems thinking is discussed in further detail in section 3.3.

There are multiple socio-ecological frameworks that the health promotion sector uses in the development of public health programs. In addition to Bronfenbrenner’s socio-ecological theory (discussed above), this study incorporated the Ottawa Charter for Health Promotion (OCHP) and the Mandala of Health, two commonly used frameworks in health promotion, to guide the research.

3.1.1 Ottawa Charter for Health Promotion

The OCHP was developed in 1986 at the first international conference on health promotion in Ottawa, Canada (WHO 1986). The OCHP is arguably one of the core frameworks used to guide practice and education in health promotion (Butler & Friel 2006; Kickbush 1989a; Hancock 2011; McQueen & De Salazar 2011). The OCHP acknowledged that the
‘inextricable links between people and their environment constitutes the basis for a socio-ecological approach to health’ (WHO 1986, p. 2). The OCHP also espoused the principles of a new public health movement that was emerging at the time (Butler & Friel 2006; Baum 2008; Brown et al. 2005; Dakubo 2011), one that emphasised the importance of incorporating ecological factors in health promotion strategies and recognised that ‘…ecology, caring and holism are essential elements to consider’ (Dakubo 2011, p. 26).

The establishment of the OCHP also included a commitment from conference participants to ‘counteract the pressures towards harmful products, resource depletion, unhealthy living conditions and environments, and bad nutrition’ (Mahler et al. 1986, p. iv). The OCHP outlined several fundamental conditions and resources that are pre-requisites for health: peace, shelter, education, food, income, a stable eco-system, sustainable resources, social justice and equity (WHO 1986). For the first time, a public health charter recognised that ‘…health improvement is interrelated with stable ecosystems, the sustainable use of natural resources and the protection of the environment’ (Dakubo 2011, p. 26).

The OCHP has been used to encourage ecosystem protection and environmental sustainability within health promotion programs at the practice and education level (Butler & Friel 2006; Diesendorf 2000; Hancock 2000). It has also been used within health promotion to address food-related health conditions including food security, nutrition, obesity and healthy eating (Bell et al. 2008; Blay-Palmer 2009; Fung et al. 2012; Gallegos et al. 2008; Jackson et al. 2006). The OCHP is therefore considered to be a good fit with the study topic and research questions and has guided the research methodology, methods, findings and discussion chapters.

3.1.2 Mandala of Health

The Mandala of Health is useful in demonstrating the interaction of people with their environment and understanding the determinants of health (Hancock 1985a). Developed by Hancock and Perkins in 1985 in response to the new public health movement, the model is a nested design, demonstrating how multiple influences affect an individual’s health and wellbeing (Hancock 1985a). Figure 10 depicts the Mandala of Health. It demonstrates that an individual is influenced by their immediate environment (i.e. family, individual biology etc.).
The Mandala of Health also demonstrates the social, cultural and environmental factors that influence health and wellbeing (VanLeeuwen et al. 1999). One of the model’s strengths is the way it emphasises that health and wellbeing are dependent on a healthy ecosystem (the term biosphere is used in this model). For example, Labonté (1986, p. 342) reiterates the principles of the Mandala of Health when he states that ‘we can be healthy only in a healthy world. This fact requires that we seek to maintain the balance of nature, that we promote the stability of the ecosystem and that we protect it from the harmful assaults of man’. The Mandala of Health has been used within health promotion practice and education over the years, including in relation to food and nutrition programs (Jones & Donovan 2004; Labonté 1986; St Leger 2003). According to Kickbush (1989a, p. 265) the Mandala of Health ‘builds on holistic health approaches developed in the context of the wellness movement aiming to underline not only the mind/body/spirit interaction that constitutes human health, but to relate human health to the wider notion of an ecosystem’. Within education, the Mandala of Health ensures that programs place an emphasis on health, rather than on medicine and illness (Hancock & Perkins 1985b). Hancock and Perkins (1985b, p. 10) also argue that the model ‘...helps to ensure that students and health care professionals alike recognise and deal with the underlying causes of ill health’.
3.1.3 Limitations of socio-ecological approaches and implications for health promotion

Despite recognition of socio-ecological theories in health promotion, understanding and application of ecosystem factors is quite varied in practice (Brown et al. 2005; Bunch 2016; Butler & Friel 2006; Parkes & Horwitz 2009; Richard et al. 2011; Wilcox et al. 2004). It has been argued that health promotion has used a reductionist approach to using socio-ecological models, where only selected parts of a model have been used to develop interventions (Dakubo 2011; Lawrence et al. 2016; Richard et al. 2011; Richter et al. 2015). Dakubo (2011) and Richard et al. (2011), for example, state that the health promotion sector has placed greater emphasis on social and cultural influences in socio-ecological models. Grzywacz and Fuqua (2000) support this criticism, noting that there has been a general focus around the social (i.e. socioeconomic status), economic or cultural aspects, with limited focus around environmental determinants.

Dakubo (2011) and Forget and Lebel (2001) assert that reductionist approaches within socio-ecological models have contributed to further degradation of ecosystems, as people are considered to be separate from the natural environment. This may be due in part to the models themselves not having explicit reference to the human-ecosystem dimension or to a lack of clarity in the definition of the terms ‘socio-ecological’ or ‘environment’ (Dakubo 2011; Richter et al. 2015; Tudge et al. 2009; VanLeeuwen et al. 1999). Hancock (1993) for example, states that the Mandala of Health is not definitive and fails to explicitly address two key determinants: sustainability and equity. In addition, the literature demonstrates that the term ‘environment’ is often referred to as a setting (i.e. cities, schools, workplaces) or the built environment, rather than the natural environment or ecosystem (McLeroy et al. 1988; Parkes & Horwitz 2009; Whitelaw et al. 2001). The word ‘ecosystem’ has also been used interchangeably in the health sector, to define either a natural ecosystem or a social ecosystem (Forget & Lebel 2001; Grzywacz & Fuqua 2000). Despite a lack of clarity there has been, within public health, an increasing recognition of more holistic approaches to the human-ecosystem dynamic (Brown et al. 2005; Butler & Friel 2006; Grootjans et al. 2005; Parkes & Horwitz 2009). One of these approaches includes the EcoHealth approach which will be discussed in the following section.
3.2 An EcoHealth approach to health and wellbeing

The EcoHealth approach is increasingly being recognised as a relevant alternative to addressing the human-ecosystem dynamic within health, including health promotion (Bunch 2016; Butler & Friel 2006; Butler & Weinstein 2011; Charron 2012; Dakubo 2011; De Plaen & Kilelu 2004; Kingsley et al. 2015; Parkes & Horwitz 2009; Webb et al. 2010). The EcoHealth approach was one of the main guiding frameworks for this study. It assisted by augmenting socio-ecological approaches discussed in section 3.1, particularly addressing gaps that are commonly found within socio-ecological approaches. EcoHealth approaches (also referred to as an ecosystem approach), demonstrate similarities to the socio-ecological approach in understanding multiple influences on health (Charron 2012; Dakubo 2011; Forget & Lebel 2001; Kingsley et al. 2015; Webb et al. 2010). They differ, however, with regards to their explicit reference to the human-ecosystem relationship (Charron 2012; Dakubo 2011; De Plaen & Kilelu 2004; Forget & Lebel 2001; Kingsley et al. 2015; Webb et al. 2010). Unlike some of the criticisms levelled at socio-ecological models (Dakubo 2011; Grzywacz & Fuqua 2000; Richard et al. 2011), EcoHealth approaches to health draw the links between ecosystems and health and wellbeing and make them explicit (Brown et al. 2005; Dakubo 2011; Forget & Lebel 2001; Labonté 1991). An excerpt from the International Association of Ecology and Health (2017, p. 1) captures the notion of EcoHealth succinctly:

EcoHealth is committed to fostering the health of humans, animals and ecosystems and to conducting research which recognizes the inextricable linkages between the health of all species and their environments. A basic tenet held is that health and wellbeing cannot be sustained in a resource depleted, polluted and socially unstable planet. This is why EcoHealth scholars and practitioners engage in integrated systemic approaches to health that sustain ecosystem health services, foster social stability and promote the peaceful coexistence of humans, animals and their environments.

According to Dakubo (2011) and Richter et al. (2015) the EcoHealth approach is well suited to the discipline of health promotion. This approach uses an intersectoral, transdisciplinary and multi-stakeholder perspective to understand the human-ecosystem dynamic (Dakubo 2011; Kingsley et al. 2015) – familiar concepts used within health promotion practice and education but not necessarily uniformly applied in practice (Choi & Pak 2007; Davies et al. 2006; Fleming & Parker 2007; Macdowell et al. 2006; Naidoo & Wills 2000; Orme et al.
The model in Figure 11 developed by De Young et al. (2008) depicts an EcoHealth approach to human health and demonstrates the interrelationships of individuals to their social, cultural and economic environment. In addition, the model emphasises the role that ecosystems have in human development, including health and wellbeing.

**Figure 11. EcoHealth approach to health and wellbeing**

This model uses a nested approach and systems thinking to explore the interdependent relationships of people to their environments (De Young et al. 2008). Dakubo (2011) explains the EcoHealth approach using the International Research Centre’s analogy of an egg. Their proposition is that just as an egg must have both the egg white and yolk to be healthy, so it is the same with society where both ecosystems and people need to be healthy in order to have a healthy society (Dakubo 2011). This is where the ecosystem approach to health differs from socio-ecological approaches. The egg model of health and wellbeing has been developed to demonstrate that human health and wellbeing is dependent on a healthy functioning ecosystem (Dakubo 2011). Socio-ecological models, on the other hand, lack explicit reference to the human health-ecosystem relationship (Bunch 2016; Dakubo 2011; Grzywacz & Fuqua 2000; Richard et al. 2011).
Charron (2012) provides a useful outline of the six principles that are the hallmark for EcoHealth approaches. Many of these share similar concepts with the OCHP: 1) systems thinking and transdisciplinary/interdisciplinary research; 2) participation; 3) partnerships to achieve desired health outcomes; 4) sustainability based on social and environmental values; 5) recognising the role that gender has for health and sustainability; and 6) knowledge-to-action or action based research. The EcoHealth approach and the OCHP share similarities with integrating health, environment and sustainability into the vocabulary and practice of the health sector. Despite these similarities, there are two elements to EcoHealth approaches that distinguish them from the standard practice of health promotion or socio-ecological approaches. As Dakubo (2011, p. 39) notes:

_EcoHealth places equal importance on both human health and ecosystem health and emphasizes the inherent connections between the two. It also proposes interventions that seek to simultaneously improve the health of both human beings and the surrounding ecosystems, of which they are integral to._

EcoHealth involves research and practice to promote sustainability of individuals, animals and biodiversity by linking complex interactions of ecosystem, socio-cultural and economic factors (Kingsley et al. 2015). Ecosystem approaches also draw upon systems thinking (Charron 2012; Dakubo 2011; Forget & Lebel 2001). Figure 12 demonstrates the use of EcoHealth theory (to supplement socio-ecological approaches) in this study and its application in the development of the research questions, methodology and methods.
3.3 Systems thinking

Systems thinking demonstrates the interconnectivity of a system, whether that be an ecosystem, health or economic system: that all parts of a system are important for it to function and that the whole system should be considered in its entirety, not just the individual parts (Chase & Grubinger 2014; Klein & White 1996; Tilbury et al. 2005). Systems thinking is used in various disciplines, including health promotion, education and environmental sustainability (Abdyrov et al. 2016; Betts 1992; Brown et al. 2005; Goekler 2003; Hjorth & Bagheri 2006; Meadows 2009; Morris & Martin 2009; Verrinder et al. 2005). Within health promotion, a systems perspective ensures that interventions address many factors and engage relevant actors on multiple levels at the same time for health outcomes to be effective (Best 2011; Naaldenberg et al. 2009; Verrinder et al. 2005). Systems thinking has been cited as increasing in importance due to the recognition that health promotion issues are becoming increasingly complex and deeply embedded within the fabric of society (Best 2011; Kreuter et al. 2004; Norman 2004; Signal et al. 2012; van Beurden & Kia 2011).

The complexity and multi-faceted nature of many population health issues has resulted in their description as wicked problems (Brown et al. 2010; Kickbush 2011; Kreuter et al. 2004; Signal et al. 2012). Kreuter et al. (2004, p. 442) define wicked problems as ‘a problem that is illusive or difficult to pin down and influenced by a constellation of complex social and political factors, some of which change during the process of solving the problem’. The current industrialised food system on which food security relies has been termed a ‘wicked
problem’ (Brown et al. 2010; Chornyak 2015; Hamm 2009; Muller et al. 2009). Brown et al. (2010) attribute the complexity of wicked problems to three interrelated factors: 1) wicked problems defy complete definition and absolute solutions; 2) they are part of society that generates them, therefore any change requires a shift in society; and 3) they require different forms of governance, ways of living and new approaches to the conduct of research.

To understand and address complex issues commonly found within food systems, such as food insecurity and ecosystem degradation, Morris and Martin (2009) suggest that ‘… food supply [is] best understood in terms of a complex, interacting food system involving land, animals, machinery, people and organizations not just unconnected crops, retail outlets, consumers’. Chase and Grubinger (2014, p. 2), support this notion and state that ‘the food system can be depicted as a much more complex and broad-reaching set of interactions, which go far beyond the production, processing and distribution of food to include the connection of food to the health of people and the environment’. Figure 13, developed by Chase and Grubinger (2014), offers a model to capture the usefulness of systems thinking with addressing the food-people-environment dynamics within the food system. It also considers the ‘factors that influence their interactions in the system, which uses inputs and generates outputs’ (Chase & Grubinger 2014, p. 2).

**Figure 13. The food-people-environment dimension in the food system**
Systems thinking that captures the food-people-environment dimension of food security also challenges socio-ecological explanations of food security. As depicted in Figure 14, socio-ecological models are limited in their scope with addressing health issues (including food security) in the food system (Chase & Grubinger 2014). According to Chase and Grubinger (2014) a socio-ecological view tends to focus on dietary health and human behaviour. Food production and distribution are depicted as a small part of this system, one of many practices, rather than central to human health, food security and ecological sustainability.

**Figure 14. Socio-ecological model depicting human health and the food system**

At the tertiary education level, systems approaches also enhance and develop graduate understanding of food security within the food system (Chornyak 2015; Combs et al. 1996; Francis et al. 2011; Hilimire et al. 2014; Morris & Martin 2009). Systems thinking assists with demonstrating ‘the way that things currently are…’ [Systems thinking models] act as starting places for learners to consider how whole systems, or components of systems, can be
redesigned along more sustainable lines’ (Morris & Martin 2009, p. 160). According to Combs et al. (1996), food systems thinking facilitates interdisciplinary, intersectoral collaboration. It also facilitates enhanced learning regarding the interrelationship between each element of the food system, human health (including food insecurity) and ecosystems (Barlett 2011; Chornyak 2015; Combs et al. 1996; Francis et al. 2001; Francis et al. 2011; Hilimire et al. 2014). Figure 13 (page 61) demonstrates the application of systems thinking to this study design.
4 RESEARCH METHODOLOGY

This section outlines the philosophical orientation and methodological approaches informing the design of this study. An overview of the pragmatic paradigm that guided the research is presented as well as a rationale for the use of mixed methods. A detailed section on methods for each phase of the research is also provided. In the final section ‘researcher reflexivity’ and ethical considerations are discussed.

4.1 Guiding theoretical paradigm

4.1.1 Pragmatic theory

In research there are a number of philosophies of thought, however, there are generally five main philosophies that are used to provide understanding and interpretation of what has been studied – namely positivism, post-positivism, pragmatism, transformative theory and constructivism (Creswell 2014; Gerber & Moyle 2004; Krauss 2005; Teddlie & Tashakkori 2009). These philosophies of thought can be viewed on a continuum with positivism on one end and constructivism on the opposite end of the continuum (refer Table 6). Positivism is ‘the central belief that there exists an objective reality and that “facts” are independent of any individual’s subjective experience and values’ (Hesse-Biber 2010, p. 26). On the other hand proponents of constructivism adhere to the idea that ‘knowledge is established through the meanings attached to the phenomena studied; researchers interact with the subjects of study to obtain data [and that] knowledge is context and time dependent’ (Krauss 2005, p. 759).

Pragmatic theory, however, does not adhere to a particular position which is commonly found in research. It tends to sit in the middle of positivist and constructivist paradigms and tries to reconcile them both to create meaning (Creswell 2014; Tashakkori & Teddlie 1998). Philosophically, pragmatic researchers accept the value that both perspectives generate (Johnson & Onwuegbuzie 2004; Morgan 2014; Volker & Scholl 2014).
Table 6. Paradigm contrast table comparing five points of view

<table>
<thead>
<tr>
<th>Dimensions of Contrast</th>
<th>Positivism</th>
<th>Post positivism</th>
<th>Pragmatism</th>
<th>Transformative</th>
<th>Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods</td>
<td>QUAN.</td>
<td>Primarily QUAN.</td>
<td>Both QUAL and QUAN; researchers answer questions using best methods.</td>
<td>Both QUAL and QUAN; community of participants involved in methods decisions.</td>
<td>QUAL.</td>
</tr>
<tr>
<td>Epistemology (researcher/participant relationship)</td>
<td>Objective.</td>
<td>Modified dualism.</td>
<td>Both objective and subjective points of view depending on stage of research cycle.</td>
<td>Both objectivity and interaction with participants valued by researchers.</td>
<td>Subjective; reality co constructed with participants.</td>
</tr>
<tr>
<td>Axiology (role of values)</td>
<td>Value free inquiry.</td>
<td>Valued in inquiry but their influence may be controlled.</td>
<td>Values important in interpreting results.</td>
<td>All aspects of research guided by social justice.</td>
<td>Value bound inquiry.</td>
</tr>
<tr>
<td>Ontology (nature of reality)</td>
<td>Naïve realism (an objective, external reality that can be comprehended).</td>
<td>Critical realism (external reality that is understood)</td>
<td>Diverse viewpoints regarding social realities; best explanation within</td>
<td>Diverse viewpoints regarding social realities; explanations that promote justice.</td>
<td>Ontological relativism, multiple, constructed realities.</td>
</tr>
</tbody>
</table>
### Possibility of causal linkages

<table>
<thead>
<tr>
<th></th>
<th>Real causes temporally precedent to or simultaneous to effects.</th>
<th>Causes identifiable in a probabilistic sense that changes over time; internal validity important.</th>
<th>Causal relations, but they are transitory and hard to identify; both internal validity and credibility important.</th>
<th>Causal relations that should be understood within the framework of social justice.</th>
<th>Impossible to distinguish causes from effects; credibility of descriptions important.</th>
</tr>
</thead>
</table>

### Possibility of generalisation

<table>
<thead>
<tr>
<th></th>
<th>Nomothetic statements possible.</th>
<th>Modified nomothetic position, external validity important.</th>
<th>Ideographic statements emphasised; both external validity and transferability issues important.</th>
<th>Ideographic statements emphasised; results linked to issues of social inequality and justice.</th>
<th>Only ideographic statements possible; transferability issues important.</th>
</tr>
</thead>
</table>

(Adapted from Teddlie and Tashakkori 2009, p. 88)
Emmanuel Kant was one of the first philosophers to challenge the claims that both perspectives made and sought to reconcile the two (Duemer & Zebidi 2009). Kant challenged the positivist paradigm and believed that ‘we can only understand our world in terms of perception rather than a purely objective reality… [he] rejected the ancient Greek conclusion that an objective reality existed, yet he was equally uncomfortable [with] the conclusion that nothing was knowable’ (Duemer & Zebidi 2009, p. 164). Pragmatism is therefore based on a relationship between what a person sees in the world and how they perceive what they see.

As Table 6 demonstrates, each of the worldviews also adhere to a particular research method. Positivist researchers generally use quantitative methods such as surveys and experiments for understanding phenomena, while constructivist researchers use qualitative methods such as ethnography, phenomenology, life histories or still photographs (Creswell 2003; Teddlie & Tashakkori 2009). Pragmatism, however, is less concerned with the dichotomy between quantitative and qualitative methods therefore it does not explicitly exclude or include either (Creswell 2003; Creswell & Plano-Clark 2011; Teddlie & Tashakkori 2009). It is more concerned with the convergence of the quantitative and qualitative methods that leads the researcher to obtain the results they require (Creswell 2014; Feilzer 2010; Tashakkori & Teddlie 1998). According to Feilzer (2010, p. 8) ‘…pragmatism accepts that there are both singular and multiple realities that are open to empirical inquiry and orients itself toward solving practical problems in the real world’. Johnson and Onwuegbuzie (2004, p. 16) make the case that ‘research approaches should be mixed in ways that offer the best opportunities for answering important research questions’.

This is of particular importance with regards to research that is undertaken in the area of sustainability in higher education where it has been argued that current research paradigms within education are inadequate for addressing the long-term needs of a sustainable future (Beringer & Adomßent 2008; Makrakis & Kostoulas-Makrakis 2016; Wals & Blewitt 2010). Makrakis and Kostoulas-Makrakis (2016, p. 145) state that:

*These inadequacies hinder attempts at planning and evaluating programmes that concern the re-orientation of university curricula to address sustainability. There is thus a need to question the dichotomy of quantitative–qualitative research and advance transformative conceptions of teaching, learning and curriculum.*

Although pragmatism appears to be underutilised in the area of sustainability the approach within health promotion is well utilised to further knowledge around health and illness.
McQueen (2001) asserts that health promotion prides itself on being multidisciplinary, regarding pragmatism as great value. Furthermore, multiple approaches that are used to improve health, reorientate healthcare systems and empower people should be welcomed (McQueen 2001). The use of quantitative and qualitative approaches to achieve this end was urged at the 51st World Health Assembly in 1998. A resolution was developed which urged all member states to ‘adopt an evidence-based approach to health promotion policy and practice, using the full range of quantitative and qualitative methodologies [that are available]’ (World Health Organisation (WHO) 1998, p. 1). This resolution was developed in recognition that the 21st century would hold new challenges and determinants for health and that there would be a need for new forms of action to free the potential for health promotion in society (WHO 1998).

The next section demonstrates the philosophies and concepts that are inherent in qualitative and quantitative research designs and how these compare with a pragmatic approach.

Table 7. A pragmatic approach

<table>
<thead>
<tr>
<th>Connection of theory and data</th>
<th>Qualitative Approach</th>
<th>Quantitative Approach</th>
<th>Pragmatic Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship to research process</td>
<td>Subjectivity.</td>
<td>Objectivity.</td>
<td>Intersubjectivity.</td>
</tr>
</tbody>
</table>

(Morgan 2007, p. 71)

Morgan (2007) outlines three key concepts that are inherent to pragmatic research: abduction, intersubjectivity and transferability (Table 7). These are discussed in detail below and provide a rationale for using a pragmatic approach in this study.

Abdication – Morgan (2007) argues that in reality researchers do not move in a linear fashion between theory and data, therefore research is rarely purely inductive or deductive. The author suggests that this is where pragmatic research has its strengths as this approach moves back and forth between the two. Abduction recognises and accepts the two approaches and
searches for useful points of connection (Morgan 2007; Pearce 2012; Teddlie & Tashakkori 2012).

**Intersubjectivity** – similar to the point made for abduction, Morgan (2007) and Pearce (2012) argue that the dichotomy between subjectivity and objectivity in research is rarely achieved. In pragmatic research this is not a point of contention, but rather a pragmatic approach accepts this reality. Rorty (1999, p. xxii) states that ‘both objective as well as subjective inquiry attempts to produce knowledge that best corresponds to, or represents, reality’. Morgan (2007, p. 72) states that ‘in a pragmatic approach, there is no problem with asserting both that there is a single “real world” and that all individuals have their own unique interpretations of that world’.

**Transferability** – pragmatic research steers away from the notions of generalizability associated with quantitative research or context specific results found in qualitative research to investigating the factors that make results usable and transferrable to other settings (Johnson & Onwuegbuzie 2004; Morgan 2007). According to Pearce (2012, p. 5), ‘it is unlikely that a study in one specific setting has no applicability beyond that setting, nor can one study be generalized to every possible historical or cultural setting’. As such transferability seeks to evaluate the results from a study and determine its contribution to the existing knowledge base (Feilzer 2010; Pearce 2012). In addition, Feilzer (2010, p. 14), states that ‘pragmatism is a commitment to uncertainty, an acknowledgement that any knowledge produced through research is relative and not absolute, that even if there are causal relationships they are transitory and hard to identify’.

Accordingly, adoption of the pragmatic paradigm to guide the research was considered appropriate for this study as the research questions were both quantitative and qualitative in nature. A pragmatic framework was also suitable for this study due to its interdisciplinary approach and disciplines (health promotion, environmental sustainability) that historically value pragmatism. As a result, the adoption of a pragmatic framework led to the use of a mixed methods approach.
4.2 Mixed Methods Research

4.2.1 Rationale for using mixed methods

Mixed methods research is ‘research in which the investigator collects, and analyses data, integrates the findings and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry’ (Tashakkori & Creswell 2007, p. 4). The premise behind mixed methods research is that both quantitative and qualitative research methods are important and useful and that researchers can draw on the strengths of each method to minimize the weaknesses that can occur in single research methods (Johnson & Onwuegbuzie 2004; Creswell & Clark 2007). Historically, extensive debates around research preferences in the social sciences resulted in a perceived dichotomy between quantitative and qualitative research methods (Creswell 2014; Glesne 2016; Lincoln et al. 2011; Oakley 1999; Stanovich 1990; Teddlie & Tashakkori 2009). Mixed methods research on the other hand indicates that despite inherent differences in philosophies there are a number of similarities. Johnson and Onwuegbuzie (2004) outline the following aspects of the paradigms that overlap:

1. Both use ‘empirical observations to address research questions’ (p. 15); describing, analysing and speculating about observed outcomes are common to both;
2. Safeguards are incorporated into inquiries to minimise bias and increase the validity of research; and
3. ‘The objectives, scope and nature of inquiry are consistent across methods and across paradigms’ (Johnson & Onwuegbuzie 2004, p. 15).

The strength of using a mixed methods approach is that one method can be complemented by another. This is useful in a research world that is becoming increasingly interdisciplinary, complex and dynamic (Doyle et al. 2009; Johnson & Onwuegbuzie 2004). Johnson and Onwuegbuzie (2004) contend that having an understanding of multiple methods can improve communication and collaboration between scholars and create superior research. Within the field of health promotion, it has been argued that mixed methods research should be recognised and accepted for providing robust evidence for improving health and wellbeing of populations (Dixey 2013; Marks 2002; McQueen 2001). With regards to food security, which is a common activity undertaken within health promotion (Burns 2004; Hughes 2009; Rosier 2011) Lemke and Bellows (2013), state that mixed methods approaches are relevant for this field of study. The authors call for mixed methods approaches that bridge the academic/non-
academic divide and result in collaborative efforts between universities and community organisations in order to inform and influence policy (Lemke & Bellows 2013).

With regards to sustainable development within higher education, Makrakis and Kostoulas-Makrakis (2016) argue that the reorientation of university curricular cannot be undertaken effectively using one research paradigm. The authors state that ‘a wide range of data must be collected combining various research methods and sources’ in order to achieve this goal (Makrakis & Kostoulas-Makrakis 2016, p. 145). Hesse-Biber (2010) state that the convergence of data collected by multiple methods increases the credibility of research findings. This is particularly important in a university setting where the implementation of sustainability policy and practice has been slow (Del La Harpe & Thomas 2009; Velazquez 2006). According to Krizek et al. (2011, p. 20) the highly complex governance structures found within universities attributes to such resistance and slow uptake of sustainability including ‘competing research, education and service outcomes, management challenges akin to small cities and new domestic competition from education for-profit enterprises which may result in campuses less likely to move forward on sustainability if programs and revenues are shrinking’. According to De La Harpe and Thomas (2009), there are a number of ways to overcome these challenges including the collection and identification of evidence from multiple sources which may create less resistance.

Considering the interdisciplinary nature of this study, which uses environmental sustainability and health promotion paradigms for reorienting university curricular around food security, a mixed methods approach within a pragmatic framework was deemed suitable.

4.2.2 Sequential explanatory design

A sequential explanatory design to mixed methods starts with the collection and analysis of quantitative data, followed by the collection and analysis of qualitative data to explain the initial quantitative results, such as significant/non-significant results, or surprising findings (Creswell & Plano-Clark 2011; Hesse-Biber 2010; Ivankova et al. 2006). The quantitative phase can also provide a representative sample that can be used in the qualitative component of a study (Creswell & Plano-Clark 2011; Hesse-Biber 2010). For this study, however, the researcher used a parallel sampling strategy where the samples in the quantitative and qualitative phase are different but are selected from the same population of interest.
Onwuegbuzie & Collins 2007). This sampling strategy results in different participants participating in each phase (Onwuegbuzie & Collins 2007).

A sequential explanatory design generally gives priority to the quantitative aspect. This is where the study is driven by the quantitative component and the qualitative supplements and improves understanding of the quantitative findings (Creswell & Plano-Clark 2011; Ivankova et al. 2006). The qualitative component that follows is also usually smaller than the quantitative phase (Creswell & Plano-Clark 2011; Ivankova et al. 2006). Literature, however, indicate that it is possible for the qualitative component to be given a higher priority than the quantitative aspect with addressing the research questions (Creswell & Plano-Clark 2011; Hesse-Biber 2010; Morgan 1998).

According to Ivankova et al. (2006), such decisions can be made at any stage of the research process, whether at the study design phase or during data collection or analysis. Hesse-Biber (2010, p. 107), also supports this notion stating that ‘there are myriad sequential designs and motivations that may come about, making the process of mixing methods more iterative than a static process’. In this study, a decision was made to prioritise the qualitative component over the quantitative aspect during the data analysis phase. This decision was based on two factors:

1) The data collected during phase 1, although robust, was limited to one simple-descriptive survey, which resulted in a relatively low response rate (6.1%);
2) The data collection in phase 2 and 3 of the study resulted in an extensive dataset in comparison to the quantitative component.

Figure 16 demonstrates how a sequential explanatory design was used in the three phases of this study design:

- Phase 1: Delivery of a quantitative online survey to current health promotion practitioners within Australia.
- Phase 2: Qualitative interviews with current health promotion practitioners within Australia.
- Phase 3: Qualitative interviews with health and sustainability academics teaching food security using environmental sustainability principles and document analysis of course materials, such as unit guides, lecture slides, tutorial outlines which academics provided.
Figure 15. A sequential explanatory mixed methods approach exploring the role of health promotion in addressing food security from an environmental sustainability perspective

In keeping with the sequential explanatory design, once the data collection phase was complete the data were then analysed separately and triangulated to produce the findings. According to Bazeley (2009), data gathering and analysis should be conducted separately when the purpose of the research is to triangulate the results through corroboration and convergence. Giddings and Grant (2009) assert the strength of triangulation, stating its appropriateness in studies where multiple data collection methods are used. The authors contend that the strength of triangulation is to ensure validity of the findings through comprehensiveness and convergence of patterns (Giddings & Grant 2009). Accordingly,
triangulation was used in this study to explore synergies and opportunities between Australian health promotion practice and tertiary education. Triangulation of the data is discussed in detail in section 4.3.4.

4.3 Methods
The following section outlines the methods that were used in this study. The methods selected reflect a pragmatic mixed methods paradigm. The research study has been divided into three phases and each phase will discuss the following:

a) Overview of design;

b) Sampling and recruitment;

c) Selection criteria that was used for each phase;

d) Data collection methods;

e) Instrumentation; and

f) Data analysis.

Triangulation of the data and validity will be discussed in detail in section 4.3.4 and 4.3.5.

4.3.1 Phase 1. Online Survey

4.3.1.1 Overview of Design
The first phase of the research was quantitative, using a descriptive research design, with the purpose of describing the characteristics of a sample at one point in time (Mertens 2015). An online survey was designed with a total of 30 questions. The survey questions took several forms including open-ended items, multiple choice and Likert scale items in order to answer the research questions (de Vaus 2002; Graziano & Raulin 2010). The online survey was distributed to health promotion practitioners in all states and territories of Australia. The survey was used to answer research questions 1, 2, 3 and 5 of the study. Figure 16 outlines Phase 1 of the research in relation to the research questions.
4.3.1.2 Sampling and Recruitment

A non-probability sampling strategy was used to target health promotion practitioners in this phase. According to Lewin (2005, p. 218), ‘this approach is adopted when researchers target a particular group and are not always seeking to generalise findings to the population overall’. This sampling strategy was considered appropriate as the research questions aim to obtain an overview of current health promotion practice at the practitioner level. Participants in this study included health promotion practitioners in all states and territories of Australia. Participants were recruited primarily through the Australian Health Promotion Association’s (AHPA) membership database (approximately 1000 members). A board member of the AHPA known to one of the PhD supervisors was approached to assist with survey dissemination. The AHPA was the primary source for delivery of the online survey in this study. Although it is acknowledged that this targeted approach may have created potential limitations with the response rate, a deliberative/targeted approach was undertaken to minimise the risks associated with third party recruitment, e.g. capturing allied health or primary health professionals without knowledge or experience in health promotion.
The survey was approved for circulation by the AHPA board on 15 August 2013 and sent to members via the National Secretary of the AHPA. Due to privacy policies within the AHPA this method of recruitment was required to maintain confidentiality of members. This method of recruitment is recognised within research and referred to as third party contact, where contact of participants is made via someone else other than the researcher (Deakin University 2016). An invitation to participate in the study, along with the Plain Language Statement and survey link was embedded within an email and sent to members for 4 weeks during September 2013 (September 2\textsuperscript{nd} 2013 – September 23\textsuperscript{rd} 2013). A reminder email was sent 2 weeks after the release date to help increase the number of practitioners responding to the survey.

### 4.3.1.3 Selection Criteria

Health promotion practitioners who were currently working in the field were invited to participate in the online survey using the mechanisms outlined above. Practitioners from various backgrounds (i.e. length of service, qualifications in health promotion) and ages were invited to participate in the online survey. In addition to background, practitioners from all states and territories of Australia practicing in various organisations (e.g. NGO, community health) were invited to participate in the online survey (demographic profile of practitioners who participated in the survey is outlined in Table 8). Practitioners were chosen for their association with or representation of key organisations and/or initiatives in the health promotion field, capable of representing the views and the experiences of constituents and not for any personal characteristics they possessed.

### Table 8. Demographic profile of Health Promotion practitioners from online survey

<table>
<thead>
<tr>
<th>Demographic information</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>(n=58)</td>
</tr>
<tr>
<td>- 18-30</td>
<td>20</td>
</tr>
<tr>
<td>- 31-40</td>
<td>10</td>
</tr>
<tr>
<td>- 41-50</td>
<td>10</td>
</tr>
<tr>
<td>- 51-60</td>
<td>12</td>
</tr>
<tr>
<td>- 60+</td>
<td>6</td>
</tr>
<tr>
<td>Gender</td>
<td>(n= 58)</td>
</tr>
<tr>
<td>- Male</td>
<td>9</td>
</tr>
</tbody>
</table>
- Female 49

<table>
<thead>
<tr>
<th>Length of experience in Health promotion field</th>
<th>(n=56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td>5</td>
</tr>
<tr>
<td>1-5 years</td>
<td>21</td>
</tr>
<tr>
<td>6-10 years</td>
<td>10</td>
</tr>
<tr>
<td>11-20 years</td>
<td>11</td>
</tr>
<tr>
<td>Over 20 years</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State/Territory of practitioner</th>
<th>(n=60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Capital Territory</td>
<td>0</td>
</tr>
<tr>
<td>New South Wales</td>
<td>24</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>2</td>
</tr>
<tr>
<td>Queensland</td>
<td>2</td>
</tr>
<tr>
<td>South Australia</td>
<td>4</td>
</tr>
<tr>
<td>Tasmania</td>
<td>1</td>
</tr>
<tr>
<td>Victoria</td>
<td>15</td>
</tr>
<tr>
<td>Western Australia</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Organisation profile of health promotion practitioners</th>
<th>(n=61)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Health Service</td>
<td>25</td>
</tr>
<tr>
<td>Education provider</td>
<td>6</td>
</tr>
<tr>
<td>Local Government</td>
<td>7</td>
</tr>
<tr>
<td>NGO</td>
<td>15</td>
</tr>
<tr>
<td>Primary Care Partnership</td>
<td>2</td>
</tr>
<tr>
<td>Primary Health Care</td>
<td>2</td>
</tr>
<tr>
<td>State Government</td>
<td>1</td>
</tr>
<tr>
<td>Unidentified</td>
<td>3</td>
</tr>
</tbody>
</table>

### 4.3.1.4 Data Collection

The primary data collection tool was an online survey. Kaplowitz et al. (2004) report on a number of studies which have found that online surveys can be a useful means of conducting research within populations that regularly use the internet. It was assumed that the majority of health promotion practitioners have access to the internet through their organisation and be allocated an email address. This assumption is based on the Australian Health Promotion
Core Competencies framework that states that ‘an entry level health promotion practitioner is able to operate a PC, word processing and email systems’ (Australian Health Promotion Association 2009, p. 5). This made it viable to administer a survey online and facilitated the human research ethics requirement of each participant remaining anonymous. Online surveys also have the advantage of being easy to use and lowering costs, including waste (Kaye & Johnson 1999). For example, there was a considerable reduction in paper consumption for this study which would otherwise have been quite high if each survey was printed and mailed. The online survey was also an efficient method for reaching all states and territories simultaneously. Other studies such as Bethell et al. (2004) support this notion, where they found internet-based data collection to be a timely and efficient method of collecting data in their study.

4.3.1.5 Instrumentation

The survey was developed from information derived from literature in the field as no pre-existing surveys were found that explore food security within a sustainable development framework in health promotion. According to Devlin (2006), this is an acceptable method when there are no pre-existing measures available to the researchers. During the survey’s development, it was apparent that the topic of the thesis, i.e. environmental sustainability required some clarity around what was going to be measured. The researcher used de Vaus (2002) dimensionalising process of abstract concepts. According to de Vaus (2002) abstract concepts such as environmental sustainability (similar to health and wellbeing) are not directly measurable. ‘Concepts are terms which people create for the purpose of communication and efficiency’ (de Vaus 2002, p. 43). To ensure the survey addressed the research questions, the study employed de Vaus two recommended processes for survey development (de Vaus 2002).

1) A definition of the concept as defined in literature (e.g. text books, dictionaries, encyclopaedias, journal articles) and internet searching – in this case what environmental sustainability definitions are regularly used to develop initiatives with a focus on sustainable food.

2) The development of indicators of the concept as it has been defined. The indicators are what were measured within the survey (de Vaus 2002).

The dimensionalising process was undertaken for the Likert scales. Figure 13 demonstrates this process below. The first step was to determine the definitions typically used within
environmental sustainability initiatives that focus on food. This resulted in the identification of 12 definitions: Food Waste, Paddock to Plate, Slow Food, Seasonal Food, Fair Trade, Food Miles, Food Swaps, Urban Agriculture, Animal Welfare, Farmers Markets, Food Sovereignty and Sustainable Farming Methods. An additional definition was also identified: Health, Economic, Social, Cultural or Environmental benefits of Plant Based Diets. A decision was made to include this in the dimensionalising process due to its use in both environmental sustainability and health promotion initiatives. Although not a definition per-se ‘Education’ was identified during the dimensionalising process and included in the survey as food literacy (through education) is critical in ensuring food security among at-risk groups (Sumner 2013). In addition, two health promotion concepts were also included in the survey, these included: healthy eating and nutrition and culturally appropriate food (culture) to gauge the extent of use in current food security initiatives. A total of 16 definitions, encompassing environmental sustainability and health promotion definitions were included within the survey to determine their use and extent of use within food security initiatives. The next step outlined in Figure 17 resulted in the development of indicators for the 16 environmental sustainability definitions. This process results in giving a clear indication of what questions need to be asked in a survey and what definitions the researcher is interested in measuring (de Vaus 2002).

Figure 17. Dimensionalising environmental sustainability within food security initiatives
<table>
<thead>
<tr>
<th>Environmental Sustainability Definition</th>
<th>Indicator within online survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Welfare</td>
<td>Initiatives consider animal welfare and integrate these values when purchasing or growing food.</td>
</tr>
<tr>
<td>Education</td>
<td>Population group is educated about concepts such as food miles, food sovereignty, paddock to plate, slow food, food waste, seasonal food, animal ethics, fair-trade etc.</td>
</tr>
<tr>
<td>Fair Trade</td>
<td>Where possible foods are purchased in initiatives that are Fair Trade accredited.</td>
</tr>
<tr>
<td>Food Miles</td>
<td>Initiatives consider where food is purchased. Food is purchased mainly from local sources, e.g. farmers markets, market gardens, from within the state.</td>
</tr>
<tr>
<td>Food Sovereignty, Principle 1</td>
<td>Population group is part of the creation and implementation of a local food system that integrates the cultural, social, environmental, health and economic context of that area.</td>
</tr>
<tr>
<td>Food Sovereignty, Principle 2</td>
<td>Population group is given the opportunity to develop skills and knowledge to grow and harvest its own food.</td>
</tr>
<tr>
<td>Food Sovereignty, Principle 3</td>
<td>Food system follows ecologically sustainable principles by protecting &amp;/or enhancing biodiversity, soil and waterways, e.g. organic pesticide/fertilizer use, conservation programs.</td>
</tr>
<tr>
<td>Food Sovereignty, Principle 4</td>
<td>Initiatives advocate for small-scale Australian farmers to be fairly and equitably rewarded. Farmer health and wellbeing needs are considered.</td>
</tr>
<tr>
<td>Food Swap</td>
<td>Initiatives have food swap activities with population group, e.g. share the harvest concepts.</td>
</tr>
<tr>
<td>Food Waste</td>
<td>Initiatives consider how food is packaged and food is chosen with minimal packaging.</td>
</tr>
<tr>
<td>Paddock to Plate</td>
<td>Partnerships developed with local Australian small-scale farmers in food security program.</td>
</tr>
</tbody>
</table>
**Plant based diets**
Initiatives provide information/education on plant based diets and outline a combination of health, economic, social, cultural or environmental benefits.

**Seasonal Foods**
Initiatives utilise foods that are in line with seasonal availability.

**Slow Food**
Food purchased considers a combination of taste, culture, environmental, social and health aspects.

**Sustainable Farming Practices**
Initiatives use organic/biodynamic, Permaculture, community supported agriculture or other sustainable farming methods.

**Urban Agriculture**
Initiatives use urban agriculture, e.g. edible streetscapes, city farms, community gardens.

The survey was then pilot tested with nine people who were either 1) staff members within the School of Health and Social Development at Deakin University that have either teaching experience in health promotion and/or have worked in the field of health promotion 2) one staff member was from the School of Environment and Life Sciences at Deakin University, familiar with environmental sustainability and 3) one board member from Environment Victoria with experience in health promotion and environmental sustainability. According to Punch (2005), there are a number of variables to test surveys for, these include: comprehension, clarity, ambiguity and difficulty in responding. Questionnaire length and time should also be tested (Punch 2005). In addition, Oppenheim (1992) states that survey layout, colour and contrast should also be tested. Using this set of criteria as guidelines, the survey was edited once feedback was received. In addition, pilot testers were given a question-answer sheet to complete (refer Appendices, section 10.1) for question-answer sheet). The questions asked testers whether the survey questions were clear and easily understood and whether the survey is the appropriate length. For example, ‘were the instructions easy to follow?’ ‘are any of the questions ambiguous?’ and ‘how long did it take you to complete the questionnaire?’ The survey was revised five times using this process to refine the questions and improve its validity. The final version of the online survey is provided in Section 10.2 (Appendices).

Once testing was complete the survey was developed using SurveyMonkey. SurveyMonkey is a leading provider of web-based survey design solutions and is commonly used by the tertiary sector in all disciplines (SurveyMonkey 2017). In addition, SurveyMonkey
administrators have partnered with the US Education Department and Harvard University to ensure the templates give high quality data (SurveyMonkey 2017). There are also a number of benefits in using this service including 1) the formation of a professional, easy to use survey 2) the formation of a survey web-link which was attached to the email invitation 3) capacity to collate the data automatically and transfer it into SPSS for immediate analysis 4) the reduction of paper and time that would otherwise have to be allocated in typing responses to each survey individually 5) and the development of a survey that is password protected.

An annual subscription was bought and maintained for the remainder of candidature. The survey contained three sections to assist with answering the research questions 1) food security initiatives within the organisation 2) knowledge and competencies regarding environmental sustainability concepts in relation to food security and 3) demographic information. These are outlined in Table 9.

Table 9. Survey format

<table>
<thead>
<tr>
<th>Section</th>
<th>Survey</th>
</tr>
</thead>
</table>
| **Section 1** | • Explored any initiatives that address food security and if so which health promotion theories, frameworks and approaches were used when developing these initiatives.  
• Whether environmental sustainability concepts in relation to food security (e.g. seasonal food, urban agriculture etc.) were used when developing initiatives.  
• Drivers, barriers and constraints with regards to developing food security initiatives using environmental sustainability principles in their organisation. |
| **Section 2** | • To ascertain health promotion practitioner self-reported knowledge and ability when developing food security initiatives using environmental sustainability concepts such as seasonal food, food sovereignty, urban agriculture etc. |
| **Section 3** | • Obtained demographic information such as length of service, age range and gender of participant. |
This section also asked for background information in food or food security to determine whether practitioners had received any formal or informal training in the area or other relevant experience.

4.3.1.6 Data Analysis

At the end of the four-week period of data collection, the survey responses were transferred into IBM SPSS Statistics 23. From the number of health promotion practitioners that were contacted (approximately 1000 members) from the AHPA, a total of 81 health promotion practitioners responded to the survey (8.1% response rate). This response rate is similar to those obtained by Patrick and Kingsley (2016) in their 2015-2016 mixed-methods study with Australian health promotion practitioners (n=82). It was evident, however, after viewing the data in SPSS that there were a number of incomplete datasets in the survey, i.e. practitioner completed first compulsory question ‘I have read and understood the plain language statement above and give my consent to participate in the survey’ but did not continue with the survey (n= 10). A further 10 practitioners completed the first four questions in the survey, however, did not proceed any further. Incomplete data as found in this study are often referred to as participant non-response (Oppenheim 1992; Sapsford 2007). Oppenheim (1992, p. 280) recommends ‘listwise deletion of cases, which refers to the deletion of all the data of an entire case from the analysis because it is in some ways incomplete’.

Although there is potential to introduce bias into a sample from listwise deletion (Oppenheim 1992; Sapsford 2007), a decision was made to delete cases with participant non-response (n=20) as they were either not useful (e.g. compulsory question only) or essential with answering the research questions. According to Pallant (2005) cleaning the data file (e.g. deleting or moving variables, or adding/deleting cases) is often a requirement before analysis can begin. A total of 61 practitioner datasets remained for analysis (6.1% response rate). Item non-response was also noted within the dataset for other questions (e.g. environmental sustainability principles in section 6.2 yielded 45 - 46 participant responses). According to Tsikriktsis (2005, p. 54) missing data can occur ‘when the respondent has no opinion or insufficient knowledge to answer the question’. Insufficient knowledge may apply for practitioners in this study as environmental sustainability principles are a novel approach within health promotion. Item non-response may also be attributed to the survey layout (de Vaus 2002). It may have been pertinent to include a ‘not applicable’ category for several
questions in the survey to reduce item non-response. One respondent from the survey, for example, highlighted that “health promotion initiatives are so varied that not all of the [environmental sustainability] concepts are applicable to work”. Other strategies to increase participant response within online surveys include: 1) reminding the participants to complete the missed question or enforcing question answering requirements (de Vaus 2002). According to de Vaus (2002) a reminder is preferable than enforcement; 2) ordering questions from easy to more difficult; and 3) providing a more engaging interface (de Vaus 2002).

Within quantitative studies there has been much debate over the years on what constitutes the desired response rate within survey research (Dey 1997; Krosnick 1999; Nulty 2008). Generally the higher the response rate the greater the ability to generalise the results to the wider population (de Vaus 2002; Dey 1997; Nulty 2008). A response rate of 10 percent or lower tends to be depicted as being quite low (Dey 1997). Low response rates within surveys (including online surveys), however, are common problems in research, with literature demonstrating a reduction in the number of people participating in surveys over the years (Dey 1997; Krosnick 1999; Sheehan 2001). A number of reasons have been proposed for low response rates including: 1) over surveying of populations with email and internet access (Porter et al. 2004; Porter 2004; Sheehan 2001); 2) salience, where a topic may be of interest to only a few people that are approached (Cook et al. 2000; Sheehan 2001; Sills & Song 2002); 3) those that respond tend to have the belief that it is their responsibility to respond to surveys as it may lead to effective change in the world around them (Krosnick 1999); and 4) questions inapplicable to the respondent (Black 1999).

Despite the low response rate within this study, literature indicate that in a number of cases response representativeness is more important than the response rate in research (Krosnick 1999; Cook et al. 2000; Schouten et al. 2009). Krosnick (1999, p. 540), for example, states:

... it is not necessarily true that representativeness increases monotonically with increasing response rate. Remarkably, recent research has shown that surveys with very low response rates can be more accurate than surveys with much higher response rates.

In addition, the overall purpose of sampling in mixed methods differs from a purely quantitative inquiry. The aim in mixed methods is to generate a sample that will address the research questions rather than seeking generalisability (Teddlie & Yu 2007; Teddlie &
Tashakkori 2009). This idea has evolved from the viewpoint of pragmatism which steers away from the notions of generalisability associated with quantitative research or context specific results found in qualitative research to investigating the factors that make results usable and transferrable to other settings (Johnson & Onwuegbuzie 2004; Morgan 2007). As such the researcher has followed this methodology of transferability as discussed in Section 4.1.1.

The next stage of the data analysis process was to check for errors, this is particularly important to ensure that values do not fall outside of a range of possible values for a variable (Pallant 2005; Chen 2012). This was undertaken using descriptive statistics to determine the maximum value obtained. Once errors and missing data were accounted for a codebook was created of the final dataset. A codebook is a tool which converts information from each case into a format that SPSS can understand (Creswell & Plano-Clark 2011; Pallant 2005). The data in this phase was then analysed using a descriptive research design. According to Thomlinson (2001, p. 2) the major purpose of descriptive studies is to describe a social phenomenon when it is relatively new or to ‘provide an overall picture of a population or phenomenon by describing situations or events’. Thomlinson (2001 p. 2) also states that descriptive research can ‘initiate a change in services or facilitate further research’. A descriptive research design was therefore deemed suitable for this phase as 1) health promotion practitioner perceptions regarding their capacity to develop food security initiatives using an environmental sustainability perspective is an unknown phenomenon and 2) there is also the potential for this study to initiate change within health promotion degrees at the tertiary level.

The data was analysed primarily using frequency distributions; that is the number of participants that fall into each category (Graziano & Raulin 2010). The data was then presented as percentages to convey the proportions of participants in a particular category, for example, the percentage of practitioners using environmental sustainability principles within food security initiatives. Using percentages to convey proportions is considered a suitable method to display raw data in research (Sapsford 2007; Thomlinson 2001). Means were used for the Likert scales to demonstrate the weighting of each environmental sustainability concept. Standard deviations (SD) and confidence intervals (CI) were also used to interpret the quantitative data. SD’s are used to assess whether values around the mean are narrowly or widely dispersed (Healey 2005). CIs provide a level of certainty that the mean of the sample or population fall somewhere between the upper and lower intervals of the CI score (Sirkin
2006). For this study the CI was set at the 95% level. The data from the online survey were then displayed as graphs and tables to offer clarity within the dataset, as most people find graphic representation easier to understand than other statistical procedures (Black 1999; Graziano & Raulin 2010; Unsworth 2004).

4.3.2 Phase 2 and 3 Interviews

Phase 2 and 3 of this study will be discussed together in section 4.3.2. This decision was made based on 2 factors 1) both interviews use a qualitative descriptive design and 2) to avoid repetition with discussing each element.

4.3.2.1 Overview of Design

Phase 2 and 3 involved conducting qualitative interviews using Sandelowski’s (2000) qualitative description research design with Australian health promotion practitioners and academics within Australian universities. Health promotion practitioners currently practising within Australia were invited to participate in phase 2 of the study. Academics from a range of disciplines teaching food security using environmental sustainability principles at both the undergraduate and postgraduate level were invited to participate in phase 3. Brannen and Halcomb state (2009) that qualitative interviews in mixed methods research are useful for developing a deeper understanding or explanation of quantitative findings. They are also used to ‘produce rich interpretations of the phenomenon’ being studied (Thomlinson 2001, p. 2).

Phase 2 interviews with health promotion practitioners provided a deeper understanding of the quantitative findings of the survey. ‘In isolation, the survey research would have been unable to offer much in the way of explaining the findings, their meanings, and how to understand and thus interpret them’ (Feilzer 2010, p. 13). The interviews thus provided sufficient depth and enhanced understanding of practitioner experiences with using environmental sustainability principles within food security initiatives. The interviews revealed the opportunities and barriers for their use within initiatives as well as practitioner competency gaps for the implementation of environmental sustainability principles. In addition, practitioners were invited to discuss their level of expertise in food security and environmental sustainability, including where they obtained such experience. These discussions with practitioners resulted in a rich and comprehensive dataset which was able to contribute to a well-rounded understanding of the phenomena being studied. The information generated from phase 2 interviews answered research questions 1, 2, 3 and 5 in this study (Figure 18).
Phase 3 interviews with academics produced rich descriptions of the types of unit and course programs that exist within Australia, particularly around food security using the EfS approach. The discussions with academics provided a comprehensive understanding of the opportunities and barriers for the development and delivery of such academic programs. It also highlighted gaps that exist within university curricular, including content and teaching approaches for developing student learning and skills around food security using environmental sustainability principles. The information generated from phase 3 interviews answered research question 4 and 5 in this study and contributed to further understanding of phase 1 of the survey and phase 2 of the interviews with health promotion practitioners. This information is presented in Figure 18 below.

**Figure 18. Phase 2 and 3 interviews in relation to the research questions**

<table>
<thead>
<tr>
<th>Phase 2 Interviews with health promotion practitioners</th>
<th>Research Question 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What are the perceptions of Australian health promotion practitioners concerning their capacity to address food security using environmental sustainability principles?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Question 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>How are current Australian health promotion practitioners and the programs they deliver addressing food security?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Question 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>To what extent are environmental sustainability principles used when developing and delivering such health promotion food security programs in Australia?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Question 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the implications of the findings for Australian University health promotion degrees?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase 3 Interviews with health and sustainability academics</th>
<th>Research Question 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What role do EfS based approaches within university programs have in the development of Australian health promotion graduate competencies to address food security using environmental sustainability principles?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Question 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the implications of the findings for Australian University health promotion degrees?</td>
</tr>
</tbody>
</table>
4.3.2.2 Sampling and Recruitment

Purposive sampling methods are the most common sampling methods within qualitative inquiries (Llewellyn et al. 2004; Teddlie & Yu 2007; Teddlie & Tashakkori 2009). They are useful in circumstances when certain individuals are able to provide rich or in-depth information about the issue being examined (Carpenter 2013; Sandelowski 2000; Schofield 2004). This information ‘cannot be obtained as adequately through other channels’ (Liamputtong 2013, p. 18). The researcher initially used homogenous sampling to recruit health promotion practitioners and academics. Homogenous sampling involves ‘selecting a particular group who are as alike as possible so that their common experience can be studied in depth’ (Llewellyn et al. 2004, p. 227).

For phase 2 of the study Health Promotion practitioners were initially identified through existing contact lists that the researcher and supervisors had obtained through practice in the field. According to Creswell (2003, p. 156), this method of recruitment is referred to as ‘single-stage sampling where the researcher has access to names in the population and can sample the people directly’. A similar process was undertaken in phase 3 of the study where academics were identified through existing contact lists that the researcher had obtained through practice in the field. Other methods included scanning university public websites for relevant participants. Potential practitioners in phase 2 and academics in phase 3 were contacted via email and invited to participate. A follow-up phone call was made one week after the initial email, this was particularly important for academic staff as many commented on the busy schedules and timeframes they were under and appreciated a second email.

To increase the number of participants in both phases, snowball methods were also undertaken. According to Carpenter (2013, p. 119) this is a common activity which ‘relies on existing participants to identify acquaintances who fit the inclusion criteria of a study’. This was undertaken at the completion of their interview where participants were asked whether they knew of other relevant health promotion practitioners or academics who may be interested in participating in the study.

4.3.2.3 Selection Criteria

For phase 2, health promotion practitioners who were currently working in the field across all states and territories of Australia were invited to participate in the interviews. Practitioners from various backgrounds (i.e. length of service, qualifications in health promotion) and ages were invited to participate in the interviews. In addition to background, practitioners from all
states and territories of Australia practicing in various organisations (e.g. NGO, community health) were invited to participate in the interviews. Age or experience was not included in the selection criteria as the researcher wanted to obtain the views of practitioners from a range of experiences and demographic profiles. Practitioners were also chosen for their association with or representation of key organisations and/or initiatives in the health promotion field, capable of representing the views and the experiences of constituents and not for any personal characteristics they possessed. Internationally based practitioners were excluded as this study endeavoured to explore the views from an Australian perspective.

In phase 3, academics that currently teach at a university in Australia and teach food security using environmental sustainability principles (in undergraduate/postgraduate level) were selected to participate in the interviews. Academics with various teaching experience and appointment at their university (i.e. lecturer, associate professor) were invited to participate in the interviews. In addition, academics of various ages from all states and territories of Australia were invited to participate in the interviews (demographic profile of practitioners is outlined in further detail in section 5.1). Academics specialised in a range of disciplines including: health promotion, education, sociology, nutrition, dietetics, public health, arts, environmental science, business, policy and community development. Although the focus of this study was on health promotion, it was important to gain an interdisciplinary view of the topic. According to Hilimire et al. (2014), food systems are complex and require an interdisciplinary approach to curriculum design. Furthermore, Hilimire et al. (2014, p. 726) state that ‘an isolated, disciplinary problem-solving approach is inadequate for the task of analysing and addressing today’s persistent and newly emerging multi-dimensional food systems issues’. As this study focused on health promotion’s role in training pre-service graduates at the university level, educators at a primary, secondary or TAFE institutions were excluded from the study.

4.3.2.4 Data Collection

Data was collected via telephone and face-to-face interviews for both health promotion practitioners (phase 2) and academics (phase 3). In qualitative research telephone interviews are considered to be just as effective as face-to-face interviews and in some cases may have an advantage (Novick 2008). Novick (2008) explored all qualitative studies in peer reviewed literature that used telephone interviews as the data collection method as well as a number of relevant study design text books on the subject to identify the benefits of telephone interviews. Three themes emerged: participant involvement, data quality and logistical
application. Novick (2008) reported that, in telephone interviews, participants were more relaxed, willing to talk more freely and disclose personal information. The quality of the data produced was sound and described as ‘rich, vivid, detailed and of high quality’ (Novick 2008, p. 393). Logistically, telephone interviews were described as having fewer costs, offering improved accessibility to participants in remote locations, increased safety for the researcher, requiring less space and allowing the researcher to take notes unobtrusively (Novick 2008; Oppenheim 1992). Telephone interviews for this study were deemed appropriate to generate information to answer the research questions, in addition to face-to-face interviews. This was particularly useful as the study was undertaken throughout Australia, which was more cost effective and efficient in reaching participants in most states and territories of Australia.

Telephone and face-to-face interviews were undertaken with 16 health promotion practitioners and 15 academic staff in this study. Interviews with practitioners and academics were between 30 minutes to 1.5 hours in length. All interviews were recorded using an audio-recorder. According to Serry and Liamputtong (2013), recording in-depth interviews is strongly suggested as taking notes during interviews may be distracting. It is also beneficial in returning to a permanent record where it is possible to re-listen to the interview to obtain further understanding of what was discussed (Serry & Liamputtong 2013). Although sample size was small saturation was achieved based on three criteria outlined by Fusch and Ness (2015, p. 1408), 1) ‘… when there is enough information to replicate the study, 2) when the ability to obtain additional new information has been attained, and 3) when further coding is no longer feasible’. According to Litchman (2010), sample size does not provide an indication that saturation has been achieved. This is also supported by Sandelowski (1995) who states that sample size is a matter of judgment and that most qualitative research designs use a small number of individuals and cover material in depth. Litchman (2010, p. 142), further states that ‘it is quite common to see studies with fewer than 10 respondents; sometimes only a single person is studied’.

**4.3.2.5 Instrumentation**

Semi-structured interview schedules for phase 2 and phase 3 were developed which assisted with generating information to answer the research questions. According to Serry and Liamputtong (2013, p. 41), semi-structured interviews are useful for ‘eliciting information but at the same time allow the participants to elaborate on their responses’. This is considered a ‘useful framework as the researcher can adapt their in-depth interview format to their specific needs’ (Serry & Liamputtong 2013, p. 41). All questions were open ended which is
beneficial for allowing ‘unexpected turns or digressions that follow the informants interest or knowledge’ common in in-depth interviews (Johnson & Rowlands 2012, p. 108). According to Neergaard et al. (2009, p. 2), the interview guide used in a qualitative descriptive study is ‘slightly more structured than in other qualitative methods although it is still modified and transformed as themes emerge during the analysis’.

Two separate interview schedules for health promotion practitioner’s and academic staff were developed. During the development of the interview schedules the researcher followed the recommendations set out by Minichiello et al. (2004) who suggest developing interview schedules after the researcher is familiar with the topic under investigation. This involves reading relevant literature or talking to people in the area. The two interview guides in this study were developed with these recommendations in mind. Guidance from the PhD candidate’s supervisors, both who have worked in the field and at the university level at the nexus of health promotion and environmental sustainability were sought in developing the interview schedules. The PhD candidate’s own professional experience in this area was also able to facilitate the development of the interview schedules. In addition, the researcher selected several questions from the survey in phase 1 and incorporated these into the interview schedules. This is a common strategy in sequential explanatory design studies to increase understanding of the phenomena under investigation and to improve validity of the findings (Creswell & Plano-Clark 2011; Creswell 2014; Hesse-Biber 2010; Ivankova et al. 2006).

The two interview schedules were then pilot tested with four staff members at Deakin University teaching at the nexus of health promotion and environmental sustainability. The health promotion practitioner interview schedule was revised five times using this process and the academic interview schedule revised four times to refine the questions and improve their validity. A brief outline of the two schedules are outlined below in Table 10. Appendices 10.3 and 10.4 contain the full interview schedules.

**Table 10. Outline of interview schedules**

<table>
<thead>
<tr>
<th>Section</th>
<th>Health Promotion interview schedule</th>
<th>Academic interview schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
<td>Defining food security from a practitioner’s perspective.</td>
<td>Unit/course information, e.g. undergraduate/postgraduate, discipline, faculty, core/elective.</td>
</tr>
</tbody>
</table>


Section 2  
Food security initiatives undertaken in organisation and environmental sustainability principles used. Strengths/limitations, barriers/opportunities discussed.  
Environmental sustainability principles used to teach food security and benefits/limitation of such principles within programs.

Section 3  
Practitioner competencies around food security using environmental sustainability principles.  
Teaching approaches used in unit/course, e.g. study tours, community garden, reflective journals. Strengths and limitations of approaches also discussed.

Section 4  
Graduate competencies around food security using environmental sustainability principles.  
Theories and frameworks used in unit/course, e.g. systems thinking, distributed systems.

Section 5  
Practitioner background and experience in food security using environmental sustainability principles.  
Education for Sustainability approach in unit/course and discussion around strengths/limitations in relation to food security.

4.3.2.6 Data Analysis

Qualitative description was used to guide the data analysis process from phase 2 and 3. According to Sandelowski (2000, p. 339), ‘the qualitative descriptive study is the method of choice when straight descriptions of phenomena are desired. Such a study is especially useful for researchers wanting to know the ‘who, what, and where’ of events’. Neergaard et al. (2009) also states that qualitative description is suitable when a description of a phenomenon is required. Qualitative description is considered particularly useful in mixed methods research to clarify concepts and gain firsthand knowledge of a professional’s experience within a particular topic (Neergaard et al. 2009). As such a qualitative descriptive design was deemed suitable for this study due to 1) its mixed methods component and 2) the phenomena under study, which explored the views of health promotion practitioners and academics in relation to food security using environmental sustainability principles.

To guide the data analysis process from phase 2 and phase 3, the researcher used the process outlined by Creswell (2009) (Figure 19). The data analysis process suited the qualitative
descriptive approach discussed above as it was able to generate descriptions of participants as well as categories and themes for analysis (Creswell 2003). It was also able to provide the basis for further analysis that went beyond basic description and into complex theme connections (Creswell 2003).

**Figure 19. Data Analysis**

The raw data from the interviews were first transcribed verbatim using an external transcription service. According to Serry and Liamputtong (2013, p. 50) ‘interview data must be transcribed into written form to enable data analysis’. To ensure accuracy and confidentiality of transcripts the researcher followed Burke’s (2011) toolkit for using an
external transcription service. The toolkit outlines several key dimensions to assist with the process, including budget and choice of transcriber. Some of these are briefly outlined in Table 11.

**Table 11. Burke’s toolkit for assessing an external transcription service**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Managing the transcription service</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Budgeting</strong></td>
<td>• Confirm cost per hour/per transcript.</td>
</tr>
<tr>
<td></td>
<td>• Ensure adequate budget.</td>
</tr>
<tr>
<td><strong>Choosing a transcriber</strong></td>
<td>• Ensure transcription service can assure confidentiality and privacy of transcripts.</td>
</tr>
<tr>
<td></td>
<td>• Ask ‘who does the transcribing’? If there are only one or two people involved this can help with consistency and quality.</td>
</tr>
<tr>
<td><strong>Managing the transcription process</strong></td>
<td>• Set up a good system, e.g. excel spreadsheet to manage recordings, transcripts and payments to keep track of the work and avoid any problems.</td>
</tr>
<tr>
<td><strong>Improving transcript quality</strong></td>
<td>• Use a good quality voice recorder.</td>
</tr>
<tr>
<td></td>
<td>• Provide clear instructions on format of transcript, e.g. page numbers, pseudonym, reference number, interview date.</td>
</tr>
<tr>
<td><strong>Ethical considerations</strong></td>
<td>• Ensure transcribing process chosen fits with the ethical guidelines set out by the researcher or organisation. Make sure transcriber knows, understands and can comply with these guidelines.</td>
</tr>
</tbody>
</table>

Undertaking this process led to the use of SmartDocs for transcribing the data from the interviews. SmartDocs are a specialist provider in the academic area, providing high quality transcripts that can assure complete confidentiality and security (SmartDocs n.d). Typists are also required to sign confidentiality agreements (SmartDocs n.d).

The researcher used thematic analysis to guide the data analysis process. Thematic analysis is a method used in qualitative research for systematically identifying, coding and organising data in order to provide meaning and insight into emerging themes (Braun & Clark 2012; Liamputtong & Serry 2010; Sandelowski & Leeman 2012). ‘The goal of thematic analysis is to arrive at a more nuanced understanding of social phenomena through understanding the
processes that tend to involve that phenomenon as well as the perception, values and beliefs of people toward it’ (Glesne 2016, p. 184). Although there has been some debate around the use of thematic analysis (Braun & Clarke 2006; Tuckett 2005) where it has been seen as a ‘poorly branded method in that it does not appear to exist as a named method of analysis in the same way that other analysis methods do’ (Vaismoradi et al. 2013, p. 400). Recent literature indicate that thematic analysis is an independent and reliable qualitative approach and recognised as a valuable method in its own right (Braun & Clark 2012; Braun et al. 2015; Vaismoradi et al. 2013). It is able to provide a rich and detailed, yet complex, account of the data and involves the search for and identification of common threads that extend across an entire interview or set of interviews (Braun & Clark 2006; Vaismoradi et al. 2013). It suits Sandelowski’s (2010) qualitative descriptive method of analysis for this study where the ‘aim of analytically examining narrative materials from life stories results in the breaking down of text into relatively small units of content and submitting them to descriptive treatment’ (Vaismoradi et al. 2013, p. 400).

Thematic analysis initially involves two important steps 1) reading and re-reading each transcript several times to make sense of what is being said by participants (Creswell 2009; Creswell & Plano-Clark 2011; Liamputtong & Serry 2010) and 2) coding of data (by hand or computer assisted) which helps to organise the material into chunks or segments of text before bringing meaning to the information (Liamputtong & Serry 2010; Rossman & Rallis 1998). The ‘coding process involves recognising (seeing) an important moment and encoding it (seeing it as something) prior to a process of interpretation’ (Fereday & Muir-Cochrane 2006, p. 83). The researcher followed these recommendations by commencing with the examination of each transcript to identify a list of codes, patterns and themes, evidenced by common words, phrases and concepts (Creswell 2009). Deductive coding which draws from existing theoretical ideas and inductive coding which draws theory from the raw data itself (Joffe & Yardley 2004) was used to guide this process (otherwise known as abduction, section 4.1.1).

The development of codes and themes was undertaken using QSR International NVivo. Grbich (2013, p. 272) states that using NVivo to code the data and develop themes ‘facilitates rich text analysis, flexible interpretations, development of matrices, modelling and framing’, allowing for the next step within the data analysis process. Once a list of codes, patterns and themes were created the researcher examined them, grouping those that were similar and collapsed them together (Creswell 2009). A final list of key themes was generated. According
to Boyatzis (1998, p. 161) a theme is ‘a pattern in the information that at minimum describes and organises the possible observations and at maximum interprets aspects of the phenomenon’. Supporting quotes from the participants were then grouped under each theme.

4.3.3 Phase 3. Document Analysis

4.3.3.1 Overview of Design

Document analysis is a ‘systematic procedure for reviewing or evaluating documents… in order to elicit meaning, gain understanding and develop empirical knowledge’ (Bowen 2009, p. 27). Document analysis is often used in mixed methods research to supplement quantitative and qualitative findings (Bowen 2009; Glesne 2016) as well as ‘validating information obtained through interviews by checking program documents and other written evidence that can corroborate what interview respondents report’ (Patton 1999, p. 1195). According to Bowen (2009), there are a number of benefits of undertaking document analysis, these include: obtaining contextual information which can provide insight to the development of a program or initiative; finding gaps which can lead to the generation of additional interview and/or survey questions; supplementing other research methods in the same study through the generation of new information; track change and development; and verify findings. In addition, documents are stable, where unlike interviews were not created for research purposes therefore they are outside of the researcher’s influence (Merriam 2009; Swanborn 2010).

Documents that were analysed in this study were in relation to the courses and units that academics of this study taught into. Merriam (2009, p. 155) states that data within documents are useful and ‘can furnish descriptive information, verify emerging hypotheses, offer historical understanding and track change and development’. The information obtained from the documents assisted with corroboration and verification of the qualitative data with academics, including 1) the extent that food security was being taught using environmental sustainability principles 2) the types of courses and units that academics were teaching into and 3) to verify the extent of use of the Education for Sustainability approach and other related teaching approaches used within units and courses. The information generated from the document analysis answered research question 4 and 5 in this study and contributed to further understanding of phase 3 interviews with academics. Figure 20 demonstrates phase 3 in relation to the research questions.
4.3.3.2 Sampling and Recruitment

Academics who were interviewed were asked whether the researcher could view any teaching synopsis/study guides, lecture slides, unit outlines, assessment tasks and other relevant material in relation to these courses and/or units. According to Glesne (2016) asking research participants to provide documents is a legitimate method for obtaining material for analysis. In addition, the researcher obtained publicly available documents that were listed on the associated website. According to Bowen (2009) document analysis is advantageous in this regard where publicly available documents can be found readily due to the internet.

4.3.3.3 Selection Criteria

Documents that were included in this study were those that were based on the course and/or units that academics were teaching into. Documents included teaching synopsis/study guides, lecture slides, unit outlines, assessment tasks and other relevant material in relation to these courses and/or units. Personal notes or memos from academics were excluded from the study as the researcher wanted to obtain a picture of current action of units and courses that taught food security using environmental sustainability approaches or the Education for Sustainability approach.

4.3.3.4 Data Collection

Finding relevant materials is often the first step for a document analysis and is a systematic procedure that evolves form the topic of inquiry itself (Merriam 2009). The researcher asked for permission to obtain any relevant teaching synopsis/study guides etc from the teaching staff. All academics (n=15) were happy to participate and agreed to email the researcher the
relevant materials. However, 13 academics sent through their documentation (33 documents in total) and these varied in scope and depth. A total of 11 academic staff sent through unit guides/outlines or a few lecture slides with minimal detail. Two participants sent through modules, unit guides and assessment tasks with comprehensive information. According to Bowen (2009) and Merriam (2009) insufficient detail within documents (due to fact that they are not designed for research in mind) and low retrievability are common issues, for example, ‘documentation is sometimes not retrievable, or retrievability is difficult’ (Bowen 2009, p. 32).

To counter these issues the researcher also visited publicly available websites for any relevant information in relation to the course or unit that was discussed during the interviews. According to Merriam (2009) being open to various documents can lead to serendipitous discoveries. The researcher took a screen shot of the webpage using the Microsoft snippy tool. All documents received from academics and screen shots of webpages were uploaded into NVivo for data analysis.

4.3.3.5 Data analysis
Sandelowski’s (2009) qualitative description was used to guide the data analysis process for the documents. In addition, the researcher used the data analysis process outlined by Creswell (2009) that was used in phase 2 and 3 interviews (section 4.3.2.6). The first step in Creswell’s (2009) data analysis process involves organising and preparing the raw data for analysis. This was undertaken by uploading all documents into NVivo. Notes were made in the memo function in NVivo that provided a description of the university, course name and a date of when the documents were received as well as dates for when the screen shot was undertaken. Documents were then analysed by skimming, reading and interpreted using content analysis (Bowen 2009). This is supported by Labuschagne (2003, p. 101) who states that documents are ‘organised into major themes using categories and case examples through content analysis’. Content analysis ‘entails a first-pass document review, in which meaningful and relevant passages of text or other data are identified’ (Bowen 2009, p. 32).

In addition, Vaismoradi et al. (2013) states content analysis ‘is a systematic coding and categorising approach used for exploring large amounts of textual information unobtrusively to determine trends and patterns of words used, their frequency, their relationships, and the structures and discourses of communication’. The second phase includes coding the data and developing relevant themes which assists with corroborating findings from the qualitative and
quantitative components (Bowen 2009; Merriam 2009). Bowen (2009) also suggests that codes may be used from the qualitative component and applied to a document analysis. The researcher used this method when analysing the documents where the codes and themes that emerged from the interview data were then applied to the document analysis phase. This method ensured consistency in both data sets and helped to validate the findings. The data from the document analysis was then triangulated with the quantitative and qualitative findings to verify and consolidate the results.

4.3.4 Triangulation and Data Analysis process

According to Greene et al. (1989) mixed methods studies are conducted to serve five main purposes within research. These include:

1) Triangulation: where the aim is to converge, corroborate and seek correspondence of results across the different method types (Bazeley 2009; Bryman 2006; Caracelli & Greene 1993). It is commonly used in sequential research designs where data analysis of each phase is conducted separately (Bazeley 2009; Creswell 2014; Morse 1991).

2) Complementarity: where qualitative and quantitative methods are used to measure overlapping but also different facets of a phenomenon, resulting in a rich and enhanced understanding of the phenomenon under study (Greene et al. 1989; Johnson & Onwuegbuzie 2004).

3) Development: where the results of one method are used to help or inform the other method (Caracelli & Greene 1993).

4) Initiation: seeks the discovery of paradox and contradiction and the development of new perspectives of frameworks. It recasts questions or results from one method with questions or results from the other method (Greene et al. 1989).

5) Expansion: seeks to expand the breadth and range of research by using different methods for different inquiry components (Johnson & Onwuegbuzie 2004).

Triangulation was deemed the most appropriate strategy to address the research questions. This decision was based on three factors: 1) the research questions under investigation were oriented for a mixed methods inquiry to develop points of convergence and corroboration of the phenomena under study. In this case the potential for health promotion to address food security from an environmental sustainability perspective; 2) Triangulation was also seen as a valuable data analysis strategy to validate conclusions through seeking confirmatory evidence from at least two sources (Bazeley 2009; Greene et al. 1989; Morse 1991); 3) Triangulation
also suited the data analysis process that was undertaken where each data set from phase 1 – 3 was individually analysed before the corroboration and convergence of results. According to Bazeley (2009) and Creswell (2014) individual analyses of data sets is a precondition for triangulation within mixed methods research using explanatory sequential approaches. In addition, the reduction of bias commonly found in research including method and inquirer bias, bias of substantive theory and biases of inquiry context (Greene et al. 1989) was seen as another benefit within triangulation methods.

During the data analysis process the researcher was guided by Onwuegbuzie and Teddlie’s (2003) data analysis process, which consists of seven stages. Table 12 outlines each of the stages.

Table 12. Stages of mixed methods data analysis process

<table>
<thead>
<tr>
<th>Stage</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Data reduction</td>
<td>Reducing quantitative data (e.g. descriptive statistics, exploratory factor analysis) and qualitative data (e.g. thematic analysis, memoing).</td>
</tr>
<tr>
<td>2. Data display</td>
<td>Reducing the display of quantitative data (e.g. tables, graphs) and qualitative data (e.g. matrices, charts, lists).</td>
</tr>
<tr>
<td>3. Data Transformation</td>
<td>Qualitizing and/or quantitizing data (e.g. possible use of effect sizes, exploratory factor analysis).</td>
</tr>
<tr>
<td>4. Data correlation</td>
<td>Correlating quantitative data with qualitative data.</td>
</tr>
<tr>
<td>5. Data consolidation</td>
<td>Combining both data types to create new or consolidated variables or data sets.</td>
</tr>
<tr>
<td>6. Data comparison</td>
<td>Comparing data from different data sources.</td>
</tr>
<tr>
<td>7. Data integration</td>
<td>Integrating all data into a coherent whole or two separate sets (i.e. quantitative and qualitative) of coherent wholes.</td>
</tr>
</tbody>
</table>

(Onwuegbuzie and Teddlie’s 2003, p. 375)

It is important to note that the above sequence is not intended to be followed sequentially. Accordingly, the first two stages follow logical steps, however, stages 3-7 are alternative options for analysis rather than steps that follow one another (Creswell & Plano-Clark 2011;
Onwuegbuzie & Teddlie 2003). As such a decision was made to exclude steps 3 and 5 due to the study design which was guided by a descriptive methodology. Running factor analysis of the qualitative data was considered unnecessary to answer the research questions. In addition, it was not possible to measure the effect size of the quantitative data due to insufficient cases within the survey. Combining both data types into new or consolidated data sets was also not required to answer the research questions. The data analysis process outlined by Onwuegbuzie and Teddlie (2003) is demonstrated in section 4.3.4.1 – 4.3.4.3.

4.3.4.1 Data reduction and display of survey, interviews and document analysis

The first stage involved reducing the quantitative and qualitative data sets. This was undertaken using SPSS for the quantitative data where descriptive statistics such as frequencies were used. Themes were also identified during this stage. NVivo was used for the qualitative data using thematic analysis to generate key themes. Analysis of the quantitative and qualitative data were conducted separately. The second step involved data display where some of the quantitative and qualitative data was converted into graphical form for ease of reading. Table 13 demonstrates this process. To ensure anonymity among interview participants a pseudonym was assigned for each participant, (e.g. health promotion practitioners P1, P2 etc; academics A1, A2 etc) in the findings.

Table 13. Data reduction and display of survey, interviews and document analysis

<table>
<thead>
<tr>
<th>Data analysis process</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online survey with practitioners</td>
<td>Interviews with practitioners</td>
<td>Interviews with academics</td>
<td>Document analysis of unit materials</td>
<td></td>
</tr>
<tr>
<td>Data reduction</td>
<td>Descriptive statistics used to identify proportions of practitioner responses for each category. Means, CI’s and SD’s undertaken to develop</td>
<td>Thematic analysis using NVivo to develop key themes.</td>
<td>Thematic analysis using NVivo to develop key themes.</td>
<td>Key themes which emerged from academic interviews were imported into NVivo and used to analyse documents.</td>
</tr>
</tbody>
</table>
4.3.4.2 Data correlation and comparison

Once a separate analysis was undertaken of the data, the next stage involved correlating and comparing the quantitative and qualitative data sets. The first step involved correlating the practitioner and academic interviews with the online survey as well as comparing all three data sources with each other. Two examples are provided to demonstrate this process in Table 14.

Table 14. Data correlation and comparison of online survey with interviews

<table>
<thead>
<tr>
<th>Data correlation &amp; comparison</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Online survey</td>
<td>Interviews with practitioners</td>
<td>Interviews with academics</td>
</tr>
<tr>
<td>1) The use of environmental sustainability concepts within food security initiatives were measured. Some of these include: food waste (13%) ‘all of...</td>
<td>1) Themes such as food waste and food miles also evolved through discussions with practitioners.</td>
<td>1) Themes such as food waste and food miles evolved through discussions with academics. These were used to compare and correlate results with online survey.</td>
<td></td>
</tr>
</tbody>
</table>
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Data comparison was then undertaken with the academic interviews and the documents that were provided. Table 15 demonstrates this process. Data from all four sources were then correlated and compared with each other.

Table 15. Data comparison of academic interviews with document analysis

<table>
<thead>
<tr>
<th>Phase 3 – Interviews with academics</th>
<th>Phase 3 – Document analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data comparison</strong></td>
<td></td>
</tr>
<tr>
<td>Themes such as food waste and food miles evolved through discussions with academics.</td>
<td>Themes developed from interviews with academics, e.g. food waste and food miles were used to correlate/compare information within documents.</td>
</tr>
</tbody>
</table>
4.3.4.3 Data integration

The data was then integrated into two sets within the findings. The qualitative data is presented first, followed by the quantitative findings due to a reordering and prioritisation of the qualitative strand as discussed in section 4.2.2.

4.3.5 Validity

4.3.5.1 Validity of research study

Debate regarding validity within mixed methods designs has evolved over the years (Creswell & Plano-Clark 2011; Onwuegbuzie & Johnson 2006; Tashakkori & Teddlie 1998). Early discussions recommended applying the use of validity measures separately for the quantitative and qualitative strands of a research study (Creswell 2003; Creswell & Plano-Clark 2011; Tashakkori & Teddlie 1998). According to Creswell (2010, p. 59), ‘the traditional approach is to talk about validity from a QUAN perspective and from a QUAL perspective but not to mix the two’. More recently, however, there has been a focus on validity with regards to the various stages of the research process (Creswell 2010; Leech et al. 2010; O’Cathain 2010). Creswell and Plano-Clark (2011) for example, state that validity in mixed methods research can be used in various stages of a research study to address potential issues in data collection, data analysis and the interpretations that might arise when merging or connecting quantitative data with qualitative data. As such the researcher has followed the recommendations presented by Creswell and Plano-Clark (2011, p. 242) to minimise any threats to validity. In addition the researcher has also used the recommendations from O’Cathain (2010, p. 541) that was not discussed by Creswell and Plano-Clark (2011). This was in relation to the ‘planning stage’. The remaining stages, i.e. data collection, data analysis and interpretation were undertaken using Creswell and Plano-Clark’s (2011) recommendations. These strategies are outlined in Table 16 below.
Table 16. Potential validity threats and strategies in sequential explanatory mixed methods studies

<table>
<thead>
<tr>
<th>Potential validity threats for connecting data</th>
<th>Strategies for minimizing threat</th>
<th>Strategies undertaken within this research study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Planning issues</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundational element not discussed.</td>
<td>Comprehensive and critical review of the literature is needed to situate the study and shape both the research question and methods.</td>
<td>Comprehensive literature review undertaken during development of research questions and methods.</td>
</tr>
<tr>
<td>Rationale is not transparent nor the justification for using a mixed methods approach.</td>
<td>Justification for using a mixed methods approach is provided.</td>
<td>Thesis contains chapter on mixed methods and justification of approach.</td>
</tr>
<tr>
<td>Planning such as paradigm used, planned design, data collection and analysis not discussed.</td>
<td>Details should be given about the paradigm, planned design, data collection and analysis.</td>
<td>Thesis contains chapter on methodology, pragmatic approach. Discussion around planned design, data collection and data analysis provided.</td>
</tr>
<tr>
<td>Feasibility of study not considered.</td>
<td>The design and each component can be undertaken in the resources (time, money, manpower) available.</td>
<td>Gantt chart developed to guide research process and provide timelines. Funds available to researcher estimated prior to development of methods.</td>
</tr>
<tr>
<td><strong>Data collection issues</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selecting inappropriate individuals for the</td>
<td>Select the same individuals to follow up on findings; select different individuals when building and testing</td>
<td>Health promotion practitioners currently practicing in Australia were invited to participate in online survey</td>
</tr>
<tr>
<td>Qualitative and Quantitative Data Collection.</td>
<td>New components, such as an instrument, typology or intervention.</td>
<td>And interviews using parallel sampling strategy (section 4.2.2).</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Using Inappropriate Sample Sizes for the Qualitative and Quantitative Data Collection.</td>
<td>Use a large sample size for quantities and a small sample size for qualitative.</td>
<td>Online survey sent to 1000 practitioners. Smaller cohort used for interviews n=16 (practitioners) and n=15 (academics).</td>
</tr>
<tr>
<td>Choosing Inadequate Participants for the Follow-up Who Cannot Help Explain Significant Findings.</td>
<td>Choose individuals for the qualitative follow-up that participated in the quantitative first phase.</td>
<td>Health promotion practitioners were identified for online survey and interviews through parallel sampling strategy (section 4.2.2).</td>
</tr>
<tr>
<td>Not Designing an Instrument with Sound Psychometric (i.e. Validity and Reliability) Properties.</td>
<td>Use rigorous procedures to developing and validating new instrument.</td>
<td>Online survey developed using dimensionalising process of abstract concepts. Reliability scores undertaken of Likert scales. Pilot testing was also undertaken and survey revised several times.</td>
</tr>
</tbody>
</table>

**Data Analysis Issues**

<p>| Choosing Weak Quantitative Results to Follow up on Qualitatively. | Weigh the options for follow-up and choose the results to follow-up that need further explanation. | Several survey questions were included in the interview schedule to develop further understanding. |</p>
<table>
<thead>
<tr>
<th>Interpretation issues</th>
<th>Interpret the quantitative and qualitative data sets to answer the mixed methods research question.</th>
<th>Data analysis of quantitative data and qualitative data undertaken separately.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparing the two data sets when they are intended to build rather than merge.</td>
<td>Order the interpretation to fit the design (e.g. quantitative then qualitative or vice versa).</td>
<td>Quantitative data analysis and interpretation undertaken prior to qualitative data analysis and interpretation.</td>
</tr>
<tr>
<td>Interpreting the two databases in reverse sequences.</td>
<td>Consider how a problem, a theory or a lens might be an overarching way to connect the stages or projects.</td>
<td>Pragmatic philosophy guided each stage of the study, i.e. methods, data analysis, reflexivity etc. The use of systems theory, socioecological theory and ecosystems theory was used to connect each phase of the study, i.e. in findings and discussion.</td>
</tr>
<tr>
<td>Not relating the stages or projects in a multiphase study to each other.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3.5.2 Reliability of Likert scales

Validity and reliability tests are usually undertaken in Likert scales that are used to measure the same underlying attribute, for example, pro-environmental behaviour or attitudes towards HIV (Jamieson 2004; Pallant 2005; Sapsford 2007). The use of Likert scales in this study, were not explicitly designed to measure an underlying attribute, they were, however, used to measure 3 types of concepts. These were 1) the extent of use of environmental sustainability concepts within food security initiatives 2) knowledge of environmental sustainability concepts that are typically used within the sustainable food space and 3) ability to integrate said environmental sustainability concepts within food security initiatives. As such the researcher decided to measure each scales internal consistency. According to Pallant (2005, p. 90) ‘internal consistency refers to the degree to which the items that make up the scale ‘hang together’. This is undertaken to ensure they are all measuring the same underlying construct (Graziano & Raulin 2010; Oppenheim 1992; Pallant 2005). To measure a scales internal consistency Cronbach’s alpha coefficient is undertaken and should ideally be above .7 (Pallant 2005). According to Gliem and Gliem (2003, p. 87) ‘the closer Cronbach’s alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale’. This was undertaken for each of the Likert scales. These are presented in Table 17.

### Table 17. Reliability of Likert Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cronbach’s alpha coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likert scale measures extent of environmental sustainability concepts in food security program.</td>
<td>.921</td>
</tr>
<tr>
<td>Scale measures knowledge of environmental sustainability concepts within the sustainable food space.</td>
<td>.908</td>
</tr>
<tr>
<td>Scale measures the ability of practitioners to integrate said environmental sustainability concepts within food security initiatives.</td>
<td>.953</td>
</tr>
</tbody>
</table>

According to Cronbach’s alpha all 3 Likert scales have good internal consistency, with scores above .7. They were therefore deemed reliable for measuring each concept (i.e. extent of environmental sustainability concepts, knowledge and ability) within the survey. Internal
validity is less of an issue in descriptive designs because no attempt is made to examine causal relationships among variables (Thomlinson 2001, p. 7).

4.3.6 Limitations of Study
This section will discuss the limitations that were present during this study, including the potential implications for this study and how they could be managed in future research.

4.3.6.1 Survey construction
During survey construction, the process may have been enhanced by including a focus group with existing practitioners to ascertain their views and ideas of the survey, including the clarity of each item, the appearance and layout of the survey. A study undertaken by Ouimet et al. (2004, p. 239) found that focus groups assisted with ‘instrument appearance and ease of completion, item clarity, and accuracy of response categories’. This process may have provided further refinement of the online survey used in this study, however, due to the time constraints of a PhD conducting focus groups was unfeasible. The process undertaken by Ouimet et al. (2004) for their survey (including focus groups with samples of their targeted population), for example, took 12 months to undertake. The consideration of focus groups to aid with the development of survey research, however, could be beneficial to further refine the survey instrument and increase its validity in future research.

4.3.6.2 In-depth case study
Case study research through site visits and observations of such sites where practitioners were attempting to address food insecurity through a systems perspective may have been useful with augmenting the interviews. According to Glesne (2016) case studies are useful for gathering in-depth information on a case or cases over time. The costs and time involved, however, to undertake site visits and observations across all states in Australia was beyond the scope of this PhD. Future research, with observations and field notes of each site where practitioners are implementing systems approaches to address food insecurity may be useful for supplementing the qualitative interviews undertaken with practitioners.

Similarly, to data collection with practitioners, undertaking case study research through site visits and observations as well as photography or videography of units where academics were teaching food security through a systems perspective may have augmented the interviews and document analysis. According to Glesne (2016) photography and videography are used to extend observations. Muñoz, (1995, p. 61) discusses the use of photography in her work
with youths living in Puerto Rico stating ‘photographs provide another approach to knowledge that literally brings me face to face with my questions and their answers’. Similarly to practitioners, the costs and time to undertake observational studies around Australia and in accordance to university timetables was beyond the scope of this PhD. Future research with site visits, observations, photography or videography of units where academics are using systems approaches may be useful for supplementing the qualitative interviews and document analysis undertaken with academics.

4.3.6.3 Enhancing credibility
According to Houghton et al. (2013), there are several strategies that can be employed to increase the credibility of a study. These strategies include: persistent engagement and observation; triangulation; peer debriefing; and member checking. Although this study adopted triangulation to ensure consistency between the quantitative and qualitative data sets, employing additional strategies such as prolonged engagement and persistent observation may have increased the credibility of the qualitative component (phase 2 and 3 interviews). Prolonged engagement and persistent observation is where the researcher ‘spends sufficient time in the field or in case-study sites to gain full understanding of the phenomena being investigated’ (Houghton et al. 2013, p. 13). Additionally, member checking of the interview transcripts may have also increased credibility of the data. Member checking is where ‘participants read the transcription of their interviews to ensure that these have been accurately recorded and are therefore credible’ (Houghton et al. 2013, p. 14). The adoption of multiple strategies in future research with a qualitative focus may therefore be useful to assist with the credibility and rigor of the data.

4.3.7 In summary
Chapter 4 presented the research methodology – a pragmatic mixed methods approach that was used to guide the development of the study design and methods. This chapter also presented the specific methods that were used to answer the research questions. Chapter 5 will discuss researcher reflexivity with regards to this study process.
5 RESEARCHER REFLEXIVITY

Learning to reflect on your behaviour and thoughts, as well as on the phenomenon under study, creates a means for continuously becoming a better researcher. Becoming a better researcher captures the dynamic nature of the process. Conducting research, like teaching and other complex acts, can be improved, it cannot be mastered (Glesne & Peshkin 1992, p. xiii)

According to Denzin and Lincoln (2000, p. 183) ‘reflexivity is the process of reflecting critically on the self as researcher… as both inquirer and respondent, as teacher and learner, as the one coming to know the self within the processes of research itself’. Research changes us both as people and as researchers (Willig 2008). According to Glesne (2016, p. 150) the process of reflexivity provides the opportunity to strengthen research through ‘equipping you with the perspectives and insights that shape what you do as a researcher, from the selection of topic to what you emphasise when you write up the study’.

Reflexivity is particularly encouraged for researchers who are undertaking qualitative research (including in mixed methods research) due to the nature and philosophy of qualitative inquiry. Qualitative researchers acknowledge that they are not objective observers of social phenomena and cannot be separated from their background, wider aims in life, values, interests, life experiences or political and cultural positions which influence their impressions of the world they are studying (Glesne 2016; Grbich 2013; Hesse-Biber & Piatelli 2012; Malterud 2001; Walker et al. 2013; Willig 2008).

Qualitative researchers are also considered to be the primary research tool where they influence and direct research outcomes based on these values, assumptions and behaviours (Glesne 2016; Watt 2007). Malterud (2001, p. 483-484) states that

A researcher’s background and position will affect what they choose to investigate, the angle of investigation, the methods judged most adequate for this purpose, the findings considered most appropriate, and the framing and communication of conclusions.

Figure 21 below captures these influences within the research process as expressed by Grbich (2013), Hesse-Biber and Piatelli (2012), Malterud (2001), Walker et al. (2013) and Watt (2007).
Mixed methods research, often due to the inclusion of a qualitative component, has been critiqued over the years for a lack of reflexivity that fails to acknowledge these influences on the researcher, including their values and biases or whether there has been any attention given between the researcher and the researched (Biddle & Schafft 2015). In response Hesse-Biber (2010) and Biddle and Schafft (2015) discuss the importance of reflexivity in mixed methods research. This is particularly important for novice mixed methods researchers ‘as one might unconsciously follow the dominant paradigm of his or her discipline without a critical assessment of the values and attitudes of a particular disciplines point of view’ (Hesse-Biber 2010, p. 30). One of Hesse-Biber’s respondents in her publication makes the following point...

*I think that if you are going to include [qualitative and quantitative methods] in one study, you have to declare [your underlying assumptions] ... you know, it is not just a matter of mixing some techniques, it’s actually a matter of mixing some assumptions about knowledge, assumptions about the type of data... assumptions about the world we live in... and how you write that up...* (Julianne Cheek cited in Hesse-Biber 2010, p. 32).

In addition Walker et al. (2013) take the idea of reflexivity for mixed methods research one step further, applying it to the quantitative component of their study, which is not typical methodology in quantitative research. Walker et al. (2013, p. 38) found that reflexivity within the quantitative component was ‘an effective, ongoing means of critically reviewing work,
process and researcher development’ and particularly useful for the novice mixed methods researcher. Walker’s ideas are also supported by Pearce (2015) who discuss similar benefits of reflexivity within quantitative studies. In addition, Malterud (2001) provides the impetus for reflexivity in quantitative studies, stating that contemporary theory on knowledge recognises that all research (whether in the field or laboratory) is influenced by the researcher and cannot be completely neutral. As such the researcher decided to use reflexivity in this research study in order to document and reflect on her own biases, values and assumptions within the study. According to Glesne (2016) tracking emotions and understanding one’s own history and experiences and how these influence the research process are actually strengths to build from.

This reflexive process was undertaken using two processes guided by Creswell (2013). According to Creswell (2013, p. 216) ‘the researcher first talks about his or her experiences through work, schooling, family dynamics and so forth’. Glesne (2016, p. 149) terms this the autobiographical component in reflexivity ‘it makes you become aware of how your personal history is engaged by your research’. The second part is ‘to discuss how these past experiences shape the researcher’s interpretation of the phenomenon’ (Creswell 2013, p. 216). In addition, the researcher started a journal at the beginning of candidature to document any thoughts and key learning’s during the research process and insights from participants and supervisors. According to Teddlie and Tashakkori (2009) and Watt (2007) reflective journals provide the opportunity for the researcher to write down what they are thinking about and how this has influenced the research process (Teddlie & Tashakkori 2009; Watt 2007). A journal also provides a focal point for the novice researcher and is a crucial means for becoming a better researcher (Glesne & Peshkin 1992). As such the key learnings from the journal will be interwoven through the two processes outlined by Creswell (2013) above.

5.1 Researcher experiences and assumptions
During the research process, I became aware of how one’s family culture, background and history can influence the choice of topic within a PhD. My interest in food security, for example, was in many aspects influenced by my family history, cultural and heritage background. Growing up with an Italian heritage my family had a large backyard where a large proportion of fruit and vegetables would come from the garden. This brought a diversity of healthy, nutritious and tasty food to the table – grown using ecological methods. It created food literacy for the entire family as we learned about the seasons, the taste of food and how
to grow and harvest food, prepare and cook it. As an adult, a vegetable garden was also a
good opportunity for me to reconnect to my father as I have had a strained relationship with
him over the years. The way in which food was able to reconnect and repair relationships was
evident – bringing other social and health benefits which became one of the drivers for
undertaking research in this area. These experiences are captured in the journal during
December 2016.

When I was growing up we had a large backyard and dad would grow most of our
fruit and vegetables from here. I must admit I was embarrassed by all this activity at
times... I did remove myself from this space for some time and I didn’t help dad in the
garden and was annoyed by his incessant activity in the backyard. Fast forward into
my mid 20’s I saw food growing as a good opportunity to eat well, to know where my
food actually comes from, to know that there aren’t any chemicals on my food and to
understand the seasonality of food. This also gave me the opportunity to reconnect
with my dad... we haven’t been that close over the years. My dad, was however, super
excited when I started growing food – he now comes over regularly to help and give
advice in the garden and we have become closer because of it.

I also became aware that life experiences can also influence the choice of topic within a PhD.
This became evident after reflecting on my participation in a Permaculture course in 2012
which brought new insights and learning’s around the links between health, environmental
sustainability and food, including food security. A new set of assumptions were developed
during this time regarding the effectiveness of teaching environmental sustainability through
food. It became one of my motivations to explore health promotion, food security and
environmental sustainability. This was captured in my journal in March 2013.

After doing my Permaculture course in December 2012 I thoroughly enjoyed it and
learning all about how we could grow food using Permaculture principles. I saw the
impossible – food growing in the desert! I also noticed how we were learning all
about sustainability principles, water, waste, energy, biodiversity, transport, equity,
social justice etc and thought wow! – We are already picking this up in the 2 weeks
we were on site. How great is that. Perhaps we could use food to teach students about
food security and also about sustainability.

During my PhD I have also been reflecting on how my values and beliefs have influenced the
direction of my PhD including the topic, choice of methodology, methods and theory
development. This has emanated from a combination of both passion and values around stewardship of the environment and the creation of healthy and sustainable communities. This has been influenced by my faith and beliefs around creation care and stewardship, equity and social justice which is the philosophy for Christianity. I became more interested in Christianity’s role in developing healthy, equitable and sustainable societies in my mid-20s. These values and beliefs translated into notions of food justice, equity and ecological food production methods.

My education and work experience have also influenced the study process. My undergraduate degree in health promotion introduced me to concepts such as empowerment, social justice and equity and assisted with the development of my values base. During my final year I took part in a unit that explored the nexus between health and environmental sustainability – this experience opened my eyes to the problems inherent when humans misuse and exploit natural resources and ecosystems. It was also apparent that there were a lack of university programs that focus on the nexus between health and environmental sustainability. This experience influenced my decision to work in the health and sustainability space. I have worked in various capacities over the past 9 years, including research and teaching that explored the impacts of climate change on vulnerable populations. I have also worked as a Sustainability Officer for 4 of these years – the role was predominately from an environmental management perspective and often lacked focus on human health. My time as a Sustainability Officer, however, confirmed that I wanted to work in the health/sustainability space and to further knowledge and practice in this area. In addition, I undertook my Honours year within the Health, Nature and Sustainability Research Group at Deakin University which further augmented knowledge regarding the interrelationship between ecosystems and human health. A lack of health promotion initiatives in the health/sustainability space became a motivation for further exploration around the development of food security initiatives using an environmental sustainability lens within higher education.

My research experience with using quantitative approaches was also another aspect that has influenced the study design for this thesis. Originally influenced by my undergraduate degree (which emphasised quantitative methods) as well as Honours where a quantitative approach was used. This has led to the use of positivist approaches and philosophical positions such as objectivity, value free inquiry and the use of a deductive approach to analyse data. I did not realise I was using this position in my research even if the research was qualitative in design.
The identification of the above factors led to a set of key assumptions that influenced the research questions, choice of methodologies and methods. These are outlined below in Table 18.

Table 18. Researcher assumptions in the study

<table>
<thead>
<tr>
<th>Theme</th>
<th>Assumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researcher knowledge</td>
<td>That my work experience in environmental sustainability and health promotion, including my family background provides me with very good knowledge and understanding of the current food system and its impacts on ecosystems and human health.</td>
</tr>
<tr>
<td>Health Promotion Practice</td>
<td>That few health promotion practitioners are integrating environmental sustainability concepts in food security initiatives.</td>
</tr>
<tr>
<td>Ecosystems and health &amp; wellbeing</td>
<td>The health promotion sector recognises that humans are inherently interconnected to ecosystems and are dependent on them for optimal health and wellbeing.</td>
</tr>
<tr>
<td>Learning about sustainability through food</td>
<td>Teaching environmental sustainability through food is highly effective.</td>
</tr>
<tr>
<td>Food security</td>
<td>Participants involved with practising food security using</td>
</tr>
</tbody>
</table>
environmental sustainability principles have either formal or informal background or interest in food.

<table>
<thead>
<tr>
<th>Methodology</th>
<th>That the quantitative component/ positivist view would drive the framework of this mixed methods research.</th>
<th>Development of an explanatory research study where the quantitative aspect is priority.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research methods: Online survey</td>
<td>That surveys are some of the most effective means for exploring phenomena under study.</td>
<td>Development of an online survey to capture health promotion practitioner practice.</td>
</tr>
<tr>
<td>Research methods: Interviews</td>
<td>Interviews are valuable for supporting the quantitative component in research.</td>
<td>Interviews undertaken after dissemination of online survey to supplement the quantitative findings in the survey.</td>
</tr>
</tbody>
</table>

5.2 How the researcher’s experiences have translated into the thesis

My experiences, background and assumptions have provided an opportunity to reflect on how they have translated into the research process. This will be discussed in the various aspects in the research process including the literature review.

5.2.1 Research questions – framing and development throughout thesis

Throughout my PhD I have been grappling with the original framing of the research questions around environmental sustainability. This was particularly evident when I started analysing the interview and survey data. It appeared that practitioners and academics were utilising environmental sustainability principles to guide practice and education, yet they were also referring to a systems paradigm to address food security. Was this a sustainable food systems approach that they were referring to? At times practitioners and academics would conflate the terms environmental sustainability and food systems/sustainable food systems, which further complicated the data analysis process. It also appeared that while practitioners discussed the notion of addressing the food system to address food insecurity, when it came to practice, this was achieved by few. Sustainable food systems was also
discussed by academics, however, it was not explicitly indicated as an actual approach in their teaching programs. Further adding to the complications was my own knowledge and understanding of environmental sustainability, which has been influenced by previous employment as a Sustainability Officer (with an environmental management orientation) and my personal interest/passion for the environment (Green’s voter). I grappled with the use of these terms for some time through various stages of my thesis, for example, in the results section: ‘should I discuss practitioner experiences around environmental sustainability principles or sustainable food systems principles?’ I would often conflate the terms ‘environmental sustainability’ and ‘sustainable food systems’ to address food insecurity within my discussions. As my knowledge and understanding progressed I was able to frame the results to demonstrate that some practitioners and academics were broadening practice/education towards a systems paradigm to address food insecurity. I was also able to map the principles used by the health promotion, environmental sustainability and sustainable food systems disciplines. This was pertinent to understanding what practitioners were grappling with to guide practice.

5.2.2 Literature review

My background and experience working in environmental sustainability and health promotion gave me a well-rounded understanding of the challenges facing our planet and human health, however, I did not realise the extent of the problem within the current industrialised food system. I was not aware of the extent of its impacts on human health and wellbeing, including food security as well as ecosystems and biodiversity. This is captured in my journal entry in July 2013.

*I’ve almost finished writing the background section of my literature review. I am so overwhelmed by all the issues generated by the agricultural sector. There are so many issues, it’s just incredible – I didn’t realise the extent to which the environment and health of people are impacted by this industry.*

This challenged my assumption that *I had a very good knowledge and understanding of the issues* before embarking on my PhD. Although some of the literature challenged my assumptions, other commentary affirmed my assumption that the health promotion sector was not active with addressing these issues. It was concerning to read that reductionist approaches were being used to address food security even though these strategies are not all that effective. On the flip side, as the research commenced it was encouraging to see that there
were a small number of health promotion practitioners that were guided by environmental sustainability principles to address food insecurity. This often conflicted with the literature I had been reading and my assumption that few health promotion practitioners are integrating environmental sustainability concepts in food security initiatives. Through this PhD it was often difficult to determine whether the health promotion sector was active in this paradigm or merely undertaken by a few, interested practitioners. This is captured in my journal entry in December 2013 where I discuss the findings from the online survey.

Data from the survey suggests that some health promotion practitioners are in the environmental sustainability space, yet when asked to specify what health promotion initiatives/strategies are used, it’s not clear, so some say they are implementing the ‘Go 2&5’ but also they ranked high when they stated they use sustainability concepts – what is happening exactly?

Further analysis of the data found that the majority of practitioners had a background (similar to me) in food. This confirmed my assumption that participants involved with practising food security using environmental sustainability principles have either formal or informal background or interest in food. This appeared to be one of the motivators for working in this space and also for participating in my research.

5.2.3 Theoretical underpinnings

I chose a number of socio-ecological and EcoHealth theories to guide this research study. These were in relation to the assumption that the health promotion sector recognises that humans are inherently interconnected to ecosystems and are dependent on them for optimal health and wellbeing. It was clear, however, during the research process that socio-ecological or EcoHealth approaches are not always used or supported during the development of health promotion initiatives. During this study, the researcher identified that some of these theories were not adequate in articulating the importance of ecosystems for human development and wellbeing. After discussing these issues with my supervisors it became a revelation for me that all theories are limited in their explanations of what we see in the world.

I had a meeting today with my supervisor Bec about the theories I was using to guide my research. I told her that they were missing important elements – in particular they really didn’t emphasise the importance of ecosystems for human health and wellbeing. I initially thought this was going to be a problem. How can I guide my
research with incomplete theories? However, Bec pointed out to me that all theories have limitations and that’s why we have to use more than one. We can also point this out in our thesis. Well, what a good learning curve that has been for me!

These observations gave me some insight with perhaps why the health promotion sector has received criticism regarding a lack of environmental sustainability considerations within initiatives. Through this reflective process, the researcher found other theories that emphasise the ‘eco’ in socio-ecological theories which may better serve the health promotion sector in creating sustainable societies (section 7.2.2).

5.2.4 Methodology and research methods

I did not realise the extent of influence that my undergraduate degree in health promotion and Honours year had on the development of my methodological and philosophical stance in research. There were numerous units that emphasised a quantitative approach within my undergraduate degree. In addition, my Honours took a quantitative approach which further reinforced the use of a positivist stance within research. Although I was unaware of these influences prior to my PhD it became apparent while reading the literature around research methodology that we all take a position in research and knowledge generation and generally adhere more strongly to one set of beliefs over another. My research stance prior to undertaking my PhD directly influenced my decision to undertake a sequential explanatory study where the qualitative aspect was considered to be the supporting act of the quantitative component. However, after I received the data from the online survey with practitioners, I became disheartened. I did not receive the response rate I desired and the data seemed to be inconclusive, not really revealing anything of significance. However, after conducting interviews with both practitioners and academics I was impressed by the quality and depth of the data. It helped me to understand the quantitative component and was the impetus for the reorientation of my research – that is the quantitative component became the supporting act of the qualitative aspect. This is captured in my journal entry in October 2016.

During the research process I have come to value qualitative inquiry. I must admit that I was sceptical at first. I have been a quantitative researcher in the past – but my PhD has been a real eye opener. It began when I received data from my quantitative survey. I was disheartened by the low response rate, in addition I felt that my survey wasn’t really giving me anything significant to work with. However, once I undertook the interviews and started to analyse the transcripts, it all came together for me....
The practitioners and academics gave beautifully rich descriptions of the work they were undertaking. The interviews really assisted with understanding the survey data! Wow! What a turn of events. Who would have thought?!

These events challenged two assumptions that I held 1) that surveys are some of the most effective means for exploring phenomena under study and 2) that the quantitative component/positivist view would drive the framework of this mixed methods research. This experience has taught me the value of qualitative approaches within research and the constructivist philosophy. As such the Results chapter and Discussion chapter reflect this new orientation.

5.3 How the research has changed me

This section will discuss how the research process has changed me both personally and professionally. These ideas were expressed in Section 5 where Denzin and Lincoln (2000) and Willig (2008) discuss the notion that research changes us as people and as researchers. Some of these are captured in Table 19.

Table 19. How the research has changed me personally and professionally

<table>
<thead>
<tr>
<th>Prior commitments</th>
<th>How the research has changed me personally</th>
<th>How the research has changed me professionally</th>
</tr>
</thead>
<tbody>
<tr>
<td>My values</td>
<td>Environmental sustainability.</td>
<td>The value of social justice approaches has been affirmed.</td>
</tr>
<tr>
<td>Discourse</td>
<td>Food security to address hunger among at-risk groups.</td>
<td>A reorientation/preference for food sovereignty as a</td>
</tr>
<tr>
<td>Political affiliation</td>
<td>Greens.</td>
<td>Valuing other political parties that emphasise both health and sustainability, e.g. Health Australia Party.</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------</td>
<td>-----------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Research philosophy</td>
<td>Committed to a quantitative approach/philosophy within the research process.</td>
<td>Opened my eyes to the value of a qualitative/constructivist approach within research.</td>
</tr>
</tbody>
</table>

Although I value environmental sustainability and protection of the natural environment and ecosystems to safeguard human health, at times I feel this has been heavily skewed with minimal consideration of the social justice implications. This would result in the development of initiatives that would safeguard the environment, however, it would produce outcomes that were inequitable for vulnerable populations. This PhD process has opened my eyes to these issues and I now see the value and significance of ensuring a social justice approach within research and practice – not just an “eco” focus. If we want to truly achieve sustainable communities, approaches need to ensure they do not reinforce affluent, Anglo-Saxon responses to ecological problems.

Similarly, the notions of food sovereignty as an approach to address food security among at-risk groups was affirmed. Prior to this study, my original discourse was towards the commonly used definition of food security provided by the FAO – this definition was used to guide my research aims and questions. It was also used to frame the questions in the online survey and interviews. Through this research, however, I became oriented towards food sovereignty due to its emphasis on empowerment. It reinforced the notion that all people (from farmers through to consumers) have a right to create their own food system (without
influence from food industry and agribusiness). It also appealed to me due to its affiliation with health promotion values and principles, e.g. empowerment and social justice.

Political affiliation have also been challenged since the beginning of this research study – once an avid Greens voter. I felt that this political party emphasises environmental sustainability action with some policy action regarding human health and social justice. Healthcare action appear to be focused on a biomedical view. As such I have become increasingly interested in political parties that have a holistic health and sustainability focus. This interest also translates with the research approaches and teaching outcomes that I will be using in the future.

My research philosophy has also changed through this PhD journey. Once committed to a positivist framework/methodology to guide research, I am now open to other viewpoints, particularly the constructivist paradigm. I see the value in this approach including knowledge that is generated. The constructivist paradigm also suits my values and beliefs – it also aligns with the food sovereignty discourse to achieve a more equitable food system.

5.4 Ethical considerations

According to Piper and Simons (2005, p. 56) ‘ethical practice is often referred to as ‘doing no harm’’. Researchers need to consider any ethical issues that may arise throughout each stage of the research process (i.e. planning the research, data collection, analysis) and develop a plan to address each of these (Creswell 2013). In addition, Creswell (2009, p. 87) states that researchers need to: ‘ensure that their research participants are protected; develop a trust with their research participants; promote the integrity of the research; guard against misconduct and impropriety that might reflect on their organisations or institutions; and cope with new, challenging problems’. Undertaking a planned approach ensures various aspects of the research process are considered, for example, confidentiality and anonymity of participants, ensuring informed consent and respecting participant rights (Piper & Simons 2005). For this study, the researcher used the guidelines provided by Creswell (2013) to anticipate any ethical issues and how to address them. Table 20 outlines this process.
Table 20. Ethical considerations during research process

<table>
<thead>
<tr>
<th>Research stage</th>
<th>Type of ethical issue</th>
<th>How to address the issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to conducting the study</td>
<td>• Seek university approval on campus.</td>
<td>• Submit for institutional review board approval.</td>
</tr>
<tr>
<td></td>
<td>• Gain local permission from site and participants.</td>
<td>• Identify and go through local approvals.</td>
</tr>
<tr>
<td></td>
<td>• Select a site without a vested interest in outcome of study.</td>
<td>• Select site that will not raise power issues with researchers.</td>
</tr>
<tr>
<td></td>
<td>• Negotiate authorship for publication.</td>
<td>• Give credit for work done on project, decide on author order.</td>
</tr>
<tr>
<td>Beginning stages of study</td>
<td>• Disclose purpose of the study.</td>
<td>• Contact participants/gate keeper and inform them of general purpose of study.</td>
</tr>
<tr>
<td></td>
<td>• Do not pressure participants into signing consent forms.</td>
<td>• Provide a plain language statement outlining privacy, confidentiality, disclosure of information and risk and how this will be managed.</td>
</tr>
<tr>
<td></td>
<td>• Confidentiality/anonymity.</td>
<td>• Inform participants that they do not have to sign consent form.</td>
</tr>
<tr>
<td>Collecting data</td>
<td>• Respect the site and disrupt as little as possible.</td>
<td>• Inform participants of their confidentiality and anonymity.</td>
</tr>
<tr>
<td></td>
<td>• Avoid deceiving participants.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Build trust, convey extent of anticipated disruption in gaining access.</td>
</tr>
<tr>
<td>Analysing data</td>
<td></td>
<td>Reporting data</td>
</tr>
<tr>
<td>----------------</td>
<td>-----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>• Respect potential power imbalances and exploitation of participants (e.g. interviewing).</td>
<td>• Discuss purpose of study and how data will be used.</td>
<td>• Avoid leading question, withhold sharing personal impressions, avoid disclosing sensitive information.</td>
</tr>
<tr>
<td>• Additional processes during data collection, e.g. audio recording.</td>
<td></td>
<td>• Avoid disclosing only positive results.</td>
</tr>
<tr>
<td>• Discuss purpose of study and how data will be used.</td>
<td></td>
<td>• Respect the privacy of participants.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Avoid disclosing information that would harm participants.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Communicate in clear, straightforward, appropriate language.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Falsifying authorship, evidence, data, findings, conclusions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Do not plagiarise.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Avoid disclosing information that would harm participants.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Communicate in clear, straightforward, appropriate language.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Share data with others.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Do not duplicate or piecemeal publications.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Complete proof of compliance with ethical issues and lack of conflict of interest, if requested</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>---</td>
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<td></td>
</tr>
</tbody>
</table>
|   | • Refrain from using the same material for more than one publication.  
|   | • Disclose funders for research, disclose who will profit from the research.  
|   | (Adapted from Creswell 2013, p. 58-59)  

This study was granted ethics approval on August 9th, 2013 (refer section 10.5, Appendices). Please see a summary of details in Table 21.

Table 21. Ethics clearance

<table>
<thead>
<tr>
<th>Ethics clearance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HEAG No.</td>
<td>HEAG-H 108-2013</td>
</tr>
<tr>
<td>Study title</td>
<td>Food Security: from the campus to the paddock</td>
</tr>
<tr>
<td>Approval granted</td>
<td>9 August 2013</td>
</tr>
<tr>
<td>End date for project</td>
<td>9 August 2016 – extension granted until 17 December 2017 (intermission due to maternity leave)</td>
</tr>
</tbody>
</table>
6 FINDINGS

The findings in this chapter are organised according to the research questions. Findings from phase 1 and 2 (survey and interviews with health promotion practitioners) are presented first, followed by the findings from Phase 3 (interviews with academics and document analysis of associated units).

6.1 How are current Australian health promotion practitioners and the initiatives they deliver addressing food security?

6.1.1 Health promotion food security initiatives – approaches that align with the FAO definition of food security

The results from the interviews and online survey indicate that practitioners in this study were involved in or have been involved in food security initiatives that align with the current definition of food security as outlined by the FAO (2006): food availability, food access and food use. Table 22 demonstrates the various activities according to each food security pillar. Section 6.1.2 – 6.1.4 will elaborate on these findings from the interviews and online survey.

Table 22. Food Security pillar and health promotion activity

<table>
<thead>
<tr>
<th>Food Security Pillar</th>
<th>Interviews</th>
<th>Online survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food availability: sufficient quantities of food available on a consistent basis.</td>
<td>• Emergency Food Relief.</td>
<td>• Emergency Food Relief.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• School and community breakfast programs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Community café/ community meals programs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Policy/advocacy for healthy food/food security.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Food security networks/ partnerships with food business/retail sector.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Food Security network/ alliance.</td>
</tr>
</tbody>
</table>
### Food access: having sufficient resources to obtain appropriate foods for a nutritious diet.

- Food mapping activities (healthy food basket mapping, food outlet mapping, food deserts, food producer etc).
- Improving access to food.
- Fruit and vegetable vans.
- Food Directories.
- Accessible/affordable fruit and veg promotion/distribution.
- Healthy school canteen program.
- Food mapping activities (healthy food basket mapping, food outlet mapping, food deserts, food producer mapping).

### Food use: appropriate use based on knowledge of basic nutrition and care, as well as adequate water and sanitation

- Healthy Eating and/or Nutrition education programs.
- Cooking classes/community kitchens/meals/café meals.
- Healthy Eating and/or Nutrition education programs (e.g. FoodCENTS, Food Sensations, Go for 2&5).
- Cooking classes/ community kitchens.
- Education and Training for practitioners.
- Food security training for practitioners.
- Nutrition training for practitioners.

### 6.1.2 Initiatives with a focus on increasing the availability of healthy food

#### 6.1.2.1 Emergency Food Relief

Four practitioners from the interviews discussed their involvement with emergency food relief programs. Practitioners highlighted the difficulties associated with food relief, including competition for food between food relief providers. One practitioner found a
solution to their problem through setting up a larger food bank in the area (P4). A loss of
dignity and shame among those seeking food relief was also discussed by practitioners. P11
stated that their model of emergency food relief had changed over the years. A voucher
program where food insecure groups can purchase groceries from their local supermarket was
initiated. This model was considered to be more effective, providing social benefits and
reducing feelings of inadequacy and shame that are commonly associated with emergency
food relief programs.

One of the things we’d talk about is what I mentioned before is that you want people
to be able to access food in a way that respects their dignity… What they’ve found is
that when people used to come and get food vouchers they would get the voucher and
leave … you know, kind of in an embarrassed way, like there was some shame
attached to it. So now what they’ve found with the supermarket is that people come in
and they feel good, they’re buying their groceries themselves, and obviously they’re
getting a lot better value… but people are staying around, using the café, socialising,
connecting up, so yeah… you can see why that issue of dignity is so important for
people (P11)

P3 stated that while they have an emergency food relief program, the work they have
undertaken around eco-friendly food is more effective for long term food security.

We do have community nutritionists working with various emergency food places.
Organisations are trying to look at ways to make sure that people who are accessing
food parcels, the food that’s being provided is, of good quality and it meets the
dietary guidelines… I think the work that we have done on eco-friendly food is about
long term food security… obviously choosing foods that have less effect on the
environment… (P3)

Ten practitioners from the online survey were also involved with the development of
emergency food relief programs for food insecure groups. One practitioner works with
emergency food relief providers to distribute shopping lists with food vouchers.

6.1.2.2 Breakfast programs

One practitioner from the interviews was involved in the development of a breakfast club for
their food insecure groups. The breakfast was provided at a reduced cost.
It was really amazing… they have a little breakfast club going in the mornings too, so you can go in and pay a couple of dollars and get a decent breakfast… there’s a bit of a café-type thing run by volunteers during the day (P11)

Free or low-cost breakfast programs within schools and the community were also initiatives undertaken by some practitioners from the online survey (n=8).

6.1.3 Initiatives with a focus on increasing access to healthy food

6.1.3.1 Food mapping activities (healthy food basket mapping, food outlet mapping, food deserts, food producer mapping)

Four practitioners from the interviews discussed their involvement with the healthy food basket mapping program. The initiative was developed to measure and monitor the cost and affordability of a healthy basket of food for a typical family in their local area.

We did the healthy food basket monitoring, we’ve participated in some of those surveys around costs and access of healthy food within [local area]. So that’s sort of what we have done (P1)

One practitioner also commented on the limitations of the healthy food basket mapping tool.

I did quite a lot of research around food security, looking at accessibility. There was a lot of mapping involved. There was also things like the healthy food basket… they’re not really great assessments, but at the time quite a few years ago, there wasn’t really many models like that to utilize (P13)

Three practitioners from the online survey were also involved with healthy food basket mapping. In addition to healthy basket mapping, several practitioners were involved in other food mapping activities, these included: fresh food outlet mapping to determine the number of fresh food outlets within the area, mapping food deserts or local food producers in the region.

6.1.3.2 Affordable food initiatives, directories, maps and food vans

Practitioners from the online survey were also involved in initiatives to increase access to fresh food. These included affordable food markets (n=1), low cost supermarkets (n=1) and reducing the cost of healthy food (n=1), however, it was not specified how this was achieved. Directories or maps with ethnic and multicultural food stores was another activity to improve access to food (n=1), particularly culturally appropriate foods for CALD groups. One
A practitioner was involved with improving transport options for community members so they could more easily access healthy food outlets. A fruit and vegetable van was also discussed by one practitioner from the online survey to increase access to healthy food for food insecure groups.

6.1.4 Initiatives with a focus on food utilisation

6.1.4.1 Healthy Eating and/or Nutrition Education Initiatives, Supermarket Tours and Budgeting Workshops

Healthy eating and/or nutrition education initiatives (i.e. involving budgeting, cooking and supermarket tours) were discussed by nine practitioners from the interviews. One practitioner stated how their program began with a healthy eating focus and expanded to include cooking classes, budgeting and supermarket tours, particularly for the refugee community.

The healthy eating focus... so we did things like cooking classes and FoodCENTS classes. Looking at budget, food on a budget and healthy food on a budget. Providing cooking skills to fit with those in low socioeconomic communities. We had a lot of refugees in the community as well so teaching them about how to go to the supermarket and basic things like that which they won’t necessarily have in their country of origin (P4)

Two practitioners were involved in the FoodCENTS program; an education program that helps families to achieve a healthy diet and to save money on their grocery shop (FoodCENTS 2016). One practitioner stated that they used to have a program called ‘Fresh’ which involved nutrition education, however, that had ended and Jamie’s Ministry of Food was one of the main programs remaining (P1). One practitioner discussed their involvement in a nutrition education program with the Australian Indigenous community which has expanded over the years to include a community kitchen, food policy and fruit and vegetable program.

We’ve worked with the AMS here – the Aboriginal Medical Service – for six years now, and that just started out talking with them about nutrition and food security, turning up to the communities and bringing veggies to put on the barbeque, bringing along some salads and that sort of stuff...then starting a community kitchen, to the point where they now have a healthy food policy, all their events they have a healthy
food auspice, the food’s healthy. If they’re running groups, their expectation is that they offer healthy food. And then they’re running the fruit and veggies program (P11).

Twenty-one practitioners from the online survey were also involved in healthy eating and/or nutrition initiatives. These varied and included healthy eating and food literacy programs, and other established programs such as ‘Go for 2&5’, ‘FoodCENTS’, ‘Munch and Crunch’ or ‘Kids Go for Your Life’. One practitioner was involved in delivering supermarket tours for food insecure groups.

6.1.4.2 Community Kitchens and Cooking Classes

Four practitioners from the interviews were involved with a community kitchen. One practitioner stated that the aim of their community kitchen was to create a space for social gatherings where people come together to share food and recipes while at the same time learning about nutrition in a non-patronising way (P10).

The community kitchen idea was really about trying to move away from nutrition education, to bringing people together to share recipes and share cooking. It had quite an educational focus, but we didn’t call it education, because it sounds so patronising. And we serve a community kitchen in an original medical centre (P10)

Two practitioners discussed the fun and enjoyment that participants received while taking part in the cooking classes developed by their organisation.

So people got together and get to know one another, they learn recipes and they took food home and they taught their families how to cook. That was a fun element and they were looking forward to having – they even wanted to have that again on the application that we’ve submitted over there (P6)

Practitioners from the online survey also stated they were involved in a community kitchen (n=8) or cooking classes (n=2), however, most did not state the aim of their kitchen or cooking class.

6.1.5 Health promotion food security initiatives: broadening health promotion’s approach to addressing food security

Interviews and the online survey revealed that some health promotion practitioners in this study were broadening their approach for addressing food insecurity. These activities incorporated environmental sustainability aspects among traditional health promotion.
offerings, for example, cooking classes with a focus on seasonal or vegetarian food. Other activities resonated with food systems activities to address food insecurity (e.g. food production, food alliances). These initiatives are demonstrated in the following section.

6.1.6 Environmental sustainability activities within food security initiatives

Interviews and the online survey with health promotion practitioners revealed the variety of activities that practitioners used to address food insecurity through an environmental sustainability perspective. Tables 23 demonstrates the varied activities undertaken by practitioners. Section 6.1.6.1 – 6.1.6.5 will elaborate on these findings from the interviews and survey.
Table 23. Food security initiatives that integrate environmental sustainability considerations

<table>
<thead>
<tr>
<th>Initiatives</th>
<th>Online survey</th>
<th>Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Promoting hands-on engagement in food production:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community Gardens, including school gardens.</td>
<td>26</td>
<td>13</td>
</tr>
<tr>
<td>Establishing home gardens with migrants/community.</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Urban agriculture (including: Gardens4Harvest, Living Streets/ Street Harvest projects, nature strip &amp; laneway planting, planter boxes).</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Permaculture, e.g. Permablitz groups, Permaculture training.</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Veggie Patch Program, Grow Your Own.</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td><strong>Increasing access to sustainable food:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farmers markets.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Food cooperatives.</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Local foods network/food map.</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Food swap/sharing.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Community Supported Agriculture (Food Box).</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Harvesting health program using a Paddock to Plate philosophy.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Increasing knowledge of food management and preparation:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking/preserving classes using food produced in garden.</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Vegetarian cooking workshops.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Cookbook development.</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Food waste programs, e.g. Love Food Hate Waste, Food Know How.</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Education on the benefits of local food plants suited to local environment.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sustainable living education program (food related).</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Sustainable/organic gardening programs.</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Seed saving programs.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>University education programs.</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Other education programs e.g. Bush Tucker, Buy Local Eat Seasonal, Traditional food plants workshops.</td>
<td>3</td>
<td>1</td>
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**Advocating for improved food systems and policies:**

| Campus food advocacy project. | 1 | 0 |
| General advocacy for sustainable food/food systems. | 1 | 4 |
| Coalition/liaisons/networks for healthy and sustainable food/food systems. | 3 | 4 |
| Urban agriculture policy scoping. | 1 | 0 |

**Localised food strategies and initiatives:**

| Community awards for sustainable living (food category). | 2 | 0 |
| University initiatives. | 1 | 0 |
| Community mobile farm. | 1 | 0 |
| Social enterprises – employment and training exchange & catering enterprise; small seed funds for start-ups in community food systems, e.g. pop-up community kitchens, food boxes, food vans. | 3 | 1 |
6.1.6.1 Promoting hands-on engagement in food production

Fourteen participants from the interviews stated that their organisation had developed activities that involved hands-on engagement in food production. Community gardens, were common activities undertaken by practitioners (n=13). Initiatives developed within the garden varied according to the community’s need; for example, increasing access to fresh food for low income groups. One practitioner discussed their involvement in community gardens that were designed for people with disabilities (P13). Three participants were involved with community gardens in school settings. Practitioners discussed the learning opportunities for health and sustainability in the garden including sustainable food production and healthy eating. Participants who were involved in providing food to disadvantaged communities highlighted the importance of community gardens in achieving this goal, while also providing social and mental health benefits.

_We work in community gardens on public housing estates and we’ve got 19 community gardens across Melbourne. These are working with people who are obviously living in disadvantage, or in a low-income situation. The community gardens provide a place for people to be able to grow food that will be able to supplement what they buy... and also that they can have that connection to the food that we talked about. But also, there’s something really amazing for people’s mental health as well, to be able to have the access to be able to grow your own food (P12)_

One practitioner discussed the development of a community garden for their Men’s Shed program. Growing and selling excess produce from the garden provided positive outcomes for garden participants. Skills acquisition for some garden participants through TAFE qualifications were other positive outcomes.

_We’ve had quite a few community gardens done up; one was a full plot that a Men’s Shed had put in, they really wanted to develop that up and to actually produce a lot more food out of it, so that’s massive now. It’s grown like top seed, that garden... As well as taking food home, they now have excess food that they sell at a little market day, and that puts money back into the garden... The project officer was able to link that to a case outreach course, and we had one guy there who was in his 50s, and when they gave him his certificate for TAFE he started to cry, so that was the qualification... (P11)
Two practitioners, however, stated that the development of a community garden was not well received by members of the community as originally thought. This garden dissolved and the focus moved into the development of community gardens in aged care facilities.

_We’ve certainly had the experience with a project that I was working on where someone thought it was a great idea to have a garden and found that their community weren’t as excited. Well actually they were really excited about it until they learnt that they had to actually own it, like really own it and drive it and then all of a sudden the interest was lost. So it just turned out to be something quite different (P5)_

Permaculture was another food production strategy that was discussed by a few practitioners. Practitioners reported their involvement with a non-government organisation called Permablitz. The aim of Permablitz is to develop edible gardens based on Permaculture principles in people’s backyards (Permablitz 2016). Two practitioners discussed the initiation of a Permablitz group to address food insecurity in their local area. One practitioner’s organisation also started up a Permablitz group which was quite successful.

_We started up one of them [Permablitz] and that’s been going really well. So, we again try to encourage people to grow at home and get that network going... we’ve done a fair few and now we’re trying to step away as such, to let it run on its own rather than council always backing it and pushing it and stuff. You want these things to take on their own and move ahead, so everything’s going really well (P15)_

Urban agriculture was discussed by one practitioner as a strategy to address food insecurity. Urban agriculture can be defined as any agricultural activity that takes place within an urban or city setting (Urban Agriculture Forum Australia (UAFAU) 2016). P9 stated that their organisation was involved with building planter boxes in the city areas and planting verges and nature strips with edible plants. Other initiatives include planting neglected laneways with edible plants around the city areas. Despite the popularity of these planting initiatives, P9 stated that some initiatives, for example, planter boxes would not be able to secure long term food security.

_We started out doing planter boxes in the city, on the streetscape and nature strips and verges. There’s quite a few of those out there. I think we’re at about 50 on the street and that seems to be taking hold, but we’re not going to feed a nation on planter boxes obviously. I think the planter boxes really are more about sort of that_
Home gardening was another food production strategy, although very few practitioners indicated that this approach was used to increase access to food for at-risk groups. One practitioner stated that growing food at home was the only way that their refugee community could access food.

*I think looking at local food production, like gardening at a local level, encouraging people to try and garden themselves, and I said that a number of years ago when I was working with the Somalian community that because of various issues around finances, the gardens that we helped them start were not just about getting more fruit and vegetables but there was literally a food security issue because sometimes the food in their garden was the only food that they had money for. You know, they didn’t have money for food so eating out of the garden was that important, and at the time I didn’t realise how financially disadvantaged some people were and that home gardening was now a way of getting food security for some people (P3)*

In addition to the interviews, practitioners from the online survey (n=34) reported that their initiatives promoted hands-on engagement in food production to address food insecurity. Most of these initiatives were based on ecological food production methods, for example: setting up Permablitz groups; urban agriculture (e.g. Gardens4Harvest, Living Streets/Street Harvest projects); and planting heirloom varieties of plants better suited to the local environment. Heirloom plants and seeds are ‘any [plant] that has been selected, bred and passed down… [due to] their superior qualities such as great flavour, pest and disease resistance, and suitability to local conditions’ (Sustainable Gardening Australia n.d., p. 1).

Community gardens (including school gardens) were other common activities. Community gardens were often developed for low income groups or children. Some practitioners stated that their organisation had partnered with local charities, churches or local councils to establish gardens, for example, the Salvation Army.

### 6.1.6.2 Increasing access to sustainable food

Increasing access to food is a common activity undertaken by the health promotion sector to address food insecurity. In this study, practitioners from the interviews were introducing environmental sustainability aspects to increase access to fresh food. This varied according to the needs and available resources of the community. For example, one practitioner stated they
were working on a ‘Harvesting Health’ program that involved people from all levels of the local food system (from producers and farmers, through to retailers and consumers) who can work collaboratively to address problems with the food system and increase access to fresh fruit and vegetables. Another practitioner stated that they developed a program that connects the community directly with local food producers, e.g. farmers.

*I suppose the main things we’ve got to do with food at the moment is our local food network and our food map, which is a website that you can access that will show you where you can actually purchase local food from. So rather than going to the supermarket and stuff, you can actually go direct to the buyers, or suppliers and then get the food from there. It’s trying to get local food producers together, and supporting that so that from a sustainability side of things, it’s a much better idea in that you don’t have the food miles and that sort of thing* (P15)

One practitioner was involved with the creation of a free meals directory that lists local food producers in the area.

*Then another project that has been going on for some time, is the creation of a low-cost and free meals directory. So pulling together all of the info about the local meal providers and food aid providers and offer donors and redistributors. So we take carriage of that project too* (P16)

P15 discussed their organisation’s Meals on Wheels program which aims to deliver healthy, nutritious meals to those with physical constraints preventing them making their own. The program was altered to incorporate local sources of food. One practitioner (P12) stated that their organisation supported a food swap initiative in their area. ‘Food Swaps are local gatherings where people swap excess home grown produce and gardening extras such as fruit, vegetables, herbs, eggs or seeds’ (Local Harvest n.d., p.1).

Six practitioners from the online survey were also involved with initiatives that sought to increase access to sustainable food, for example: establishing local food cooperatives among food insecure groups and the development of a local foods network. One practitioner stated that their organisation was in the process of developing a farmer’s market. Food swapping and food sharing were other common activities.
6.1.6.3 Increasing knowledge of food management and preparation

6.1.6.3.1 Food preparation skills

Eleven participants from the interviews stated that their organisation had a community kitchen or café where the community could participate in the educational activities offered. These activities expanded on current approaches within health promotion nutrition and budgeting education. Food literacy aspects with a systems focus (e.g. education regarding the production of food), teaching people to cook using seasonal produce and reducing food waste were some examples. Some participants stated that their community garden provided food for the cooking classes.

One of our programs that we’re working on at the moment is the development of the community food centre in [suburb]; and that idea is there’s a community kitchen there, it’s attached to a community garden so it will provide opportunity for people to skill up around growing food and preparing food; and then also an opportunity to share food in a community setting, and also learn about the food system and where their food comes from and what’s going on with food (P12)

One practitioner stated that excess or imperfect food was used in their community kitchen and café. Discussion also branched out into other benefits of having a community kitchen/café and cooking classes, such as social interaction and networks. This was a common theme among participant responses.

We did in our community kitchens and community gardens, community cafes, some things like bread runs where people had day old bread to dispose of, or picking up, I think there was a run of buttermilk at one point. There's a dairy nearby, that sometimes had produce that was about to run out of date, so they would donate that. So, then we’d put recipes into little parcels, and distribute that. The community kitchen idea was really about trying to move away from nutrition education, to bringing people together to share recipes and share cooking (P10)

One practitioner, however, discussed the difficulties for food insecure groups to attend cooking programs, particularly in very remote and rural locations.

And we had a neighbourhood centre that did a cooking program as well, for isolated women. One of the problems we have as health promoters is… it’s easy when you’ve got a big concentration of population, you can offer something and it’s quite
accessible for a lot of people, but we’ve got a lot of little rural villages that it’s a bit trickier to do that work (P11)

6.1.6.3.2 Food waste

Food waste refers to ‘food appropriate for human consumption being discarded, whether or not it is kept beyond its expiry date or left to spoil’ (FAO 2013, p. 9). Three practitioners in this study discussed programs in place that reduce food waste in their local community. P12 stated their organisation had developed a composting program. Another practitioner stated that their organisation had initiatives to reduce food waste going into landfill.

... Paddock to Plate is important but we like to talk about paddock right through to the landfill, and so one of the things that we do, we’ve got a big sticker that you put on your bin and we ask people to write landfill bin on the bin that goes to landfill, so they actually name it for what it is and then they have a measurement sticker so they can work out whether they’re putting more or less garbage into landfill (P3)

One practitioner’s organisation developed a ‘Food Know How’ program, a joint initiative with a not for profit organisation that collects food from cafes for composting.

... it’s mostly been targeted at cafes, but also – I can’t remember the exact number – but I think there’s about 100 residential properties as well. You might see people driving with a little bike with a bin on the back of it. People basically dispose of their food waste in those bins and there’s a couple of other ones – points around town. That food all gets taken to the Collingwood Children’s Farm and they have a series of composting bins there (P9)

One practitioner discussed their organisation’s program for increasing food literacy among food insecure groups. The program was developed with the dual aim of increasing food preparation and cooking skills while reducing the quantity of food thrown away by food insecure groups.

...often people can be food insecure and still throw a reasonable amount of their food away if their food literacy is low and they’re not able to cook those foods or sort of have a good understanding of how to do that. So we do quite a lot of work with teaching people to cook and those sorts of things as well, and also sometimes we do work around budgeting, which includes ways obviously of menu planning which reduces the amount of waste that is thrown away (P3)
6.1.6.3 Sustainable food education

One practitioner from the interviews (P2) stated that they developed workshops to local organisations and communities where access to food was poor on edible and traditional food plants. P2 also mentioned the creation of a mentoring program in their local region which connected older generations with food growing knowledge with people interested in growing their own food.

_Just having that wisdom of years often, supporting somebody that’s keen but doesn’t necessarily have that knowledge... So I think it’s been – those knowledge and skills has been very useful. And I guess it’s continuing to shape what we do in food security, because it’s more than just providing the information, we also need to provide skills, and hands-on understanding as well (P2)_

One practitioner discussed the importance of education in the community for food security, particularly around growing food. P16 discussed their involvement with a sustainable living education program that was developed through their local council. This program was delivered through a series of workshops around sustainability, with food one of the key themes. P16 discussed the popularity and interest from the community from the food theme.

_It was also very quickly proved to be the most popular thing that we were offering in a range of different workshops. We were doing water, waste, energy... We were doing sustainable food and biodiversity and far and away the sustainable food workshops were the most popular that we were running and have now integrated into the core environmental and waste programs, things like native gardening, backyard chooks, cheese making, pickling and preserving, waste and ‘Love Food, Hate Waste’ workshops in addition to some of the more traditional sustainability themes or sustainable living themes (P16)_

Many practitioners from the online survey were also involved with food management and preparation that had a focus on sustainable food production (n=21). Examples include: educating the community on cooking and preserving food from community gardens, veggie patch programs, horticulture programs and vegetarian cooking workshops. Two practitioners stated that they developed cookbooks, however, only one provided detail regarding the content (i.e. Bush Tucker), while the other is unknown. One practitioner was involved with developing curriculum within schools and universities around the food system. Two practitioners stated that they were involved in food waste initiatives.
6.1.6.4 Advocating for improved food systems and policies

Some practitioners from the interviews were involved with policy and advocacy for improved food systems. Two practitioners discussed a Food Policy Coalition in their region which brought together various professionals from the area to discuss the food system and common goals. P10 discussed their own involvement in a food forum in their region which evolved into an official advocacy group called the [Region] Food Fairness Alliance. P10 also mentioned their involvement with a submission to the review of the Australian Dietary Guidelines and working with the planning department in their local council. Another practitioner mentioned their involvement with advocacy, particularly at a local level, supporting residents’ needs (i.e. the community garden). P14 discussed their involvement with a Food Alliance to develop a Local Food Act for Victoria, while P16 discussed their involvement at an organisational level to shift policy towards more sustainable food (e.g. ethical procurement of food in catering policy).

One of the biggest initiatives, I suppose, that we have, is a food policy coalition, which started about two and a half years ago now, maybe a little bit longer, around bringing all of the different players, in both health, environmental health, environment, community gardening, local government and the like; bringing them all, and having them in the room, around the table, talking about the system. It’s a policy coalition, it’s about looking at the system that is within our area (P7)

Two practitioners were involved with developing a food security policy and a food coalition within their organisation. A food forum was organised with the aim to discuss food security and health. The forum, however, was cancelled due to low participation rates.

We scheduled and booked a venue and we had everything in place, handed the petitions out and we thought we’d have a food forum which would be a good way to bring them up and talk about what is food security and what is harvesting health, which is the name that we gave to the fresh food network. What it would mean for them? But we just had two people [turn up to the forum] ... so we actually didn’t have the forum, but that made us aware of the fact that there’s much more work to be done (P5)

Six practitioners from the online survey were also involved with advocating for improved food systems and policies. Examples that were provided include: A campus food advocacy
project, development and/or involvement in food coalitions/alliances, urban agriculture policy scoping and submissions to relevant policy discussion papers.

6.1.6.5 Localised food system strategies and initiatives

One practitioner from the interviews discussed their involvement with several initiatives to build a local food system in their region, including the development of a program called ‘Edible [Town]’.

…the whole city would share enthusiasm for growing and preparing and eating fresh fruit and vegies. I came up with an idea for social enterprise which I’ve called ‘[Town] Edible Enterprises’. So, I would like to use my background to set-up an entity. I’m working on this at the moment – to set-up an entity to actually provide small seed funds for start-ups in community food systems and to provide some support based on my experience and could be able to do that as well. And so it might be pop-up community kitchens or, you know, food boxes, food vans, other little ideas that people might have (P14)

Two practitioners were developing healthy living and food sensitive urban planning principles for their local government area. These practitioners also organised an annual sustainable food festival with over 50 stallholders, activities such as cheese making workshops are available through the festival.

We are looking at collaborating with both the two shires, we’re well on the way to this, to look at developing healthy living and food sensitive planning principles in local government; so that’s massive by design. The other program that I forgot to mention, which is, I suppose, from our perspective is about sustainable, healthy, eating... (P7)

P16 stated that their local government area has developed a Regional Food Strategy which aims to address a range of challenges in the food system. P16 also discussed a Permaculture training initiative that emerged when they received a large grant from an environment trust in NSW.

The [region] Regional Food Strategy that I just sent through to you has one, two, three, four, five, six, seven, eight different guiding principles. So they range from talking about the challenges posed by people in climate change to articulating what we believe food security is the right to food and acknowledgement that the current
food system is broken basically and needs to fundamentally transform in order to deliver what it needs to deliver (P16)

Seven practitioners from the online survey were involved in various initiatives that were classified as localised food strategies and programs. One was a community mobile farm, the other a sustainable food project at the university level, however, details of these two initiatives were limited. Two practitioners stated their organisation held community awards to celebrate local food initiatives. Three practitioners were involved in initiatives with a social enterprise focus.

Section 6.1 provided an overview of the various initiatives that health promotion practitioners were incorporating into their food security programs. Section 6.2 will outline the environmental sustainability principles that practitioners were utilising to guide the development of these initiatives within their food security programs.
6.2 To what extent are environmental sustainability principles used when developing and delivering such health promotion food security initiatives in Australia?

This section will demonstrate the utilisation of environmental sustainability principles to guide the development of health promotion food security initiatives. This study did not evaluate the impacts of these principles; however, it provides a snapshot of the extent of their use within these initiatives.

6.2.1 Ecological Integrity and Biodiversity principles

Interviews revealed that principles based on ecological integrity and biodiversity were used by some practitioners in the production of food (n=10). Food production methods that encompass these principles include conservation agriculture, organic gardening and Permaculture. Some practitioners did not use a particular food production method such as Permaculture or organic gardening, however, the use of non-chemical approaches to grow food was discussed (P11).

*There’s a Permaculture and organic garden so we’ve tried to maintain that as much as possible and part of the rule around the garden is about gardening in a sustainable way and they compost and fertilise from the garden itself without using an awful lot of additional fertiliser. They don’t use pesticides, they do use natural controls… crunching the snails as opposed to bullets in them. With regards to the garden maintenance and management itself that’s the philosophy of the garden (P1)*

Data from the survey, however, (Figure 22) demonstrates that initiatives tend to rate on the lower end of the scale with regards to ecological integrity and biodiversity principles. Animal Welfare (mean= 2.46, SD= 1.31, CI= 2.07-2.85) was ‘rarely’ (30.4%) or ‘never’ (28.3%) considered. These results, however, may reflect the number of initiatives that do not involve animals for meat consumption. Farming practices that follow a method such as organic/biodynamic, Permaculture or community supported agriculture were not followed by many practitioners (Sustainable Farming Practices) (mean= 2.78, SD= 1.28, CI= 2.40-3.16). Some practitioners stated that they used Seasonal Foods in their initiatives either ‘most of the time’ (30.4%) or ‘all of the time’ (45.7%) (mean= 4.15, SD=0.94, CI= 3.87-4.43).
6.2.2 Social Equity and Fairness principles within food security initiatives

Practitioners from the interviews discussed the use of social equity and fairness as key principles within their initiatives. Practitioners noted the environmental sustainability aspects within their initiatives, however, felt that a fair food system was equally important.

Well because they're inextricable [environmental sustainability principles]. I guess one of the main driving factors for developing the food strategy has been an acknowledgement that food is an incredibly important part of our lives and it has a huge impact on our communities. That it’s central to health and wellbeing and cultural identity and a very important part of the local economy... so I guess that you can’t have a fair food system without it being sustainable. You can’t have a sustainable food system without it being ethical and connected to communities (P16)

On a similar note P12 stated that environmental sustainability principles require the notion of food justice, in addition to environmental sustainability to produce resilience in communities and the environment.
Well, I suppose we feel that [environmental sustainability principles] they’re fair, it’s about food justice, because one of the underlying impacts of our work is around low income and disadvantaged communities so we feel that that’s a big element to our work and we feel that all of those things, like organic food and local food, skilling people up, is the most sustainable way of creating resilience in a community as well; and that it can hopefully provide a safety net for us as times are changing, in terms of climate and resource depletion, and all of those sorts of things (P12)

Data from the survey, however, reveal that food security initiatives that consider social equity and fairness as guiding principles varied among practitioners (Figure 23). The purchasing of Fair-Trade food for food security initiatives was undertaken by a few practitioners (mean= 2.47, SD= 1.16, CI= 2.12-2.82). Food Sovereignty (Principle 1) rated highly, with practitioners stating that initiatives include their population group as part of the creation and implementation of a local food system that integrates the cultural, social, environmental, health and economic context of that area, (mean= 3.70, SD= 1.09, CI= 3.37-4.02). Similarly, to Food Sovereignty (Principle 1), Food Sovereignty (Principle 2), where the population group is given the opportunity to develop skills and knowledge to grow and harvest its own food rated high (mean= 3.93, SD= 0.99, CI= 3.64-4.23). Initiatives that advocate for small-scale Australian farmers to be fairly and equitably rewarded and where health and wellbeing needs are considered were ‘never’ (28.3%) or ‘rarely’ (19.6%) used (Food Sovereignty, Principle 4) in food security initiatives (mean= 2.59, SD= 1.32, CI= 2.19-2.98).
6.2.3 **Initiatives integrating principles around limits on natural resource use**

Four practitioners from the interviews discussed food waste as a principle, including its significance within food security initiatives. P3 stated that it was often those with low food literacy or food insecurity issues were the ones that produced a large quantity of food waste.

*I think maybe the concept of conserving resources, like reducing waste and not throwing food away. And so, often people can be food insecure and still throw a reasonable amount of their food away if they’re food literacy is low and they’re not able to cook those foods or sort of have a good understanding of how to do that (P3)*

P14 discussed the conservation of water, particularly within their region where drought and reduced water availability was a common occurrence. Educating the community on the conservation of water was part of the bigger picture for protecting future food production.

*Water is a huge thing too and quite often these initiatives will have a component of education, if we’re talking about local food production around understanding what our constraints are with that resource because water is a very constrained resource in*
Australia…. and particularly when you live in a regional area, as I do understanding how to make better use of the water in your gardens – whether its wicking beds, mulching, the way you build your food production system is actually really important (P14)

Another practitioner discussed the use of Permaculture principles within their Permablitz group as a guiding framework to conserve resources such as energy, waste and water.

...with the Permablitz group, permaculture principles are all about sustainability and designing the garden to grow and retain as much of its own energy, in the form of waste, or whether it’s water on your own property, to continue that so you’re not actually having to bring in anything from outside, and you’re not discharging any waste off site (P8)

A small number of practitioners from the online survey utilised principles that recognise the limits on natural resources. Food packaging waste was ‘never’ or ‘rarely’ considered by 37 percent of practitioners, while 34.7 percent stated this was considered ‘most’ or ‘all of the time’ in food security initiatives (mean= 3.0, SD= 1.21, CI= 2.64-3.36). Food Sovereignty (Principle 3) where the food system follows ecologically sustainable principles by protecting &/or enhancing biodiversity, soil and waterways (Food Sovereignty, Principle 3) (mean= 2.98, SD= 1.49, CI= 2.53-3.42) varied. For example, 26.1 percent of practitioners stated they ‘never’ use this principle to guide initiatives, while 21.7 percent stated they utilise Food Sovereignty, Principle 3 ‘all the time’. Figure 24 demonstrates these results.
6.2.4 Initiatives focusing on Local Food Systems principles

Ten practitioners from the interviews stated that local food systems principles guided the development of their program. Most outlined the benefits for their communities; for example, P3 discussed the idea of local food production with ensuring a level of food security for their culturally diverse community, while P15 stated that encouraging people to buy locally supports the local economy and reduces food miles. One practitioner discussed the benefits of a localised view of the food system as well as some of the costs associated with industrial food system processes.

_I suppose we promote local food, so accessing food, whether you’re growing it yourself or you’re connecting with local growers. Trying, for ecological reasons, that we want to have our food sources grown as nearby as possible, but also for our own economy and social sustainability and all of those kind of reasons, that we seek and promote local food; and also organic food, and GM free food (P12)_

Most practitioners from the survey stated their food security initiatives are guided by local food systems principles. Food is purchased mainly from local sources, e.g. farmers markets or market gardens within their region ‘most’ (30.4%) or ‘all of the time’ (41.3%) (Food Miles), (mean= 4.11, SD= 0.875, CI= 3.85-4.37). Urban agriculture initiatives such as edible streetscapes, city farms, community gardens ranked highly, (mean= 3.65, SD= 1.01, CI=
3.35-3.95) which is not surprising considering the substantial number of community gardens in use by practitioners. Food Swaps where sharing excess produce was undertaken varied between participants. Some practitioners used food swapping as an initiative (mean= 3.16, SD= 1.26, CI= 2.78-3.53). Figure 25 demonstrates these results.

Figure 25. Local Food Systems principles and extent of use in food security initiatives

![Graph showing the extent of use in food security initiatives for Food Miles, Urban Agriculture, and Food Swaps.]

### 6.2.5 Initiatives utilising Health Promoting principles

In addition to the environmental sustainability principles outlined above. Interviews with practitioners revealed that health promoting principles were used in food security initiatives (n=7). One practitioner discussed activities that embrace the cultural diversity of food which assists food insecure groups to integrate into their local community. One practitioner discussed the intersection between health/health promotion practice and environmental sustainability principles and the benefits of developing a holistic understanding between the two (P14).

*Well it goes way back to my view of the world from decades ago. It’s a holistic view. You might say integrated. It’s a way of understanding the intersection of all of the different aspects of our environment etcetera on our health if we’re looking at it from a health promotion point of view (P14)*
Another practitioner (P16) outlined how their region’s fair food alliance brought together practitioners from various disciplines, including health promotion, to achieve common goals. P16 further stated that their work on food security is underpinned by strategies that will deliver both healthier communities and ecosystems.

*Our work on food security is absolutely underpinned by the principles of sustainability and specifically have come from an Education for Sustainability perspective. I am very encouraged by the ability of food, as an issue, to bring together practitioners from different disciplines in order to work towards mutually beneficial outcomes (P16)*

Health promoting principles from survey responses generally rated higher than other principles (section 6.2.1 – 6.2.4). Initiatives that educate the community regarding the health, economic, social, cultural or environmental benefits of plant based diets were high among practitioners with 65.2 percent of practitioners stating they use these concepts ‘most’ or ‘all of the time’ (Figure 26), (mean= 3.70, SD= 1.22, CI= 3.33-4.06). Education around concepts such as Food Miles, Food Sovereignty, Paddock to Plate, Slow Food, Food Waste, Seasonal Foods, Animal Ethics and Fair Trade to practitioner’s target group varied with 41.3 percent stating they educate their population group on these concepts ‘most’ or ‘all of the time’, while 23.9 percent stated they ‘rarely’ educate their population group on these concepts. A further 32.6 percent stated that they provide education on these concepts ‘sometimes’ (mean= 3.35, SD= 1.14, CI= 3.01-3.69). Initiatives that consider culturally appropriate food (Culture) for their target group were high among practitioners where 84.8 percent of practitioners stated using this concept ‘most’ or ‘all of the time’ (mean= 4.30, SD= 0.72, CI= 4.09-4.52).
Figure 26. Health Promoting principles and extent of use in food security initiatives

6.2.6 Benefits of using environmental sustainability principles with addressing food insecurity

6.2.6.1 Addressing the complexity within current food systems

Practitioners from the interviews discussed the importance of food security initiatives that address current food systems issues. It was apparent that environmental sustainability principles would assist with achieving this goal. One practitioner also discussed the notion of a food system that was equitable, in addition to an environmentally sustainable one for true food security.

...there are some severe threats coming to the food system, and if we don’t address those threats we could be in dire straits in terms of national and community health and security. At the moment, we’ve got a food system that, while it’s not being done sustainably, we are getting enough food produced from it. But people are still going hungry in this country, so it’s not enough to ensure that everybody’s food secure...
because I think we can still have a very sustainable food system that is still inequitable. So I think we have to always keep that on the agenda (P11)

Another practitioner stated that environmental sustainability principles were required for more resilient communities. Such principles were also considered vital for addressing the current food systems impact on the environment.

I think that is the pathway to having a more resilient community...I know I bang on about the food system, but it exemplifies a lot of issues that if we can minimise our footprint on the environment, we can minimise the inputs into the foods we’re growing, we can be more resilient in times of potential future vulnerability with climate change which we know is going to have an impact on many of the things that we assume are going to continue as normal… (P14)

Environmental sustainability principles were beneficial for addressing the disconnection from the food system. A disconnection was seen to create further environmental issues (e.g. food waste). P9 provided an example to demonstrate the idea of developing food literacy among children to alleviate part of this issue.

They don’t have that real physical connection to the food and where the food comes from. I think once you develop that, you develop more of a respect for that food and wastage becomes a little bit less, because you understand that it’s not walking into Safeway’s and taking five mandarins off of a huge pile. They come from a tree and there’s only a certain number and at certain times of the year they’re available and fresh and at other times of the year they’re not. So it’s that whole sort of language of food and understanding where it comes from (P9)

6.2.6.2 Recognising the impact of the current food system on ecosystems for future food security

One practitioner (P2) from the interviews stated that environmental sustainability principles ensured practice aligned with ecological systems, which was vital for future food security. P2 provided an example using a case study in Papua New Guinea of the detrimental effects of inappropriate agricultural methods.

Just realising that working with the ecological system rather than against it, is really important. For example, as soon as somebody who is very well educated would arrive in Papua New Guinea and teach the local villagers to grow their taro in rows,
without intercropping. Within one season their taro plants would have diseases that had transferred from one plant to the next. And that’s fine for us because we can go to the shop and purchase some food, but for the people in these villages, you could just see the devastating impact, because that was their food for the next, or current season... (P2)

One practitioner discussed the impact of current farming and food production practices on the environment within their region. The use of environmental sustainability principles ensured protection of the natural environment as well as the development of a food system that was fair and equitable.

... because they’re inextricable [environmental sustainability principles]. One of the main driving factors for developing the food strategy has been an acknowledgement that food is an incredibly important part of our lives and it has a huge impact on our communities...75 percent of the water we use in New South Wales goes to agriculture for example. There’s huge ecological impacts from farming and food production. I guess that you can’t have a fair food system without it being sustainable. You can’t have a sustainable food system without it being ethical and connected to communities (P16)

6.2.6.3 Increasing the skills offering among practitioners

Using environmental sustainability principles provided personal and professional benefits for some practitioners, such as the strengthening of their knowledge and skills offering around food security. One practitioner discussed their skills offering with working on the intersection of food security, health and environmental sustainability, particularly as this was a relatively new area of practice.

I suppose I have the luxury of now being able to synthesize in the point in my career where I’ve thought long and hard about what is the best way for me to be able to add value using my skills and interests in an area that I see as critical and that there is an ability to have an impact. So I’ve sort of packaged my skills and interests around the food, health, inequalities, environment area (P14)

One practitioner discussed how the use of environmental sustainability principles provided the skills to discern the different goals of their partners. These skills also assisted with developing common objectives among partners within the region.
Certainly those networks have been really good for us, and particularly the link with Permaculture Macarthur and the woman who set that up – she’s a great advocate. And I think we’ve informed each other, so she’s much more aware now of the issues of food insecurity for people today, and we’re more aware of what she’s interested in in terms of how we can do things in a more environmental way. So it’s good. We challenge each other, and that’s a good thing (P11)

6.2.6.4 Ensuring food security initiatives include social justice considerations, in addition to environmental sustainability

Some practitioners discussed the use of social justice principles in addition to environmental sustainability in the development of their initiatives. One practitioner stated that a food system that was environmentally sustainable should also be one that was fair and equitable.

I suppose we feel that they’re fair [environmental sustainability principles], it’s about food justice, because one of the underlying impacts of our work is around low income and disadvantaged communities so we feel that that’s a big element to our work and we feel that all of those things, like organic food and local food, skilling people up, is the most sustainable way of creating resilience in a community as well; and that it can hopefully provide a safety net for us as times are changing, in terms of climate and resource depletion, and all of those sorts of things (P12)

Another practitioner reflected on their learnings for empowering communities through food through their international experience. The newly acquired knowledge appeared to align with the notion of food citizenship and food sovereignty.

So I came back from Ladakh really committed to making a difference particularly the ability of communities to realise their own aspirations for a better food system. I saw that in the United States and Europe and the UK ... in terms of community gardens and farmers markets and some of the big community based food initiatives which tend to provide the initial texture and drive for change (P16)

6.2.6.5 Improving understanding of culturally appropriate foods within initiatives

Within health promotion, cultural considerations within food security initiatives has been a mandate for some time, particularly with diverse cultural and linguistically diverse groups within Australia (Australian Health Promotion Association 2009; Naidoo & Wills 2000). The use of culturally appropriate food is also applicable for developing food security initiatives in
an international setting (Dixey et al. 2013). Practitioners using environmental sustainability principles learned valuable lessons and gained insight regarding the cultural aspects of food within initiatives. Traditional foods will be used as an example. P2 stated that the use of traditional food within their program was easier for their food insecure groups to access, generally more nutritious and environmentally sustainable.

And then overseas in Zimbabwe, we have made some nutrition posters that have got pictures as well as scientific names, local Shona names and English for each plant. But that’s led to the request that we run traditional food plants workshops in HIV clinics.... I realised that providing information is one element, but actually going on and giving people skills, practical knowledge is also really important. So that’s pretty exciting, because again in Zimbabwe and many other countries, the edible weeds are very nutritious, and so people can access them regardless of their income. And the HIV medications will not work unless they have a good diet, but their perception of good nutrition is, if I’m rich enough to buy a tomato, then I’ll get good nutrition. But just for them to realise that they can be set free, and getting a handful of green leafy vegetables, will get them in the right direction in terms of many micronutrients, so that’s lovely... (P2)

6.2.6.6 Clarification of purpose
Using environmental sustainability principles gave one practitioner clarification of purpose and reignited their passion and belief in their work (P15).

I suppose it’s helped in having a good understanding of why you’re doing it and what are the reasons behind it and how that is going to help. So being comfortable and having more knowledge about the whole purpose of why you’re doing it, I suppose I think, makes it much easier for you to roll out a program because then you believe in it, then you’ve got ownership of stuff and then you’re passionate about it, rather than just doing somebody else’s work (P15)

6.2.6.7 Connecting communities to environmental sustainability through food
One practitioner discussed their passion for environmental sustainability issues, including food. This interest assisted with finding common ground with the community they were working with and as such the development of their food security initiatives.
Well I feel passionate about those issues, so I bring that passion to the various projects that we’re working on, and trying to develop something together... I think people feel passionate about food, so whatever kind of food projects that you’re working on, it’s really easy to engage people around food and people want to learn more about food. So being able to pass on some of that information is always creative, interesting and engaging (P12)

6.2.6.8 Developing joy, connections and positive memories through sustainable food

Practitioners discussed the idea that environmental sustainability principles could provide additional benefits to food security. One practitioner discussed the idea of reigniting positive memories and connections to food for children and nurturing of physical and spiritual health.

Having involvement in food production, and I guess food security, there’s just a wealth of richness that can be given to children in terms of memories, understanding seasons, cycles, the joy of having some physical exercise in normal activities, rather than having to jump in the car and go to a gym...And that spiritual element as well, wondering... how does the compost form, and asking some bigger questions. So yeah, I think it’s good... (P2)

Another practitioner discussed the facilitation of food stories with their community. Sharing food stories were considered powerful narratives that could bring people together from diverse cultural backgrounds.

...So it’s that whole sort of language of food and understanding where it comes from that I think a generation has really lost. I think that’s very important and for knowing, [local region] in particular, we have a lot of people coming from other countries and very different cultures and we’re quite lucky that they come with a lot of different stories and food stories in particular. I think food is actually a really good way to actually share those stories and bring those people into the community (P9)

6.2.6.9 Creating resilience under future climate change and peak resource scenarios

Eight practitioners stated that environmental sustainability principles would ensure that communities are food secure in the future, as well as being resilient to external shocks such as climate change and peak oil.

I think our council realised that the big industries in our area, and the community, to be more resilient, they had to address sustainability. Under future climatic conditions,
peak oil, peak phosphorus conditions, where we won’t necessarily have the same amount of access, or affordability to oil, we won’t necessarily have the access to phosphorus for our farming at an affordable price, so we’ve got to find other ways of still maintaining that productivity that makes our global area so wonderful (P7)

6.2.7 Barriers with implementing initiatives using environmental sustainability principles

Practitioners from the interviews and online survey identified a wide range of barriers that were affecting their ability to implement food security initiatives that were guided by environmental sustainability principles. The most prevalent barriers experienced by practitioners from the interviews and online survey are outlined in Figure 27 and will be discussed further below.

Figure 27. Barriers to implementing food security initiatives using environmental sustainability principles

6.2.7.1 Governance

Participants from the interviews and online survey discussed the lack of governance as a barrier for the development of food security initiatives using environmental sustainability
principles. There were two main areas that participants stated this was occurring; within their organisation and at a wider government level. Participants from the interviews often noted that a lack of governance for environmental sustainability also meant a lack of support for preventative health and health promotion.

At an organisational level, participants from the interviews expressed that health promotion was only one of many priorities and this would often shift according to who was in power within government at the time. A change in government leadership would often mean a shift in ideologies and as such resources and priorities would also change.

*I think as a health promotion team, I mean that’s not the only priority area that we’re working on so...there’s another layer into this which is the fact that this organisation is political, so the priorities can shift in the blink of an eye and that means that the resources have to be allocated in another way* (P5)

P11 further elaborated on the individual risk factor approach that their organisation was turning back to with regards to health care.

*... So yeah, it’s... being part of a big health organisation, it’s not going to be up on their priorities I guess, as a way of addressing the future health of the community. They’re much more interested in the individual risk factors approach, so there’s a lot more emphasis on—and in fact, rather than going away from siloing the health risk factors, we’re going further down that track I think, in terms of the way we’re funded from state health* (P11)

Other participants stated that while there was a focus on health promotion, there was limited acknowledgement of environmental sustainability within their organisation, particularly within health promotion initiatives.

*I don’t think it’s forefront in the priorities of the whole health service. So for example, we’ve just redone our strategic plan for health promotion, and I’m practically certain that while we will have touched on the environmental sustainability of local food, I’m pretty sure that we haven’t got that as a general kind of aim within the work that we’re doing, that we’re working towards environmental sustainability...* (P10)

A lack of environmental sustainability focus within the practitioner’s organisation was also apparent among survey participants where 46.2 percent identified a lack of organisational
support to broaden health promotion practice around food security for environmental sustainability.

*Have tried to support food security initiatives e.g. locally and with [region] Food Fairness Alliance but told this was not a Health Promotion priority by local management (Survey Respondent)*

Participants also discussed the lack of government support with either environmental sustainability or preventative health/health promotion whether that be at a federal, state or local level. Participants discussed government approaches in healthcare that were moving towards more neo-liberal models of health care that focus on individual treatment and primary health. Participants then discussed the implications from such trends on health and the ability to develop food security projects that protect ecosystems in addition to health outcomes.

*I think that as a health professional there’s huge barriers with the way government policies are going... especially at state level, about keeping people out of hospitals. So sometimes it’s very hard for us as health professionals to look at food security, especially in the framework of environmental sustainability. Very hard to draw those lines and say this is about keeping people out of hospitals, and so we've really had to drastically reduce any resources to this area, where in the past, we’ve been easily able to justify this to manage it and say this is part of long term health promotion and getting people healthy ... So the way that the Health Department is becoming much more sickness focused and we call it the sickness department, not the Health Department (P3)*

Similar experiences were observed by survey respondents, where minimal support from state government was noted by 62.3 percent of practitioners. Some practitioners (53.7%) also stated that minimal support from local government was also an issue for the development of food security initiatives generally.

*...food security is barely on the state health register – overlooked and rarely if ever mentioned – much more focus on education and individual behaviour change (Survey Participant)*
6.2.7.2 Costs and Funding

Participants from the interviews discussed the financial barriers to food security initiatives and the development of initiatives using environmental sustainability principles. P12 discussed the difficulties with trying to balance between meeting people’s immediate needs with food but also ensuring that the food was sustainable for both farmers and the environment.

_I think that one of the biggest barriers, because particularly when you are working with low income communities, and that often we’re talking about organic food or we’re talking about locally sourced food or supporting our local farmers; so we have this constant situation where either you can buy food that is really cheap but it’s not going to be that food that we’re talking about that supports that local community forward to a sustainable food system. So trying to find that balance between what people can afford and supporting those ecological ways of growing food, supporting our local farmers (P12)_

Other participants discussed a general lack of funding to develop sustainable food initiatives. P14 stated that there were lots of great ideas around local, sustainable food projects but limited funding for people to source which makes it difficult for good ideas to get off the ground.

_...There’s not a lot of money around for research within organisations like academia. There’s not a lot of money around for people outside of that for projects. It’s highly competitive and as this space is full of people with great ideas, it’s very difficult to get funding for those ideas to make them realities... you know, there’s so many philanthropics who’ll provide funding. So again, it’s a bun fight, to be honest... (P14)_

The majority of practitioners from the online survey (75.9%) also agreed that a lack of financial resources to develop or run initiatives was a key barrier.

_Lack of finance has led to lack of time and personnel (Survey Participant)_

_The ability of the organisation to become self-funding has been impeded by government and social expectations that we should provide services and goods for free or a token cost because we are seen like a “charity” (Survey Participant)_
6.2.7.3 Knowledge, expertise and evidence around the development of food security initiatives using an environmental sustainability perspective

Six practitioners from the interviews felt that they did not have adequate knowledge or skills in environmental sustainability to confidently integrate them into their food security initiatives.

Basically, lack of knowledge from a health promotion perspective about environmental sustainability and then not knowing enough about all those big topics at the moment that we keep getting asked about... so organic farm versus non-organic and GM versus non-GM. So there’s all those different perspectives that we probably don’t have enough information about... (P4)

One practitioner felt that health promotion professionals do not have adequate knowledge or qualifications regarding the food system, particularly from an environmental sustainability perspective.

I think that having really strong networks that follow across all of the whole production and distribution and consumption pathway would help with that, but obviously as a health promotion person, we’re not very well qualified in most of the important areas of food sustainability (P3)

Practitioners (73.6%) from the online survey, however, felt that their knowledge to implement food security initiatives using environmental sustainability principles was adequate. Inexperience rated more highly with 44.4 percent of practitioners stating that this was a barrier for implementing food security initiatives using environmental sustainability principles.

One practitioner from the interviews, however, felt that there was a loss of knowledge around food sustainability within the sector generally, particularly within academia and within education.

The knowledge has been lost I think, from two generations ago when most people produced their own fruit and vegetables from home. The lack of foodie’s academia, well education and extra-curricular activities. So I guess the barrier for us in Australia is actually finding people that are interested, and have the energy or the conviction to actually put some of the principles into practice (P2)
Several practitioners felt that there was a lack of evidence to demonstrate what initiatives are effective. A lack of evidence was seen to create problems with obtaining organisational support to develop food security initiatives using environmental sustainability principles.

_I don’t think it’s an area where there’s a lot of evidence around what’s effective, and while that’s not a problem – because you can always set about things in a way that you add to the evidence base – it’s often hard to get up line... up the tree support for that kind of work if there isn’t already evidence around which approaches are effective and how... (P11)_

### 6.2.7.4 Community attitudes and expectations

Participants discussed the attitudes and values that the community held towards sustainable food. For many, this was not a priority, particularly if they had regular access to food.

…I think it’s more to do with attitudes. If your tummy is full, and full of food that tastes nice, the whole concept of being involved in producing food... I think so much knowledge has been lost, and the desire and the need... the way in which they see the need of actually producing food themselves is not one that they value. Because it takes time to invest time in our very busy lives, is a big ask, and it’s messy. You’re fingers get dirty, you actually have to experience all seasons (P2)

Practitioners felt that attitudes and values were being lost around local knowledge of food, food production and differentiating between real food and convenience food. Another practitioner felt that many people in the community have minimal ability to discern between fresh, local food and supermarket food (P8). One practitioner discussed community expectations with food and that consumers expect food to be cheap, perfect and pre-packaged.

_I guess about working with the consumers and, you know, organic food tends to be more expensive. The higher it’s produced, processed, packaged all that, you know, our communities have been, I don’t know, indoctrinated or whatever into expecting perfect food with the packaging which is not necessarily environmentally friendly (P1)_

### 6.2.7.5 Other barriers

There were other barriers that participants raised, including: working in silos; natural resource challenges; lack of community knowledge and skills; and lack of time. Practitioners
stated that most disciplines work in silos which makes it difficult to work in an integrated approach, resulting in knowledge gaps around the food system.

*I think the fact that we tend to work in silos and it’s really quite tricky to feel like you have a mandate if you’re working in health to really talk about food production, and you know, having those really good Paddock to Plate and Pass the Plate networks that are really well integrated. So what happens is that you get people talking... like as a dietician... or a nutritionist to talk about food production. Even though I’ve got an ag science degree, it’s a really old one... and it’s very hard for farmers to really talk about end products around what happens when it gets to the supermarket as well* (P3)

One practitioner discussed natural resource and development challenges that will create barriers to more sustainable food production.

*I think some of the other challenges that we face are natural resource challenges, so balancing the needs of retaining local biodiversity and the integrity of natural areas with food and food production...* (P16)

Another practitioner stated that there was a lack of community knowledge and skills with cooking sustainable food, for example, how to cook with seasonal or local food.

*People often, even despite My Kitchen Rules and all that, I don’t know that we are better cooks or know how to cook food that’s seasonal or whatever. We like to look at it and maybe try it on an occasion but whether or not that translates into us being able to cook healthy affordable food with seasonal produce that’s locally grown, to reduce food miles and all the rest of it, I’m not sure that people have the skills to do that either...* (P1)

Having limited or no time to develop or run food security initiatives (61.1%) and limited or no staff who are qualified to implement food security initiatives (63%) were also important barriers within the organisation among survey respondents.

*We have too many program areas to cover as generalists in our team and are pressured to work to meet state determined KPI’s rather than look at developing programs that really meet the needs of local communities. There are way too few staff*
and resources in Health Promotion in our Health District – It is very understaffed and underfunded (Survey Respondent)

6.2.8 Overcoming barriers for the development of food security initiatives using environmental sustainability principles

Practitioners from the interviews were asked to provide suggestions and ideas to overcome identified barriers. There were several common themes which are outlined in Figure 28. Some practitioners gave ideas and suggestions that were specific for their area of work. These will be presented under ‘other’ barriers.

Figure 28. Suggestions for overcoming barriers

6.2.8.1 Education for health promotion practitioners and consumers

Seven practitioners from the interviews suggested further education of health promotion practitioners around the food system. One practitioner felt that education on the food system would benefit their health promotion unit as well as the other business units within their organisation.
I think we need to get a lot of time getting educated on the whole food system, or we need to make those sorts of really great partnerships across the whole life cycle of food, so that we can make sure that we end up with strategies that are really effective, or just work within our little key area, you know, what people buy, what they produce in their local garden, how they deal with their waste and those sorts of things (P3)

One practitioner felt that research that was currently undertaken in various aspects of the food system (e.g. GMOs and organic foods) needed further promotion within the community. This practitioner further stated that health workers specialising in food security required various skills and knowledge of food systems from production to consumption.

I guess around the GM and organic just more research or getting the research that has been done more publicly acknowledged. Then for the consumer side of it, people working in food security skills need to know about both the nutrition and community development and that sort of thing as well as that environmental perspective. So... across the spectrum from producing it to consuming (P4)

6.2.8.2 Interdisciplinary collaboration
Some practitioners felt that interdisciplinary collaboration would provide an opportunity to overcome barriers. It was also seen to create a supportive environment for health promotion.

I think it’s very hard to keep up with that whole other area like food production when you’re working in nutrition promotion, and working out of your scope you’re likely to make mistakes. So having broader networks where expertise could be gained from everybody, you’d be much more sure that what you were saying across that continuum would be accurate and up to date (P3)

Partnerships with other key stakeholders was also seen to facilitate learning of the food system. P14 stated that information sharing of current food security projects would provide a beneficial way of learning from others.

A way of sharing, which I'm not exactly sure what’s the best way of doing that, but a way of sharing learnings and what’s worked in other areas would definitely be a good way. Whether that be like a work pool for what people put information on... (P14)
6.2.8.3 Policy and advocacy

To overcome much of the governance barriers that were raised, it was suggested that practitioners be involved in policy discussions and advocacy. P3 discussed the need for practitioners to raise the importance of prevention work and the costs to human health from unhealthy food and unsustainable food systems.

*I guess there needs to be advocacy at that high level of, you know, the value of prevention work, about the importance of food security to human health and the cost to the health system when people are eating sub-standard foods, where they can’t access healthy foods or don’t have the ability to cook them, all those sorts of things. I think at a higher level we need some advocacy and people really making very clear dots between health outcomes and hospital costs and this work (P3)*

P13 also expressed similar ideas, stating that health promotion officers need to be working in policy and advocacy in addition to their project management role. Another practitioner felt that the community had to be involved with policy and advocacy to create any effective change.

*And more I think from the political aspect, if the community is not involved then the government is not going to have an interest in delivering it. They have to demand for that to happen. It’s almost like “no we are full of crap” we don’t want that anymore! Now as a community, as a collective, we decided that we want to have healthier families and that’s what we demand and if you give us the resource and the support, we can carry on with this task (P5)*

6.2.8.4 Funding

Four practitioners stated that funding would help overcome some of the barriers in the development of their initiatives. Two practitioners, however, also stated that while funding would assist with overcoming some barriers, in and of itself would not solve the entire issue. One practitioner felt concerned regarding current government spending which tends to focus on reductionist approaches to healthcare rather than taking on a broader approach to health.

*...So if we keep going in that direction of putting funding back into silos for particular risk factors, I think that that will really hamper action on the broader issue. Because I can’t imagine any state government earmarking funding in any big way [laughs] for sustainability of a food system; I just don’t see that coming [laughs]. I mean, if the*
Greens ever got to run the country maybe it would make something happen [laughs] (P11)

6.2.8.5 Social determinants perspective

Three practitioners discussed the importance of a social determinants perspective with the development of initiatives; this perspective was seen to overcome some of the barriers.

...I was going to say the other thing that we – having done these very local projects, and starting to try and build some capacity among other organisations, is that we realise that all those local projects could work on a local level, but a lot of the issues underlying food security, really are broader, more kind of social determinants of health levels. They depend on things like transport, and land use, and food policy, at a state and national level, and welfare policies (P10)

Practitioners also discussed other elements of health promotion theory that would help to address some barriers including: capacity building (n=3); creating cultural change (n=2); community development and engagement (n=2); and evaluation of initiatives to determine effectiveness and best practice (n=3).

I think there needs to be formal health promotion officers, more capacity building within advocacy... (P13)

I think probably my last comment is about cultural change, and just the different factors that come together to influence cultural change. And I think on the area of food security with environmentally sustainable practices, there needs to be opportunities for a cultural change (P2)
6.3 What are the perceptions of Australian health promotion practitioners concerning their capacity to address food security using environmental sustainability principles?

6.3.1 Practitioner knowledge to develop food security initiatives using environmental sustainability principles

Section 6.3.1 and section 6.3.2 demonstrate the results from the online survey. Practitioners were asked to rate their knowledge and ability to deliver food security initiatives that integrate the use of environmental sustainability principles. These are outlined in the following sections.

6.3.1.1 Knowledge of Ecological Integrity and Biodiversity principles

The survey demonstrated that knowledge around ecological integrity and biodiversity principles varied among practitioners (Figure 29). Animal Welfare issues was low for most practitioners with 54 percent stating they had ‘none’ or ‘basic’ knowledge (mean= 2.67, SD= 1.01, CI= 2.41-2.94). Sustainable farming practices varied with 46.6 percent stating they had ‘none’ or ‘basic’ knowledge, while 51.8 percent stated they were of ‘intermediate’ or ‘advanced’ level (mean= 2.76, SD= 0.97, CI= 2.50-3.02). Knowledge of seasonal foods rated the highest with 62.1 percent of practitioners stating they had either ‘advanced’ or ‘expert’ knowledge in that area (mean= 3.67, SD= 0.84, CI= 3.45-3.89).
6.3.1.2 Knowledge of Social Equity and Fairness principles

Figure 30 demonstrate that most practitioners stated they had ‘basic’ knowledge around Fair-Trade (43.1%) concepts while 31 percent stated they had ‘advanced’ knowledge (mean= 2.91, SD= 0.94, CI= 2.68-3.15). Knowledge around Food Sovereignty varied. Over one-third of practitioners reported having ‘intermediate’ knowledge with regards to Food Sovereignty (36.8%). While 43.5 percent stated they had ‘none’ or ‘basic’ knowledge of Food Sovereignty. Some practitioners (19.3%) stated they had ‘advanced’ knowledge with regards to Food Sovereignty (mean= 2.58, SD= 0.99, CI= 2.31-2.84).
6.3.1.3 Knowledge of principles regarding limits on natural resource use – Food Waste

Most practitioners had good knowledge of Food Waste in this cohort with 41.4 percent stating they had ‘advanced’ knowledge and 34.5 percent stating they had ‘intermediate’ knowledge (Figure 31), (mean= 3.36, SD= 0.89, CI= 3.13-3.60).

Figure 31. Knowledge of principles regarding limits on natural resource use – Food Waste
6.3.1.4 Knowledge to implement Local Food Systems principles

Most practitioners had good knowledge of principles that focused on local food systems (Figure 32). Almost half the cohort stated they had ‘intermediate’ knowledge around Food Miles (43.9%) (mean= 3.12, SD= 0.84, CI= 2.90-3.35). Around one-third of practitioners had an ‘intermediate’ level of knowledge with regards to Urban Agriculture (32.7%), (mean= 3.22, SD= 0.89, CI= 2.98-3.46), and Farmers Markets (36.2%), (mean= 3.31, SD= 0.84, CI= 3.09-3.53). Around 40 percent of practitioners have ‘advanced’ knowledge around Urban agriculture (40%) and Farmers Markets (43.1%). Where over one-third have ‘advanced’ knowledge with regards to Food Miles (36.8%) concepts. A few practitioners reported having either ‘none’ or ‘basic’ knowledge on Food Swaps (8.8% and 29.8%), while 35.1 percent stated they had ‘advanced’ knowledge in the area (mean= 2.98, SD= 1.11, CI= 2.69-3.28).

Figure 32. Knowledge of Local Food Systems principles

6.3.1.5 Knowledge of Health Promoting principles

The majority of practitioners reported ‘advanced’ or ‘expert’ knowledge around the benefits of Plant based diets (mean= 3.55, SD= 0.95, CI= 3.30-3.80) and Healthy Eating and Nutrition (mean= 4.24, SD= 0.63, CI= 4.08-4.41). These concepts rated very high at 67.2 percent (Plant based diets) and 93.1 percent (Healthy Eating & Nutrition) (Figure 33).
6.3.2 Practitioner ability to develop food security initiatives using environmental sustainability principles

6.3.2.1 Ability to integrate Ecological Integrity and Biodiversity principles into food security program

Figure 34 demonstrates that practitioners reported having ‘none’ (32%) or ‘basic’ (33%) ability to integrate Animal Welfare issues into their food security initiatives (mean= 2.19, SD= 1.09, CI= 1.90-2.48). Practitioners also reported having ‘none’ (17.9%) or ‘basic’ (30.4%) ability to integrate Sustainable Farming Systems into their initiatives (mean= 2.61, SD= 1.09, CI= 2.32-2.90). Almost 30 percent of practitioners stated they have ‘intermediate’ ability to integrate Seasonal Foods (28.1%) concepts, while almost half the cohort felt they had ‘advanced’ ability to integrate Seasonal Food concepts (47.4%), (mean= 3.32, SD= 1.00, CI= 3.05-3.58).
6.3.2.2 Ability to integrate Social Equity and Fairness principles into food security program

Figure 35 demonstrate that 21.1 percent of practitioners reported ‘none’ with their ability to integrate Fair-Trade concepts into their initiatives, whereas over one-third stated having a ‘basic’ ability to integrate Fair Trade (38.6%) concepts (mean= 2.37, SD= 1.02, CI= 2.10-2.64). Almost one-quarter of practitioners reported ‘none’ with their ability to integrate Food Sovereignty (21.4%) concepts into their initiatives. Over one-third reported a ‘basic’ ability to integrate Food Sovereignty (41.1%). Almost 30 percent of practitioners stated ‘intermediate’ ability to integrate Food Sovereignty (28.6%), (mean= 2.27, SD= 0.94, CI= 2.02-2.52).
6.3.2.3 Ability to integrate principles regarding limits on natural resource use into food security program – Food Waste

Almost 30 percent of practitioners stated they have ‘intermediate’ ability to integrate Food Waste (29.8%). A further 31.6 percent of practitioners stated they have an ‘advanced’ ability to integrate Food Waste into their initiatives (Figure 36) (mean= 2.91, SD= 1.09, CI= 2.62-3.20).
6.3.2.4 Ability to integrate Local Food Systems principles into food security program

Figure 37 demonstrate that 17.5 percent of practitioners stated ‘none’ with regards to their ability to integrate Food Miles concepts into initiatives. Over one-third of practitioners stated they have an ‘intermediate’ ability to integrate Food Miles (36.8%) concepts into initiatives (mean= 2.63, SD= 1.04, CI= 2.35-2.91). Around one-third of practitioners have ‘intermediate’ ability to integrate Urban Agriculture (33.9%) concepts into initiatives. A further 33.9 percent of practitioners stated they had an ‘advanced’ ability to integrate Urban Agriculture (33.9%) concepts (mean= 2.95, SD= 1.05, CI= 2.66-3.23). Over one-third of practitioners (37.5%) reported having an ‘intermediate’ ability to integrate Farmers Markets within initiatives (mean= 2.88, SD= 1.02, CI= 2.60-3.15). A further 17.9 percent of practitioners reported ‘none’ with regards to integrating Food Swap concepts (17.9%) into initiatives. Around one-third of practitioners have ‘intermediate’ ability to integrate Food Swap (30.4%) concepts into initiatives. Around one-third of practitioners stated they have ‘advanced’ ability to integrate Food Swap (30.4%) concepts (mean= 2.79, SD= 1.12, CI= 2.48-3.09).
Almost half of the health promotion practitioners stated they had an ‘advanced’ ability to integrate Plant based diets (42.1%), (mean= 3.23, SD= 1.11, CI= 2.93-3.52) and Healthy Eating and Nutrition concepts (50.9%) into food security initiatives. Almost one-third of practitioners stated they had ‘expert’ ability to integrate Healthy Eating and Nutrition concepts (29.8%) into initiatives (mean= 4.0, SD= 0.92, CI= 3.75-4.25). Figure 38 demonstrate these results.
6.3.3 Tertiary education – an overview of its contribution to health promotion competencies to address food security from an environmental sustainability perspective

Section 6.3.3.1 and Section 6.3.3.2 will highlight the qualifications health promotion practitioners received from the interviews and online survey. It will demonstrate the highest level of qualification obtained by practitioners as well as the discipline. Section 6.3.3.3 will then discuss practitioner experiences within tertiary education for addressing food security using environmental sustainability principles and approaches.

6.3.3.1 Overview of tertiary qualifications

Tertiary qualifications were sought to determine whether practitioners had received any formal qualifications. This study revealed that most participants held a qualification from a tertiary institution. The survey illustrated a greater proportion of practitioners with a postgraduate degree. The findings are presented in Table 24.
Table 24. Highest level of qualification

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Interviews</th>
<th>Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>TAFE Certificate or Diploma</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Undergraduate degree</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>5</td>
<td>42</td>
</tr>
</tbody>
</table>

The discipline that practitioners obtained their qualifications varied within this study. Table 25 indicates that most practitioners obtained their degree through a health oriented discipline (n=49). Qualifications were also obtained through degrees which were from environmental science or science oriented disciplines (n=9). The remaining degrees were obtained from business, communications, arts and education oriented disciplines (n=8). Despite the variation all participants self-identified as health promotion practitioners from the interviews and online survey.

Table 25. Discipline of study

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Interviews</th>
<th>Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health oriented disciplines, e.g. health promotion, public health, nutrition, environmental health, psychology.</td>
<td>9</td>
<td>40</td>
</tr>
<tr>
<td>Environmental science/ science oriented disciplines, e.g. agriculture, horticulture, environmental science.</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Other disciplines, e.g. business, communications, arts, education.</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>

6.3.3.2 **Tertiary qualifications around food security using environmental sustainability principles**

This section will demonstrate where practitioners from the interviews and online survey received their knowledge and skill base to address food security using environmental sustainability principles. Six practitioners from the interviews explained that the university degree they undertook introduced them to food security concepts using environmental
sustainability principles. These practitioners had received their initial qualifications from environmental science and science based disciplines. For example, two practitioners stated that their agricultural degree gave them some understanding of food security using environmental sustainability principles.

I was lucky to do the Bachelor of Agricultural Science as the feeder course for a grad dip in nutrition and dietetics. So I had that. I had a natural interest in growing food at home, so that was sort of one (P3)

One practitioner discussed their introduction to environmental sustainability through microbiology within their science degree, while another practitioner discussed their learnings around pollution and the impacts on the environment through their environmental health degree.

For mine, I started off in environmental health with an Applied Science Degree at Swinburne uni, and I suppose part of that was we did subjects like contaminate types, and part of our job, septic tanks, so understanding what the... basically what the earth can cope with before it becomes pollution. So that was more around pollution, that side of things (P8)

The interviews also reveal that practitioners with health promotion degrees (n=9) received minimal training to integrate environmental sustainability principles and approaches to address food insecurity. Practitioners developed skills to implement food security projects using environmental sustainability principles through work experience, involvement in the community or personal interest.

Probably through my own personal interest, and some of the things I’m involved with outside my working life (P10)

Probably by osmosis, working in the community, working as a health promotion practitioner. Some of it might have been personal interest around living sustainable lifestyles and understanding about the socioecological impacts on human health (P1)

In addition to the interviews, the online survey demonstrates the degree pathway for some health promotion practitioners with environmental sustainability skills to address food insecurity. Comparable to the interviews, there appeared to be few practitioners who obtained environmental sustainability skills to address food security from a health oriented discipline.
Some practitioners with environmental sustainability skills to address food insecurity received these from environmental science and science oriented disciplines, e.g. agriculture, horticulture, environmental science (n=4). One practitioner received their skills through an education degree. Another practitioner obtained a TAFE certificate in workplace training and assessment around community gardens. Two practitioners did not specify the discipline where they received training to address food security using environmental sustainability principles and approaches. Table 26 provides further detail on the formal qualifications received.

Table 26. Tertiary degree where some training in food security using environmental sustainability principles and approaches was received

<table>
<thead>
<tr>
<th>Discipline</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health oriented disciplines, e.g. health promotion, public health, nutrition, environmental health, psychology.</td>
<td>3</td>
</tr>
<tr>
<td>Environmental science/ science oriented disciplines, e.g. agriculture, horticulture, environmental science.</td>
<td>4</td>
</tr>
<tr>
<td>Other disciplines, e.g. business, communications, arts, education.</td>
<td>1</td>
</tr>
<tr>
<td>Community Engagement in Community Gardens, TAFE Certificate IV</td>
<td>1</td>
</tr>
<tr>
<td>Unspecified</td>
<td>2</td>
</tr>
</tbody>
</table>

6.3.3.3 The importance of educating graduates about food security though an environmental sustainability perspective

Despite few health oriented degrees with an environmental sustainability focus, practitioners from the interviews discussed the importance of addressing complex issues such as food security through this perspective. This would ensure ecosystems and the natural environment are protected for future food security. Some practitioners who discussed the importance of environmental sustainability had received post-graduate degrees that explored these concepts. Practitioners discussed their learnings, including how environmental sustainability and health
promotion/public health can complement each other. One participant discussed more generally how environmental sustainability was integral to the practice of good health promotion.

*I think my study in my Masters again brought together health promotion framework to look at those environmental issues, in terms of food security and agriculture. And I keep returning to that framework because it makes most sense to me. And so it was only in 2010 when I came across the whole concept of health promotion, but for me it was kind of an epiphany of understanding. Because health by itself isn’t the answer, education by itself isn’t the answer, just having big public policies isn’t the answer, so I think it’s that continuum from public policy right down to health services that is important* (P2)

### 6.3.3.4 Skills and knowledge to implement food security initiatives using environmental sustainability principles were obtained through informal learning

Throughout this study it became apparent that few practitioners from a health oriented discipline received training to implement environmental sustainability principles to address food insecurity (Section 6.3.3.2). To address this knowledge gap some practitioners sought additional learnings and qualifications. The majority of learning around food security using environmental sustainability principles for these practitioners were obtained through informal education. Most practitioners felt that their health oriented degree did not provide all the information, skills or knowledge that was required to work in this space.

*My background is in health promotion and before that I was a journalist and when I learnt about health promotion, the environmental aspect was not there. It was missing… I just felt the need of learning more of what was lacking to understand* (P5)

*Within this space I think it’s mainly all the additional stuff. The nutrition dietetics degree didn’t give me anything on food sustainability, but it did give me an understanding of what a nutritious diet was and food science and things like that, and so how to apply those things within the nutrition context; it was marrying the two* (P3)

Practitioners increased their competencies to develop food security initiatives using environmental sustainability principles through various avenues, e.g. personal interest, working in the field of practice. Some of the learnings that were taking place were developing practitioner skills and competencies to address food security through a systems perspective. It
was also apparent that these learning opportunities were few at the time or lacking in depth, particularly with marrying health promotion frameworks with environmental sustainability frameworks. The following section will highlight these learnings.

6.3.3.4.1 Personal interest
Six practitioners stated that they had a personal interest in either the natural environment or environmental sustainability generally which then spurred their interest in food/food security.

I’ve always had interest, ever since I can remember. I think I’ve always liked being outdoors, so I’ve done a lot of trekking and hiking and things like that, so I guess that makes you respect what’s out there and why it’s worth protecting... I think that idea of having a just and fair society has always been a part of my upbringing (P11)

6.3.3.4.2 Self-directed learning
Self-directed learning varied and included research (e.g. reading literature, books and relevant websites), attendance at forums and conferences on food systems or interest and attendance at short courses, seminars and workshops.

We had the FNAC conference and we were able to spend the time as a unit to do a whole lot of food, to do literature reviews and things like that in key areas of food sustainability. So I guess they’re the main areas that we used for training. I’ve gone to a couple of conferences as well (P3)

Another participant received a scholarship for a study tour exploring the food system in an international context.

I had a Churchill Fellowship in 2004 to go overseas and have a look at different projects. I spent a bit of time in the States and Canada and Brazil; and some of the projects that I saw there really opened my eyes to food system issues, and I think that this area has also evolved over that time too, I think that we’ve all been learning together about what are the implications of the industrial food system, and what is a community food system, and we’ve been building those different systems and understanding about our part and how it all fits together... (P12)

It was also apparent that some of these self-directed learning opportunities were encountered with barriers or limitations, for example, one practitioner discussed forums and conferences which had a focus on food security through a health promotion lens. Environmental
sustainability was limited in these discussions rather than an integral part of health promotion practice.

When we were developing up our community kitchen we looked at some of the literature and did some research and attended some forums around community kitchens and food security was discussed in there. Not so much with environmental principles in mind but certainly around low cost and accessible food and talking about seasonal produce and things like that (P1)

Another practitioner highlighted the difficulties of finding relevant learning or training opportunities to build skills and knowledge around environmental sustainability approaches to address issues such as food security.

I think it’s really seeking out the learning that I need. I mean it’s not that I’ve learnt it through my degree, and it’s really trying to ... because I mean even like special development opportunities haven’t really come up have they? (P6)

6.3.3.4.3 Working in the field of practice

Working in the field of practice was a key area for knowledge and skills generation to implement environmental sustainability principles within food security initiatives.

... Done a couple of different short courses around health promotion, but no environmental sustainability, what do you call it, formal qualification whatsoever, it’s purely what I’ve learnt working in the industry (P7)

Another practitioner garnered much of their knowledge and skills through work experience in an international setting (P16).

I worked on a program with traditional Tibetan farming women on the western edge of the Tibetan Plateau, so high up in the Himalayas....so I ran a program that was placing mostly western tourists and visitors and curious activists and other folk in traditional remote villages in order to help with the harvest and farming over the summer period. One of the main purposes of the program was to look at the impact of corporate commercialisation on remote traditional communities... So I came back from Ladakh really committed to making a difference in particularly the ability of communities to realise their own aspirations for a better food system (P16)
6.3.3.4.4 Partnerships and collaborations

Informal or formal partnerships and collaborations were other ways that practitioners received knowledge and skills around environmental sustainability principles (n=5). One practitioner discussed their involvement with a primary care partnership which increased their knowledge around food security and climate change (P1). P1 also discussed their involvement in a food policy coalition which helped to garner further knowledge. P4 discussed a less formal arrangement with people who had environmental sustainability knowledge, this helped to increase their skills in delivering food security initiatives. P14 mentioned their involvement in a community food network which provided essential skills.

I’m part of a big community food network. So last week, there was a gathering which was a lovely evening community meal at a local community garden which is called the ‘Old Church on the Hill’ and, you know, that was terrific. That was about thirty people bringing food together and talking about what the projects and community gardens are up to around the place and giving an overview of what they’re involved with at the moment and what’s coming up. So that’s a nice sort of community connection (P14)

One practitioner discussed their involvement at a community level where working with people on the ground led to increased learning of the food system. Another practitioner discussed informal involvement with a food fairness alliance and other relevant groups in their area.

I suppose in the working in the [Region] Food Fairness Alliance I’ve worked alongside a lot of people who’ve much more of a focus in their work, so people from the community gardens network, people from Edmund Rice Centre, I mean, a number of different organisations (P10)

6.3.3.4.5 Permaculture education

Two practitioners participated in Permaculture courses. One practitioner stated that their background was originally in Permaculture and this led to knowledge around organic gardening and understanding of sustainable food systems (P12). Another practitioner stated that Permaculture was the course that cemented their knowledge and understanding of the food system.
And then I [attended] study with Bill Mollison and Jeff Lawton in a course in 2009 in Melbourne, so I now have my Design Certificate in Permaculture as well...I suppose, into my focus into environmental management and sustainability, and that, for me, my further studies around Permaculture really get that, for me, it was the one thing that actually brought it all together for me, and that the prime purpose is that we can actually sustain ourselves on the land that we already have, basically. We don’t have to go to Mars (P7)

Data from the online survey also suggest that health promotion practitioners obtained skills and knowledge around food security using environmental sustainability principles through informal learning. Practitioners attended professional development workshops with a focus on traditional health promotion food security approaches, e.g. VicHealth Food for All Seminar, FoodCENTS workshops. It was not clear whether environmental sustainability was a key part of these professional development programs. Practitioners also attended professional development programs that were organised by the sustainability sector, for example, Permaculture and Good Food workshops. Through these programs, food security was addressed through the food system. Table 27 demonstrates these ideas.

Table 27. Informal learning around food security using environmental sustainability principles and approaches

<table>
<thead>
<tr>
<th>Qualification type</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permaculture Design Certificate or similar</td>
<td>8</td>
</tr>
<tr>
<td>Health promotion professional development workshops, e.g. VicHealth Food for All Seminar, FoodCENTS/Sensations Facilitator Training</td>
<td>6</td>
</tr>
<tr>
<td>Sustainable food/agriculture workshops, e.g. Good Food Workshop, Light Square Pruning and Fruit Trees workshop</td>
<td>3</td>
</tr>
<tr>
<td>Food Security Training/Workshops</td>
<td>3</td>
</tr>
<tr>
<td>Community Gardens experience/volunteer</td>
<td>1</td>
</tr>
</tbody>
</table>

In addition, most practitioners (79%) from the online survey had either personal experience, interest or a background in environmentally sustainable food which spurred their involvement in the area. Practitioners discussed experiences such as growing up on a farm, growing fruit
and vegetables at home, or volunteering, e.g. Willing Workers on Organic Farms (WOOFING). Others stated that they had personal interest in food sustainability which was influenced by their family who shared a slow food/organic food philosophy. Others have worked in the field of practice in food security projects. Table 28 provides a breakdown of experiences and interests.

*Grew up in a household where there was a culture of slow/organic food and a focus on the importance of knowing where our food comes from – how the animals were raised, who grew it… (Survey Respondent)*

*Grew up on farm, family always produced own food. I have raised my family growing our own food and I belong to a community garden. I have interest in organic food; slow food and kitchen gardens (Survey Respondent)*

Table 28. Experiences and interests from practitioners

<table>
<thead>
<tr>
<th>Experiences and interests</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grows own fruit and vegetables at home</td>
<td>23</td>
</tr>
<tr>
<td>Food and farming background, e.g. grew up on farm, partner/family are farmers, family involved with food production</td>
<td>22</td>
</tr>
<tr>
<td>Work experience, e.g. food security projects, farm manager, hospitality</td>
<td>12</td>
</tr>
<tr>
<td>Personal interest/research</td>
<td>6</td>
</tr>
<tr>
<td>Active in food sustainability related campaigns and alliances, e.g. Slow Food Movement, Food Fairness Alliance</td>
<td>3</td>
</tr>
<tr>
<td>Grew up with fruit and vegetable gardens at home</td>
<td>2</td>
</tr>
</tbody>
</table>
6.4 What role does the Education for Sustainability approach have in the development of Australian health promotion practitioner competencies to address food security through an environmental sustainability perspective?

In the third phase of the research, academics within Australian universities who taught food security using environmental sustainability principles were sought and interviewed. A total of 15 academics were interviewed. Academics were invited to participate in the research if they were teaching food security using environmental sustainability principles.

In addition, phase three of the research involved undertaking a document analysis. Academics who were invited to participate in the interviews were asked to provide supporting documents in relation to the units they discussed. A total of 33 documents were provided by academics. A unit in this thesis refers to a single subject area of study (e.g. Anatomy and Physiology) and a course refers to the degree undertaken at a tertiary institution (e.g. Bachelor of Applied Science). The subject area refers to the topic or discipline area of that course (e.g. health, environmental science). The documents were used in conjunction with the information provided by the academics during the interviews and are presented alongside the quotes.

6.4.1 Education program profile

6.4.1.1 Faculty, discipline and level

Interviews with academics and the supporting documents provided information on the units that they were teaching into. Table 29 demonstrates which faculty or school the units reside, the discipline that included the unit and the level (undergraduate/postgraduate) with which the unit was taught. Fourteen units were from the nutrition sciences, for example, nutrition, dietetics, or public/community health nutrition programs. The other twelve units varied, with disciplines ranging from community development, health sciences, health promotion, sociology, environmental science, education, public health, arts, environmental health, sustainability and business. A total of 26 units were identified and discussed during the interviews. Two of the units discussed by academics were online. One unit was a work integrated learning placement unit while two units were part of an undergraduate or postgraduate research degree, i.e. Honours (n=1) or Masters by Research (n=1). Units offered were a mix of core and electives.
Table 29. Unit profile

<table>
<thead>
<tr>
<th>Academic Profile</th>
<th>No. of units discussed</th>
<th>Faculty/ School</th>
<th>Discipline</th>
<th>Level</th>
<th>Documents supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5</td>
<td>2</td>
<td>Global, Urban &amp; Social Studies.</td>
<td>Multiple: Arts, health, social sciences, environmental science.</td>
<td>Undergraduate.</td>
<td>Unit Guide.</td>
</tr>
<tr>
<td>A6</td>
<td>2</td>
<td>Health.</td>
<td>Health science, exercise science, environmental health.</td>
<td>Undergraduate.</td>
<td>None provided.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>-----------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
</tr>
<tr>
<td>A11</td>
<td>1</td>
<td>Education.</td>
<td>Secondary Education.</td>
<td>Undergraduate &amp; postgraduate.</td>
<td>None provided.</td>
</tr>
<tr>
<td>A13</td>
<td>1</td>
<td>Global, Urban &amp; Social Studies.</td>
<td>Multiple: arts, health, social sciences, environmental science.</td>
<td>Undergraduate.</td>
<td>Unit Guide.</td>
</tr>
<tr>
<td>A14</td>
<td>2</td>
<td>Humanities &amp; Social Sciences.</td>
<td>Community development.</td>
<td>Postgraduate.</td>
<td>None provided.</td>
</tr>
</tbody>
</table>
| A15 | 2 | Exercise & Health Sciences | Nutrition, dietetics, public health, community nutrition, public health nutrition | Under-graduate & post-graduate | Unit Guide
Selected seminar slides |
6.4.1.2 Unit profile

Figure 39 (p. 198) indicates that from the 26 units discussed there were four units with a general sustainability focus. One unit brought together food, health and environmental sustainability and this was embedded throughout the entire unit. For the remaining units (n=21) academics stated that environmental sustainability was one of the modules or topics discussed. The food system was incorporated as one module within these programs and food security presented as an issue within the wider food system.

So environmental sustainability and, you know, just impact on the environment is one of those factors. Unfortunately, you know, it's not the only component of the whole unit. So it is just, you know, one of many (A10)

We use food systems as an exemplar, rather than teaching around food systems. Because its community, community development's there in practicing it (A14)

Figure 39. Unit profile
One academic stated that their unit taught three weeks of content around food security, sustainability and climate change and how policy and politics influence these.

*It’s basically been a core unit for that particular degree, but that’s going to change, it won’t be a core unit as of 2015. But fundamentally, it’s about the connection of nutrition to public health and there’s probably about three weeks specifically dedicated to the concept of food security, sustainability, climate change and the effects of policy and politics actually have on decisions made around that (A15)*

Some academics linked their module or topic around environmental sustainability, food systems and food security to an assessment task.

*...The first assessment task is a reflective piece that goes for a few weeks but the second assessment task is students are required to work in an interdisciplinary team to imagine a future scenario of sustainability and we offer them a few areas to focus on, one of which is food (A7)*

*So the students have to basically go through a process of developing a project plan, which is just an issue, and this year I’ve had issues that I decide for students, and they get to choose one to focus on for the semester... So like there’s some food insecurity, the sustainability of the food system, and sustainability related practices, that are four projects that kind of intersect with those issues (A8)*

### 6.4.2 Environmental sustainability principles used within programs

Academics were asked to state what environmental sustainability principles they used within their teaching programs around food security. Academics also discussed issues to demonstrate the principles they were using, for example, climate change and/or peak oil in relation to the food system and would often use case studies and stories to demonstrate the principles used. At times principles overlapped and were discussed together to demonstrate how they were taught. The responses are reflected below.

#### 6.4.2.1 Ecological Integrity and Biodiversity principles

Academics provided examples of how they taught principles around ecological integrity and biodiversity within their teaching programs. These are presented below.
6.4.2.1.1 Animal Welfare Issues

One academic stated that students learn issues around animal welfare in relation to the wider food system and the problems inherent within it.

I think it is all kind of part and parcel of our whole food system and there needs to be changes in lots of different aspects and it’s not sustainable to keep cows in feed lots...

It’s also cruel. So I guess they’re the main sort of principles around food sustainability. It’s about being able to make sure we have a food supply and that it doesn’t contribute negatively on the environment, it’s going to be there for future generations, it’s a just system and it treats animals well (A10)

Documents (n=2) support the notion that few academics were teaching students about animal welfare issues with regards to the current industrialised food system. One academic who includes animal welfare as a topic within their unit has provided details regarding the focus of this content.

The desire, by consumers, for purchase of ‘clean and green’ foods that come without traces of agri-chemicals, conform to raised standards of animal welfare, and are sourced from sustainable production systems, is another – Unit Guide (A3)

6.4.2.1.2 Impacts of current food system practices on ecosystems

Fifteen academics stated they discuss the impacts of the current food system on ecosystems with students. One academic stated they discuss water in relation to climate change as well as water use along the entire food system. Another academic taught students about the environmental limitations facing future production as well as the impacts the current food system is having on the environment.

...around food systems, in my understanding of sustainability, would be about issues around climate change and how that might impact on the availability of food and not only the availability but also I suppose the nutritional content of food. So it’s not just climate change but it’s also environmental degradation, soil degradation and that impact from the quality of say, fruit and vegetables that can be grown. You know, over grazing, over production of and the impact that has on the soil (A9)

Several (n= 11) documents verified that academics were teaching students about the implications of the current industrialised food system on the environment. A15 used climate change implications of the industrialised food system as a learning outcome.
Two academics highlight the environmental implications of the global food system as a key learning objective of their unit.

*The environmental implications of the global food system will be examined along with the social, cultural and economic impact of these transitions, and the local-global interconnections of food security into the future – Unit Guide (A5)*

### 6.4.2.1.3 Food, nutrition and the natural environment

Ten academics discuss the links between the natural environment, food and nutrition. Two academics provided examples using a systems based approach when demonstrating the links between a flourishing natural environment, food production and nutrition. Both discuss the relationship between the current food system and its contribution to issues such as greenhouse gas emissions, pollution, food miles, and other environmental issues as well as nutrition.

*The main thing I look at in terms of principles is the food system and the food supply chain and how that has a strong link to nutrition choices that people have available to them, but how the environmental influence can actually affect those outcomes as well... (A15)*

Only a few documents (n=3), however, verified that academics were teaching students about the links between food and the impacts on the environment, food security or human health.

*Sustainable diets are defined as ‘those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations’... (A10)*

### 6.4.2.2 Social Equity and Fairness principles

#### 6.4.2.2.1 Future food supply and access

Interviews indicate that academics (n=10) taught students about ongoing access to food for communities, particularly in the future. Seven academics use issues such as climate change and population growth to demonstrate some of the increasing pressures on food provision. They also discuss the disproportional impacts on developing nations and future generations in a food constrained world.
I guess what I’m trying to do is to open up their understanding from paddock to plate, where food comes from. I think a lot of my students, if they’re not farmers, a lot of them haven’t really thought about it so I actually talk from paddock to plate. And historically where we started and then where we are standing with the global food system and what the solutions might be in the future if climate change does affect future food supply. And what’s our responsibility for our Asia specific neighbours and also globally as well (A6)

Eight documents verify that some academics taught students about future food supply and access to food in the immediate future and long term.

The focus will include driving and limiting factors of a food system, how food systems have changed, the influences and consequences of this change. Public health nutrition issues relating to the changing food supply will be explored – Unit Guide (A2)

6.4.2.2 Food Sovereignty, Food Citizenship and Equity

Empowerment and social justice issues were considered an important principle to discuss with students (n=10), this took the form of either food citizenship, food sovereignty, democracy, tolerance or equity.

So some of the principles relate to democracy, tolerance, equity – it teaches really all these things that are aligned to the principles of sustainability apart from doing their natural or their more scientific… with the principle of looking at biodiversity and the rights of food – which country or the policies of each of the country to have the right to really do whatever or to manage their resources in their own particular ways and respecting their commerce treaty and economics and all of that (A11)

Documents, however, suggest that three academics discuss empowerment and social justice principles with students, namely in the form of food citizenship. The documents, however, did not provide clarity regarding the extent of such discussions.

All the sectors of the food industry must be involved and transformational change is needed. Informed and active communities can also help to stimulate change. Citizens can be encouraged to participate in decisions concerning their food system (Fisher A 2010) e.g. Community Supported Agriculture and Food Policy Councils – Module of Food and Sustainability (A10)
6.4.2.2.3 Polices and the politics around food and food systems

Fourteen academics discuss policies and the politics around the current food system to demonstrate how decisions made at this level either contribute to a more or less equitable food system for people, from farmers through to consumers. Academics also discuss the power relations within big food industry and supermarkets and how they contribute to a more or less equitable system.

"I want to talk about what's happened with the food industry, how it works, what the big players are, what the power relations are behind the scenes, say between supermarkets and growers. I then talk about things like the world food crisis... So a lot of that's that political economy, it's about the politics and the economics of the delivery of food, and the students get introduced to some concepts that come out of a critical political economy about consumption, the sociology of consumption, they learn about profit making, and some of the Marxist ideas..." (A3)

Eight documents indicate that students learn about the politics, policies and power relations within the food system (i.e. role of agribusiness, large supermarket chains) and how this shapes the current food system. An understanding of policy processes were most often reflected within the learning outcomes of unit guides.

"Understanding how the food system is shaped by policy, politics and food regulation is a fundamental skill for nutritionists and public health nutritionists. This unit focuses on understanding how policy, politics, and evidence affect how we approach important nutritional issues such as healthy eating, food security and sustainability, obesity and other chronic diseases and how we manage them at a population level – Unit Guide (A12)"

Two academics also stated that they try to empower students to think about their role as leaders in the policy space in shaping and contributing to a more sustainable and equitable food system.

"...I go to...a slightly different tack and getting them to think about leadership and capacity building in relation to policy because, for me, a major issue is that people – particularly people who have come through the food and nutrition system in terms of their education or profession – don't necessarily think of themselves in a leadership role in this area. And I specifically address leadership because with the premise that"
you’re the educated ones around these issues, if you don’t take a stand on some of these issues, nobody else is going to, or people with a different agenda that you may not agree with, will influence the policy agenda (A4)

6.4.2.3 Principles around limits on natural resource use

6.4.2.3.1 Food and packaging waste

Academics (n=8) who taught students around food and packaging waste in the food system tend to use examples and practical demonstrations to highlight the issue. A3 stated that they break students into groups to discuss recent purchasing, which evolves into a discussion around food and packaging waste.

One of them is to break the students up into groups, get them to talk about their recent weekly purchases, what did they purchase? And what did they throw out? And so that then gets into the issue of food waste. And you know, very often the students, they’ve never really understood how much they’re wasting in terms of packaging and that sort of thing (A3)

Another academic stated that students undertake a lifecycle analysis of food to understand the entire process within the food system (A13). One academic stated that they take their students on a field visit to a café that produces no waste (A11).

...he opened this café which is really an example of how Education for Sustainability operates and by this I mean they don’t produce any waste. So it’s all recycling. They do have the butter jars, they have a compost and it’s fascinating to have a coffee and to talk to the guys and see how they run the place... So when we went there, of course I took some materials and we were having coffee there with the students and then we were doing the exercise and the practicum there ... (A11)

Only two documents, however, verified that food and packaging waste is taught within units. Overconsumption and food losses across the food system are also provided within documents.

Attention will be placed on the processes of consumption characterised by immense contradictions of widespread hunger and malnutrition alongside of lifestyles of over-consumption and waste – Unit Guide (A5)
6.4.2.3.2 Natural resource conservation

Academics (n=5) also discussed the limits to natural resources by providing examples of various issues, such as water, oil and energy.

I also link the water issue, in particular, to the water embedded in food that we consume and the different types of processed foods versus less processed foods and the amount of water required in the food – growing of the food, so the food manufacturer and the consumption of food in terms of the cooking... also looking at the input of fuel into food production and the relative cost of that and that’s both in terms of basic food production, food manufacture and food support and then refrigeration, both retail, commercial retail and domestic (A4)

Documents (n= 6) also verify that some academics are teaching students about natural resource constraints as a result of the current food system. Water, soil erosion, land availability and oil are common themes.

Describe water footprint; describe virtual water and the sub categories – Lecture slides (A15)

Our current food system is at risk of food availability interruptions as a result of diminishing resources, environmental changes and increasing competition for land use. Food availability is already being influenced by water, soil erosion and salinity, oil and grain shortages – Module on Food and Sustainability (A10)

6.4.2.4 Local Food Systems principles

6.4.2.4.1 Local food production

Interviews demonstrate that ten academics taught students about the benefits of local food production for communities, farmers and the natural environment as well as some of the challenges. One academic encourages student discussion on alternative local food systems, including their strengths and limitations. However, only three documents were able to support the idea that local food systems were discussed in units.

Discuss alternative or complementary approaches to current food systems to increase sustainability; discuss sustainability of the environment, comparing and contrasting the strengths and limitations of different food systems. Week 3: Activity 1.8: Local access to food; Activity 1.9: Other types of sustainable agriculture – Unit Guide (A2)
Alternative local food systems were also provided by academics for students to discuss, for example, food co-operatives, urban agriculture, and policy development (e.g. local food act). They also discuss the impacts of a global food system on the food supply and people’s access to food.

...Looking at things around localisation of food production and how that works and issues around farmers markets; community gardens; linking the growers to the purchasers; distribution network; localised distribution network; co-operatives; little mini food co-ops that work like that. It’s about looking at those as part of a sustainability process but more within the framework of: How does that develop a sense of sustainable community? (A14)

6.4.2.4.2 Food miles

Interviews reveal that six academics discuss food miles and demonstrate to students the complexity of the topic using examples and drawing out key points from within these. One academic discusses food production and geographic differences.

And so food miles is something that’s been useful, it’s been around for a while, again it’s a very blunt instrument, because we shouldn’t be growing rice for Australia, frankly, we’d be better off importing rice, because it’s a very thirsty crop... so food miles is another kind of introductory idea... (A13)

Another academic discusses the benefits and limitations of organically grown food internationally versus conventionally grown food locally and the food miles associated with it. The unit guide provided by A2 also reflects similar notions regarding the true cost of food systems. In addition to the document supplied by A14 a further two documents were identified which indicate that a discussion on food miles or local food production was taught to students by few academics.

If you’re growing organic food but you’re then transporting it— your food miles associated with that in an unsustainable transport system, to me, is it better to use localised food that might have had non-organic fertilisers used on it or...non-organic insecticide sprays used on it, it is better—what are the pros and cons about using something that’s local that might have used unsustainable or non-organic growing methods to having something that is organic but has travelled 2,000, 3-4,000 kilometres to be on your plate. How do you weight up those pros and cons? (A14)
6.4.2.4.3 Food culture linked to local food systems

One academic discussed the links between local food systems and food culture where people who participate in food systems at the local level are more likely to appreciate their food and understand their role in the system.

That’s right those cultural aspects of food are very important and that’s another important aspect of it... But part of what I ask people is about how do they actually appreciate food? How do they make meaning of their food? Again it was the local food system, people who access local food systems, who had what I’d describe as this contemporary relational food culture. Where they actually derived meaning from knowing where it came from and who grew it and that actually contributes to their enjoyment of the food. It’s a very complex and deep way of thinking about their food whereas the people who went to the supermarket never spoke in those terms (A2)

Three documents provided by academics suggests that there may be a discussion of food culture in their teaching program, however, the wording within the documents was not clear whether it was a strong feature within the program.

Food systems are inextricably linked to health and the natural environment... The relationships between agriculture, food and health are mediated by the natural environment, culture, and technology – Module on Food and Sustainability (A10)

6.4.2.5 Consideration of health promotion principles

6.4.2.5.1 Food Security

Interviews reveal that fourteen academics discuss food security with students and the factors that are contributing to increased food insecurity as well as some of the solutions that are being proposed.

I do a lecture in food security where I look at all of the factors that are leading to an insecure food world. There I sort of populate that around those problems, or around those issues, those boxes of issues, probably about ten or fifteen, with a whole lot of solutions that have been proposed, and a lot of them, of course, are really outrageously silly solutions. Some of them are about genetic engineering... (A3)
Documents (n=12) verify that food security is one area that academics focus on in relation to the larger food system. This material is usually taught in the form of weekly activities or general learning outcomes of the unit.

Describe how reducing waste will improve greenhouse gas emissions and reduce food security; Define the concept of global food security; Outline principles of advancing food security – Learning Outcomes (A15)

6.4.2.5.2 Culturally appropriate food

Five academics address culturally appropriate food within their units when teaching students about food security. One academic stated that they taught students about culturally appropriate foods that are accessible for various ethnic groups and that these are also important aspects of a sustainable food system.

The other aspect of that which is probably not so much where you’re coming from but just about providing people with secure, you know can’t even access food security but providing different cultural groups with secure access to foods that they are familiar with, that they know how to cook with, particularly... I’m talking about migrant groups or even, Aboriginal/Torres Strait Islanders on the urban fringe (A9)

Documents provided by academics suggest that few academics (n=2) integrate the notion of culturally appropriate food as an integral component of food security and the food system.

Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimising natural and human resources’ (Food and Agriculture Organization of the United Nations (FAO) 2009) – Module of Food and Sustainability (A10)

6.4.2.5.3 Food systems and health

Interviews demonstrate that ten academics taught students about the links between the current food system and a range of health conditions. Specific examples were used to explore and demonstrate these links, for instance, one academic discusses the links between climate change, obesity and food production.

Boyd [Swinburn] co-authored a book a couple of years ago around obesity and climate change and made the link between obesity and climate change. If you were to
graph the two, so we had increasing obesity rates and then increasing impacts of climate change and there’s a point at which the two absolutely correspond to each other. So that’s really again showing how the two are linked together and a really interesting case study…There’s also correspondence with increase in carbon emissions (A7)

One academic discusses the links between a functioning ecosystem, food security and food sovereignty and how they all interact to influence health outcomes.

Well I’ve got unit content written up here as maximum global related health statistics, approaches to the prevention of non-communicable nutrition-related diseases. I’ve got food security, food sovereignty, and food systems of how these actually influence and interact with health outcomes. Then there’s the social, cultural, political, intellectual and economic factors in relation to food security. The effect of governance, social capital and policy on food supply at a national/international level, and how to build a resilient food system, based on future predictions (A15)

Documents (n=7) also verify that food systems and health were discussed with students. Health issues (e.g. food security, obesity, nutrition) were generally used to demonstrate the impacts that a global and national food system has on health.

Understanding how the food system is shaped by policy, politics and food regulation is a fundamental skill for nutritionists and public health nutritionists. This unit focuses on understanding how policy, politics, and evidence affect how we approach important nutritional issues such as healthy eating, food security and sustainability, obesity and other chronic diseases and how we manage them at a population level – (Unit Guide A12)
6.4.3 *Use of the Education for Sustainability approach*

Academics were asked whether they use the Education for Sustainability (EfS) approach when developing or delivering these units. Two academics stated they actively use EfS within their programs. These responses are outlined below.

### 6.4.3.1 *Education for Sustainability in the curriculum*

One academic stated that they use EfS within their education programs due to its systems thinking emphasis and approach.

> I love the Education for Sustainability framework from the systemic approach and emphasis. So that’s pretty much the one I use in terms of looking and understanding everything as a system and how the system integrates and relates to all these other little parts of the system. And it’s a very interesting way for the students to really get and understand the whole concept of sustainability (A11)

Another academic stated that they use the approach because it encourages students to develop systems thinking. The approach also has effective teaching and learning features that meet the various learning styles of students.

> ... I think for effective teaching there’s lots involved in having effective teaching and effective learning but one of them is to look at the student as a whole person and to consider the student, consider their learning needs, that there are different students who learn differently, have different aptitudes. So the head, hands and heart speaks to different students, whether they can express themselves intellectually or affectively or in practical terms so that the students feel validated in all their learning domains... for that reason it’s a really good way... it has I suppose generalisable features that just are good teaching and learning features (A7)

Documents that were provided by A7 and A11 were also analysed to determine whether the EfS approach was being used. Although the terms ‘Education for Sustainability’ were not indicated in the documents the teaching approaches were consistent with EfS. The assessment was made using a checklist against EfS pedagogies as discussed by Tilbury et al. (2004). Figure 40 demonstrates the core teaching approaches inherent within this approach.
One academic stated that their university supported EfS within the curriculum due to the University’s commitment to sustainability. This university set up an “educational sustainability community of practice campus wide across every discipline of the University with the intent of embedding educational sustainability into the curriculum of all undergrad units at the University” (A6). A6 further stated that the community of practice was very new and EfS was not yet established within their Health Sciences courses. This was verified with the documents provided by A6 where there was no reference made to Education for Sustainability or whether any approaches from this teaching philosophy were in use.

But if you look at what’s actually happening or what’s happened is that it is happening in pockets but it’s not happening in health science at all. So health science is one of the disciplines where educational sustainability or sustainability principles you cannot find... (A6)
6.4.3.2  Education for Sustainability – missing in the curriculum

Academics that were not actively using the EfS approach were prompted to discuss why this approach was not used and whether other educational approaches were utilised. Most academics were unaware of the EfS approach or knew very little about it, while one academic did not feel experienced or confident enough to use it and felt that this may be posing a barrier for other staff to use it.

6.4.3.2.1 Lack of awareness and/or limited understanding of approach

Twelve academics stated that they either had not heard of the approach or were vaguely aware of it. One academic was intrigued by the approach during the interview process and stated that they would further investigate it.

No I don’t because I haven’t been aware of it before (A2)

Not formally, no, because I haven’t heard of that term before but I’d like to find out a little bit more about it (A9)

One academic stated that they had a basic understanding of the approach.

Not a lot. My very rudimentary understanding is that it’s trying to embed sustainability across faculties... so that if you’re doing education you’re still learning about sustainability or if you’re doing food, you’re learning about it, if you’re doing physical education (A10)

6.4.3.2.2 Lack of teacher education

One academic used their own experience within their university to identify that a lack of skills and confidence in EfS may be posing barriers for staff to implement the approach more widely. A6 suggested that having EfS as an elective in their university’s graduate certificate of teaching and learning in higher education may help to alleviate this issue.

... the challenges are even if you’re an academic who really wants to embrace Education for Sustainability in your curriculum and embed it, if you don’t have the skills yourself then it’s going to be really hard to be able to impart that knowledge with the confidence that you need. So we offered to talk to you about the fact that our peers and ourselves need ongoing peer support around sustainability... we offer a graduate certificate in learning and teaching and higher education here and maybe one of the electives could be teaching Education for Sustainability or embedding
Education for Sustainability principles into your learning and teaching. So we see that as really critical... (A6)

6.4.3.2.3 Informal use of the Education for Sustainability approach
Some academics who were not actively using the Education for Sustainability approach highlighted the similarities of the education approaches they used in their program with Education for Sustainability.

I certainly use common elements of the approach. I don’t use it within the specific framework that you referred to, but in terms of reflective practice, really looking at values and so on, I certainly step the students through that... So, how I teach would be somewhat similar... (A4)

6.4.4 Teaching and Learning approaches
Academics were asked to discuss the teaching and learning approaches they use when teaching students about food security using environmental sustainability principles. Although academics were not formally using or recognising the EfS approach within their teaching program, the results indicate that many of the teaching approaches that were adopted are consistent with EfS. The assessment of EfS approaches was made using the checklist used in section 6.4.3.1 (Figure 40) against EfS pedagogies as discussed by Tilbury et al. (2004). The following section will demonstrate academic teaching and learning approaches and how they align with the EfS approach.

6.4.4.1 Experiential Learning
Many academics (n=9) discussed the use of experiential learning to enhance student understanding of food security and the food system. One of these included students undertaking work integrated learning projects in community gardens. Extra-curricular activities were also common practice and tied in with the learning outcomes of the unit, for example field placements, development of cookbooks, attendance at cooking classes, involvement in regional food workshops or alliances, student blogs and discussion boards and field trips.

So we’re trying to do a bit more hands-on I suppose. The students are actually in the garden actually helping us with that from the ground up to develop the garden. One other thing that I forgot about with food security we have students that developed a cookbook. That was another project that we did. That was focused on improving food...
and security among the student population group... I’ve got some students down looking at the canteen at the moment saying, “oh there’s not even any fruit and vegetables down here.” They’re trucking it in from [region] and other things. So it’s that hands-on experience, they learn so much more than what they can read in a book, can’t they? (A1)

Despite academics stating they use experimental approaches in teaching programs only three documents supported the notion that experiential learning was actively used within units. One unit guide indicated that students were involved in practicums, however, the details were limited. Another unit involved taking students off-site, however, there was limited information regarding where they go off-site. In addition, meeting notes provided by A8 were indicative of future plans, however, there was little indication that students were involved in current offerings with experiential hands-on experiences.

2-hr lecture (8 weeks), 3 x 3-hr practical sessions, 1 x off-campus visit approximately 3-hrs, readings and online components – Unit Guide (A6)

Encouraging students to engage in practical hands-on food growing (to improve food literacy, respect for food and avoiding wastage) e.g. some universities in US encourage their students to participate in local food production (CSA)... Supervising (or supporting) student placements that relate to food and environmental sustainability e.g. Eco-friendly Food Website project, mapping local food production, supporting the creation and promotion of local farmers’ markets, helping schools to make links between school gardens and health curriculum – Meeting notes (A8)

6.4.4.2 Critical Thinking

Critical thinking was another key approach within academic teaching programs (n=9) around food security and the food system. To develop critical thinking skills, academics provide students with various tasks such as critically appraising current literature around food systems or solutions proposed, holding student debates and generating group discussion.

This unit I would actually say is probably the most taxing for students. It’s really getting them to critically appraise literature and think in ways they haven’t before... It’s not the sort of topic where we’re going to have neat answers to everything but I want them to explore the topic and to try and get a better understanding of how food
systems operate and where the power lies. Where the consumer or the individual can be within that whole system, where they’re situated (A2)

Although critical thinking was noted in documents, these were apparent in less than half of the documents received by academics (n=11). Unit guides had critical thinking skills as an outcome and students were required to apply them within the unit, either through assessment tasks or group work in class.

Critically appraises multiple perspectives in relation to a particular topic; identifies and describes personal learning, using explicit examples to illustrate – Unit Guide (A2)

At the conclusion of this course you will be able to: identify significant threats to food security on a global scale; evaluate critically the processes which lead to specific outcomes in food consumption patterns; identify the social, political and environmental implications of the global food system, and identify the various alternative strategies proposed to avoid food crises into the future – Unit Guide (A5)

6.4.4.3 Reflective Practice

Reflective practice (n=9) was another key approach that was used to teach students about food security and the food system. There were several ways this was undertaken, e.g. through informal and formal discussions in class, tying assessment to a reflective piece and reflective journals were some examples provided.

They do a reflective practice and they do reviews of what they are doing and with a view to actually improve and how they can change things. We do activities around problem solving, so they’re presented with a situation based on what they’d learned around food sustainability. How would you actually address those creatively, with underpinning it with evidence? (A15)

Reflective practice was minimally indicated within documents (n=7). Academics who used reflective practice within their unit developed this approach either as an assessment task or activities within tutorials.

Students will complete a reflective journal, based on the activities and readings that are part of the weekly curriculum. Reflective tasks requiring responses throughout the trimester provide a scaffolding opportunity for personal & professional learning. A
minimum of 8 journal entries are required. Each entry will be approximately 250 words (2000 words) – Unit Guide (A7)

6.4.4.4 Systems Thinking

Systems thinking (n=8) was another key approach for academics when teaching students about food security and the food system. Academics discussed systems thinking as a key theory and highlight the importance of teaching students how to be systems thinkers; that it assists them to understand the complexity inherent with the current food system and how to approach the topic holistically rather than from a reductionist approach.

*It’s a way of thinking where we think holistically rather than reductionist so that’s the first thing I would say. That means encouraging students to appreciate systems dynamics so that aspects of the relationship between food and health don’t happen in isolation... you can’t teach food policy without having a food systems approach to it otherwise it’s probably not proper food policy teaching... There are interconnections between food production and the environment. Between the distribution of food and policies about what food is produced in the first place and so on. It’s a skill base and so on around the dynamics of interconnectedness, feedback loops, negative feedback and so on (A12)*

The documents supplied by academics (n=11) verified that systems thinking was used as an approach by some academics. Documents reveal that academics who taught about systems thinking apply these concepts through lectures and tutorials using case studies. Students also learn to apply systems thinking within assessment tasks where academics used this approach to challenge students thinking around the current industrialised food system.

‘Systems thinking’ involves viewing “problems” as parts of an overall system, rather than reacting to specific parts, and potentially contributing to unintended consequences. ‘Systems thinking’ ensures that health is viewed as an outcome of the food system as a whole rather than from the individual components within the system (Story, Hamm and Wallinga 2010). This can challenge some of our traditional approaches to improving nutrition – Module on Food and Sustainability (A10)

Understanding how the food system is shaped by policy, politics and food regulation is a fundamental skill for nutritionists and public health nutritionists – Unit Guide (A12)
6.4.4.5 *Transformative Learning*

According to Mezirow (1997) critical reflective thought, imaginative problem posing, consciousness raising, life histories, repertory grids, participation in social action and group problem solving are some of the methods used to create transformative change. Most academics (n=8) did not use the term ‘transformative learning’, however, it was evident that some teaching programs were incorporating this approach within their units. Academics discussed the shift in student attitudes and beliefs throughout their units as well as the sceptical nature of students with regards to the approaches used within their program, particularly in the beginning. However, towards the end of the unit academics found that students had shifted their perceptions regarding the approaches used as well as their ideas, values and beliefs regarding the current food system.

*Quite often I have students say what has gardening got to do with nutrition? Then it gets to week four or out of their six weeks and they’re like now I get it. I get why you’re doing this. Influence people to change our food supply or get this person involved or that person... In a science degree it’s often quite black and white and then they start thinking outside the box and thinking about how our environment does affect our everyday life I suppose. That’s something that actually some of them hadn’t thought about in the past* (A1)

*Some think I’m off the planet and just think I’m a wacko and think “what is she doing? Let me get out of here” and others are just like “my goodness, I have never thought about this, my goodness” and they’ve become really quite passionate about it. So I’ve got from one from extreme to the other. One lot is saying “this is so not relevant to my degree and to my profession, what am I doing in here?” to those who say “my god, why didn’t I know this? Why didn’t anyone tell me? What can I do about it?” so that type of thing* (A6)

6.4.4.6 *Futures Thinking*

Two academics used futures thinking within their teaching program. Futures thinking ‘is a process that engages people in conceiving and capturing a vision of their ideal future, it helps people to discover their possible and preferred futures and to uncover the beliefs and assumptions that underlie these visions’ (Tilbury 2007, p. 124). The two academics who stated they use futures thinking were the ones who also actively integrate the EfS approach within their units.
The second assessment task is students are required to work in an interdisciplinary team to imagine a future scenario of sustainability and we offer them a few areas to focus on, one of which is food... and then that led to assessment task number three which isn’t project based. But more to go back to the fact that the students had to have this idea about what sustainable food production and consumption might look like in 2040 and so we provided them with resources… (A7)

In addition to the interviews, documents provided by A7 demonstrate how futures thinking is used as an assessment task to generate skills.

Students work in inter-faculty groups and are asked to put themselves in the year 2040. They must, together decide what type of world they wish to live in. The task is to research the problem, then formulate a pathway to get there – Unit Guide (A7)

6.4.4.7 Partnerships

One academic demonstrates partnerships to students through modelling, where they collaborate and build positive partnerships with students during their unit.

... So for me it’s about living what I teach and I don’t teach one thing and not try and live it in another sense... if you’re going to be expecting people to recognise and value and work with the locals and work with their communities, I need to do that (A14)

Seven academics taught students about partnerships through group work and encourage collaboration despite group differences to reflect real life practice. One academic commented on the value of interdisciplinary work to challenge students own set of values, assumptions and beliefs – students were then required to work together positively despite varied perspectives.

In [unit] the students are also in groups and they have a responsibility to their groups but the groups are for their assessment tasks but again they have time in class to work on these things, we work on building group dynamics, in understanding group dynamics, in being responsible to a group. So we really try to emphasise the importance of collaboration and valuing collaborative solutions to problems, real world problems (A7)
The documents also revealed that some academics facilitate partnership development through interdisciplinary (n=3), problem solving (n=6) and group work approaches (n=9). These were outlined in unit guides provided by academics.

On Moodle each week there is a link to a separate discussion board. Please use the Discussion Board in Moodle for this assignment for each week’s discussion... You are expected to be prepared to engage in the discussion topics with your fellow students. From week 2, students will be assigned as the moderator of the group’s discussion for each week. All students are expected to participate through postings pertinent to the topic and through the weekly online discussion – Unit Guide (A2)

6.4.4.8 Participation

‘Participation goes beyond consultation, to empowering people by directly involving them in the decision-making process. Engaging people in decision-making creates a greater sense of ownership and commitment, both of which mean they are more likely to take action’ (ARIES 2015, p. 1). Five academics have set up their programs to ensure that students were being empowered and that they were building their confidence to make change – this is through encouraging active participation in group discussions, activities (field visits, campus gardens, practical projects and placements, student blogs and online discussion boards) and assessments tasks.

All aspects of it [community garden] they’ve been heavily involved in. So they’ll come along to our steering committee meetings. We’ve had an engineering student design our pop-up garden bed. We’ve got an Honours student in Nutrition and Dietetics researching the volunteer engagement with the gardens (A1)

The interdisciplinary aspect also builds student confidence to engage with others who may have a varied perspective on the same topic and how to manage differences and expectations. In some cases, students were also supported to develop skills to effectively empower people in the communities with which they will be working to create effective change.

Oz Harvest, for example, do food rescue and that sort of thing. This group of students this year had come up with a model where it was trying to have a more sustainable approach. Rather than thinking about just providing poorer people with emergency food supplies how can we come up with something that might be more sustainable in the long run? What they came up with is having a community garden in a particular
suburb near where the head office is for Oz Harvest and maybe having some skill development for people who are unemployed. They were trying to consider some of the social determinants of health (A2)

Participation approaches in accordance to the EfS approach, however, was only evident in one document provided by academics. Meeting notes from A8 suggest some academics may be attempting to utilise this approach within teaching programs, however, in practice participation approaches were few.

Encouraging students to find out about (and possibly become members of) discussion groups like the FEIG and other relevant organisations like the Youth Food Movement, The Sydney Food Fairness Alliance, The Inspire Foundation (see Act Now website at http://www.actnow.com.au/) – Meeting notes (A8)

6.4.5 Limitations to teaching and learning approaches

Academics were asked to discuss the limitations of their teaching and learning approaches. Academics discussed the limitations of embedding environmental sustainability content within their programs. Figure 41 provides a model to demonstrate the limitations which were discussed, these include: the biomedical model of health as the dominant paradigm; lack of resources; minimal university support; a lack of constructive alignment with regards to approaches; lack of time; student maturity and; minimal knowledge and/or competencies to implement EfS within the curriculum (section 6.4.3.2). These are discussed below.
6.4.5.1 Biomedical Model of Health as the dominant paradigm

Some academics discussed the biomedical model of health and how it is the dominant paradigm in society – at a policy level and within education. This can then be a challenge for students to learn about food security from an environmental sustainability perspective and to think more broadly about the complexity of the problem.

Well a limitation is teaching it when the students find the medical model a lot easier to understand and might be more inclined to think that that’s where their career fits. I think that is a little bit easier to understand. So that’s probably the barrier (A1).

In addition, meeting notes provided by A8 discussed the reduction in government spending on health promotion, food and environmental sustainability which makes it challenging to validate its inclusion in the curriculum.

The current trend in government spending away from health promotion makes it more difficult to work in food and environmental sustainability and to get this area...
recognised as a valid area for dietitians and students to explore – Meeting notes comment (A8)

One academic provided an example of how influential the biomedical model of health is on leading professional associations towards a view of how to address food security, sustainability and nutrition. This then has influence on university curriculum.

*Dieticians Association of Australia is shocking in failing to address issues like food systems, food sustainability and so on. They are far more concerned about reduction of science, looking at physiology, biochemistry, most things you could get in a textbook. Most things which are pretty much secondary importance for the issues we’re now facing.... It’s a huge challenge we’re facing.... it’s huge in terms of getting food systems and sustainability into the curriculum. Into learning outcomes and so on we have some major hurdles from the professional groups in how we achieve that (A12)*

On the other hand, A8 discussed the potential influence that external accrediting bodies can have in guiding universities towards specific graduate competencies, such as being environmentally astute.

*...I think that some of those external accrediting bodies that require certain competencies from graduates is a real space to explore... unis can say they want whatever they want, but you know, if there’s a body that says you can’t be accredited unless you do X, Y, Z, then that creates more impetus for change.... (A8)*

The tensions around professional associations and their influence was also noted in the documents. One unit guide stipulated that the completion of the unit would fulfil competency requirements outlined by their professional association.

*To meet the competency standards of an accredited nutritionist through the assessment, planning, implementation and evaluation of a community public health project – Unit Guide (A1)*

Meeting notes provided by A8, however, reflected both issues and opportunities for their accrediting professional body with regards to including environmental sustainability content within the curriculum.
DAA needs to provide strong leadership in emphasising the importance of including environmental sustainability in the curriculum. They also need to be seen as strong advocates for action at a national level and be part of the agenda setting – Meeting notes (A8)

6.4.5.2 Lack of financial and human resources

Academics stated that a lack of financial resources was often a limitation to the implementation of their teaching and learning approaches.

Funding is always a barrier to run some projects like this. We’ve been lucky here because sustainability is a key graduate attribute and also a focus of the university, we’ve been able to get some funding through the uni to get the initiative up and running. But it’s maintaining that funding as well (A1)

Another academic stated that there were limited resources for course development, particularly for sessional staff. As a result, courses were developed without the time to consider other teaching and learning approaches.

... There’s almost no resources for course development so there’s no resources to be thinking through in a very structured way what your approach to these materials are going to be and how you’d want to bring those different kinds of approaches in... (A5)

A10 stated that their school wanted to develop and run a unit on food sustainability, however, a lack of staff expertise in the area meant that this did not occur.

In the past though I know that the school has tried to or has talked about the issue of having a whole unit that is food sustainability. That was sort of canvassed quite a while ago – I don’t know exactly how long ago. But it didn’t eventuate because they didn’t have anyone onsite that was available and who had the skill set and the knowledge to be able to do it... (A10)

6.4.5.3 Minimal university support

A lack of university support was also a barrier to implementing current teaching and learning approaches. This was identified at two levels: Faculty/School level and University level. At the faculty level one academic stated that they received minimal guidance on running their unit, particularly as a sessional academic. That they had to find appropriate materials as the
weeks progressed. This would then result in limited guidance in introducing new teaching and learning approaches.

To be honest, when I say given a set of frameworks to run with, nobody gives you a set of frameworks to run from our point of view. Like no one tells you what they are. You’re going to have to find them out as you go along... particularly somebody who’s casual at the university, there’s very little guidance at all, I found. (A5)

At a broader university level, one academic stated how their own philosophy of life was often in contrast to how the education system runs and is often in conflict with the principles of sustainability. A11 stated that this would often create tension with the teaching and learning approaches used.

I mean for me one of the limitations, or more than a limitation, it creates a tension because my own philosophy of life is open and flexible and is taking risks. It’s always really trying to incorporate the principles of equity, of integration of all these kind of things and sometimes the education system on the other hand resist and doesn’t really go parallel to the principles of sustainability because the educational system is pretty much based on competitiveness, selfishness instead of working together – you see it really promotes different things that are not necessarily aligned with the principles of sustainability... (A11)

In addition, meeting notes provided by one academic demonstrate minimal commitment by their university regarding the development of environmental sustainability approaches within the curriculum.

Ideally incorporating environmental sustainability into the curriculum requires a systems approach and a commitment by the university (and its staff) not just a ‘retrofit’ to include sustainability by interested teaching staff – Meeting notes (A8)

Two academics stated that the university’s processes did not easily permit the introduction of other approaches, such as fieldwork – which would allow students to step outside of the university environment and discover food systems issues firsthand.

It’s actually very difficult at a university to take a group out now, particularly when you’ve got over 100 students as well. The time that’s been allocated to do that would be over and above what the students are probably allocated for that particular unit.
Then there’s a lot of guidelines around risk assessment as well if the students actually go off campus. It can be a little bit limiting (A15)

6.4.5.4 Minimal time to develop units with new teaching approaches
Academics discussed a lack of time to be able to incorporate new teaching approaches. Academics discussed various aspects of time, for example, A10 stated that having the time to add novel approaches was difficult to find.

...But it comes back to, I just don’t have time in my normal day to develop a new unit without something else going or getting some extra funds to employ someone for me to assist or to give some direction to and then they go and find all the relevant information... (A10)

One academic stated that they tried to take students on a field excursion and camping to a state forest, however, students did not have the time to attend.

It was probably the first year that I organised the field excursion but also camping. We went to Talunga State forest and I wanted to do that every year but the limitations is time. It always comes down to time for the students. Most of them if not all of them work so that is a complicating factor because every time we have to organise something, it has to be during the time of their seminar in order for them to go otherwise it’s not possible because they work or many of them will be missing the session if we do this... (A11)

6.4.6 In summary
This chapter presented the findings from Phase 1 (online survey) and Phase 2 (interviews) with health promotion practitioners as well as the results from Phase 3 (interviews and document analysis) with academics and their associated units. Chapter 7 will present a discussion of the findings.
7 DISCUSSION

This chapter explores the findings of this study in the context of existing literature and knowledge. It builds on the analyses (provided in the previous chapter) of the data generated through the survey, interviews and document analysis to respond to the key research aim through **exploring the potential role of health promotion in addressing food security from an environmental sustainability perspective.**

7.1 Environmental sustainability: broadening health promotion practice to address food insecurity

_This magical, marvellous food on our plate, this sustenance we absorb, has a story to tell. It has a journey. It leaves a footprint. It leaves a legacy. To eat with reckless abandon, without conscience, without knowledge; folks, this ain’t normal – Joel Salatin, farmer and author_

This study and subsequent thesis was prefaced on the idea that, across the globe, the entire food system from production to consumption is impacting heavily on the health of people and the planet (Caraher & Coveney 2004; Carey et al. 2011; Clay 2011; Gaballa & Abraham 2008; Lang 2009; Lenzen & Murray 2001; Sheridan et al. 2016). Ecosystems are becoming increasingly degraded from the current industrialised food system (Nellemann et al. 2009; Edwards 2011; Food & Agriculture Organisation of the United Nations (FAO) 2013; Lawrence et al. 2012; Sheridan et al. 2016) and food insecurity is pervasive and increasing in most nations, including Australia (Food Bank 2014; Second Bite 2014). It has been noted that a correlation exists between ecosystem vitality and food security. Ecosystems provide essential services for humanity, including the provision of fresh food (MA 2005). Concerns have been raised, however, regarding the future provision of food due to significant ecosystem impacts (MA 2005; Nellemann et al. 2009). In response to these issues several commentators have suggested the use of environmental sustainability considerations within current modes of practice within the health sector, including health promotion (Brown et al. 2005; Hancock 2015; Talbot & Verrinder 2010). This includes a broadening of public health practice beyond the social determinants, to an ecological or planetary public health approach (Horton et al. 2014; Horton & Lo 2015; Rayner & Lang 2015). This approach highlights the importance of ecological considerations for addressing significant health issues in the 21st century (Rayner & Lang 2015; Whitmee et al. 2015).
With regards to food security (a common health promotion priority), it has been argued that environmental sustainability considerations are required within practice to safeguard ecosystems, while ensuring future food security (Caraher 2009; Kickbush 2011; Patrick et al. 2011; PHAA 2009). As noted in Figure 42 the integration of environmental sustainability considerations supports two of the pillars of food security (food availability and food access). It could also be argued that environmental sustainability supports the fourth pillar (stability over time), as ecosystem health is a requirement for the continued provision of food (MA 2005).

**Figure 42. Environmental sustainability considerations within food security programs**

Addressing food security through an environmental sustainability framework also recognises that all levels of the current food system (i.e. production, processing, distribution and consumption through to waste) impact on ecosystems and subsequently food security (Beddington et al. 2012; PHAA 2009; Story et al. 2009; Tansey & Worsley 2008). This study demonstrated that some practitioners were aware of the significance of addressing food security through an environmental sustainability framework. Some practitioners were beginning to develop initiatives that incorporated environmental sustainability ideas (e.g. food waste programs, seasonal foods workshops) alongside traditional offerings (e.g. emergency food relief, food mapping) within existing food security programs. Given the push
for environmental sustainability within health promotion, (for example, through recognition of environmental determinants as expressed by the Ottawa Charter pre-requisites for health) over the years, the fact that some practitioners were utilising this approach within food security initiatives is not surprising. It was also apparent, however, that practitioners were grappling with the idea of addressing food security through a systems thinking framework (i.e. paddock to plate). This is a significant finding for the Australian health promotion sector which generally addresses food security from a food availability and food supply framework through a social determinants lens. According to Story et al. (2009) and Kickbush (2011) public health efforts generally acknowledge ecosystem protection for continued food security, however, health, sustainability and nutrition efforts often focus on the end result, i.e. food consumption among individuals and not on the food system (Story et al. 2009; Kickbush 2011).

A focus on systems thinking to address food security, however, recognises that the multifaceted issues inherent within the current industrialised food system (e.g. food waste, climate change, ecosystem degradation, food insecurity, obesity) are all interconnected (Ackerman-Leist 2013; Toronto Public Health et al. 2010). Food security, for example, was considered by practitioners and academics to be one of these interconnected issues that could not be addressed adequately in isolation. In addition, the use of environmental sustainability principles to guide practice was considered vital for ensuring ecosystem protection for future food security. The following diagram demonstrates this shift (Figure 43).
Recent debate from some proponents within the health sector, including health promotion, may be fuelling this shift by highlighting the importance of addressing significant health challenges (resulting from the industrialised food system) through a sustainable food system (Ingram 2011; Kickbush 2011; Malhi et al. 2009; PHAA 2009; Ziervogel & Erikson 2010). Kickbush (2011, p. 14; 36) for example, states:

*Health promotion must be concerned with how food is governed, produced, distributed and consumed... Health promotion must make the promotion of healthy and sustainable food systems a priority so that healthy and sustainable diets become possible. It must address the unsustainable patterns of food production and consumption and their impact on health.*

The following section will draw on the findings of the study to demonstrate the broadening of health promotion practice to address food insecurity.
7.2 Health promotion and environmental sustainability principles and practice: the merging of paradigms to address food insecurity

This study identified that health promotion practitioners were recognising the need to address food security through systems thinking. Integration of environmental sustainability considerations within this framework was also considered vital to address key issues such as food insecurity and ecosystem degradation. To guide practice in this new space, practitioners were drawing on environmental sustainability principles, for example, social equity, ecological integrity and biodiversity (refer Table 30) (Brown et al. 1992). The use of environmental sustainability principles in this study supports the notion that they are complementary to health promotion’s tenets of practice (Brown et al. 1992; Patrick et al. 2011). These principles are also shared within the philosophy of health promotion, for example, equity across and within generations, sustainable resource use and empowerment (Table 30) (Brown et al. 1992; Mogensen 1997; Patrick et al. 2012).

It also appeared that some practitioners were guided by principles commonly found within sustainable food systems commentary to extend health promotion practice. Some practitioners recognised the value of food sovereignty and food justice, for example, within food security initiatives – which has been said to ‘reinsert everyday people back into the centre of the food system’ to achieve true food security and ecosystem protection (Parfitt et al. 2013, p. 11). Other sustainable food systems principles such as localisation (section 6.2.4), ensuring resilience (section 6.2.6.9) and economic viability (section 6.2.2; section 6.2.4) were also raised as issues to consider within health promotion practice around food security. Table 30 provides a comparison of health promotion, environmental sustainability and sustainable food systems principles.
Table 30. A comparison of principles among health promotion, environmental sustainability and sustainable food systems

<table>
<thead>
<tr>
<th>Health Promotion</th>
<th>Environmental Sustainability</th>
<th>Sustainable Food Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecological – associated with holism, sustainability, diversity and balanced development.</td>
<td>Ecological integrity and biodiversity.</td>
<td>Ecological responsibility: Conserves, protects, and regenerates natural resources, landscapes, and biodiversity.</td>
</tr>
<tr>
<td>Social justice – associated with addressing structural disadvantage, discourses of disadvantage, empowerment, need identification and human rights.</td>
<td>Social equity; community participation; Intergenerational equity.</td>
<td>Fair and Accessible: Supports fair and just communities and conditions for all farmers, workers, and eaters; food sovereignty, food justice. Provides equitable physical access to affordable food that is health promoting and culturally appropriate.</td>
</tr>
<tr>
<td>Participation – involves stakeholders concerned at all stages of the project.</td>
<td>Environmental values and natural resources are accounted for economically; natural capital with sustainable income.</td>
<td>Economic balance: Provides economic opportunities that are balanced across geographic regions of the country, for a diverse range of food system stakeholders.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transparency: Provides opportunities for farmers, workers, and eaters to understand</td>
</tr>
<tr>
<td>How food is produced, transformed, distributed, marketed, consumed, and disposed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversity: food systems are diverse in relation to size, scale, geography, culture and choice.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resilience: Thrives in the face of challenges, such as climate change and peak oil, pest resistance, and cost of water and energy supplies.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limits on natural resource use are recognised.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservation of resources; food and packaging waste ↓.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value in the local – values local knowledge, culture, resources, skills and processes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Localisation: local and regional food economies are prioritised and supported.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holistic: Considers the multiple dimensions of health: physical, mental, social, and spiritual.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Promotion: Supports the physical and mental health of all. Farmers, workers, and eaters.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Process principles – associated with process, outcome and vision, process integrity, consciousness raising, participation, co-operation and consensus, pace of development, peace and non-violence, inclusiveness and community building.

(Adapted source: American Planning Association et al. 2010; Gregg & O’Hara 2007; Parfitt et al. 2013; Tremblay et al. 2013)
Sustainable food systems principles, which were used implicitly to extend health promotion practice by some practitioners also share similar principles with health promotion and environmental sustainability principles (refer Table 30). The American Planning Association et al. (2010), depicts sustainable food systems principles as encompassing both health promotion and environmental sustainability ideas such as fairness, equity, ecosystem sustainability and transparency. According to Kickbush (2011, p. 14), ‘the food system can be considered a prism of the interface between the sustainability agenda and major public health challenges that health promotion aims to address’. It could be argued that sustainable food systems principles may therefore bridge health promotion and environmental sustainability practice to address the multifaceted issues (including food insecurity) inherent within the wider food system through a shared set of principles. Figure 44 demonstrates this idea.

**Figure 44. Health Promotion and Environmental Sustainability principles**

The adoption of sustainable food systems principles by some practitioners may be explained by the theory of the diffusion of innovation. ‘Diffusion is a kind of social change, defined as the process by which alteration occurs in the structure and function of a social system… it includes both the planned and spontaneous spread of new ideas (Rogers 2003, p. 6). Rogers (2003) states that there are five adopter categories that can explain the adoption of new ideas or innovations. These include: innovators, early adopters, early majority, late majority and
laggards. Practitioners from this study could be categorised as the early majority. These groups of people ‘adopt new ideas just before the average member of a system… they frequently interact with their peers but seldom hold positions of opinion leadership in a system’ (Rogers 2003, p. 283). According to Rogers (2003, p. 283), the early majority ‘are an important link in the diffusion process [as] they provide interconnectedness in the systems interpersonal networks’.

Existing practitioner values may also play a role in the adoption of sustainable food systems principles. According to Verrinder et al. (2005, p. 201), ‘all professionals come to their jobs with a set of personal values that influence how they work’. In addition, ‘ideologies, values and principles strongly influence what is accepted as valid evidence’ (Raphael 2000, p. 388). According to Raphael (2000) a lack of basic definitions and values within health promotion can lead to conceptual confusion and practices that lack an evidence base. The formal development of sustainable food systems principles within health promotion, therefore, could serve as an important tool to guide practice in this area. According to Gregg and O’Hara (2007) a lack of specific guidance exists on how to apply values and principles inherent to health promotion within programs. A set of values and principles enable health promotion practitioners to purposefully integrate them into practice and enhance understanding (Gregg & O’Hara 2007). There appeared to be a knowledge gap among practitioners for addressing the multifaceted issues (such as food insecurity and ecosystem degradation) within industrialised food systems. Sustainable food systems principles for health promotion practice and education could serve to alleviate part of this capacity issue. The following framework (Figure 45) demonstrates the practical application of sustainable food systems principles within health promotion practice to address the multifaceted issues within the food system, including food insecurity.
The clouds in Figure 45 represent the intersection of health promotion and environmental sustainability principles that practitioners were drawing from. Combined, these principles have the potential to be developed into a set of sustainable food systems principles to guide health promotion practice. The rain drops represent each principle and the rain feeds the roots of the tree. The roots represent each key process of the food system, i.e. production, processing, distribution, consumption and waste. The roots provide nourishment in the development of fruit on the apple tree. The fruit represents each of the multifaceted issues in the food system. In this representation, the fruit is what is possible, for example, food...
security, ecosystem protection, food sovereignty, climate change mitigation, increased social cohesion, decreased chronic diseases etc.

7.2.1 Barriers with addressing food security through systems thinking and environmental sustainability principles

Although some practitioners within this study recognised the value of addressing food insecurity through systems thinking, few were involved in developing initiatives that encompass this idea in its entirety. Applying systems thinking, for example, to address food systems issues in relation to food insecurity and ecosystem degradation appeared to be undertaken in an adhoc manner. Patrick and Kingsley (2016, p. 41), noted that practitioners rarely focus on systems wide change in programs, stating that ‘traditional ‘midstream’ health promotion strategies (education, training and behaviour change) were being applied to promote environmental sustainability’ within programs rather than using systems approaches. Similarly, environmental sustainability principles were recognised as vital for addressing multiple issues within the food system such as food insecurity and ecosystem degradation.

This study, however, revealed several barriers to broadening health promotion practice to address food systems issues using environmental sustainability principles. Practitioners stated that environmental sustainability principles were generally not supported by the organisation they worked for. A lack of support for environmental sustainability principles was also apparent within state and local government priorities. In addition to minimal organisational and government support, practitioners reported: few partnerships or networks outside of health promotion (e.g. with local farmers) to address food systems issues; a lack of funding to develop programs and initiatives with an environmental sustainability focus; and a lack of practitioner knowledge and skills around environmental sustainability (refer section 6.2.7).

Section 7.2.1.1 will elaborate on some of these issues.

7.2.1.1 The separation between the environment and human health and wellbeing – exploring alternative models to progress ecological understanding

Some practitioners within this study attributed minimal progress in the development of programs that broaden health promotion practice to government approaches in healthcare that were reinforcing neo-liberal/biomedical models of health. The implications of such trends in healthcare result in limited opportunity to include environmental sustainability considerations within a systems perspective to address food insecurity. According to Fee and Krieger (1993), the biomedical model rests on the ideology of individualism, adopting the idea that
individuals are free to choose health behaviours. This individualistic ideology aligns with neo-liberal governance approaches in healthcare, however, they generally conflict with socio-ecological approaches to understanding health that are commonly adopted in health promotion (Baum 2008; Raphael 2006). Figure 46 demonstrates the influence of government values and ideologies on health promotion practice and outcomes for food security and ecosystem health.

Figure 46. Government values and ideologies and health promotion practice

The neo-liberal/biomedical model of healthcare has also been noted as contributing to the separation of environmental impacts from health and wellbeing (Dunlap & Patton 1994; Dutta 2008; Mehta 2011; Nettleton 2013; Wade & Halligan 2004). According to Mehta (2011, p. 207) this separation has been attributed to Cartesian dualistic philosophy which considered the body a separate entity to the mind and ‘took our focus away from the dynamic nature of human beings, their relationship with the environment and their real health concerns’. Although developed some time ago by Descartes (1595-1650), these ideas are apparent today (Hawkes 2008; Hawks et al. 2007; Larson 1999; Mehta 2011; Smith et al. 2013; Summers et al. 2012). As such the separation of environmental impacts from health and wellbeing has resulted in the majority of research, policy and program development around food security emphasising the social, economic or cultural effects of food security on populations (Booth & Smith 2001; Brooke 2016; Burns et al. 2004; Rosier 2011).

Environmental sustainability considerations are rarely considered within health promotion
research or program development agendas (Caraher & Coveney 2004; Hamm 2008; Kickbush 2011; PHAA 2009).

This study confirms the separation of the environment within health promotion practice. Although practitioners were broadening practice to include environmental sustainability principles within their food security initiatives, this was limited. Most felt that there was still a divide between health promotion and environmental sustainability practice within their organisation or department. Rather than environmental sustainability being recognised as integral to health promotion and the advancement of health and wellbeing, it was often seen as competing with the goals or outcomes of health promotion, particularly if the practitioner’s time and resources were limited. Practitioners also discussed local or state government policy objectives that were influencing their food security initiatives. These policy goals often entailed a focus on the health and wellbeing dimensions of food security among populations, however, lacked recognition of the ecosystem factors that support continued food security.

It could be argued that the separation of the environment from health and wellbeing has also contributed to reductionist approaches in the application of theory within health promotion practice. Emphasis on the social, political or economic factors that impact health with minimal reference to the environmental determinants has been documented within socio-ecological theory (Dakubo 2011) (refer section 3.1). Throughout this study, an alternative model was identified for broadening health promotion practice, which may be more useful for addressing complex health issues such as food insecurity. Often referred to as an eco-sociological model, this framework may be more suitable for reorienting health promotion practice towards environmental sustainability. It may also be useful for reorienting health promotion approaches to address food security through a systems perspective. Chase and Grubinger (2014) state that current socio-ecological models are limited in their approach to addressing food systems issues (such as food insecurity). Socio-ecological models (such as Figure 47) have been criticised for depicting food production and distribution as a small part of this system, just one of many practices (Chase & Grubinger 2014).
Stanger (2011) proposes the eco-sociological model over current socio-ecological approaches that have been used within various disciplines, including health promotion over the years. This requires a re-centering of the socio-ecological model to an *eco-sociological model* and provides ‘a more sustainable approach to contextualising human-life and educational systems’ (p. 167). Stanger (2011) argues that socio-ecological models contribute to the anthro-dominant focus of human systems, whereas eco-sociological models ‘increase ecological literacy, such that environmental factors are considered in the development of humans’ (p. 167). This re-worked model is presented in Figure 48 below. Table 31 that follows illustrates each dimension within the eco-sociological model and how it influences human development and ecosystems. The food system will be used as a case study to demonstrate this idea.
Figure 48. Reworked eco-sociological model

Adapted from Stanger (2011) and Yildirim and Hablemitoğlu (2013)
<table>
<thead>
<tr>
<th>Eco-sociological dimension</th>
<th>Food systems and their impact on human development and ecosystems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nano ecosystems</strong></td>
<td>‘Represent almost invisible types and components that affect health, metabolism and biochemical compounds that are essential for life’ (Yıldırım &amp; Hablemitoğlu 2013, p. 49). Within the industrialised food system this includes synthetic agrichemicals (pesticides, herbicides etc), chemically derived food additives and preservation techniques. Polluted water and soils that are depleted of essential nutrients and subsequently fruit, vegetables, legumes, seeds and grain.</td>
</tr>
<tr>
<td><strong>Micro ecosystems</strong></td>
<td>‘Refer to immediate natural surroundings… including peers, networks, friends, environmental influencers, local food systems’ (Stanger 2011, p. 171). The presence of local food systems within communities has a positive influence on health and wellbeing, including food security. Local food systems provide green space including places to learn and interact socially.</td>
</tr>
<tr>
<td><strong>Meso ecosystems</strong></td>
<td>‘A researcher must pay attention to the integrity of the local ecosystem as they interrelate to social systems… Functioning community level ecosystems will influence our emotional and physical ways of life (Stanger 2011, p. 171). For example, local food systems generally use more ecological food production methods which facilitates health and wellbeing. Local food systems increase access and availability to fresh food, reduce lengthy transportation and storage requirements which are generally healthier for humans and ecosystems. They also facilitate social, mental and physical health, including local employment opportunities.</td>
</tr>
<tr>
<td><strong>Exo ecosystems</strong></td>
<td>‘The overarching systems that influence us such as governmental and political systems, economic systems, religious systems, and ecological systems…Understanding the influence of biomes, oceans, and ecosystem integrity on human wellbeing, health and survival is most necessary’ (Stanger 2011, p. 171). Examples include</td>
</tr>
</tbody>
</table>
government policies and economic systems that support industrialised agriculture and how these decisions impact on ecosystems (e.g. oceans, rivers, forests etc). Ecosystem degradation results in decreased food production, food security, health and wellbeing.

| **Macro ecosystems** | ‘Macro ecosystems refer to the Earth affecting all the other system levels mentioned above. Within this scope, physical and mental effects such as climate change, unsustainable development, habitat loss and mass extinction on human life and earth may be taken into account’ (Yildirim & Hablemitoğlu 2013, p. 49). The impacts of the current industrialised food system on ecosystems (e.g. habitat loss, biodiversity extinction, climate change etc) are considered at this level. Ecosystem disruption contributes to reduced physical and mental wellbeing, e.g. erosion of cultural foods, local heritage and identity. Contributes to unemployment, de-skilling and mental health impacts. Chronic health conditions increase. |
| **Chrono ecosystems** | ‘Refer to the influence of passing time on environment and human life via all the systems mentioned above’ (Yildirim & Hablemitoğlu 2013, p. 49). Whether it is screen-time, open access information, or genetic manipulation, human development is intrinsically linked to evolutionary time’ (Stanger 2011). Examples include development of genetically modified food technologies, antibiotic provision within industrialised farming, food fortification, synthetic food preservation, homogenisation, food irradiation, and controlled fruit ripening systems. These are new technologies that have only been available since the industrialisation. These impact on human development and ecosystems, including future generations. |
The idea of an eco-sociological view of health is also supported by Hancock (2015) who notes that recent work around population health has remained silent on ecological issues. A reorientation of health promotion practice towards the ecological determinants is necessary for health promotion in all facets of practice, research and teaching ‘because the challenges we face are both ecological and social and interdependent’ (Hancock 2015, p. 254). An eco-sociological model of health supports the notion that the health and wellbeing of populations is optimal when ecosystems and environmental sustainability considerations are integrated within practice (Hancock 2015; Stanger 2011). In addition, this study indicates that health promotion practice that is oriented towards an eco-sociological view of health may be able to address the multifaceted issues within the food system, including food insecurity and ecosystem degradation (Figure 49). Section 7.2.3 will provide a worked example using the study findings and literature to demonstrate the possibility of an eco-sociological view of health to achieve this goal.

**Figure 49. Eco-sociological theory in health promotion – broadening health promotion practice to address food insecurity**

7.2.2 *Eco-sociological theory and health promotion practice – an applied example*

The use of an eco-sociological approach could reorient health promotion food security initiatives from reductionist approaches (food availability and food supply) to a systems paradigm that centre on ecological processes. The following section will demonstrate this idea through the literature and study findings, using the sustainable food systems principles outlined in Table 30. This study also identified knowledge and competency gaps among
practitioners who broadened health promotion practice through adoption of said principles. These are also discussed.

**Principle 1. Ecological Responsibility.** The adoption of ecological food production practices is common within sustainable food systems approaches; however, it is generally not considered within health promotion (Hamm 2008; Kickbush 2011; Parkes & Horwitz 2009; PHAA 2009). Ecological food production practices, however, were adopted by some practitioners in this study to produce food that had fewer chemical inputs, conserved water and biodiversity as well as reducing waste. Examples of such activities by practitioners include: Permaculture, conservation agriculture, companion planting and composting. These findings are consistent with the literature that finds ecological methods of food production can improve biodiversity, health of waterways and the microclimate as well as conserve soils and improve nutrient recycling (Beddington et al. 2012; Deelstra & Girardet 2000; Mougeot 2006). Awareness of the benefits for the environment were discussed by practitioners, however, there were few that recognised the benefits for human health. According to Welch and Graham (2000, p. 361) ‘the nutrition and health communities have never considered using agriculture as a primary tool in their programmes directed at alleviating poor nutrition and ill health globally’. Research, however, indicates that ecological food production methods have benefits for human health, for example, practices that rebuild soil health can produce food with higher nutritional value (Brevik 2013; Brevik & Sauer 2015; Lal 2009).

**Principle 2. Fairness and Accessibility.** Within health promotion practice, fairness and accessibility is often addressed through increasing access and/or reducing the cost of healthy food for food insecure groups (Booth & Smith 2001; Burns et al. 2004; Rosier 2011). However, there has been much discussion regarding health promotion’s role to extend beyond a food sufficiency and food consumerism (e.g. promoting healthy eating) model to an approach based on food citizenship or food sovereignty (Caraher & Coveney 2004; Hamm 2008; Parfitt et al. 2013). These approaches are common among food systems commentary (Parfitt et al. 2013; Renting et al. 2012). Vulnerable populations and communities (including farmers) are considered active participants in shaping the food system, rather than passive consumers (Caraher & Coveney 2004; Welch & MacRae 1998; Wilkins 2010).

Although food citizenship/food sovereignty ideas were integrated into health promotion practice in this study, it was not clear how practitioners were applying these models to address food insecurity. In addition, few practitioners articulated the benefits for food insecure groups, farmers, communities and/or ecosystems when using a food
citizenship/sovereignty model. Multiple health benefits for communities who are food insecure as well as ecosystems have been documented (Baker 2004; Parfitt et al. 2013). Greater participation and decision making at various levels (local, state, national) for food insecure groups can lead to more effective food security outcomes (Altieri 2009; Altieri & Toledo 2011; Baker 2004; Parfitt et al. 2013). The disconnection between communities and their food system can also be regained, which leads to improved outcomes for health (through greater engagement, inclusiveness and participation) (Altieri & Toledo 2011; Baker 2004; Parfitt et al. 2013). In addition to human health benefits, the literature also demonstrates the environmental benefits when communities are active in the development of their food system (Baker 2004; Parfitt et al. 2013), for example, regaining a sense of connection to nature, its cycles and seasons which may lead to responsible stewardship of the environment and ecosystems (Baker 2004; Wittman 2009).

Active participation of farmers and local food producers in the food system may also result in a more liveable income for these groups, while ensuring food security for local regions (Altieri 2009; Altieri & Toledo 2011; Rosset 2003; Tscharntke et al. 2012). It has also been suggested that food sovereignty and food citizenship results in ecosystem protection and enhancement as farmers and local food producers use more ecologically-based farming and production methods than conventional practices (Altieri & Toledo 2011; Tscharntke et al. 2012). This study’s findings also support the idea that farmer participation in the food system is vital for food security and ecosystem protection; however, this was recognised by few practitioners. According to Tscharntke et al. (2012), food production from small-holder farms is the backbone to global food security. It also maintains functional biodiversity, sustains ecosystems and reduces environmental costs (Altieri & Toledo 2011; Tscharntke et al. 2012).

**Principle 3. Conservation of resources.** Using food waste as an example, health promotion food security initiatives often aim to address the dual problem of food waste and food insecurity through emergency food relief activities (e.g. excess supermarket produce distributed as emergency food relief) (Kickbush 2011; Riches 2011). Proponents such as McIntyre (2003) and Riches (2011), however, argue that foodbanks have failed to eliminate or even significantly reduce hunger and food insecurity. Emergency food relief also does not generally consider the rising level of food waste at the farm and food processing end or the fact that a significant portion of edible food still ends up in landfill despite these efforts (FAO 2013; Sheridan et al. 2016). This was also expressed by practitioners in this study, who felt
that long term food security must move beyond emergency food relief and consider waste at all levels of the food system.

The FAO (2013) supports this notion stating that the current state of food wastage globally and in Australia is placing further pressures on natural resources to produce food for the future. It was also noted by some practitioners that food insecure groups in this study had significant levels of food waste which, according to Sheridan et al. (2016) can in part be attributed to a lack of knowledge and skills with using up leftovers, shopping and storing food, composting and worm farming. Considering the findings of this study, health promotion food security initiatives that consider the conservation of resources at all levels of the food system could achieve improved food security in the short term, as well as safeguarding ecosystems.

**Principle 4. Localised Thinking.** Food security initiatives within health promotion generally do not consider the distance from which food is sourced for their food insecure groups; however, this study demonstrates the benefits of thinking locally for improved food security and ecosystems. Some practitioners, for example, developed community gardens, food cooperatives and urban agriculture initiatives for their food insecure groups, which have the potential to reduce food miles and carbon emissions from the transportation, distribution and storage of food (Edwards 2011; McCarthy 2014; Tagtow & Harmon 2009). These activities also make it easier for food insecure groups with limited transport options to access fresh food on a regular basis (Larsen & Gilliland 2009; Lotoski et al. 2015; Wise 2013). The findings of this study are also consistent with the literature that finds that food that is grown and sourced locally (e.g. urban agriculture) provides economic benefits such as employment opportunities for food insecure groups (Deelstra & Girardet 2000; Kingsley et al. 2009; Wakefield et al. 2007). In addition, fruit and vegetables that are grown locally can have greater nutrition for human consumption, as extensive transportation and storage contributes to loss of nutrient value (Carey et al. 2011).

This study also supports the notion that broadening health promotion practice around environmental sustainability through a systems perspective may contribute to health promotion goals for chronic disease prevention (PHAA 2009; Friel 2010). Approaches to addressing food security that consider the food system through an environmental sustainability perspective (e.g. community, home and school gardens, food cooperatives, urban agriculture), are generally better for health as participants increase their consumption of healthy foods such as fresh fruit and vegetables, legumes and nuts (Friel 2010; Sustainable
Development Commission 2009; Walker et al. 2005). Reduced consumption of processed foods high in trans-fats, salt and sugar as well as red meat and dairy products which have a high environmental footprint may reduce the incidence of chronic diseases such as cardiovascular disease, type 2 diabetes and some cancers (Friel 2010; Sustainable Development Commission 2009; Walker et al. 2005).

Ecological methods of food production, such as natural fertilizer inputs (e.g. compost, worm castings) and alternative methods for pest control (e.g. increasing biological diversity through companion planting, restoration of native habitat) were also reported by some practitioners. Some practitioners also expressed their concerns as well as their community’s with chemically derived fertilisers and pesticides found in commercial farming. Research supports these concerns, with pesticide and other chemical inputs contributing to chronic disease including increased cancer risks, liver, brain, immune, endocrine and nervous system dysfunction (Horrigan et al. 2002; Conant & Fadem 2008). Other health promotion goals with regards to chronic disease, mental health and obesity prevention (Commonwealth of Australia 2009; Department of Health 2014) were also reported by some practitioners in this study through involvement in ecological food production. Food insecure groups, for example, received incidental exercise (e.g. gardening), and had greater opportunities for social interaction (e.g. at food swaps, workshops) and improved mental and spiritual health through these activities.

7.2.2.1 Personal and professional transformation among practitioners

Broadening health promotion practice to address food security and ecosystem degradation through the food system also appeared to transform the personal and professional lives of some practitioners in this study. A personal transformation was observed when practitioners became involved in local and sustainable food systems activities (e.g. Permaculture, community gardens, food alliances), for example, the development or strengthening of their passion and belief for environmental sustainability, as well as finding common ground with the community they were working with. During this study, the researcher identified and used Borgmann’s theory on ‘focal practice’ to explain these observations. Boers (2011, p. 11) summarises Borgmann’s theory of focal practices, stating:

_Focal living, as advocated by Borgmann, help us identify and perceive the “something more” that people seek. When our existence seems shallow and unfulfilling, he commends focal concerns that “center and illuminate our lives”._
Focal thinking and focal practices move, teach, inspire and reassure. Focal living poses a telling contrast to many realities of our lives today that merely “lead to a disconnected, disembodied, and disoriented sort of life”.

According to Borgmann’s theory, the act of being involved with food, whether that is growing, cooking, or gathering produce from a community garden or farmers’ market, can bring coherence and purpose to our lives and helps us to focus on what really matters, i.e. life skills, relationships and other experiences that enrich our lives (Blewitt 2006; Boers 2011; Thompson 2010). According to Boers (2011, p. 59) ‘food has a centering and orienting capacity that… points us in the direction that matters most’.

The findings of this study resonate with Borgmann’s theory of focal practices with regards to food. This study revealed that practitioner involvement with local food systems activities (e.g. community supported agriculture, Permaculture, food cooperatives and food alliances) resulted in experiences that brought a sense of purpose and satisfaction in life (section 6.2.6). It also appeared that involvement in local food systems activities developed a similar experience among the professional lives of practitioners, for example, where work appeared to become more fulfilling and purposeful. It could be argued that fulfilment and purpose leads to greater morale, retention and satisfaction – common objectives in workplace health promotion programs (Fleming & Parker 2007; Lerner et al. 2013; O’Donnell 2002; Rongen et al. 2014). Section 7.3 will discuss the role of health promotion with reorienting practice and education towards a systems approach to address food insecurity, one that also considers environmental sustainability to achieve this goal.

7.3 Health promotion – a reorienting of practice and education to address food insecurity

Practitioners from this study were broadening health promotion practice to address food insecurity through the use of environmental sustainability principles. It was apparent, however, that there were significant challenges for health promotion practitioners with shifting towards a sustainability approach to address food insecurity (section 6.2.7). To overcome this knowledge gap, it appears that some health promotion practitioners undertook further education to strengthen their skills in this area. Although some approached this through a degree, it appeared that their skills and knowledge remained incomplete. This was evidenced by the number of practitioners who became involved with informal methods of
training (e.g. professional development opportunities, joining food alliances, reading relevant literature).

In addition, some practitioners undertook educational opportunities outside of the tertiary sector, for example, Permaculture design certificates. Interestingly, additional educational opportunities were undertaken by all practitioners regardless of their formal background and training in health promotion. Additional learning was required as current practice to address food insecurity in Australia focuses on a social determinants perspective, with minimal consideration of environmental sustainability (Caraher & Coveney 2004; Story et al. 2009; Patrick & Kingsley 2016; PHAA 2012). This study also revealed that some practitioner skills and competencies to address food security was occurring through sustainable food system activities, such as membership of sustainable food alliances and involvement in urban agriculture initiatives.

Although informal and alternative learning opportunities are important aspects of practitioner development (Boud & Middleton 2003; Eraut 2004; Marsick & Watkins 2001), this study demonstrated remaining gaps among practitioners. Practitioners, for example, reported having minimal knowledge or skills for broadening practice towards a systems approach. It was also evident that environmental sustainability principles were implemented ad-hoc. Self-reported knowledge and ability to implement environmental sustainability principles to address food insecurity varied considerably among practitioners.

Participation in informal and alternative learning opportunities appears to be attributed to a dearth of tertiary programs in Australia that consider the multifaceted issues in the food system, such as food insecurity and ecosystems degradation (William Angliss 2015). This study confirmed that few tertiary programs focus on this area, with most academics stating that their units briefly touched on the food system or environmental sustainability principles. It was also apparent that systems thinking through an environmental sustainability perspective was a relatively new concept for Australian academics in this study. Although academics were beginning to consider the food system through an environmental sustainability perspective within their programs, the international literature (e.g. United States, Canada and Europe) demonstrates that such programs have existed for some time (Ahee 2013; Barlett 2011; Hammer 2004; LaCharite 2015; Pietrykowski 2004; Rojas et al. 2007; Rojas et al. 2011). Several commentators in tertiary curriculum development emphasise the importance of university education with training students from all disciplines towards systems approaches for addressing complex food systems issues (i.e. food security,
ecosystem degradation) (Ahee 2013; Barlett 2011; Hammer 2004; LaCharite 2015; Pietrykowski 2004; Rojas et al. 2007; Rojas et al. 2011). Burke (2012, p. 155) states that:

Emerging professional demand for sustainable food system expertise is anticipated in a variety of settings such as, but not limited to, informing local food production, enhancing kitchen literacy, integrating sustainable food and nutrition practices in kinder to year 12 education, developing food charters and policy, and integrating sustainability principles into agriculture, public health planning, communications, and community development.

Practitioner involvement with informal learning opportunities demonstrates the need for Australian health promotion degrees to reorient health promotion practice towards an alternative paradigm to address the multifaceted issues within the food system. According to Blewitt (2006) informal learning on its own is insufficient for pressing environmental sustainability challenges, which include those inherent within the current food system. According to Hilimire et al. (2015, p. 725), the upcoming generation of leaders requires interdisciplinary knowledge to ‘make connections between diverse topics such as food consumption and justice, farm management and federal policy, and other linked social and ecological food system dynamics’.

Academics within this study and reviewed literature affirm that degrees in Australia, including health promotion, will need to adapt to meet this urgent issue and broaden their approach with regards to food security – through systems thinking (Hammer 2004; Hilimire et al. 2014; Meek & Tarlau 2016). Adapting to urgent health challenges is not a new concept for the health promotion sector, where a broadening of practice has occurred over the years in accordance with public health challenges of the time (Baum 2009; Dixey 2013; Naidoo & Wills 2000). This has also been espoused at the educational level where, according to Barry et al. (2009, p. 5), ‘current and future health challenges demand new and changing competencies to form the basis for education and training development and workforce planning’. Dixey (2013, p. 164) also provides commentary on this topic, stating ‘the need to invest in the training and education of health promotion practitioners and other workers so that they have the required competencies and skills to address complex health issues within rapidly changing social and political contexts seems obvious’.
### 7.3.1 Food industry influence and graduate competencies

There is a perception that the food industry could have a negative influence on the way the health sector progresses its work within policy, practice and competency development on food security. Food industry influence was particularly noted by some academics in this study as guiding the development of graduate competencies within the Dietetics Association of Australia (DAA) towards reductionist approaches, with minimal consideration of environmental sustainability or the food system. These assertions are supported by Nestle (2013) and Simon (2015) who demonstrate serious conflicts of interest within professional associations. An investigative report by Simon (2015), for example, demonstrates that the DAA is compromised by their partnership with Meat and Livestock Australia and Dairy Australia. These food industry associations have been noted as providing oversight and monitoring of important DAA initiatives such as dietary recommendations and policy positions (Simon 2015).

Although food industry influence may theoretically be a potential risk for the Australian Health Promotion Association (AHPA), the AHPA’s endorsed Sponsorship and Advertising Policy precludes this from occurring. This is of particular importance as the AHPA was given approval in 2016 by the International Union of Health Promotion Education (IUHPE) (the official governing body for health promotion) to certify practitioners before they can practise in the field (AHPA n.d). Currently, certification does not require knowledge of environmental sustainability; however, if environmental sustainability is stipulated as a graduate competency, it could be a positive driver for the reorientation of health promotion degrees towards a systems paradigm that considers the environment. Past experience, however, has demonstrated that the food industry is highly influential in policy development, including within nutrition and public health practice (Caraher & Coveney 2004; Nestle 2013; Simon 2015). If the food industry supports, sponsors or partners with the AHPA the continuation and ongoing revision of a Sponsorship and Advertising Policy will be pertinent to ensure potential vested interests are moderated.

The barriers identified by practitioners within this study (section 6.2.7) and the identification of industry influences on healthcare practice affirm that graduates require further training and development in politics and policy. A sound understanding of the political economy of food systems was suggested by one academic, so practitioners develop a comprehensive understanding of how the current industrialised food system influences food policy and health (Lang & Heasman 2015; Nestle 2013). This is supported by Bambra et al. (2005) and
Raphael (2006) who argue that there is a lack of training and research within the tertiary sector around the political economy of health. This includes a lack of discussion around power relationships within industry, government ideology, public policy and welfare state typologies that influence decision making around health (Bambra et al. 2005; Raphael 2006). Clavier and de Leeuw (2013) provide further insight into the policy space, stating that health promotion academics and practitioners struggle in this area due to three main issues: a lack of awareness of the ability of public policy to influence health; poor understanding of the policy making process; and a shortage of appropriate tools to engage effectively in this space. According to Meek and Tarlau (2016, p. 253) a lack of training around the policy and economic influences within food systems leads to education programs that ‘promote more knowledge and healthier practices, but lead to curricular modules that exist in a contextual vacuum that do not analyse the political and economic reasons why the current food system exists’. This study, however, demonstrates that there were some academics who were participating in this new debate, where students were taught to critique the food system, such as food industry influences on policy development and the impacts on the environment and human health. It could also be argued that these skills would be beneficial for food insecure groups (through capacity building) to regain food citizenship, democracy and food sovereignty to achieve true food security.

This study confirms that it would be valuable for the health promotion sector to shift towards an alternative paradigm that addresses the multifaceted issues from the current industrialised food system, particularly as its implications for food security and ecosystems becomes increasingly evident (Burke 2012; Parfitt et al. 2013). Recognising that chronic health conditions such as cardiovascular heart disease and diabetes, as well as food insecurity are, in part, attributed to a broken food system would also be pertinent for health promotion (Kickbush 2011; PHAA 2009; PHAA 2012).

As a result, it appears that current degrees within Australia focus on disease prevention, obesity reduction, food availability or food supply rather than taking a whole systems perspective (Caraher & Coveney 2004; Hamm 2008; Thomas & Day 2014). One academic within this study also attests to a focus on nutrient and micronutrient deficiencies within degrees. Although this is an important aspect of food security and nutrition, it was suggested that a strong emphasis was being placed on these issues rather than providing a balanced approach where food systems are considered. A recent study undertaken by Thomas and Day (2014) that graduate attribute statements within Australian universities indicate a lack of
systems or holistic thinking as a graduate outcome. This may result in graduates not being able to address the complexity inherent within the current industrialised food system.

A reorientation of healthcare degrees towards a systems perspective may be disputed in health promotion tertiary programs, however, it has been argued that the health sector, including health promotion has a very important role with increasing the capacity of graduates to respond to the complexity within the food system (Kickbush 2011; Parfitt et al. 2013). Future graduates will require the competencies to address multiple issues in the food system, for example: increasing pressure on agriculture to produce food, coupled with climate change and other environmental constraints that will place increasing pressure on food security; and ensuring the food system is fair and equitable for all (Ingram 2011; Ziervogel & Erikson 2010). Graduates will also require the skills to address the growing chronic disease epidemic within the country (attributed, in part, by the current food system) and develop effective strategies to address this issue (Baum & Fisher 2014; National Health Priority Action Council (NHPAC) 2006). The following section will discuss the potential for EfS to build the capacity of graduates to address these complex issues.

7.4 Education for Sustainability – exploring paradigms to address food systems challenges

As noted in the literature review (section 2.10) EfS is an educational approach that has been developed to engage and equip the community towards a sustainable future (ARIES 2009). Within the higher education sector, EfS has been regarded as the preferred approach to prepare students with the knowledge and skills to create this transition (Department of the Environment & Heritage 2005; Leihy & Salazar 2011; UNESCO 2014; Tilbury et al. 2005). In addition, EfS is unique in that it calls for cultural change within the community, recognising that present challenges, such as those within the current industrialised food system, are caused by crises of mind, perception and values (Tilbury et al. 2005). The core aim of EfS, therefore, is to guide students along this journey and to challenge their minds, perceptions and values around current ways of living (Orr 2004; Tilbury et al. 2005).

Although EfS holds the potential for challenging the current industrialised food system, most literature focuses on a general discussion around EfS’s contribution to a sustainable society (Cotton & Winter 2010; De La Harpe & Thomas 2009; Dyball et al. 2015; Nicolaides 2006). Interestingly, there appear to be no references that discuss EfS for reorienting practice (including health promotion) towards a food system that is environmentally sustainable. This
study supports this idea as most academics, including those teaching into the discipline of health promotion, were not even aware of the EfS approach nor how it could be used to complement academic teaching around food security or food systems. A lack of awareness of EfS has been one of the main challenges facing proponents in support of this approach (McKeown et al. 2002; Thomas 2004; Velazquez et al. 2005).

Other challenges facing integration of EfS are discussed within the literature and concur with the findings within this study, including: 1) elements of the EfS approach being used by academics, including health promotion, in an adhoc manner (Christie et al. 2013; Cotton et al. 2007; Cotton et al. 2009); 2) lack of support from universities regarding EfS implementation within the curriculum (Christie et al. 2015; Moore et al. 2005; Ralph & Stubbs 2014; Tilbury et al. 2005); and 3) minimal to no teacher training to develop understanding and integration of the approach within existing curricula (Christie et al. 2013; Holdsworth & Thomas 2015; Jones et al. 2010; Noonan & Thomas 2004). It has also been noted within the literature and this study that some academics believe that EfS is irrelevant to their field (Christie et al. 2015; Hopkinson et al. 2008; Noonan & Thomas 2004). The issue of perceived irrelevance is also apparent within the field of health promotion.

One study undertaken by Patrick et al. (2016) may explain some of the opposition to EfS within health promotion degrees, with some practitioners and academics stating that environmental sustainability was an issue to be understood but not to any great depth, nor should whole units or programs be dedicated to it. This resistance has been reiterated throughout much of the literature on EfS more generally (Christie et al. 2013; Cotton et al. 2007; Cotton et al. 2009; Dyball et al. 2015) and probably reflects the lack of understanding of the pivotal nature of environmental sustainability. This further indicates the need for the health promotion sector to recognise the relationship between ecosystems and human health, and in this case, how food security relies on a sustainable food system.

The lack of integration of EfS within the curriculum, particularly health related courses including health promotion, is particularly problematic considering that environmental sustainability issues cross disciplinary boundaries, impacting significantly on health (Hanlon & Carlisle 2008; McMichael 2006; Talbot & Verrinder 2010). With regards to food security, which has been a central activity for health promotion over the years, a lack of environmental sustainability considerations will impact on the ability of the planet to produce food for a rapidly expanding population and thus impact on health and wellbeing (Farmer-Bowers et al. 2013; Friel 2010; Lawrence et al. 2010; Oosterveer & Sonnenfeld 2012). These concerns
were also expressed by practitioners and academics alike, who felt that the focus on health outcomes as distinct from current environmental issues will culminate to a point where environmental degradation and pollution will exceed the capacity for the health sector to respond.

It would appear from the literature and findings of this study that there may be a more relevant educational approach to address the multifaceted issues (such as food insecurity and ecosystem degradation) inherent within current food systems. Generally referred to as Sustainable Food Systems Education (SFSE) (Hilimire et al. 2014; Meek & Tarlau 2016), this approach shares similar teaching methods to EfS for generating student competencies towards sustainable societies, e.g. interdisciplinary collaboration, experiential learning, systems thinking, reflective practice etc (Ahee 2013; Burns & Miller 2012; Hilimire et al. 2014; Galt et al. 2014). Table 32 demonstrates the similarities. SFSE, however, has a specific focus on developing competencies for sustainable food systems rather than sustainability issues in general (Hilimire et al. 2014). According to Hilimire et al. (2014, p. 740), using the approaches found within SFSE ‘can create new spaces of learning that support core skill development and food system specific problem-solving capabilities, essential for future leadership in addressing the myriad challenges for global and local food systems’.
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SFSE and EfS also share similar values and philosophies such as citizenship, peace, equity, health, multiculturalism, global human rights, as well as the belief that traditional mechanisms developed by society to contend with social problems are incapable of doing their job (Huckle & Stirling 1996; Schiro 2012) (refer Table 33). SFSE, however, may be more relevant for the health promotion sector, particularly for program pathways (e.g. minors, majors, units) that develop student capacity around issues related to the food system, such as food security. It may also be relevant for other food related issues such as nutrition, healthy eating and obesity which are common areas of practice within the sector, as these are influenced by the current food system. In addition, academic and practitioner responses from this study, together with SFSE literature, demonstrate the potential to develop four key areas of competency for health promotion graduates if an SFSE approach is used:

1) Involvement in sustainable food system projects and teaching programs which have a positive effect on the development of sustainable agriculture practices and alternatives to the current industrialised food system as well as developing environmental sustainability knowledge, skills, and awareness (Barlett 2011; Hilimire et al. 2014; LaCharite 2015; Rojas et al. 2007);

2) The development of an enhanced understanding of food security, including the issues facing communities living in poverty and how environmental problems (e.g. climate change, biodiversity loss, soil degradation) exacerbate food security issues (McGregor 2010; Rojas et al. 2007; Rojas et al. 2011);

3) The cultivation of altruistic feelings towards social and environmental sustainability, including environmental stewardship (LaCharite 2015), (LaCharite 2015; Walter 2013); and

4) The development of political, advocacy and leadership skills to challenge current industrialised food systems processes (Ahee 2013; Barlett 2011; Wynne 2006).

Borgmann’s theory of focal practices (raised in section 7.2.2.1) could also be used to support the SFSE approach within health promotion degrees. The personal and professional transformation among health promotion practitioners in this study suggests that hands-on, practical involvement in local food systems activities may also be an effective teaching approach for broadening student competencies with addressing food systems issues. Borgmann’s theory of focal practices may also lead to the re-centering of health promotion practice towards an environmental sustainability orientation. This is supported by Hilimire et al. (2014) who discuss the importance of experiential learning in its various manifestations.
within tertiary programs, (ranging from growing, harvesting, preparing, cooking food and sharing meals together to community supported agriculture, food alliances and food cooperatives) to create shifts in student thinking towards local food systems that are environmentally sustainable. As food provides an orienting and centering experience, its practical use within health promotion practice and education could potentially lead to transformative learning among students – a key objective in SFSE.

Through this study it was also apparent that many of the skills that may be developed through SFSE would complement the competencies that are frequently outlined in documents for health promotion practitioners, such as those in the Galway Consensus Statement and the Australian Health Promotion Association national competencies. Such competencies include: 1) practitioners’ and students’ capacity for catalysing change for improved systems (e.g. health, food, environment); 2) increased skills around leadership and advocacy to effect this change; 3) ability to analyse and determine underlying influences and factors in poor health – in this case due to food insecurity and food systems issues; and 4) further development of a respect for cultural diversity and sensitivity (AHPA 2009; Barry et al. 2009). Skills for sustainable development and the ability to develop partnerships across sectors have been identified as additional benefits (AHPA 2009; Barry et al. 2009).

This study attests to the possibilities of SFSE within health promotion degree pathways, where it may develop cognitive and affective attributes in students, including astuteness to the issues that encompass food systems and food security, as well as consciousness raising and self-awareness. These attributes are not only espoused in SFSE but in health promotion, where both share common ground, philosophies and a values base with regards to ‘people care and earth care’ (Baum 2009; Dixey 2013; Hilimire et al. 2014; Jones et al. 2010; Meek & Tarlau 2016).

It would appear, however, that health promotion practice for protecting ecosystems and the environment as stipulated by the OCHP has been minimised (Brown et al. 2005; Kickbush 1989a; Macdonald 1992; WHO 2016). Health promotion, however, was founded on various disciplines and social movements that sought to challenge how people live and the conditions with which they live, calling for improved health through social justice, ecosystems protection and equity principles (Dakubo 2011; Dixey 2013; Macdonald 1992; Kickbush 1989b; Kickbush 2003). This study identified key barriers for health promotion to effect this change: the dominant neo-liberal and individualistic ideologies of government, including healthcare practice; and biomedically oriented approaches in healthcare, including food
security. This study, however, demonstrates that a small cohort of practitioners and academics were challenging current paradigms and returning to the foundations of health promotion, including the pre-requisites of health within the OCHP.

7.5 In summary

This chapter provided a discussion around the reorientation of health promotion practice and education to address food insecurity. Chapter 8 ‘Conclusions and Implications’ will provide a synthesis of the study, including limitations and opportunities for further research.
8 CONCLUSIONS AND IMPLICATIONS

This chapter will demonstrate the significance of the study in the development of new knowledge for practice and education in health promotion.

8.1 Conclusions

8.1.1 Health promotion – broadening practice and education to address food insecurity

*Vision without systems thinking ends up painting lovely pictures of the future with no deep understanding of the forces that must be mastered to move from here to there* – *Peter Senge, The Fifth Discipline*

This thesis demonstrated that some practitioners and most academics considered the use of environmental sustainability principles to guide practice as vital for addressing food insecurity. It was also apparent that practitioners and academics were broadening practice and education to address food insecurity through the food system. This is a significant finding for the health promotion sector which has typically addressed food security from a social determinants perspective (section 2.1). This thesis demonstrates that food insecurity was considered one of many issues within the food system that could not be addressed adequately in isolation.

8.1.2 Capacity building within health promotion degrees

*Food systems are inherently complex, and the need to understand and intervene in food systems as objects of social and environmental governance is increasing* – *Hilimire et al. (2014)*

This thesis revealed that most formal qualifications undertaken by practitioners provided limited training to address significant health issues (including food insecurity) through an environmental sustainability perspective. To address this knowledge gap some practitioners sought informal learning opportunities to further knowledge and skills around environmental sustainability (section 6.3.3.4).

This thesis, however, demonstrated some of the knowledge gaps that can result from informal training approaches (section 7.3). This is a significant finding for health promotion where a lack of degree pathways to address food systems issues may lead to ineffective practice. This thesis indicates a need for current health promotion degree pathways to be reoriented towards
a systems approach for addressing the dual challenges of food insecurity and environmental degradation. One that also considers environmental sustainability principles to guide practice.

8.1.3 Moderating food industry partnerships and sponsors within the Australian Health Promotion Sector

People are fed by the food industry that pays no attention to health and are treated by the health industry that pays no attention to food – Wendell Berry

This thesis acknowledges the potential risk from the food industry on the health sector within Australia in the development of policy, practice and competency development around food security. Food industry influence was noted within the DAA where national competency standards are developed for nutrition and dietetic professionals (section 7.3.1). Although the risk for the AHPA is small due to their endorsed Sponsorship and Advertising Policy, it would be pertinent for the association to keep close vigil on their policy and provide ongoing revision where relevant to ensure potential corporate interests are moderated.

This thesis also provides a rationale for training and education of pre-service graduates and existing practitioners around the political economy of food systems. Training and education would assist future and current practitioners to moderate potential food industry influences within the Australian health promotion sector.

8.1.4 Localising a set of principles to guide health promotion practice in Australia

This thesis identified that some practitioners were guided by environmental sustainability principles to address food insecurity. In addition to environmental sustainability principles, some practitioners were adopting aspects of sustainable food systems principles to enhance and broaden practice. This thesis indicates the use of sustainable food systems principles to bridge health promotion and environmental sustainability practice to address the multifaceted issues (including food insecurity) inherent within the food system through a shared set of principles (section 7.2).

A lack of specific guidance also exists on how to apply values and principles inherent to health promotion within initiatives (section 7.2). This thesis, therefore contributes to furthering the knowledge base around the practical application of sustainable food systems principles within health promotion practice (section 7.2.2).
8.1.5 Sustainable Food Systems Education to develop pre-service graduate competencies

It is critical as educators and academics that we support and empower students to understand the complex challenges facing us as we collectively seek to create a more healthy, sustainable, fair and delicious world – Kelly Donati, Fair Food Challenge

This thesis identified several factors limiting the use of EfS within tertiary programs (section 6.4.3.2; section 7.4). The thesis provided insight into the potential use of another relatively new educational approach – Sustainable Food Systems Education (SFSE). Although teaching approaches used in SFSE are similar to EfS, students receive specific learning in relation to sustainable food systems and are involved in sustainable food system projects. SFSE appears to be more relevant than EfS for health promotion degree pathways (e.g. majors, minors, units) to address food insecurity. It may also be more relevant for developing student capacity around other food related issues common in health promotion such as nutrition, healthy eating and obesity, as these are directly influenced by the current food system (section 7.4).

8.1.6 Expanding health promotion practice and education through alternative models and theory

Ecological systems have been relegated to the periphery for far too long. Whether it has been caused by politics, apathy, or simply ignorance, our neglect of incorporating ecological literacy and principles in our research methods and education systems has finally caught up with us – Stanger (2011)

A prevailing dichotomy between health and environmental sustainability was apparent through this thesis (section 7.2.1.1). The findings and literature pointed to the need for other theories to guide practice, for example, the ‘eco-sociological’ view of health (Stanger 2011). Eco-sociological theory has the potential for identifying the multiple influences inherent within the current food system (section 7.2.2). Such a model may also be more useful for health promotion practice with reorienting practice towards environmental sustainability.

This thesis also provided insight into the personal and professional transformation that some practitioners experienced while participating in food systems activities (e.g. Permaculture, food alliances) (section 6.2.6; section 7.2.2.1). Borgmann’s theory of focal practices was identified and used to explain these observations. This is an important finding as it demonstrates the possibility of hands-on experiential learning as important aspects of health
promotion degrees. As food is an orienting and centering practice, its practical use within health promotion education could potentially lead to transformative learning among students – a key objective in Sustainable Food Systems Education.
8.2 Implications for health promotion practice and education

8.2.1 Introduction
This explanatory mixed methods study sought to **explore the potential role of health promotion in addressing food security from an environmental sustainability perspective**. As such this study identified that broadening health promotion practice to encompass environmental sustainability is vital for addressing the dual challenges of food insecurity and ecosystem degradation. The study also found that food insecurity must be addressed through a systems perspective. This was in recognition that the food system is comprised of multifaceted issues that are interconnected. Thus, food insecurity cannot be addressed in isolation from the food system. These findings have implications for health promotion practice and education. This will be discussed in the following section.

8.2.2 Localising a set of sustainable food systems principles to guide health promotion practice and education in Australia
This study confirmed the use of environmental sustainability principles in the development of food security initiatives. The study suggest that the Australian health promotion sector may benefit from the development of an official set of sustainable food system principles to bridge health promotion and environmental sustainability principles to assist with guiding practice and education towards environmental sustainability approaches that consider the food system.

8.2.3 Capacity building for the health promotion sector
Capacity building is a common activity within health promotion and is a term used to explain community or workforce development (VicHealth 2012). Capacity building is commonly used within university education (Dixey 2013; Hoffmeister et al. 2016). Dixey (2013, p. 164) states ‘as well as research, universities and other Higher Education Institutions (HEI’s) have teaching as a core function, and a key role in educating health workers in their initial training as well as in continuing professional development and ‘lifelong learning’’. Considering the findings of this study, together with literature around capacity building, it would be ideal for most Australian health promotion degrees to reorient the relevant areas of their programs towards systems approaches. It would also be pertinent for degrees to develop a set of sustainable food systems principles to guide practice towards environmental sustainability at all levels of the food system.
8.2.4 Sustainable food systems education within health promotion degree pathways

Section 8.2.2 identified a need for capacity building among Australian health promotion degrees to reorient practice towards a systems paradigm for addressing food insecurity. This study suggests the use of SFSE as a teaching approach within degree pathways (e.g. within majors, minors, units) to meet competency gaps identified in this study. This study recommends the following pedagogical shifts within health promotion degrees: 1) teaching approaches cognisant of SFSE incorporated into program pathways; 2) inclusion of specific learning in relation to the political economy of food systems; and 3) experiential learning activities around the food system including sustainable agriculture projects to achieve the desired transformation and change among students.

8.2.5 Theories guiding health promotion practice and education towards ecological thinking

8.2.5.1 Borgmann’s theory of focal practices

This study identified that Borgmann’s theory of focal practices could be integrated within Australian health promotion degrees to achieve transformative learning sought by SFSE pedagogy. Food as a focal practice can reorient and centre the experiences of those involved in food-based activities (Boers 2011; Thomson 2010). This experience was observed among practitioners in this study who were actively involved in food systems activities. Considering these findings, the use of experiential, hands-on learning is suggested – such as growing food, harvesting, preparing and cooking food and sharing meals together be integrated into health promotion degrees to reorient practice towards systems approaches and environmental sustainability.

8.2.5.2 Eco-sociological model of health

This study also indicated the use of the eco-sociological model of health within health promotion practice and education. The use of this model ensures that multifaceted issues within the food system are taken into consideration when developing food security initiatives. The ‘eco’ within eco-sociological models are also emphasised rather than an anthropocentric view of health and wellbeing which dominate socio-ecological models of health and wellbeing. This study identified that the use of eco-sociological models within health promotion holds potential for a reorientation towards the ecological determinants of health.
This reorientation includes considerations for ecosystem protection and enhancement within health promotion initiatives.

8.2.6 Moderating food industry influence within the Australian Health Promotion sector

This study suggests continued adoption and systematic revision of the AHPA’s endorsed Sponsorship and Advertising Policy to ensure the association is not influenced by industry models and preferences. This thesis also identified a lack of health promotion degrees that develop understanding and knowledge among students regarding food industry influences within government policy decision-making (including national health priorities). In light of the findings of this study, it would be pertinent for Australian health promotion degrees to develop graduate knowledge and understanding around the political economy of food systems to counter these influences.
8.3 Opportunities for further research

Based on the findings of this study this section outlines opportunities for further research.

8.3.1 Evaluating the use of sustainable food systems principles within health promotion practice

Trial and evaluate the use of sustainable food systems principles to guide a health promotion program in Australia. The evaluation could compare and contrast the outcomes with a traditional health promotion program (e.g. addressing food security through a food availability or food supply framework) that addresses food security. Case study research could also be undertaken to develop deeper interrogation of existing health promotion initiatives that address food security through a systems perspective. The online survey that was undertaken within this study could also be scaled up, e.g. from a descriptive study to a representative methodology. Further research via evaluations, case studies and expansion of the online survey may provide further evidence for the utilisation of a systems approach within health promotion practice and education.

8.3.2 Exploring theory within health promotion practice and education

During the study two theories were identified as being of possible significance and utility for the health promotion sector: 1) Borgmann’s theory of focal practices and 2) Eco-sociological view of health. Future research could explore these theories in-depth: either within health promotion practice or education in Australian universities. Research could be undertaken to examine their application within the health promotion sector.

1) Borgmann’s theory of focal practices could be explored further with regards to generating a shift in practice within the health promotion sector. Borgmann’s theory of focal practices (though experimental learning activities) could be explored with generating transformational learning among students within international or domestic health promotion degrees. This would be pertinent for arguing that degree pathways emphasise experiential learning with food (e.g. involvement with growing, harvesting, cooking and sharing food) to achieve a shift in practice, particularly as current models within universities emphasise learning based on technological/digital innovation (Bates 2015; Hanna 2000; Wheeler & Gerver 2015). This study also identified that involvement with food systems activities (e.g. Permaculture, community supported agriculture, food cooperatives etc) as a focal practice. Future research could explore this idea using...
Borgmann’s theory of focal practices among health promotion practitioners or students in Australia or internationally.

2) The eco-sociological view of health could be researched further within health promotion degrees in Australia. This model could be integrated into current health promotion curriculum offerings and measured (pre-and post-integration) to determine its applicability for developing student competencies towards the use of sustainability frameworks with addressing health issues (such as food insecurity). Research could decipher whether an eco-sociological framework provides students with improved understanding for identifying the multiple influences of health that span both the ecological and social.

8.3.3 Exploring the use of Sustainable Food Systems Education within health promotion degrees

Develop a case-control study to explore SFSE within Australian health promotion degrees to compare learning outcomes among students. Outcomes could include whether SFSE within health promotion degrees create a shift in practice towards a systems perspective that also emphasise environmental sustainability. This research could address knowledge gaps in the SFSE literature as health promotion/public health graduate learning outcomes are unknown.
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## 10 APPENDICES

### 10.1 Question-answer sheet during survey development

<table>
<thead>
<tr>
<th>Question</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is the questionnaire clearly set out?</td>
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<td>2. Were the instructions easy to follow?</td>
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<td>3. Is the order of the questions appropriate?</td>
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<td>4. Have all options for each question been covered?</td>
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<tr>
<td>5. Are any of the questions ambiguous?</td>
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<tr>
<td>6. Is the language appropriate?</td>
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<tr>
<td>7. Did you notice any spelling, or typographical errors?</td>
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<tr>
<td>8. Did you feel comfortable answering the questions?</td>
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<tr>
<td>9. Which questions were difficult to answer, irritating or confusing?</td>
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<tr>
<td>10. How long did it take you to complete the questionnaire?</td>
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</tbody>
</table>
10.2 Online survey

I have read and understood the plain language statement above and give my consent to participate in the survey

Agree □

Background information

1. Name of organisation, please list.

2. What is the focus of your health promotion initiatives, e.g. mental health, obesity, asthma? Please list below.

3. Which population groups do these initiatives focus on? E.g. low-income groups, refugees, general community, children. Please list below.

The following set of questions focus on food security and any related health promotion initiatives that your organisation has developed or is currently working on.

4. Do any of your health promotion initiatives address food security?
   - Yes □
   - No* □

5. If yes,

   Please list any past or current health promotion initiatives that your organisation uses to address food security? E.g. kids go for your life, community gardens, emergency food relief etc.

   If no* move to question 12.

6. Please list what strategies are incorporated in these food security initiatives? e.g. education, behaviour change etc.

7. Do any of your food security initiatives consider the following health promotion frameworks?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marmot’s social determinants of health</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Ottawa Charter</td>
<td>□</td>
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</tbody>
</table>
8. Are any of the following concepts considered in the development or delivery of your health promotion food security initiatives? On a scale of 1 – 5 where 1= never, 2= rarely, 3= sometimes, 4= most of the time, 5= all the time.

<table>
<thead>
<tr>
<th>Concept</th>
<th>1= never</th>
<th>2= rarely</th>
<th>3= sometimes</th>
<th>4= most of the time</th>
<th>5= all the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiatives consider where food is purchased. Food is purchased mainly from local sources, e.g. farmers markets, market gardens, from within the state.</td>
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<td>Population group is educated about concepts such as food miles, food sovereignty, paddock to plate, slow food, food waste, seasonal food, animal ethics, fair-trade etc.</td>
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<tr>
<td>Population group is part of the creation and implementation of a local food system that integrates the cultural, social, environmental, health and economic context of that area.</td>
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<td>Population group is given the opportunity to develop skills</td>
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</table>
and knowledge to grow and harvest its own food.

**Food system follows ecologically sustainable principles by protecting &/or enhancing biodiversity, soil and waterways, e.g. organic pesticide/fertilizer use, conservation programs.**

**Initiatives advocate for small-scale Australian farmers to be fairly and equitably rewarded. Farmer health and wellbeing needs are considered.**

**Partnerships developed with local Australian small-scale farmers in food security program.**

**Food purchased considers a combination of taste, culture, environmental, social and health aspects.**

**Initiatives consider how food is packaged and food is chosen with minimal packaging.**

**Initiatives utilise foods that are in line with seasonal availability.**

**Where possible foods are purchased in initiatives that are fair-trade accredited.**
Initiatives use organic/biodynamic, permaculture, community supported agriculture or other sustainable farming methods.

Initiatives consider animal welfare and integrate these values when purchasing or growing food.

Initiatives use urban agriculture, e.g. edible streetscapes, city farms, community gardens.

Initiatives provide information/education on plant based diets and outline a combination of health, economic, social, cultural or environmental benefits.

Initiatives consider culturally appropriate food for target group.

Initiatives have food swap activities with population group, e.g. share the harvest concepts.

9. What have been the driving mechanisms for your health promotion initiatives to consider the concepts outlined in question 8?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
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a) Pressure from community
b) Climate Change concerns
c) Local government strategy/policy
d) State government strategy/policy □ □ □
e) National government strategy/policy □ □ □
f) Other

10. What have been the facilitators to developing your food security initiatives using the concepts outlined in question 8?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
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</table>
a) Support from the community □ □ □
b) Funding available to develop program □ □ □
c) Partnerships with other organisations □ □ □
d) Other

11. Barriers? Participants will be asked to complete question 12 below.

a. Please tick any barriers for the development or delivery of health promotion food security initiatives within your organisation

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>
a. Inexperience around developing food security initiatives □ □
b. Lack of knowledge around food security □ □
c. Not a priority for organisation to consider food security □ □
d. Lack of financial resources: limited or no funding to develop or run food security initiatives □ □
e. Lack of time: limited or no time to develop or run food security initiatives □ □
f. Lack of personnel: limited or no staff who are qualified to implement food security initiatives □ □
g. Minimal support from local government to develop or implement food security initiatives □ □
h. Minimal support from state government to develop or implement food security initiatives □ □
i. Other barriers. □ □

i. If yes, please list

12. What would help your organisation to overcome these barriers? Please explain.

The next set of questions are in relation to your own personal knowledge and skills around food security concepts from a sustainable development framework.
13. Please rate your **knowledge** around the following concepts in relation to food security, where 1= none, 2= basic, 3= intermediate, 4= advanced and 5= expert

<table>
<thead>
<tr>
<th>Concept</th>
<th>1= None</th>
<th>2= Basic</th>
<th>3= Intermediate</th>
<th>4= Advanced</th>
<th>5= Expert</th>
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<tr>
<td>Food Miles</td>
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<td>Food Sovereignty</td>
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<td>Paddock to Plate</td>
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<td>Slow Food</td>
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<td>Food Waste</td>
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<td>Seasonal Foods</td>
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<td>Fair-Trade</td>
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<td>Sustainable Farming Systems, e.g. organic, biodynamic, permaculture, community supported agriculture</td>
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<td>Urban Agriculture, e.g. city farms, community gardens/orchards, edible streetscapes</td>
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<td>Farmers Markets</td>
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<td>Food Swaps – share the harvest concepts</td>
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<td>Animal welfare issues in relation to food</td>
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<td>Health, economic, social, cultural or environmental benefits of plant based diets</td>
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<td>Healthy eating and nutrition</td>
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14. Please rate your **ability** to implement the following concepts into health promotion food security programs, where 1= none, 2= basic, 3= intermediate, 4= advanced and 5= expert

<table>
<thead>
<tr>
<th>Concept</th>
<th>1= None</th>
<th>2= Basic</th>
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<th>4= Advanced</th>
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<td>Sustainable Farming</td>
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<td>Systems, e.g. organic, biodynamic, permaculture, community supported agriculture</td>
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<td>Healthy eating and nutrition</td>
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15. What type of training would assist the health promotion sector to address issues of food security? Please tick all that apply
   a) Short courses
   b) University (undergraduate or postgraduate):
      o Courses
      o Units
      o Majors
      o Study tours
   c) Workshops
   d) Seminars
   e) Professional development training
   f) On the job training
   g) Other _______________

About you:

16. What is your age? (Drop down box for 1 answer)
   a) 18-30
   b) 31-40
   c) 41-50
   d) 51-60
   e) 60+

17. Gender? (Drop down box for 1 answer)
   a) Male
   b) Female

18. Which state or territory do you live in? (Drop down box for 1 answer)
   a) ACT
   b) NSW
   c) NT
   d) QLD
   e) SA
   f) WA
   g) VIC
19. What is your highest qualification? (Drop down box for 1 answer)
   a) Secondary □
   b) TAFE certificate or diploma □
   c) Undergraduate degree □
   d) Post-graduate degree □

20. If applicable, what is the name of your TAFE certificate or degree?

21. From which institution did you gain your TAFE certificate or degree?

22. Year of qualification?

23. Have you had any training or education, whether formal or informal (e.g. permaculture course, workshop, university course degree, TAFE certificate or diploma etc) around food security?
   a) Yes □
   b) No □

If yes:
   a) Name of course/workshop?
   b) Which institution/organisation delivered the course/workshop?
   c) Year of qualification

24. Do you have any personal experience or background in relation to food, e.g. grew up on a farm, grow fruit and vegetables at home, volunteered on a farm for 3 months while travelling etc.
   a) Yes □
   b) No □

If yes, please explain in a couple of sentences what your background or personal experience is

25. How long have you been working in the health promotion field?
   a) Less than 1 year □
   b) 1-5 years □
   c) 6-10 years □
   d) 11-20 years □
   e) Over 20 years □

26. Is there anything else you would like to add? Please comment. Thank you for completing this survey.
10.3 Interview schedule for health promotion practitioners

**Defining Food Security:**

1. Could you tell me what food security means to you personally?
2. The current definition for food security is “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life” (FAO/WHO) – what do you think about this definition? *What is good about it/what are its limitations?

**Food Security initiatives:**

3. Could you share with me some of the initiatives that your organisation is undertaking around food security?
4. What environmental sustainability principles does your organisation use in their food security programs?
5. What are the strengths and limitations of these principles? What could be improved?
6. Why does your organisation look at these principles in their food security initiatives?

**Barriers:**

7. What are some of the barriers/constraints to implementing food security initiatives using these principles?
8. How could some of these barriers be overcome?

**Practitioner competencies:**

9. Thinking about the principles you mentioned earlier, where did you obtain your knowledge and skills to implement them?
10. How has this contributed to your own knowledge and ability to deliver food security initiatives?
11. Do you have any background or personal experience with food? *E.g. growing food at home, farming etc. Could you tell me what some of these experiences are?
12. How has this experience contributed to your own knowledge and ability to deliver food security initiatives?
13. If a short course/PD opportunity/workshop was available to HP practitioners that looked at food security using these concepts, what would it look like? *e.g. field trips, guest speakers etc

- What about length?

- What do you think are the strengths and limitations of these opportunities?

14. What would make a HP practitioner interested in undertaking a short course or other PD opportunity around food security using these concepts?

**Graduate competencies:**

15. What skills do you think health promotion graduates require to be able to implement food security initiatives using environmental sustainability principles? *e.g. systems thinking

16. How could these be addressed? *Curriculum content, assessment, pedagogies (e.g. reflective practice, field placements etc).

17. Are there any theories/frameworks/approaches that could be used to facilitate learning in this area? *e.g. systems thinking

18. Is there anything else you would like to add from today’s interview?

19. Is there anyone else who you think would be suitable to interview?
### 10.4 Interview schedule for academics

I’m particularly interested in the courses or units you are developing/teaching into that teach food security using environmental sustainability principles. Therefore, these questions will be around this idea.

**Courses/units:**

1. **What courses/units are you currently developing or teaching that teach food security using environmental sustainability (ES) principles? Are they undergraduate/postgraduate?**

2. **Could you tell me a bit about these courses/units? For example, how long have you been developing/teaching these courses/units? Where did the idea for these courses/units originate? In which school/faculty are they based?**

3. **What principles does your course/unit use to teach students about food security? *E.g. Social: embracing diversity, equity, human rights, social justice; Environmental: protecting/enhancing ecosystems/biodiversity, sustainability; Economic: promoting local economies, participation in decision making.**

4. **Why does your course/unit use these principles?**

5. **Could you provide examples of how you teach food security using these ES principles… in the curriculum, assessment, pedagogies used, *e.g. student farm/community garden, reflective journals, discussed in tutorials, seminar on food security, study tours, fieldtrips etc**

6. **How do students respond to these approaches/methods of teaching?**

7. **What are the strengths and limitations of these approaches/methods?**

8. **What theories/frameworks are you using to teach students about food security using ES principles and why have you chosen these? *e.g. systems thinking, distributed systems**

9. **What are the strengths and limitations of these theories/frameworks?**

**Introduction into following section:**

The next set of questions is around Education for Sustainability (EfS). It’s a framework used to teach students about sustainability issues and then transform their thinking/attitudes etc so they also become active citizens for sustainability in their
professional and personal life. These questions are in relation to this framework and while some academics may not be using the framework formally or even aware of the framework they may be using the principles found in it.

10. Do you use the EFS framework to teach students about food security? If yes, could you explain further why and how you use this framework? If no, could you explain further why you don’t use this framework?

11. What other sustainability issues besides food security do you teach in your course/unit? E.g. Poverty alleviation, human rights, equity, environmental degradation (e.g. biodiversity loss, deforestation, overfishing etc), climate change, peak oil etc

12. Why does your course/unit teach these particular sustainability issues?

13. How do students respond to these sustainability issues taught?

14. What pedagogies do you use in your teaching program to teach students about sustainability issues? E.g. futures-thinking (visioning), Interdisciplinary/systems thinking, reflective practice etc

15. Why does your course/unit use these particular pedagogies?

16. How do students respond to the pedagogies used?

17. What are the strengths and limitations of these pedagogies? What could be improved?

18. If you think back to when you were teaching without these pedagogies, what difference do you notice in student knowledge and general competencies now that they are included? *If any, has this been evaluated?

19. Is there anything else you would like to add?

I would like to speak to other academics that teach food security using environmental sustainability principles that I could invite to an interview? Would you be happy to pass on any contact details of other people you may know who would be suitable to be interviewed?
10.5 Ethics approval letter

To: Associate Professor Mardie Townsend
    School of Health and Social Development

From: Secretary – HEAG-H
      Faculty of Health

CC: Ms Sonia Nutman

Date: 9 August 2013

Re: HEAG-H 108_2013: Food security: from the campus to the paddock

Approval has been given for Associate Professor Mardie Townsend School of Health and Social Development, to undertake this project for a period of 3 years from 9 August, 2013. The current end date for this project is 9 August, 2016.

Please note that HEAG-H only approves this project for 3 years, so you will need to apply for an extension prior to the current end date.

The approval given by the Deakin University HEAG-H is given only for the project and for the period as stated in the approval. It is your responsibility to contact the Secretary immediately should any of the following occur:

- Serious or unexpected adverse effects on the participants
- Any proposed changes in the protocol, including extensions of time
- Any events which might affect the continuing ethical acceptability of the project
- The project is discontinued before the expected date of completion
- Modifications that have been requested by other Human Research Ethics Committees

In addition you will be required to report on the progress of your project at least once every year and at the conclusion of the project. Failure to report as required will result in suspension of your approval to proceed with the project.

An Annual Project Report Form can be found at: http://www.deakin.edu.au/hmnbss/research/ethics/ethicssubmissionprocess.php

This should be completed and returned to the Administrative Officer to the HEAG-H, Pro-Vice Chancellor’s office, Faculty of Health, Burwood campus by Tuesday 19th November, 2013 and when the project is completed. HEAG-H may need to audit this project as part of the requirements for monitoring set out in the National Statement on Ethical Conduct in Human Research (2007).

Good luck with the project!

Steven Sawyer

Secretary
HEAG-H

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R/COE Provider Code: 001139

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