Declaration

The following declaration, signed by the candidate is to certify that:

- the thesis comprises only my original work towards the PhD;
- due acknowledgement has been made in the text to all other material used; and
- the thesis is fewer than 100 000 words in length, exclusive of tables, maps, bibliographies and appendices.

Johanna Christensen
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Abstract

Apple growing practices are embedded in a productivist mentality aiming for ever higher efficiency and productivity. And while the climate change impacts are to a large extent known, there is little attention given to the coupling of the social and the ecological effects. I use apple growing as a case study to explore the relationship between place, biodiversity and rural change in Victoria. My research is based on historical research; including an analysis of the Museum Victoria’s collection of wax apple models, and in-depth interviews with orchardists.

By drawing on environmental history, social-ecological systems thinking and Bourdieu’s theory of practice, I highlight the importance of a systems perspective and inform it by emphasis on the critical role of underlying power structures and individual dispositions, or the habitus, of the growers. These dispositions have been shaped and internalised by the growers’ histories and their physical surroundings. Orchardists have been able to respond to intensifying production requirements by utilizing technologies and scientific nous to keep up with the continuous aim for efficiency. Growers are caught up in a self-reinforcing cycle of satisfying the demand for perfect apples by adopting expensive techno-scientific approaches to enable ever more intensive production. The symbolic violence and amplified biophysical pressure orchardists experience has driven many to despair; resulting in a significant decline in small scale apple growing businesses over the last decade. I offer some suggestions for government policy and support measures and argue that any services or support programs need to be tailored to the appropriate level and need of each orchard business and the individuals who are involved.

My analysis shows that those growers, who engage more closely with their biophysical place as well as their history and identity as apple growers in that place are (re-)creating another version of what it means to be an apple grower. In some cases this is resulting in resistance to the vortex of agricultural productivism that has been the basis of their existence for many generations.
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I thank my parents who have believed in me as long as I can remember and without whose encouragement I would not have completed. Thank you Glen, my darling husband who has put up with my ups and downs - the infamous peaks and troughs of the PhD. He was always there to listen, read and (most importantly) vent to. Glen’s belief in my ability to finish has kept me going and made me a more confident researcher.

I dedicate my thesis to Karl and Maximilian; my two boys who remind me every day what really matters – love, happiness and family. Without them keeping me grounded and motivated to enjoy the most simple and important things in life I would not have been able persevere with this project.

Thanks to everyone above, I submit this thesis as happy and confident as I could have ever wished for.
Chapter One, in which I introduce the wax apples and give an overview of my thesis

1.1 My motivation

I have personal motives that led me to undertake this PhD. Paramount in these is the overwhelming evidence that exists on the effects of climate change, rapid population growth and associated environmental degradation.

Loss of biological and agricultural diversity is one contributor to global concerns about food insecurity. It is generally understood that biodiversity conservation and agricultural production are closely connected. Traditional plant varieties, the knowledge about them and the practices of growing them play an essential role in ensuring that agrobiodiversity is preserved into the future. The places where food is grown, the communities that surround them and the industries and societies that depend on them hold precious resources in the form of knowledge, memories and skills relating to the history and current growing practices. Landscapes act as mirrors, reflecting cultural and physical impacts on the land and by studying them valuable lessons can be learnt for the future. Unravelling the environmental history and analysing the connection between physical and socio-cultural places of agricultural production can not only lay out the ongoing process of history but also inform about how to move ahead into a future under accelerated climate change as well as changing land use.

My interest in the relationship between people, place and social-ecological change steered me to the Strategic Postgraduate Award Scholarship offered by the Museum Victoria and the University of Melbourne, aiming to work on the broad topic of place, biodiversity and rural change in Victoria. A purpose of the scholarship was to utilise the Museum’s large collection relating to agricultural history and technology, namely the wax models of fruit and vegetables. The collection represents biodiversity and place, and it stands for the colonial aspiration for Australia to be a successful player in the globalised apple market.
1.2 The wax apple models

In 2012 I went to Scienceworks, the science and technology division of the Museum Victoria, to see the collection of wax apple models. I was not in the main exhibition hall, but in the warehouse at the back where artefacts are stored when not on display. Long rows of metal storage cabinets stretched out in front of me, making me curious about what was inside. Once unlocked, the contents of the metal cabinets are exposed which look remarkably similar to the shelves at a well-stocked green grocer: life-sized wax models of bananas, grapes, potatoes, citrus, pears and many more fruits and vegetables are neatly packed away on trays. Here are the wax apple models: life size, beautiful and deceptively real. The curator says that once, when left lying on an office desk overnight, one of the models had bite marks in it the next day.

Figure 1.1 Trays of wax apple models (source: author’s own)
Figure 1.2 Wax apple models (source: Museum Victoria)

Figure 1.3 Metal storage cabinets at Scienceworks (source: authors own)
Looking at the range of sizes, colours and shapes, I marvelled at the apples’ diversity and wondered where they all came from, who made them, and where the original apples grew. In the next three years, as part of my PhD research, I was to analyse the wax models and their associated documents in more detail. I also undertook historical research related to the Victorian apple industry and conducted over 40 interviews with apple growers around the state. These three elements - the physical artefacts, the historical documents and the contemporary grower interviews - comprise three tangible representations of the same thing: the apple industry in Victoria. The wax models have been around the world and are a material embodiment of apple species, their research and their biodiversity; the historical documents represent information and research, too. Some of it is also international and national; and, the apple growers reflect on international trends in pomology and markets that relate to their orchards and change their lives. The wax models are a culmination of all these aspects of time, place, biodiversity and research.

1.2.1 The history of the wax models

I begin my thesis with the visit to the wax apple models as their story intersects with the contemporary stories of apple growing in Victoria in many ways. These narratives tell about success, diversity and continuous change; but most importantly, they reflect the critical role of ecological and socio-cultural place in the realisation of an agricultural ideal based on colonial productivism. The wax model collection is a legacy of this settler vision for productivity, wealth and export success; and at the same time they stand for the physical ability to grow a breadth of different varieties.

The Museum Victoria (MV) has over 1800 wax models featuring more than 50 different fruits and vegetables, ranging from kumquats and pineapples, to potatoes and tomatoes. The enterprise of modelling fruit into wax was not unique to Melbourne; for example Sydney’s Powerhouse Museum also houses a collection of wax fruit, including 124 apples (Chapman, 2010). This collection is much smaller and was based on the Melbourne models (ibid). There are also international collections of botanical models, such as the Glass Flowers

The MV wax apple model collection is the largest and consists of 558 wax apple models, including 321 different varieties. And while not all of these varieties replicated in the collection were for everyday eating, the collection reflects a diversity of uses. The notes accompanying the models tell about their culinary use, some were for eating but also for cooking and baking. The models themselves are a variety of colours, shapes and sizes; some not much bigger than a golf ball (e.g. Pomme de Neige) and others as large as a big grapefruit (e.g. Twenty Ounce). The original apples came from different locations around the State of Victoria, indicating the suitability for apple growing in many places. The collection reveals an era of experimentation, expansion and curiosity. Trial and error by the European settlers led to testing what apple varieties grew best in their new environment and while doing so, they discovered new strains, many of which were then modelled into wax and added to the collection.

Most of the models were crafted between 1873 and 1885 (Figure 1.4). They are catalogued by numbers and dates, which creates a sense of order and scientific enterprise that almost masks their artistic representation and their contribution to cultural and social life (Pearce, 1994). The collection of wax apple models, ought to be viewed within context as they hold multiple stories and meanings (Roberts, 1997, p. 3) and we can hold one carefully, with white gloves on, and admire it as the object of our scientific gaze. Yet, at the very same time it suggests a world elsewhere - the Chicago World Fair, or a blossoming spring-time orchard in Greensborough, Victoria, or the prize winning variety at the Melbourne International Exhibition in 1880.
Different artists employed by the museum made the models. The notes accompanying them indicate that in the early years (from 1873-1885) most models were crafted by Mr T. McMillan, and later by his daughter Miss M.J. McMillan and also other female artists, including Miss J. Dickins, Miss A.B. Hodgkinson and Mrs O’Neill. The artists used complex techniques using plaster moulds and wax to accurately capture the apples’ appearance (Yates and Yates, 2008).
The apples that the models were based on were supplied by a variety of orchardists around the State. Duplicates of the models were also given to the State Department of Agriculture for their research purposes (Dale-Hallett and Carland, 2008). There are however, a few growers who provided a large number of apples to the museum. Thomas Whatmough of Greensborough supplied 36 of apples to be modelled. Charles Draper of Harcourt provided 52 apples. These men were also active members of the Victorian Horticultural Society and contributed their knowledge of fruit growing in meetings across Australia as well as in newspaper columns (e.g. Draper, 2003; Lang, 1918).

1.2.2 The purpose of the models

As curators told me, the intention of the apple models was to encourage people to take up horticulture and to show Australian growers what could be grown, as well as to demonstrate pests and diseases that were common at the time. In addition to this educational use, the wax models were also made to promote the Victorian horticultural industry overseas and showcase the colony as a place for development. In this narrative they demonstrate how Victorian apples have played a role in the political economy of Australia and connected it globally. Through early export and the international exhibitions, a culture of ‘feeding the Empire’ was reinforced across the nation. Today, while no longer just for the Empire, the export culture still exists with government suggestions that Australia be the ‘Asian food bowl’ in years to come (Commonwealth of Australia, 2012).

The nascent concept of world fairs in the second half of the nineteenth century (Rydell, 2008) was fuelled by the desire to showcase the colony’s unique flora and fauna (Macinnis and Home, 2012), but also to boast about Australia’s capacity to compete on an international scale in agricultural production. World fairs became “showcases of scientific and technological innovation” (Rydell, 2008, p.143), and they were “marketing tools for colonial and national advancement in global trade, migration and tourism” (Darian-Smith, 2008, p.1). The apple models were put on display at the following exhibitions:
• London International Exhibitions (1871-74)
• Intercolonial Exhibitions in Sydney (1873, 1879, 1875)
• International Exhibitions held in Melbourne (1875, 1880, 1884 and 1885)
• Philadelphia Centennial Exhibition (1876)
• Paris International Exhibitions (1878, 1889)
• Calcutta International Exhibition (1883)
• The Chicago World’s Fair (1893)

Displaying models had a more profound impact for visitors than drawings or other ways of presenting plant products, such as pressed specimens (Bedford and James, 1992). Models allowed for a better appreciation of scale, colour and texture (Cornish, 2013). It was an imaginative way to show, demonstrate and educate visitors. The models were used extensively throughout these major exhibitions and made it possible to display a remote part of the world with viewers being able to marvel at the artistry of the models and the diversity of the varieties on show. In this way, the wax models made Australia and Australian apples accessible to international and domestic viewers alike.

The big spike in model making in 1875 (Figure 1.4) is associated with the Intercolonial Exhibition held in Melbourne, where 108 apple models were on display (Victorian Intercolonial Exhibition, 1875). These were actually in preparation for the Philadelphia International Exhibition of 1876. As described in Chapter Four, this particular time was a very prosperous one for apple growers. We can imagine that these exhibitions and the models displayed at them, generated interest and momentum among growers, middlemen in the export and marketing trades, and for consumers. Hence the wax models contributed to the narrative of a productive and bountiful land.

This use of the wax models is reflected in the catalogue of the 1875 Intercolonial Exhibition held in Melbourne. It states that the apple models “embrace most of all of the important species cultivated, and in many cases such assortments of varieties as are calculated to
sufficiently illustrate the orchard and other open ground fruit-producing capabilities of Victoria” (Victorian Intercolonial Exhibition, 1875, p.30). Interestingly, the catalogue depicts the Victorian colony as one place for fruit growing, and does not distinguish between different locations. This is similar to today, when mainstream retail outlets do not mark the apples’ origins; customers can only choose ‘Australian’ apples – opposed to New Zealand or Chinese for example – and places of production are rendered insignificant, along with the practices, knowledge and technologies that went into the growing of those apples.

Taking into account the purpose as described in the exhibition catalogue, the creation of the wax apple models reflects the Museum’s intention to showcase the diversity of apple varieties as well as the suitability of Victoria for orcharding, whereas today they are kept as a heritage collection and memory bank of what was once grown in Victoria. Yet, as I will discuss, today’s exhibit of some of the models also serves as an aide memoire of diversity, nudging at the viewers’ imagination of what other varieties there are. As Reid (2012) argues, it is important to acknowledge that objects such as these bear historical significance, comparable to that of oral histories or textual evidence. The models and their accompanying notes reflect cultural and social aspects of the time, containing information about the place where the apple was grown and the use it had (cooking, cider making or table fruit). In effect the models evoke a markedly diverse collection of apple varieties as objects for education and for horticultural promotion. The ‘education’ focus, however, has changed from the nineteenth century when emphasis was on expanding horticultural production for national and overseas markets, to today, when the models are used to educate visitors about diversity in times gone by. By indicating the different culinary uses, they also capture the cultural values of the time. The models have high aesthetic value and by referring to them as artefacts, we reflect their dualistic representations as made objects with a utilitarian as well as aesthetic denotation (Prown, 1993).

These artefacts connect the viewer to the orchard landscapes of the past and to the underlying cultural beliefs and traditions (i.e. culinary use). They are “historical evidence” (Prown, 1993, p.3) that apples were planted in a variety of regions, that were all physically able to support the growing of apple trees but varying in their proximity to markets, and therefore requiring different technologies and transport to be sustained in the subsequent
agricultural production systems that developed in Victoria. As Melbourne’s population increased, so did the requirement for fresh vegetables and fruit and the apple market boomed in the 1880s, leading to expanding orchards and a new scale of production. This, as previously noted, is reflected in the increase of wax apples based on the fruit provided by orchardists from across the colony for modelling.

Figure 1.6 Map showing number of apples donated for modelling from different areas across Victoria (source: Chandra Jayasuriya, University of Melbourne, and author’s own numbering)
1.2.3 Different ways of exhibiting

Records show that when presented at Intercolonial exhibitions and world fairs, there were many models on display at once; these mass displays served to demonstrate the diversity in the Antipodes. Sometimes even several models of the same variety were showcased. While there is no record of why this occurred, doing so allowed the visitors to see small variations in colour, size and shape even within the same apple variety.

For example there are five models of the Cellin apple (two from Ballarat, two from Hazelglen, and one from Enoch’s Point). They all look very similar, but the Cellin from Enoch’s Point is markedly bigger (95mm in height) compared to the Cellin from Ballarat (82mm in height); it is also not as red as any of the others.
Another example of one variety showing great diversity is the Gravenstein apple. There are seven different Gravenstein models and while some only have very slight differences, there are two from the same location – Burnley – that showcase great variation in colour:

The shape is very similar, but the earlier model is predominantly yellow while the more recent one is almost completely red. Having multiple models of the same variety on display demonstrates the natural variation that can occur, not only because of physical nuances depending on locality, but also due to fluctuating seasonal conditions, as well as changes in tree culture. For example a tree shape allowing more light penetration will yield redder
apples. In this sense, the apple models are also an indicator of changes in orchard practices, such as related to pruning and tree shaping, as well as tree spacing (see Chapter Four).

The style of mass displays described above, persisted for many decades and as recently as the 1960s, the models were showcased en masse. Today, the emphasis is no longer just on displaying for curiosity and scientific education, rather the focus has shifted to presentations of multiple narratives that nudge at the viewer’s imaginations of other possibilities than the normal apple varieties that are sold in supermarkets. Roberts (1997) describes this shift in how collections are displayed. He suggests that more involvement by educators over the years has resulted in objects being displayed in a different way, one that includes different interpretations and offers narratives that provide context and invite different understandings, rather than just scientific naming and factual knowledge.

The collection holds multiple meanings; not only does it show the pride Victorians took in their apple industry but it also reflects the colonial project of cultivation and is a manifestation of the desire to establish, foster and promote the young Victorian colony as a place of scientific advances and agricultural success. This is not dissimilar to how today’s government is promoting Australia as a place for agricultural development and investment (Australian Trade Commission, 2014), demonstrating how this vision for productivity and export is ingrained into the colonial psyche and underpins Australian identity, despite adversity associated with distance to markets, lack of water and adverse weather conditions.

The Think Ahead exhibition at Scienceworks, the science and technology arm of the Museum Victoria has incorporated a few of the wax model apples into the exhibit. The aim of this exhibition is to demonstrate advances in technology and science and it is intended to stimulate the viewers’ imagination as to how the future might look in terms of buildings, material design, food and the use of space. The wax apple models are displayed between the agriculture and food sections of the exhibition and their purpose is to show different types of apples with their varying uses over the years (figure 1.9).
Figure 1.10 Scienceworks Think Ahead Exhibition: cabinet of wax apple models (source: author’s own)
This display of the wax apple models is a direct reflection of their change of meaning in the MV collection. They are showcased to reveal the loss of agricultural diversity and together with the display narratives, create a sense of nostalgia for other possibilities - such as making use of old apple varieties, or specific varieties for cooking instead of using only one of the few mainstream varieties available in supermarkets; as one of the Museum’s curators says:

“the way we use historical objects is a sort of stimulus to get you thinking […] I guess we want to raise ideas for people and maybe get them thinking down different tracks”

In this way the wax apple models continue to serve a political function in society, this time stimulating questions about why we don’t see these varieties in the supermarkets, and what
they might taste like and where they may be purchased. Their presence in this exhibition could be interpreted as an implicit critique of the current food supply chain.

1.2.4 The wax models and my thesis

The collection of wax fruit held by the Museum is at once a reflection of what has been grown; they are a heritage collection and a repository of agricultural diversity, while at the same time the models are cultural evidence of the importance apples have played in in the political economy of Australia. As settlers established new places of production and familiarised themselves with their new environment, invariably new identities were created that - as I will highlight in Chapters Five and Six - have been critical in the survival of these places as orcharding places, over time. The collection is symbolic of the pride the early colonists took in demonstrating the ability to grow European crops in the Antipodes and to be successful in exporting them across the globe.

But the wax models are more than symbolic; they are in fact a tangible heritage. Many orcharding families have a history going back four or five generations. Their identity is embedded in the traditions of apple growing. As the interviews reveal, there are even some growers who are still in the same location as their ancestors, however the actual orchards have changed significantly as over time new trees have been planted and also practices of growing apples has undergone considerable change. Apart from buildings and a few very old trees on some orchards, the heritage of their long family history in orcharding is almost invisible on site. For those families, whose ancestors contributed apples to the museum for modelling, the collection of wax models makes their history tangible. Nonetheless, even to those growers without a long history of orcharding, the wax model collection is a legacy and validates the history of apple growing in Victoria.
The apple models are the poster-child of the government’s aspiration for productivity. But that narrative stands in stark contrast to the stories of present-day growers. As my thesis will demonstrate, theirs is largely a story of a struggle for survival. Their sentiment reflects a lack of government support and continuing market pressures to adopt expensive technologies to produce higher quality and quantities of apples, with growing conditions worsened by ecological limitations such as pests and water availability.

The collection is proof of what was possible to grow in Victoria, but as my research reveals, the physical, social and economic realities are such that this rich diversity of bountiful and beautiful apples is, today, little more than a memory. My thesis contributes to appreciating the value of history in understanding that places of production are as much physically assembled as they are socio-culturally constructed – just as the wax apple models. Problems arising in the relationship between socio-cultural settings and biophysical place have a historical context and can be considered as part of a social and ecological system, itself characterised by unpredictability and continuous change. Throughout my thesis I will return to the wax apple models as they contribute to and elucidate the narratives I tell, not only about the history of apple growing, but also of contemporary growing practice and the relationship between biophysical and socio-cultural place.

I now provide an overview of my thesis; including my motivation, the overarching aim of my research, some limitations and an outline of my thesis structure.

### 1.3 Thesis overview

The purpose of this overview section is to provide the background and motivation for my study. I describe the aim and outline the pathway to achieving it and some associated limitations and difficulties. Lastly, this section serves as a signpost for my thesis as a whole.
1.3.1 Thesis aim

This thesis demonstrates how places of production are part of wider social and ecological systems. I do this through a case study of apple growing in Victoria. Tracing the connection between apple growing and place and their contribution to the history of Victoria, reveals how apple varieties were selected and how these created areas of biological, cultural, social and economic significance. Through historical research and interviews with apple growers, I investigated how these places and practices of apple production have changed over time, and will continue to do so, in response to changing climate and land use. By placing contemporary practices in a historical context and analysing the rationale behind certain actions, I argue that we have insight into future possibilities in dealing with social-ecological change.

1.3.2 Research approach

By using Bourdieu’s theory of field, I identify the complex interactions that exist between how apple orcharding has evolved, and how these practices are responding to changes in economic, socio-cultural as well as physical conditions. The apple industry in Victoria has the characteristics of what Bourdieu refers to as a game and Bourdieu’s concepts of field, habitus and capital resonate here. If the apple industry is the field, then the players within are the growers and families who over generations have accumulated knowledge and experiences that, together with cultural influences, determine their disposition, or habitus. The position of apple growers is further influenced by the composition and amount of capital they hold.

To address the complex relationships that exist between the socio-cultural and physical domains of apple growing, I draw on social-ecological systems (SES) thinking. I use landscape - defined as a specific area, containing physical elements, social and cultural norms, as well as individual perspectives - as a metaphor to explore the coupling of social and ecological place of apple growing. Apple growers and their communities (social) are located within and
contribute to physical settings (ecological). Both need to be considered together as one inextricably linked system (Walker and Salt, 2006).

I employ a qualitative research approach, whereby I utilise face-to-face interviews and historical research to co-construct a narrative that draws on the respondents’ personal histories of apple growing as well as contemporary orcharding information. The use of SES thinking and Bourdieu’s theoretical concepts allows me to critically analyse how orchardists respond to social, ecological and economic pressures. I also draw on concepts of environmental history and place theory to explore how global productivism influences the growers’ local practices.

1.3.3 Limitations

The history of apple growing in Victoria is a relatively short one - apples arrived with the first European settlers only 200 years ago. My thesis does not give a detailed historical account of all apple growing places in Victoria, rather it aims to position apple growing in a wider social and ecological context, symbolic of agricultural production, diversity and place in general. In spite of being a very specific study this case study is based in systems thinking and therefore the context has relevant implications and connections to many other forms of agriculture within the same time period in Australia. Victoria has been, and still is, the biggest apple producing state in the country and therefore it is a useful case to highlight fluctuations in national market trends, developments in growing practices and changes in the social fabric of orcharding communities - all of which combine to co-construct place.

1.3.4 Contribution

As this thesis will demonstrate, there is much literature on both the physical impact of climate change on apple growing and the social and cultural aspects of orcharding in
Australia and internationally, including place specific historical accounts. It is generally accepted that agricultural production landscapes are multifaceted social-ecological systems that require a holistic approach when attempting to understand the complexities surrounding them at different scales (Walker and Salt, 2006, Darnhofer et al., 2010). Agriculture constantly undergoes economic, socio-cultural and biophysical changes, and hence it is important to adopt such a systems perspective.

Research suggests that studies ought to direct more attention to the broader context surrounding agricultural biodiversity, or agrobiodiversity (Veteto and Skarbo, 2009). It is critical to recognise the foundations of current agricultural practices in order to understand how this heritage has bearing on today’s actions. What separates my research from the existing literature, is not only the emphasis on the connectedness between the social and the ecological, but also the critical analysis of the interplay between physical aspects and the power structures that drive the food production system, reflected in the interviews with the apple growers. My contribution also lies in the application of two complementary conceptual frameworks, namely Bourdieu’s theory of field, and social-ecological systems thinking. While these have been applied in combination before (see recent dissertation by Tamara Sysak, 2013 entitled: “Drought, power and change: using Bourdieu to explore resilience and networks in two northern Victoria farming communities”), my use of these theoretical concepts is set apart by the unique focus on place.

My thesis redefines the importance of place as a way of better understanding the interdependencies within it as a coupled social-ecological system. Apple trees are literally rooted in place, not easily shifted to new locations, and the technology and infrastructure invested in orchards limits mobility - of growers, not just the trees - even further. Mirroring this, many orchardists exhibit a profound connection to place through long family histories of apple growing. Changes in physical conditions and in the social fabric of places due to urbanisation and agricultural intensification mean that the viability of these places as agricultural production landscapes needs to be reconsidered. By adopting Bourdieu’s theory of practice - in particular the concepts of field, habitus, capital, hysteresis and symbolic
violence - underpinned by social-ecological systems thinking, my research contributes to the conceptualisation of the relationship between power structures, ecological influences and environmental history in the context of changing agricultural landscapes.

1.4 Thesis structure

Chapter Two provides the rationale for my research. After an overview of the physical impacts of climate change on apple growing in Victoria, I explore the literature surrounding the socio-cultural and historic aspects of orcharding. I then introduce and provide context for the terms local knowledge, landscape, heritage and place; and explain their significance and how they are connected. The chapter concludes with the evolution and overview of the research questions.

Chapter Three outlines my methodology and pathway of how I will answer the research questions. I first introduce my theoretical framework, based on social-ecological systems thinking, in combination with Bourdieu’s theory of practice. I explain certain concepts I draw on throughout my thesis, including field, habitus, capital, hysteresis and symbolic violence. Then, I reflect on the significance of environmental history and its critical contribution to my research. Lastly, I describe my research approach, including methods of data collection and analysis.

Chapter Four addresses the first research question: ‘what is the connection between socio-cultural place and ecological places of apple growing?’ By recognizing apple production landscapes as social-ecological systems, I present the environmental history of apple growing and give an overview of how places of orcharding have been shaped over time.
In chapter Five I examine the second research question: ‘what factors determine where, how and what apple varieties are grown today?’ I present a Bourdieusian field analysis and discuss the underlying structures that impact on contemporary apple growing practices.

In Chapter Six I consider how apple growing practices are connected to place and shaped by history. I then explore the potential of symbolic capital and place (and the heritage within that place) in countering the symbolic violence experienced by the apple growers. I conclude the chapter by analysing in detail how growers respond to these pressures they experience.

Chapter Seven provides an overview of the policy implications of my research. I offer some suggestions for government policy and support measures. I emphasize the importance of underlying power structures and the significant role of history, and I argue that any services or support programs need to be tailored to the appropriate level and need of each orchard business and the individuals who are involved.

In Chapter Eight I bring my thesis together. I reflect on my research questions, and outline my key findings. I then address the theoretical contribution of my thesis, using social-ecological systems thinking in combination with environmental history and Bourdieu’s theory of practice. Lastly, I highlight some limitations and suggest areas of possible further research.
2 Chapter Two, in which I provide context and introduce my research questions

2.1 Introduction

This chapter provides the rationale for my thesis by describing the intricate and dynamic relationship between the physical and the socio-cultural aspects of orcharding in Victoria. I first outline the expected impacts of climate change on the physical aspects of apple growing; then I move to the complexities of agricultural production landscapes as social and ecological systems. I then give an overview of the socio-cultural and history literature surrounding apple growing. While this chapter focuses on today’s apple growing industry, I emphasise the critical role of environmental history (discussed in Chapter Four) in positioning contemporary practices within a historical context.

I then turn towards certain terms I refer to throughout this thesis: knowledge and memory, heritage, landscape and place. Through the review of literature as well as my fieldwork, I have evolved definitions of these terms that inform key ideas in this thesis. This chapter concludes by introducing the research questions, before outlining my methodology in Chapter Three.

2.2 The context

Australia is only one of many nations that have been affected by globalisation and population growth, placing increased pressures on natural resources and agricultural productive land in particular with regards to climate change and its predicted impacts (Harman and Choy, 2011, Stokes and Howden, 2010, Webb and Whetton, 2010). There is very high confidence from the scientific community that temperatures will increase in all Australian regions over the rest of this century (CSIRO, 2007) and research points to climate change exacerbating drought conditions, especially in south-eastern Australia (Steffen,
2015), which is also the most productive apple producing region in the country (APAL, 2015b); in addition, Australia’s population, like the rest of the world, is predicted to expand significantly in the decades to come.

Compared to other countries, Australia has limited Government support for the farming industry, which is dominated by family owned farms, giving the impression that Australian farmers are very efficient (Millar and Roots, 2012, Lawrence et al., 2012). Yet, the distinction between family and corporate farming is not clear, with many family owned farms being controlled by external (and very corporate) drivers such as supermarkets or processing industries (Pritchard et al., 2007). While in the short term there is little concern raised in the literature about Australia’s domestic food supply, severe problems are expected in the long term due to changing land use, changing climate as well as social and economic factors (PMSEIC, 2010, Millar and Roots, 2012). The concerns reflect expectations of a decrease in arable land as a consequence of land degradation by intensive farming methods, as well as rapid urban expansion, resulting in issues of supply and distribution of agricultural products (Lawrence et al., 2012, Harman and Choy, 2011, Millar and Roots, 2012, Ford, 2001, Stokes and Howden, 2010).

Current agricultural practice and policies are embedded in a productivist mentality that aims to perpetually increase financial returns by maximising efficiency (Lawrence et al., 2012). While climate change is recognized to have significant impact on the physical aspects of agricultural production, there is less focus from the private and public sector on the coupled socio-cultural and ecological effects, but also opportunities, to effectively deal with climate change into the future.

My thesis demonstrates creates an understanding that the relationship between place and agricultural diversity is central to dealing with changes in climate and land use in the future. In now review the physical impact of climate change on apple growing, before moving into the literature addressing agricultural landscapes as social-ecological systems.
2.3 Climate change impact on apple growing

The Garnaut Climate Change Review prepared in 2008 stated that climate change will impact Australian fruit growing (Deuter, 2008). More recent studies also recognise the adverse effects on the industry from the estimated 0.9 degrees rise in mean temperature from 1990 by 2013 (Thomson et al., 2014, Gunasekera et al., 2007, Putland et al., 2011, Deuter, 2008, Darbyshire et al., 2013): not only will some varieties become unsuitable in certain areas, but the changing distribution and increase of pests, diseases and weeds will place mounting pressure on the industry. Damage from sunburn, heat stress and/or increased rainfall will likely worsen and affect the marketability of fruit. In addition, more intense rainfall will amplify soil erosion and simultaneously, increasing dry conditions in other times will put extra pressure on water supply. Increased costs for fuel, water and fertilizers will exacerbate the strain on the industry.

As Putland et al (2011) outline in detail, the relationship between changing temperature and fruit tree phenology is complex. Apple trees depend on dormancy during winter months for protection against cold temperatures. A certain amount of winter chilling hours, or vernalisation, is needed to break this dormant phase and to initiate bud burst (Darbyshire et al., 2013). How many chilling hours a tree requires for this break to occur is not only dependent on the genetic make-up of the variety but also on the weather conditions, in particular the temperature (Wilkie et al., 2013). And while it is known that a lack of required chilling leads to delayed and inconsistent flowering (Thomson et al., 2014), there is still limited knowledge surrounding exact triggers and timing of bud burst and flowering.

Nonetheless, it is widely acknowledged that a changing climate will cause temperatures to rise and extreme weather events to become more frequent, pests and diseases will increase and water availability is predicted to decrease (Thomson et al., 2014, Putland et al., 2011, Ramos et al., 2011, Webb and Whetton, 2010). Historically, Australia has adapted to pressures to the agricultural sector (ecological as well as economic) by increasing productivity through technological fixes (Gunasekera et al., 2007). There are many
suggestions as to how to manage these impacts, which have already been implemented widely. These range from more efficient water usage, hail and sun/UV netting, integrated pest management techniques (such as biological controls, better monitoring, and the use of disease resistant varieties and rootstock), as well as a focus on tree row orientation to optimise shade and light penetration and to reduce sunburn (McClymont et al., 2013, Putland et al., 2011, Thomson et al., 2014, Deuter, 2008).

Research also suggests that in the long term, orchard site selection will be crucial, as warmer regions will become less suitable, even with the best technologies available (Webb and Whetton, 2010, Putland et al., 2011). Adaptation strategies proposed by Deuter (2008) include the selection of cultivars that are more suited to the local conditions as well as adopting more locally adapted cultivation practices. Similarly, Hennessy and Clayton-Greene (1995), and more recently Darbyshire and colleagues (Darbyshire et al., 2013, Darbyshire, 2013, Parkes and Darbyshire, 2013) suggest that in areas where the required chilling for fruit trees cannot be met under rising temperatures, the selection of varieties with lower chill requirement needs to be considered. And as Thomson et al emphasize (2014), the capital invested in orchards and associated infrastructure such as cool stores, means that such adaptation measures could be more economically viable than relocating entire orchards.

However, there seems to be a lack of focus by the scientific community on socio-cultural effects of these mentioned changes, and how the adaptation measures will be carried out on the ground and with what support. In Australia today, 56% of pome fruit orchards are less than 49 ha in size and the trend for some time has been that many smaller businesses are either exiting the market or consolidating into larger operations (Buxton, 2007). While in the past, growers collaborated via centralised cool storage and packing facilities, today’s industry is a lot more fragmented, compared to other export markets such as apple businesses in New Zealand, Chile or South Africa (ibid).
Government assistance for apple growers today is limited to education via various channels. Apple and Pear Australia Limited (APAL), an industry body representing apple and pear growers in Australia provides education to growers and undertakes research in partnership with the federal Department of Agriculture, Fisheries and Forestry (DAFF). The program entitled ‘Future Orchards 2012’ aims to make growers more competitive on an international level by increasing productivity through improving growing practices and intensifying production. The ongoing national project on “Apple and Pear Production in a Changing Climate” aims to identify climate change impacts on the Australian apple and pear industry and provide mitigation and adaptation strategies (Wilkie et al., 2013, Smith, 2014) – the final report is expected in late 2016. Similarly, the APAL submission on the role of government in assisting Australian farmers to adapt to the impacts of climate change calls for ongoing government contributions to research and development, as well as training for individual orchardists, and low interest loans to support growers during the phase between initial investment and return (APAL, 2009). In the same way, the Horticulture Industry Network (HIN) aims to strengthen working partnerships between the former Department of Environment and Primary Industries (DEPI) and the horticulture industry. The DEPI provides extension services to growers, such as free one-on-one consultations for drought affected businesses.

Lawrence et al (2012) suggest that horticultural demands are not met in Australia and that this deficit will worsen in the future. In a report prepared for Horticulture Australia Limited (HAL), a not-for-profit organization that works in collaboration with the horticulture industry, it states that Australia imports 34% of its fruit supply, and suggests this as a serious issue for the nations’ food security (Growcom, 2011). Concerns are not only raised with regard to the amount of produce grown in Australia but also about how it is marketed and where it is grown. Three supermarkets (Coles, Woolworths and Aldi) control 60% of the Australian fresh food market and many of the fruit producing areas are concentrated in particular areas (Lawrence et al., 2012). This disjunction between places of production, marketing and distribution makes the industry vulnerable to natural disasters such as when the majority of banana plantations were destroyed in the 2011 cyclone that swept over
Queensland. Because the cool storage facility was located in one specific region that was affected by the storm, there were only limited other banana growing areas to fall back on. As a result, banana prices increased by over 350% (Australian Bureau of Statistics, 2011).

This dilemma, whereby physical factors are disturbing the supply of crops from particular places, is what Rudel and Meyfroidt (2014) describe as a crisis occurring at the nexus between climate change, biodiversity and food security, which requires planning acknowledging that the challenges are “as much political as they are social and ecological” (Rudel and Meyfroidt, 2014, p. 245). As they highlight, it is essentially social and political choices that impact on land use planning, in particular what varieties are grown and where.

Industry and government initiatives, however, are focused on technological advances to counter any issues that are expected under climate change. Even with some acknowledgement that locations of agricultural production need to be reconsidered as some places may become unsuitable, there is little emphasis given to the social and cultural implications of such changes.
2.4 Farming in a social and ecological system

“There is a continuing need for the agriculture sector to maintain strong productivity growth in order to cope with the potential pressures emerging from climate change. In this context, adaptation measures, including improved agricultural technologies, will be particularly important in reducing the potential impacts.” Gunasekera et al (2007, p.657)

The above quote reflects much of the literature; research and government initiatives focus on structural adjustment and techno-scientific solutions, aiming to protect productive land for agriculture, including horticulture (Millar and Roots, 2012). This is in line with what Walker and Salt (2006) refer to as the ‘optimisation approach’, whereby production is focused on maximum output to be sustained at any cost. This tactic assumes little and predictable change that can be overridden by efficient management practices. The problem, as the authors point out, lies in the disregard of other influences, such as changes in climate or land use, that are non-linear, often unpredictable and occurring at different scales (Walker and Salt, 2006, p. 6).

This non-linearity is described by Rosen and Tarr (1994) who suggest that the continuous search for more efficient agricultural practices results in the improvement of specific species, while resulting in a decrease of overall crop diversity as the focus remains on only a few. As agricultural techniques take increasingly more control over the plants’ own ability for natural selection, the natural variability decreases (Rosen and Tarr, 1994). So while much effort is expended in intensifying and optimizing production, little attention is paid to the resulting risk associated with relying on only a narrow breadth of crop variety.

In contrast to this industrial scale production, and in the face of climate change and fluctuating national and global markets, different ways of imagining production landscapes are emerging. In this section, I will consider the interconnectedness between agricultural,
biological and cultural diversity; explore literature around place-based agricultural production; as well as introduce the concept of farms as social-ecological systems that are historically embedded in socio-cultural and political contexts.

Lawrence et al (2012) argue for a more fundamental change in the agricultural production sector, aspiring for a break in the productivist style of agriculture in favour of a food system that supports local food production while maintaining high levels of crop diversity to cope with physical shocks and variations as expected under climate change. Similarly Tscharntke et al (2012) argue for a ‘land-sharing’ approach (p.54), whereby agricultural production and biodiversity conservation are integrated and practiced on the same piece of land. In the same way, Altieri et al (1987) suggest that crop germplasm, or collection of plant genetic resources, is not confined to the agricultural fields but also to adjacent land/ecosystems and therefore local systems beyond the cropping field must be taken into account. Their argument is that traditional agro-ecosystems interconnect with adjacent ecosystems, providing hunting and gathering grounds as well as habitat for natural enemies of agricultural pests such as those projected to increase with a changing climate (also see Bengtsson et al, 2005). In order to sustain food supply, it is now widely recognized that the reciprocal relationship between agriculture and biodiversity must be taken into account (Chappell and LaValle, 2011).

While food security and climate change is widely addressed on a global as well as national scale, there is a gap in the literature that focuses on place-based implications for communities and biodiversity (Stiles et al., 2011, DeFries et al., 2012). Loss in agricultural and biological diversity poses a risk as there are fewer apple varieties to fall back on if commercial varieties fail due to climate change or changes in landscape making some crops unusable in certain areas. While there will always be pressures to move forward in the search for more efficient and productive technologies, there is a need to ensure that it does not continue at the expense of cultural and biological diversity. Local memories and skills can be valuable reservoirs of knowledge about how local food systems operate and how they adapt to changes.
Recognising that food is produced within social ecological systems that are complex and adaptive (Darnhofer et al., 2010, Lansing, 2003) requires a closer analysis of the socio-cultural aspects of farming systems. Farms are complex systems requiring place-based, interdisciplinary and practical approaches (DeFries et al., 2012, Mascarenhas and Busch, 2006, Stiles et al., 2011), that take into account not only environmental conditions but also historical, cultural and social aspects (Darnhofer et al., 2010, DeLind, 2011, Nazarea, 2005). Barthel et al (2013) argue that while physical aspects of landscapes need to be protected, similar attention should be given to the knowledge that is embedded in places "that ensures the durability of landscapes of agricultural production" (p.1143). Further, Bowen and DeMaster (2014) also propose that the history that is embedded in production landscapes, together with geographical aspects of place, should form the basis for future actions. Using such a place-based approach provides agency to place itself, because producers can benefit from the symbolic meaning embedded in their production landscapes.

In the Australian context, there has been a growing body of research analysing the socio-cultural and political context of farming systems (Millar and Roots, 2012, Lawrence et al., 2012), as well as the power relationships and economic domination underpinning these production systems (Richards et al., 2013, Hattersley et al., 2013). Government deregulation and neoliberal policies, together with the prevailing mantra of efficiency and high productivity, is placing significant pressure on Australian producers, especially small-scale farmers who are struggling to compete in domestic as well as global markets (Lawrence et al., 2012), like the apple growers in my research. As I will highlight, this situation is no longer a viable option for many orchardists, and as Sinclair et al (2014) suggest, a transformative change is required for agricultural producers - including apple growers - to effectively respond to challenges as expected under climate change. Different ways of transformation and alternative trajectories growers are embarking on are outlined in Chapters Five and Six.
2.5 The socio-cultural and historical context of apple growing

“It is not about food per se, but about the relations within which food is produced, and through which capitalism is produced and reproduced. [...] refocusing from the food commodity as an object to the commodity as relation [...]”
(McMichael, 2009, p.281)

As stated, apple production landscapes are not only affected by climate change but they are also exposed to social, political and economic realities. The above quote by McMichael points to the importance of acknowledging this complex relationship. I now review literature that deals with the social and cultural aspects of apple growing and also the environmental and economic history associated with it.

American journalist Michael Pollan is one of many popular writers who have focused their work on presenting a view of food products that is transparent, one that gives a comprehensive picture of where food comes from, its social history and contemporary production practices that might otherwise be invisible to consumers. He aims to improve the association humans have with food and nature. He gives an account of the origins of apples and their place in contemporary culture (Pollan, 2003). Pollan’s central ideas hinge on the intimate connection between nature and humans, and he uses apples as an example of this close relationship. In a not dissimilar way, Janson (1996) provides a review of European pomology literature, analysing the relationship between fruit and social history. As Janson details it, the pomology literature is vast and dates back many centuries, demonstrating how human culture has always had a close connection to fruit, one that goes beyond just functional use of fruit. And while most accounts of apple growing are either focused on the physical or the social context, Henry Thoreau, American poet, author and naturalist, is perhaps one of the earliest writers to offer a more complete, social-ecological study of apple growing in his essay on ‘Wild Apples’ (Thoreau, 1862). Thoreau and Pollan
share ideas around the intricate relationship between humans and the biophysical world, and describe how we have become estranged from nature.

In her PhD study, Amanda Claremont explores the role of fruit cultivation in the formation of the Australian identity (Claremont, 2003). In this cultural study, she gives a nuanced overview of existing orchard literature, and describes orchards as settler landscapes that have created communities and contributed to the creation of their identity. Her dissertation is one that concentrates on the social and cultural, and not so much on the physical practice of apple growing.

There are several historical accounts of apple growing; examples focused on Victoria, Australia by Draper (2003, 2004, 2006), Shaw (1996), Winzenried (1991) and Green (1985). Draper has extensively written on his family’s history of apple growing in Victoria; and Shaw describes the history of apple growing on the Mornington Peninsula; while Green gives a more general overview of the history of orcharding in Victoria, but concentrates on the eastern outskirts of Melbourne; Winzenried’s account is specifically dedicated to the development of the first horticultural school in Melbourne. There are also other environmental history accounts with more emphasis on changing agricultural production management practices (Barr and Cary, 1992), or focus on the introduction of plant material (Fox, 2005). In Chapter Four I will provide more detail on the environmental history of apple growing.

The above review of existing literature on the history and socio-cultural context of apple growing demonstrates that there is a lack of attention given to the combined social and ecological aspects of orcharding. In particular, how certain communities will be affected by changing physical conditions. Knowing the history associated with apple growing in specific areas, as well as being aware of contemporary growing practices and power structures that sustain these, is a necessary foundation from which to develop recommendations how to support communities within these agricultural production places.
My research demonstrates how historical and local knowledge can contribute to an understanding of the links between agricultural and cultural systems. In focusing on the history of apple growing in Victoria and drawing on historical information and cultural memory to reconstruct narratives around the apple, it becomes clear that apples are at once a product (an object) and a representation (subject) within society. This is similar to the wax apple models, which are at once artefacts - symbolic of the country’s ambition to be part of the global apple market - and at the same time they are a tangible heritage and a repository of diversity.

2.6 Definitions

2.6.1 Local knowledge and memory

“Local knowledge and cultural memory are crucial for the conservation of biodiversity because both serve as repositories of alternative choices that keep cultural and biological diversity flourishing.” (Nazarea, 2006, p.318). In that sense traditional ecological knowledge (TEK) is similarly described as the “cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment” (Berkes, 2000, p.1252). While much of the research focuses on traditional knowledge, mainly referring to indigenous knowledge (Nazarea, 2006, Gadgil et al., 1993, Berkes et al., 2000), these ideas also pertain to local ecological knowledge (LEK) generated by and with local users of a place (Olsson and Folke, 2001). This knowledge is based within the family businesses but also within local communities.

Nazarea (2006) stresses that although the contested discourses surrounding terms such as biodiversity, and the debate around the legitimacy or authenticity of local knowledge and memory, local growers still go about their daily business “exchanging, renewing and
connecting through seeds and memories” (p.320). This, she argues is what enables famers to “resist the vortex of agricultural commercialization and monoculture to nurture a wide variety of species and varieties” (p.325). In a similar way, apple growers in Victoria used to be very closely connected through cool stores and packing houses, where they exchanged knowledge and shared information about new apple varieties. Today however, most growers have their own packing facilities and the majority of growers voiced a preference for internet resources rather than depending on exchange of information through local growers associations. Nevertheless, there are growers who still depend on each other for information and resources and some groups of growers even come together for marketing purposes. My thesis will also demonstrate the significance of knowledge and tradition passed on through the family.

Just as Barthel’s (2010) Swedish allotment gardens function as “pockets of social-ecological memory in urban landscapes” (p263), apple orchards in Victoria can also be seen as stores of local knowledge and memories to be tapped into for future reference, for example if commercial varieties are no longer suitable and older cultivars or orcharding practices may be called upon. What is known and remembered can be considered as living history, and it provides a particular account of the past, akin to the collection of wax models, which provides an indication of biodiversity at particular times.

In order to assess what can be learned from the past, the social and cultural knowledge base becomes a crucial tool, as does the reading of landscapes as a reflection of history (Eaton, 1990, Cosgrove and Jackson, 1987). However, there are difficulties associated with the integration of this knowledge source into planning and management of natural resources as scientific facts often override local knowledge (Taylor and de Loe, 2012). In a similar way, today’s growers tend to dismiss traditional growing practices because they have been overturned by technological changes.
Still, local narratives contribute to appreciating the history that is embedded in places. Artefacts such as the wax models, but also other orchard related objects displayed in local history museums make this oral history tangible and add an interesting interpretive layer. Studying the history of apple growing in Victoria exposes the relationship between social and ecological systems; it reveals the heritage that is embedded in agricultural landscapes and gives insight into how it might be protected, promoted and made accessible to the broader society.

2.6.2 Landscape

All landscapes are symbolic as they reflect social and cultural values, activities, as well as individual actions (Meinig and Jackson, 1979). As I will argue below, landscapes, as culturally constructed areas, reflect the inseparable connection between the social and the so-called natural world. Hence, I use the term landscape as a metaphor for social-ecological systems and I use apple growing in Victoria as a lens to study agricultural production landscapes.

The European Landscape Convention defines landscape as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” (p.1). This definition firstly makes clear that landscapes as perceived by humans, are a social imaginary (Cosgrove, 1984, Whyte, 2002). Secondly, it demonstrates that the character, or nature, contained in a specific landscape is a result of the interaction between human and non-human. However, one aspect missing is the concept of different scales; political, temporal and spatial, and those imagined. Naveh (1987) incorporates this in his description of landscapes, being “physical, ecological and geographical entities, integrating all natural and human caused ('cultural') patterns and processes along spatial, temporal and conceptual scales” (p.75). Similarly Verburg et al (2012) emphasize the importance of considering spatial structure and function by suggesting landscapes are shaped by “human-environment interactions” (Verburg, 2012, p.10). Ingold uses the term taskscape to refer to how “constitutive acts of dwelling” imprint themselves onto the landscape and become part
of it (Ingold and Bradley, 1993, p.158). In this sense, apple production landscapes are the inscription of the cultural, economic and physical act of planting apple trees.

Landscapes are complex systems that require a holistic approach integrating multiple disciplinary views (Greider and Garkovich, 1994, Bastian, 2001, Schaich and Bieling, 2010, Cosgrove and Jackson, 1987), taking into account all different aspects that define a landscape, physical as well as social and cultural. Landscapes only exist because humans create them, setting boundaries defining a certain landscape, in fact they are “cultural artefacts” (Low and Altman, 1992, p.16). In line with this, Schaich and Bieling (2010) suggest to attribute ‘culture’ to the term landscape, as it then reflects that (cultural) landscapes are “at the interface between nature and culture, tangible and intangible heritage, biological and cultural diversity.” (p.271). Landscapes are therefore contested by different groups within society (Whyte, 2002, p. 8), groups with diverse views about what values should be placed on certain landscapes. The notion of cultural meaning of landscapes is also touched on by Eaton (1990) who explores landscape in terms of semiotics and suggests that landscapes, just like languages, reflect cultural differences by containing certain signs or symbols. In this sense Australian apple orchards - like the wax models - are a symbol of seemingly successful European cultivation; and more recently with the removal of apple trees in central Victoria because of international market variability the pulled out and piled up trees and empty grassed-over paddocks reflect the decline of apple orcharding in that area.

The symbolic quality of landscapes is emphasized by Cosgrove and Jackson who regard landscapes as cultural constructs or images (Cosgrove and Jackson, 1987). The authors also emphasize the textual character and propose that landscapes should be ‘read’. Johnson (1994) also suggest that history is inscribed in landscapes and quote: “Our human landscape is our unwitting autobiography, reflecting our tastes, our values, our aspirations, and even our fears, in tangible, visible form” (Lewis, 1979, p.12, in Johnson, 1994). Apple orchards that are managed on an intensive basis, that is, with close plantings, up-to-date technology and infrastructure, thus, reflect the grower’s aspiration, or acceptance, to participate in a
competitive market. At the same time such an orchard landscape, or *taskscape* (Ingold and Bradley, 1993), is a reflection of the grower’s fears of failure and the anxiety to live up to the pressures exerted by the mainstream market demand.

The symbolic meaning embedded in landscapes is also taken up by Greider and Garkovich (1994) who from a sociological perspective propose that landscapes are symbolic environments (p.1), shaped by people’s values and beliefs. The authors argue that even natural occurring events are what they are because humans interpret these events in the context of their existence. As a result landscapes are filled with symbolic meanings which themselves are described as socio-cultural phenomena (Greider and Garkovich, 1994, p.2). Therefore changes in the physical environment need to be considered in a socio-cultural context. For example the recent increase in apple tree plantings in northern Victoria could be viewed as a desire to lift apple production, but rather it is the result of complex political and economic reasons. These have forced growers out of stone fruit production contracts and they have consequently planted apple trees to supplement their income.

21st century cultural geography adopts a holistic view and argues that landscapes are neither a direct result nor determinant of culture; rather they are an ever-changing and subjective process, influencing and being influenced by physical and human developments. Landscapes are no longer just objects to be studied, but they embody subjective processes and phenemological qualities (Mitchell, 2002, Palka, 1995).

Nonetheless, Palang et al (2011) suggest that there is disconnect between cultural-geographical studies of landscapes and those focusing on historical-geographic aspects. The authors propose an approach of cultural landscape biography whereby the description of “the history of the material landscape and of the world of social meanings and individual ideas grafted onto that landscape during various periods” merge. A landscape biography therefore is an account of the physical, material landscape (matterscape), the social dimension ascribing norms, values and meanings to landscapes (socioscape) and the
individual dimension which reflects personal perceptions of a landscape (mindscape) (Palang et al, 2011, p. 345). This is echoed in Low and Altman’s notion of landscapes being cultural artefacts.

It becomes clear that history is a very important element when considering how landscapes are shaped, interpreted and managed. In this thesis landscape is used as a general term to refer to a specific area, containing biological and cultural diversity, acknowledging visible and invisible scales of time and perception and keeping in mind that landscapes are a central element of cultural heritage (Whyte, 2002, p. 205).

2.6.3 Heritage

Landscapes are often evaluated in terms of their cultural, ecological and economic significance in order to develop policy and management plans (Whyte, 2002). People reviewing landscapes in terms of their meaning, therefore must take into account not only visible and tangible aspects of landscapes but also underlying values only evident after comprehensive engagement with the individuals and groups that share some sort of stake or interest in that landscape. This aligns with Scoones who calls for a “more integrative style of enquiry” which “integrates the natural and the social in exploring environmental change” (Scoones, 1999, p. 497). Because the dimension of time is important when considering the historical meaning and transformation of landscapes (Palka, 1995), I now explore the meaning of heritage and how it relates to my research.

The literature surrounding heritage is extensive but the area most relevant to this research is relating to heritage landscapes and cultural heritage. Roymans et al (2009) differentiate history from heritage by suggesting that heritage is a “practice designed to situate the past in or adapt it to the present” (Roymans et al, 2009, p.350). It is widely accepted that cultural heritage is a process, it is not fixed but ongoing and changing (Roymans et al., 2009, Harvey, 2008, Harvey, 2001, Cotter et al., 2001, Abu-Khafajah, 2010, Waterton and Watson, 2011,
Cultural heritage emerges from how people and societies interact with and relate to their environment, based on societal beliefs, values and norms; it is contextual (Tweed and Sutherland, 2007, Abu-Khafajah, 2010). Therefore, it is “virtually anything by which some kind of link, however tenuous or false, may be forged with the past” (Johnson and Thomas, 1995, in Harvey, 2001, p. 319). This definition implies that everything is heritage as long as there is a connection between the observer and the past. The link therefore depends on the context and the cultural values of a society, group or individual (Lennon, 2001).

For example, throughout my thesis I occasionally refer to ‘heritage’ apple varieties. Here, the term refers to old fashioned varieties, ones that are no longer grown, consumed and marketed on a commercial basis. One of the interviewees who grows heritage varieties gave me this definition:

“I’d say heritage varieties are those that have become obsolete in commerce.”

This implies that whether a variety is ‘heritage’ depends on context and how the apple is subjectively perceived in the present. While Granny Smith apples for example are an old Australian variety, they are not a heritage variety as they are still commercially grown and sold. Jonathon apples on the other hand are going out of fashion, mainstream retailers do not stock them anymore, and hence they are now referred to as a heritage variety.

While history and heritage often can be used interchangeable, heritage is more than history as it is the essence of history that is subjectively relevant in the present. Heritage can be tangible history, for example an old tree that has been harvested by many generations; or it can be intangible, for instance a practice or thinking that has been passed on as a tradition.

Australia has changed dramatically since colonization in the late 18th century, and heritage can be indigenous, historic or natural (Lennon, 2001). The way the production landscape heritage is defined and viewed in Australia is based on early colonial representation of the landscape (Verrocchio, 2001), explaining the distinct separation that is often held between
indigenous and other people’s cultural heritage. The question arises as to what determines whether a certain agricultural landscape is deemed to hold cultural heritage values. Applying Harvey’s (2008) premise that heritage is a cultural construct, contemporary in its use but originating in the past, means that heritage values of a particular landscape are imbued by the local people who interact with it.

Heritage is made up of cultural memories and understood by local stories (Harvey, 2001, Verrocchio, 2001, Roymans et al., 2009). Local narratives contribute to appreciating the heritage that is embedded in places. Just as museums hold and represent heritage; landscapes (and places) can do the same, made visible through elements in the landscape, that are associated with places, like orchards. And while physical museum structures can and often tend to be about maintaining a static view of events, the concept of an ecomuseum speaks to the embeddedness of heritage in geographical places (Hawke, 2012). The concept of an ecomuseum aims to “promote and safeguard a number of intangible and tangible heritage resources that are crucial in terms of defining local distinctiveness” of place over time as experienced by the people who live there (Corsane et al, 2008, p.11), and therefore is able to better reflect the dynamic nature of landscapes than the traditional museum could ever do.

For example the significance of the collection of wax apple models is amplified when the models are seen in the context of the places they come from. With the decline of orchards for instance, the rich history of apple growing in my main fieldwork site of Harcourt is not much more than a story, but through the wax models this story and the heritage of the place is substantiated. Just as the orchard industry is represented through industry artefacts (apple boxes, family labels, pruning tools) exhibited in the local Harcourt historical museum, the wax apple model collection also makes the heritage of this industry tangible.

Interesting parallels can be drawn between Bowen and DeMaster’s study of Wisconsin’s cheese industry in the US (2014) and the Victorian apple industry, especially Harcourt. The
The authors’ argument is that by drawing on Wisconsin’s heritage as a cheese producing area, the cheese makers are able to differentiate themselves and survive in a highly industrialised dairy industry. The quality of the cheese is attributed to the terroir, or the combination of biophysical resources coupled with historical and social contexts (Bowen and DeMaster, 2014; Gade, 2004). This interplay is also the basis of social-ecological systems thinking. The concept of terroir resonates here, as it stipulates that the quality of an agricultural product is determined “by the character of the place from which it comes”, embodying the physical as well as socio-cultural qualities of that place (Gade, 2004, p.849). This local distinctiveness, the character of the place, or ‘disposition’, is what Hawke refers to as a manifestation of heritage (Hawke, 2012, p. 243).

But it is more than just the cultural heritage that gives places distinctiveness. For example, orchardists in the Victorian apple growing town Harcourt distinguish themselves from other places not only because of Harcourt’s history but foremost by its unique climatic and soil conditions that produce exceptionally high quality red apples. Hence, the character of place is not only a result of the socio-cultural history but importantly also depends on the physical aspects of place.

### 2.6.4 Place

In this section I provide an overview of place literature, and I analyse what place is, how it is created and how people identify with it. I demonstrate that heritage is embedded in place and that the people, who interact with place on a social, cultural as well as physical level, depend on this heritage. But equally important, place itself exerts agency that in turn shapes the people who live there.

In a similar way to landscape, discourse about place has emerged as an important aspect of research on the relationship between humans and their surroundings (Patterson and
Place is a concept that is easily understood but difficult, if not impossible, to define as it not only has diverse and subjective meanings, but also the way in which place is perceived and imagined depends on other aspects that can be vague themselves (Breen, 2001, Bennett and Agarwal, 2007). So to understand a place (whether physical or conceptual), is to acknowledge and realize what contributed to the formation of that place. I use landscape as a representation for the social-ecological system of apple growing; place is where this system can become tangible.

Places are recognized at different scales; they can be defined by space and time, tangible and intangible characteristics, and they derive their “meaning through personal, group, or cultural processes” (Low and Altman, 1992, p. 5). This means that not only do places derive their significance from individuals attaching meaning to a certain area, but places are also constructed by groups, communities or cultures and ‘stored’ in cultural memories. Similarly Riley (1992) suggests that people interact with landscapes on biological (by being part of a species), cultural (as member of a culture) and on individual levels. Place, therefore is not a fixed entity but rather an ever-changing concept. Nonetheless, Tuan (1977) describes place as something that is organized, even static. Places are signposts of human actions through time (Tuan, 1977, p. 198). So while place as a concept is blurred with multiple meanings, each place in itself is fixed.

Tuan (1977) wrote that places are constantly created by experiencing different emotions and meanings by sensing our surrounds. He distinguishes between general and specific significance (Tuan, 1977, p.164), suggesting that certain places can have a very specific meaning to those who know about it, i.e. cultural significance, however, to others the same place only holds general significance, i.e. aesthetics. Similar to the use of landscape, place is a composite of different aspects, with a meaning that is subjective and dependent on different interpretations.
While much of the literature focuses on the social construction of *place*, it is critical to not underestimate the physical attributes and how these contribute to the construction of *place*. Trentelman (2009) acknowledges this tension between some scholars putting more emphasize on the social aspects of *place* (i.e. Greider and Garkocich, 1994, Tuan, 1977) and others emphasizing the impact of physical elements of the construction of *place* (i.e. Stedman, 2003). There is a reciprocal relationship between the social and the physical through which “local community culture influences place meanings” but at the same time, the physical environment also shapes community culture (Stedman, 2003, p.673). As Corsane and colleagues point out: “the essence of place lies in the environment itself, and is defined by the individuals and communities that live there” (Corsane et al, 2008, p.3).

Pickering (2005) recognizes this as the inter-weaving between society and nature and analyses it in posthumanistic terms, emphasizing the intricate connection between the material and the social sciences, the human and the non-human. In terms of apple growing, what humans choose to grow and what *actually* is possible to be grown represents this “coupled becoming of the human and nonhuman” (Pickering, 2005, p.35). While cultural and social influences may determine what we want to grow, there are other limiting factors over which humans have little control, such as climate and the way plants adapt to certain conditions; and pests that impact otherwise ideal growing conditions.

With regard to Victorian apple production, places influence what is grown, but the relationship is reciprocal - the choice of crop also creates places. Climate influences how well crops thrive, although no longer are growers purely reliant on environmental conditions, but they have the ability to create controlled environments, with irrigation, frost cloths, shade netting and fertilisers. As Stedman (2003) holds, culture can be a determinant of where crops, in my case apples, are grown but it can also be created by emerging (orcharding) communities. For example certain cultures may choose to live closer to horticultural production and in turn shape and contribute to these local communities.
In the apple growing town of Harcourt, it was serendipity that brought apples to the land; trees were planted because of the opportunity to feed nearby goldminers. In the decades to come the suitability of the place for orcharding was recognised and efforts were made to perfect growing conditions by clearing vegetation, applying irrigation and improving technologies to support apple production. But no longer do growers have total control over their crops as so-called pests, especially birds and kangaroos, damage the apple trees. Now it is place that reveals its agency, even as we acknowledge that it has always been there but it has been suppressed by human interference. This interplay between place and the human manipulation of it, is referred to by Pickering as the “geographic-technological-social assemblage” (Pickering, 2005, p.37). This term implies that places and the non-human and human actors within them continuously co-construct each other.

**Place identity**

I have explored the meaning around place and have also highlighted how place exerts agency itself by ‘responding’ to human manipulation; now, I want to focus on the connection people have with place. Low and Altman describe places as “repositories and contexts within which interpersonal, community, and cultural relationships occur, and it is to those social relationships, not just to place qua place, to which people are attached” (Low and Altman, 1992, p. 7). Similarly, apple growers identify with place, not only on a physical level (because the ecological conditions are suited for apple growing); but because of their ‘social relationship’ which is often based on a long family history embedded in a place.

I use the term place identity to refer to how we perceive the physical environment; as Proshansky argues, the identity associated with a place emerges out of how we feel, experience and value it (Proshansky, 1983, p. 59). Trentelman (2009) points out that place identity is a subset of self-identity. Self-identity distinguishes the individual not only from other people, but also from the physical environment that impacts on our daily routine (Proshansky, 1983, p. 58). In other words, it is personal history, or heritage, that influences
how we relate to place. Hawke points out how personal identity is co-constructed out of personal history and physical place (Hawke, 2012, p.237). As I will demonstrate throughout my thesis, orchardists foremost identify as apple growers; their attachment to place depends on this self-identity.

As Proshansky (1978) argues, place identity is a subset of self-identity which for these orchardists is rooted in the family tradition of apple growing. Therefore, their attachment to place is primarily based on the physical features appropriate for apple growing. Place, as I have now established, is nonetheless more than just the physical setting. Growers connect to place through their heritage, which gives place a “temporal depth” (Hawke, 2012, p.239).

My research takes a constructivist viewpoint (Scoones, 1999, Trentelman, 2009) which acknowledges multiple perspectives and trajectories of place and recognises the diversity of associations contained in it. I will refer to place as a material location comprising of physical conditions, but also as a concept, a cultural construct or imaginary, resulting from social and cultural interaction with the environment. The notion sometimes overlaps with that of landscape, yet, places “are more than cultural landscapes; they include the people and the relations between them” (Winchester et al, 2003, p.4) But most importantly places reflect history, they display tradition, and indeed they are a manifestation of heritage (Borrelli and Davis, 2012, Melnick, 1983).

This concept of heritage however, becomes little more than a memory or imagination of place. This occurs when the physical realities together with power structures and economic pressures cause the people who live in these places social and economic hardship to a point where they can no longer pursue their existing livelihood. In fact, respecting heritage and seeing it as immutable can become a burden when people’s ingrained dispositions limit the choice of options to adapt. On the other hand, the heritage inherent in place can also be drawn upon to legitimise, authorise or promote existing land use. Therefore the concept of heritage is malleable and the growers are able to adjust their need to evoke it as required.
There is a gap in the literature with regard to the interplay between social and ecological aspects of place and the social construction of heritage within that place. This can take into account the influence of social, environmental, economic and technological history as well as the dominance of present-day economic structures because these undermine or support concepts of heritage. Places are perceived differently by those who live in and outside of a place. As my thesis will explain, this ‘imagination’ of place can at once hinder adaptation to economic and physical pressures, while at the same time it can provide avenues for resistance and new ways of re-imagining future use of place.

2.7 Research questions

After providing the context for my research, I have reviewed the literature, from which I have derived my research questions. These are based foremost on my personal interest in the relationship between place, biodiversity, food production and social-ecological change. This interest steered me to the Strategic Postgraduate Award Scholarship offered by the Museum Victoria and the University of Melbourne, aiming to work on the broad topic of place, biodiversity and rural change in Victoria.

As described in the preceding sections, there is no doubt that agricultural productive land will undergo increasing pressures and site selection will become a crucial factor in dealing with climate change impacts and population growth in the future. While the productivist style of agriculture is predicated upon technological fixes, recognising farms as coupled social-ecological systems opens up alternative trajectories that consider history and local knowledge. The close connection between agriculture, cultural systems and place has been veiled by modern technology. A desire to uncover this connection, by recognising how historical processes shape the interaction between the social and physical world, is what underpins this thesis. After considering the literature and identifying gaps surrounding these aspects in relation to apple growing, I constructed my research questions:
1. What is the relationship between socio-cultural place and ecological places of apple growing?

2. What factors determine where, how and what apple varieties are grown today?

- what role does the relationship between social and ecological place play in the contemporary variety selection process?

2.8 A note on policy matters

“There is a growing appreciation in agro-food studies that relations of power between producers, retailers and consumers are produced, transformed and reproduced through a series of processes including capital accumulation, consumer manipulation of material practices and the symbolic regulation of markets.” (Dixon, 2003 p.37)

The above quote highlights the opportunity for studies like mine to have impact beyond the contribution of academic knowledge. As such, Dramstad and Fjellstad (2013) call for scientific research to be translated into policy, especially while addressing the mismatch between spatial and temporal scales. This is particularly relevant in Australia where the “influence of government food regulatory authorities is diminishing”, giving way to the increasing control by retailers (Dixon, 2003, p. 37). There is a dissonance between the national (and global!) aim for efficiency and growth - bolstered by retail chains imposing strict quality and quantity guidelines on their suppliers - and on the ground apple growers exposed to ecological anxieties coupled with economic and financial pressures. These pressures are making it difficult, if not impossible, for growers to adhere to the ideals of efficiency and productivity.

Hence, I see a need for researchers to not limit attention to accumulating new data and interpreting it in novel and innovative ways, but to make this knowledge available to the
broader community, especially those who have the potential to act on it and incorporate it into policy and practice. I concur with Goulson et al who wrote:

“It is only when the research reaches the right audiences and is translated into practical action that it makes any difference. Very few farmers, gardeners, politicians or nature reserve wardens sit down of an evening to read a scientific journal, nor should we expect them to. If they did, they might struggle to make sense of most of it. Academics must take some of the blame for this situation; many researchers make little effort to communicate their work beyond the traditional use of scientific journals, publications which are all but incomprehensible to the layman.” (Goulson et al, 2011, p.3)

To this effect, I highlight my motivation to address implications for policy makers as well as suggest alternative routes for government to support and services (see Chapter Seven).

2.9 Summary

There is little doubt that rising temperatures and more frequent weather events will put pressures on an already struggling orcharding industry in Victoria. While the ecological implications are predicted and to some degree known, the socio-cultural repercussions have received less attention, despite a growing body of research dedicated to analysing places of agricultural production from a social-ecological systems perspective. Place in this thesis represents at once a physical location, influencing what can be grown, while reciprocally being influenced by social and cultural interactions.

I have clarified and discussed the terms knowledge, heritage, landscape and place; and I have defined my research questions. By taking into consideration the history and the power structures that underpin apple growing, as well as by examining how practices are
generated by and at once impact on place and biodiversity; my research contributes to the wider literature on social-ecological systems in relation to changing agricultural production landscapes. How I will do this is the focus of Chapter Three, which outlines my theoretical framework and methodology.
Chapter Three, in which I outline my methodology and discover Bourdieu

3.1 Introduction

This chapter outlines my research methodology. I begin with describing my theoretical framework, which is based on social-ecological systems thinking and Bourdieu’s theory of practice. I then explain my historical research approach and the methods I used; consisting of document and artefact analysis, as well as interviews. Finally, I describe how I conducted the interviews, including the selection and recruitment process, and methods of analysis.

3.2 Theoretical framework

My research employs qualitative social research methods, embedded in social constructivism (Crotty, 1998). This approach aims “to develop an understanding of social life and discover how people construct meaning” (Neuman, 2006, p.88). I adopt a research approach framed by social science that acknowledges the complex nature of food production systems (Rivera-Ferre, 2012).

Social-ecological systems (SES) thinking (Walker and Salt, 2006) provides the framework for my research. Apple growers and their communities (the social) are located within and contribute to physical settings (the ecological). Both need to be considered together as one inextricably linked system (Walker and Salt, 2006). These ideas of connectivity align with my second theoretical approach, that of Bourdieu’s theory of practice. SES thinking sits within constructivist ontology, whereas Bourdieu’s concepts are rooted in critical theory. Nonetheless, these theories do not stand in contrast, rather, they add to each other as they both assume interactions between social and ecological system elements to be relational.
To comprehensively explore the changing apple production landscape, I focus on practice and how practice generates knowledge. Interaction of individuals with place generates practices and actions derived from within their experiences (constructivism). However, in analyzing the current practices of apple growing, there is also a need to critically uncover and engage with the underlying power structures that determine the system boundaries for these apple growers. Environmental history is particularly useful here in locating the myriad possibilities within past practices that motivate today’s apple growing practices.

Environmental history explores the interactions between the social and the natural world over time (McNeill, 2010); it aims to “explain the landscapes and issues of today [...] to elucidate the problems and opportunities of tomorrow” (Dovers, 1994, p.4). By drawing on concepts from environmental history, I argue that historical processes underpin how social-ecological systems emerge; and it is this forming of SES boundaries that can assist in understanding what adjustment to changes in physical, cultural and social landscapes are being made. I combine environmental history with SES thinking and Bourdieu’s theoretical concepts. Epistemologically these theories build on each other; and notably critical theory - and Bourdieu’s theory of practice! - does acknowledge historical processes as central contributors to current conditions of society (Guba and Lincoln, 1998). SES thinking is fundamental to environmental history, as both consider the intricate relationships between humans and the environment.

Therefore, I adopt a mixed methods approach (Creswell, 1998) to enable me to re-construct meaning and explore the pluralist nature of landscapes and how they are influenced by, and at the same time influence, the people who interact with them. Embedded in a constructivist/critical theorist and qualitative research approach and supported by social theory, my study engages with methods that recognize socio-cultural processes rather than seek generalizations, or in other words, the methods employed do not seek an analysis as “an experimental science in search of law but an interpretive one in search of meaning” (Geertz, 1973, p. 5).
My research is rooted within a transactional and subjectivist epistemology, whereby knowledge is co-constructed by the researcher and the object of investigation (Guba and Lincoln, 1998); meaning - or knowledge - is not something to be discovered but it is constructed (Crotty, 1998). In this sense, it is important for researchers to be reflexive and locate themselves in their “professional universe” as this influences not only the selection of the topic to be investigated, but also their methods and theoretical approach (Bourdieu, 2003, p. 283).

3.2.1 Social-ecological systems

Social-ecological systems (SES) are recognized as complex and adaptive (Holling and Meffe, 1996, Hobbs, 1997, Darnhofer et al., 2010, Leach, 2008, Rivera-Ferre, 2012, Ostrom, 2009). This systems approach is now widely used within different disciplines and stems from the movement away from traditional utilitarian resource management, where resources are viewed as isolated units detached from the rest of the ecosystem and social world (Berkes et al, 1998). Rather, resources are acknowledged as being part of a closely coupled and complex system, consisting of self-organising and adaptive elements (ibid). These ideas of complexity and adaptation form the backdrop to my research.

Complexity can be understood as an intrinsic property of a system, also labelled as ‘descriptive complexity’ (Schlindwein and Ray, 2004, p.28). This view assumes an objective reality within which complexity can be logically dissected and explained. The other interpretation is that of ‘perceived complexity’, which depends on interpretation, or in other words, it is dependent on the situation and context within which the system is viewed (ibid). Here, complexity stands in contrast to equilibrium thinking which is based on traditional straightforward scientific predictability and simplification (Scoones et al., 2007, Cilliers, 2000). SESs exhibit complexity in both forms, descriptive and perceived, but it is the perceived complexity that makes analysis of these systems more difficult.
Complex systems consist of elements that in themselves can be simple and easily defined but as a whole they represent dynamic, non-linear, cross-scalar interactions (Cillier, 2000, Scoones, 2007), characterized by uncertainty and self-organisation and adapting to constant changes that can occur at different scales (Lansing, 2003). The capacity to adapt is not to be mistaken with the concept of self-balancing equilibrium thinking (Walby, 2003), but rather refers to the ability of a system to respond to “future change or perturbations [...] without undergoing significant changes in function and structural identity while maintaining the option to develop” (Saliterer et al, 2015); an example is given below in relation to apple growers controlling supply and demand of their product.

Apple production landscapes are social ecological systems; they are complex because they contain many different actors and subsystems and are undergoing continuous change across different scales. At the same time they are adaptive because the actors involved constantly react and respond to those changes (Cilliers, 2000, Darnhofer, 2010). As part of production imperatives, growers experience an inter-penetration between local and international scales. For instance, world markets have a significant effect on the local scale as growers adapt their production regime to global demand; while extreme weather events or pest and disease outbreaks are likely to impact on the nation-wide or even international supply of apples. These systems are non-linear and characterized by uncertainty because apple growers cannot predict the quality and quantity of their yearly apple harvest. Storing apples in cool stores for up to twelve months of the year, and drip-feeding them to the market is one of the many ways orchardists have adapted to the intricate task of managing supply and demand in a production environment that is constantly changing.

Change in itself is varied, unpredictable and can occur at different scales (e.g. local vs regional, internal vs external), and can range from a temporary shock to ongoing stresses (Scoones et al., 2007). A system that is able to withstand change while maintaining its original function, adapt to changes without transitioning into a new state, or to recover
after disturbance, is understood to be resilient (Miller et al., 2010). A system’s resilience relies on the interrelatedness between social and ecological elements of that system; or in other words, “dependency on a narrow range of natural resources can increase the variance of income and hence decrease its stability” (Adger, 2000, p. 354).

Recognising that food is produced within these social ecological systems that are also tied to a very local place because of their physical rootedness, locates place as both a material representation and a subjectively understood idea. This invites a closer analysis of the socio-cultural aspects of farming systems. Nonetheless, the SES approach often lacks focus on the underlying power that drives the system (Leach, 2008). And while the social structures of society are part of the SES by definition, I use Bourdieu’s theory of practice to better inform how these structures are maintained by making explicit the power relations inherent within and across different systems.

SES thinking frames my thesis, and I use landscape - defined as a specific area, containing physical elements, social and cultural norms, as well as individual perceptions - as a metaphor to explore the social and ecological place of apple growing. SES thinking is useful in analyzing the ecological aspect and how it impacts on the social; and Bourdieu’s concepts add an important textual and interpretive layer to critically analyse the effect of underlying political and power relations. And while his theory on its own would miss a focus on the physical and ecological aspects of the system in question, ‘place’ acts as a bridge between these theories (SES and practice theory). These approaches are complementary, contributing to a deeper understanding of how history and place are related and what this means for the future of agricultural production landscapes and the communities within. By tying SES thinking and Bourdieu’s theory of practice to the meaning of place, especially how orcharding creates, and at the same time is created within a SES (as shown through the environmental history), my research fills a gap in the literature that has not been addressed as yet.
3.2.2 Bourdieu

In order to analyse my research results, I turned to the French sociologist Pierre Bourdieu. I approached his writings after I completed my fieldwork, which was also a time when I contemplated who I wanted to reach with my research and planned how I would make my research findings available. I started reading the preface of “Firing Back – Against the tyranny of the Market 2” (Bourdieu, 2003). Here, Bourdieu calls on academics and scientists to exit the confinement of their “ivory towers” and “bring the achievement of science and scholarship into the public debate, from which they are tragically absent”, and as a result they “will release the critical energy that remains confined within the scientific city” (Bourdieu, 2003, p.13). Bourdieu’s thinking and ideas instantly resonated with my belief in my own role as a researcher, and it triggered me to consider what more I could and ought to contribute to the public debate. I was eager to learn more about his theoretical approach.

Soon after starting to explore Bourdieu’s concepts of field, habitus and capital, I realised how well his ideas and theories helped me make sense of my research findings. Apple growers often referred to themselves and others as the players in the ‘game of orcharding’, and while their cliché use of the word holds no connotation to any social theory, Bourdieu’s notion of the game seemed very fitting in describing the Victorian apple industry. A game occurs in a social space and is competitive; that is, the players or agents each seek to improve their positions by accumulating economic, cultural or symbolic capital (Thomson, 2008, p.69).

3.2.2.1 Field

The social space of the game is the field. A field only exists because there is a “belief on the part of the participants in the legitimacy and value of the capital which is at stake in the field” (Jenkins, 1992, p.85). This common interest, which is the fundamental precondition for the formation of a field, is rooted in a historical context (Bourdieu, 1990, p.89). Interest,
as the “product of social conditions” is at once what contributes to the functioning of the field, and the product of how the field functions (Bourdieu, 1990, p. 88). Whatever interest someone or some group has, is dependent on their position in the field as well as their *habitus*, which in turn is a result of their social conditions.

A field is not fixed, it changes and adapts, and its boundaries are fuzzy, often overlapping with other fields (Thomson, 2008). As Bourdieu puts it, “to think in terms of field is to think relationally” (Bourdieu, 1988, p.39). We belong to multiple fields at the same time; therefore one field cannot be viewed in isolation but only in relation to others, and all fields are part of the overarching field of power; the political field. Moore (2008, p.102) states that fields “exist in and through time”, pointing towards the importance of the historical context when trying to understand relationships within a certain field (Bourdieu, 1990).

According to Bourdieu, fields are structured by a common belief in what should be valued (Wacquant, 1989, p.39). The overall field is held together by the mutual aim to grow apples and sell them to make a profit; but within that field, there is a huge divergence of interests that cause the field to constantly shift. When analysing the different *interests* apple growers have, it becomes clear that, despite being part of the same field (‘the apple industry’), their interests are so unlike and their belief in what should be valued so different, that sub-fields emerge, such as farmers’ markets and apple nurseries focusing on old apple varieties.

Thus, if the Victorian apple industry is the *field*, then the players within are the growers and families who over generations have accumulated knowledge and experiences that, together with cultural influences, determine their disposition, or *habitus*. The position of apple growers is further influenced by the composition and amount of materialised or embodied forms of *capital* they hold (Bourdieu, 1985, p.725).
### 3.2.2.2 Capital

Bourdieu argues that capital is what powers the field and it can be in material or embodied form (Bourdieu, 1985). Bourdieu defines capital not only in economic terms but also as culturally and socially valued exchanges within and across fields (Moore, 2008). In apple growing, capital does not only include the physical assets invested in the orchard (material), but also the know-how, experience, or the family history (embodied). Capital is anything that is valued, but can vary in type and symbolic worth across different fields (Swartz, 2012). Bourdieu refers to symbolic capital as cultural or economic capital that “is acknowledged or recognized” by others (Bourdieu, 1990, p.135). Through the lens of apple growing, I will use Bourdieu’s concept of *symbolic capital* (see section 3.2.2.6) to explore the meaning and significance of place and history.

### 3.2.2.3 Habitus

The *habitus* is shaped by one’s past and reflects ingrained dispositions that are the result not only of history but also of current context. It is therefore not a deterministic concept, as it is not history alone that shapes individuals; rather it stands in combination with other circumstances such as one’s position in the field, which in turn is influenced by the type and amount of capital that is held individually. To understand practice is to recognise the relationship between habitus and field (Maton, 2008). History and life experience equips individuals with a framework of dispositions; upon entering or creating a new field these can influence the field and others in it, while at the same time the field can alter the existing habitus. It is a dynamic relationship. The ingrained dispositions of the apple growers have been shaped over many generations and these dispositions have created, and at the same time they maintain, the growers’ own reality.

As Hage (2013) points out, the formation of the *habitus* is a process of “internalisation and sedimentation of the experience on the one hand”, and the externalisation of a generative capacity on the other hand (Hage, 2013, p.81). In this sense, the apple growers have
accumulated inner dispositions, but as Hage highlights, *habitus* is more, it includes the capacity to act on the dispositions. In a similar way, this can be described as ‘the push and pull of the world’ (Wagenaar and Cook, 2011, p.193). The authors describe practices as emerging out of experience with our surrounds – i.e. *place* - while at the same time our practices sediment new experiences.

Orchardists’ narratives reflect knowledge of both, their embedded history as apple growers as well as contemporary orcharding know-how, which, together with their embodied understanding of what it is to be an orchardist, form the habitus. Their knowledge about, and connection to, physical place is critical here, which when only viewed from a Bourdieusian perspective would receive little attention. Through SES thinking however, I will explore how the ecological situation of the growers constantly sediments experiences which are internalized and then influence their practice. Hence, the concept of habitus is used in this thesis to explain the reasoning behind certain practices and decision-making processes amongst apple growers. Practices are socially situated and part of a network of relations (Wagenaar and Cook, 2003, p.151); or from a Bourdieusian angle: practices emerge out of the relationship between habitus and field. SES thinking is useful here as it reflects on the interpenetration of practices between different temporal and spatial scales. Importantly, our experiences and practices are at once located within place, while at the same time they contribute to the formation of place (socio-cultural and physical). Therefore to affect practices is a complex undertaking as it requires complete attention to the individual level (his/her history and current circumstances), as well as consideration of the context, that is, acknowledgment that practices are embedded within multi-scalar, dynamic and coupled social-ecological systems. Importantly, the uncertainty associated with complex systems can also present a barrier to practice change (Dramstad and Fjellstad, 2013).

### 3.2.2.4 Hysteresis

Field and habitus are mutually generated and generating; hence, a change in one triggers a change in the other (Hardy, 2008). If changes in the field occur but the habitus is such that
the players don’t respond rapidly enough to accommodate the change, then this is what Bourdieu refers to as the *hysteresis effect* (Bourdieu, 1977, p.78-9). *Hysteresis* provides the link between systemic change within the field, and the subjective individual response, or the habitus; it reflects a disconnect between intent, action and outcome.

The hysteresis effect is something almost inherent in apple growing, as there is a delay, or lag, from the time of grafting a new variety or adopting new technologies until full production is reached. The concept also explains how the difference between those who are adopting new practices and diversification choices is not just based on resources available or industry experience as such, but rather on their life experience and ensuing dispositions (their habitus). Hysteresis occurs across all apple-growing areas in Victoria and can be attributed to the rapidly changing circumstances surrounding apple growing. Not only have the economics changed significantly (i.e. high Australian dollar in 2012; competition with imported apples and fewer opportunities for export) but the physical realities also mean that growers can no longer keep up with the rate of production. Increasing pests and diseases, and more frequent extreme adverse weather events, coupled with high input costs such as those associated with paying for irrigation water; make it increasingly difficult for growers to continue with the exponential growth the industry has experienced over the last century.

### 3.2.2.5 Illusio

A closely related concept to that of *interest*, and often used interchangeably by Bourdieu, is that of *illusio* which can be explained as the “tendency of participants to engage in the game and believe in its significance, that is, believe that the benefits promised by the field are desirable” (Heidegren & Lundberg, 2010, p.12). *Illusio* is a product of the field, and explains the taken for granted interest that keeps a field functioning.
In the case of orcharding, *illusio* is represented in the way growers continue with their orcharding business even though from the outside it could appear unviable. Or in Bourdieu’s words: “*Illusio* in the sense of investment in the game doesn’t become *illusion*, in the original sense of the art of deceiving myself […] until the game is apprehended from outside, from the point of view of the impartial spectator, who invests nothing in the game or its stakes” (Bourdieu, 1990, p.195). Or as Heidegren and Lundberg describe it, “illusio is an illusion only to those outside the field” (Heidegren & Lundberg, 2010, p.12). It is a concept explaining the blinkering of the players as to why and how they are indeed performing their everyday practices; in Bourdieu’s words, it is their “tacit recognition of the value of the stakes of the game” (Bourdieu and Wacquant, 1992, p. 117).

### 3.2.2.6 Symbolic violence

To understand how a field functions, means to recognise the power relations and constant struggles within it. Bourdieu argues that symbolic *capital* embodies symbolic *power*; that is “the power to make things seen” (Bourdieu, 1985, p.735). In order to analyse social inequalities (such as the ones apple growers are experiencing), which is one of Bourdieu’s main endeavours, one must look at the causes that are usually rooted in symbolic domination not in actual physical force (Schubert, 2008, p.183). Symbolic domination is held by those who have gained enough recognition “to be in a position to impose recognition” (Bourdieu, 1990, p. 138). If this domination plays out in such a way whereby social agents do not recognise or perceive it as domination then this is what Bourdieu refers to as symbolic violence, a hidden form of exploitation without physical violence (Bourdieu, 1977, p.192).

In an interview with Loic Wacquant (Professor of Sociology and former student of Bourdieu), Bourdieu outlines the steps in analysing a field as follows: first, it is essential to position the field in question in relation to the field of power, often the political field. The next step involves the mapping of the objective structures of relations between agents and institutions; and lastly, one needs to analyse the habitus of the agents which involves taking into account the historical context (Wacquant, 1989, p.40) (see figure 3.2). In doing this, I
will be able to answer two of my main research questions. The first deals with analysing how apple growing places have been constructed and shaped; and second, how this relates to contemporary growing practices and the future of apple growers in Victoria. The former places the field of apple growing in the wider historical context and relate it to other fields such as that of power, i.e. the political field; and the latter involves taking it a step further and using this background knowledge and awareness of how the field of apple growing relates to other fields, to consider today’s practices and how they are based on the past.

Figure 3.1 Schematic of field: players are positioned according to their capital and habitus.

By using Bourdieu’s theory of field and its associated concepts, I identify the complex interactions that exist between how orcharding has evolved, and how current practices are responding to changes in economic, socio-cultural as well as physical conditions. I adopt Bourdieu’s concepts to explore the, often unacknowledged, power struggles (represented in illusio and symbolic violence) and I apply SES thinking to delve deeper into understanding the effect of ecological conditions (see figure 3.2). I also draw on environmental history to recognize how past experiences are embedded and reflected in the growers’ practices,
because as Swartz (2012) writes, Bourdieu’s concepts seek to explain “the social world by situating the actors and their categories within a broader social and historical framework” (Swartz, 2012, p.22).
Figure 3.2 Schematic of theoretical framework
3.3 Case study

A case study approach is well suited to an in-depth analysis of the Victorian apple industry, The ‘case’ being the object of the study, bounded by time and place, can be intangible as an event, or tangible such as a group of people (Creswell, 1998). I collected data from multiple sources of information (Creswell, 1998) such as document analysis, historical research, physical artefacts, and interviews. What binds all these facets together is the assemblage of these parts in the narrative, which can be “understood to organize a sequence of events into a whole so that the significance of each event can be understood through its relation to that whole” (Elliot, 2005, p. 3).

The ‘case’ is Victorian apple production since the 1830s until present, and with some projections into the future. While the case is bounded by time and place, drawing a line around a ‘case’ is not very clear cut. For example, to trace the beginnings of apple production I consider where the apples came from originally; my thesis is not about the entire contemporary apple industry as there are other places than Victoria that play an important role in that industry in Australia. Yet, Victoria is the biggest apple producing state in Australia and can therefore be used to highlight and explore issues that face the Australian apple growing industry in general. Victoria’s climate is suitable to produce all varieties currently on the market. Nonetheless, the Victorian apple industry is not an intrinsic case study, in the sense that it is the uniqueness of the case that is of interest; rather it is used as an instrument to demonstrate a broader issue (Creswell, 1998). The aspects I aim to consider with a case study are listed below:

- illustrate colonial landscape transformation (as place) by studying environmental history, including the development and implications of infrastructure and innovations in technologies among apple orchards/industry;
• explore the changes in agricultural practices that occurred since non-indigenous settlement through environmental history and interview narratives to identify changes associated with place (biophysical and social conditions) and technology;

• investigate the loss of biological and agricultural diversity (cultural, social and economic factors through secondary documentation and interviews);

• reconstruct the significance and purpose of the wax fruit model collection at Museum Victoria by tracing the use of it in the past and comparing it to the meaning the collection holds today, as well as the changing role the Museum plays in relation to public education and promotion of horticulture; and,

• identify the gap in the literature around the construction of place and the selection of crops; through secondary literature and interviews, ascertain if there was the influence of climate on the growing of the consequent crops; and identify what climate, variety and place knowledge exists and how this synthesis contributes or could contribute to the discourse on local food provision under climate change.

By selecting the Victorian apple industry as a case study I was able to consider all of the above aspects. Apples were planted by the first settlers in the 1830s, and Victoria has a well-documented history when it comes to apple growing. While there is much useful information, there is no existing comprehensive analysis of the history of apple growing in Victoria. 43% of Australia’s apples are grown in Victoria, making the state the biggest apple producer in the country, signifying the suitability of physical conditions for orcharding. Access to the Museum Victoria’s wax apple collection, with over 600 models, some of them dating back to the mid-nineteenth century allows me to evaluate this collection not only as a material source but also consider it as a representation of culture and the meaning of apples over the last 150 years and investigate what value the collection holds for the future.

| Victorian production of apples (tonnes) | 116,580 | Australia wide production of apples (tonnes) | 266,771 |
3.3.1 Selection of case study sites

There are several major apple growing regions in Victoria and I decided to focus on one in particular to allow me to gather rich data; one that fit with the above criteria and allowed me to get insight into all the aspects I endeavoured to consider. I chose Harcourt as my main research site. Harcourt is a township in central Victoria, located in the Harcourt Valley, at the foot of Mount Alexander. It has a population of 872 people and comprises 28.5 km² (ABS, 2011). The climate is temperate, and extreme weather events such as droughts and hail are not uncommon (ABS, 1999). The mean annual rainfall comprises 697mm (Bureau of Meteorology, 2015). As Anthony, one of the interviewees, points out below, this average varies significantly as the rainfall can vary greatly between years:

“It’s supposed to be average rainfall of 660 per annum. It may have happened in some years but....we get weather on both sides of that. If you take the long view, there were droughts and then there have been years of heavy rain. So your average is not necessarily to be expected every year. And people who thought that the last two years of rainfall were so good that they started a new garden are going to become a dud because they won’t be able to sustain that in the next dry spell. We will go into a dry spell.” (Anthony, February 2013, Harcourt)

Harcourt was one of the earliest orcharding areas in Victoria. In addition it has undergone significant changes, in terms of land use, physical changes, as well as population changes that have impacted on the social fabric of the area. Nonetheless, the area is still known for its high quality apples and even with only a handful of growers left, Harcourt is still imagined by Victorians as good apple growing country. There is a well-documented history, including a local museum and historical society. 41 of the Museum Victoria wax apple models were
created based on Harcourt apples, making the region a significant contributor to the wax apple collection, ranking second only after Hazelglen (no longer a commercial apple growing place) and government research station sites in Melbourne. All over, *place* plays an important role in the Harcourt apple industry. Not only physically, in relation to suitable climatic and soil conditions for orcharding, but also in terms of place identity, and social and cultural meaning of Harcourt as a place.

However, I also decided to get a statewide overview of apple growing over time and gather an understanding of today’s situation and contemporary growing practices in other areas around Victoria. Hence, I also interviewed growers from the following other orcharding areas: Yarra Valley, Red Hill (Mornington Peninsula), Goulburn Valley, Melbourne, Bacchus Marsch and Gippsland. (see figure 3.3)

![Figure 3.4 Map showing apple growing areas in Victoria where interviews were conducted (source: Chandra Jayasuriya, University of Melbourne, 2013)](image)
3.4 Methods and data collection

For the data collection I employed a mixed methods approach. By this I refer not to mixed epistemological positions, but to mixing different theoretical approaches as well as employing a range of methods that stand independent from their epistemological origins (Bryman, 2004). There are several reasons why a mixed methods approach can be appropriate. For my research it was clear from the beginning that one primary method would be insufficient (Creswell and Clark, 2011) to represent the history of apple growing in Victoria, to analyse the meaning of place in the context of orcharding, while at the same time to consider contemporary growing practices in order to explore how to achieve sustainable and resilient apple growing in the future. For a meaningful outcome it is important to bring the mixed approaches together, not have them stand on their own (Bryman, 2001). Using a mixed method approach allows me to triangulate my findings from various sources (Flick, 2000). I employed a historical research design and used document and artefact analysis, as well as interviews.

3.4.1 Historical Research design

“Historical research is a translation of translations” (Lundy, 2008, p. 399), implying that the interpretation of history is biased and influenced by the researcher’s present day perspectives and context (Ayres, 2008). Thomas (2003) describes historical research as a way of “identifying how some phenomenon has changed or has remained the same with the passing of time” (p.17). Not only does a historical investigation involve a chronological view of past events, but it also aims to give meaning to past events and analyse the “relationship between structure and agency” over time (Gardner, 2006, p.135).

I therefore make use of the historical research approach to first of all place my study into historical context (Chapter Four). This is done by giving an overview of the environmental history of apple growing. I then interpret the historical data I collected in order to make
sense of how history as a dynamic process is continuously created and always impacts on today’s practices and understandings of social life. Places (social and ecological) evolve over time and the history associated with them becomes an important aspect for understanding their contemporary meaning and use.

Social-ecological systems constantly undergo changes; history therefore is an essential aspect to consider when analysing how actors in these systems react and adapt to changes. In Bourdieu’s theory of practice, history is key when trying to understand how today’s practices unfold; and his concept of *habitus* can in fact be seen as the bridge between social and ecological systems. Habitus refers to our ingrained dispositions which are the result not only of our history but also of our current context (Maton, 2008, Wacquant, 1989). I argue that the current context is social *and* ecological; by that I mean that we are influenced as much by socio-cultural circumstances as we are by our physical environment.

To gather data in order to analyse history as described above, I used the following methods:

document and artefact analysis, scoping and pilot study and interviews.

### 3.4.2 Document and artefact analysis

One method of researching socio-cultural processes is that of document analysis (Seale, 2004). Plummer (1983) describes these as “documents of life” and suggests that diaries, letters and photographs are valuable sources of information about social experience, however, often neglected in the research literature. I have used such sources to get a better understanding of the history of the apple industry. While interviews contributed anecdotal information about nineteenth century apple orcharding; letters, diaries and photographs are a primary source (Altheide, 1996, Lundy, 2008) and give firsthand insight into cultural and social processes of the time.
Repositories of sources I accessed include the State Library of Victoria, University of Melbourne library, Doncaster library, Harcourt Historical Society, and the National Library of Australia online search engine TROVE which gives access to a variety of colonial and regional newspapers and publications. I investigated journal articles and also anecdotal information from contemporary apple growers (see section 3.4.5 on interviews). I searched early fruit tree and nursery catalogues, newspaper articles, and any other documents relating to the apple orcharding industry in Victoria, including reports and journals by the Victorian Department of Agriculture, and Victorian Year Books.

I also searched current government documents, reports by research and development organisations, as well as the Australian Bureau of Statistics to get an understanding of today’s apple industry in Victoria, not only in economic terms, but also to explore and correlate this information with climatic data. I used statistical data from Government publications such as the Statistical Accounts of Australia and Victorian Year Books to tabulate data relating to apple and orchard production in Victoria. I recorded yearly orchard area, apple production and where available, number of commercial fruit tree growers. From the same sources I also recorded weather data to track against the production data.

Another source of information has been the Museum Victoria’s Economic Botany and Agriculture collections, which contain a wide range of trade literature, photographs as well as an extensive collection of wax fruit models and associated notes which I described in Chapter One.
As laid out in the introductory chapter, the collection comprises 1800 wax models of fruits and vegetables. The compilation of around 600 wax apple models is a magnificent visual legacy of what was grown and it also signifies the importance that was placed on certain varieties. The wax fruit model collection is now considered a heritage collection, of objects (apples) and culture. However, at the height of modelling in the 1860s and 70s, the wax models had a very contemporary and practical use. Local artisans who were employed by the museum modelled the apples. The purpose was to show Australian growers what could be grown and to demonstrate pests and diseases that were common at the time. In addition to this functional use, the wax models were also crafted to promote the Victorian horticultural industry overseas. The models were put on display at international exhibitions such as the Philadelphia Centennial Exhibition in 1876 or the one held in Melbourne in 1880 (Dale-Hallett and Carland, 2008).

In taking a closer look at the apple models (and associated trade literature and material relating to the horticulture industry), by identifying the different varieties held at the Museum and by exploring their origin, apple narratives emerge that tell the history of not only a particular apple, but also society as a whole and the way apples were active agents in creating what we today know as Victoria. Part of the collection is displayed in a museum exhibition that started in late 2013 which showcases displays about advances in science and technology (Scienceworks, 2014). By interviewing the curator and others involved in the
exhibition, an understanding of how the collection is used today emerges and I compare it to the purpose of it in the past. The value it holds for the future is also of interest as it acts as a repository of possibilities and experiences in terms of what was able to be grown in various locations around Victoria.

3.4.3 Scoping methods

To gain more insight into the history of apple growing, especially in Victoria, early in my research, the Museum Victoria published an article about my study asking anyone with knowledge about the apple industry to get in touch with me. I received 20 responses, ranging from current apple growers to others who had some involvement with the industry in the past. As a result of this first article, the regional newspaper *Weekly Times* also published an article about my research in their regional newspaper (See Appendix B). Following on from that I was also asked to give two radio interviews on the ABC Radio (Bush Telegraph (http://mpegmedia.abc.net.au/rn/podcast/2012/08/bth_20120809_1141.mp3) and Country Hour (http://www.abc.net.au/site-archive/rural/vic/content/2012/08/s3564318.htm)). The public responses were used to make contact with growers and gather general insights into the apple growing industry.

Once I started contacting apple growers around the state for my fieldwork proper, it was clear that from the earlier article, a lot of them had already heard of me. I was contacted by the industry association *Fruit Growers Victoria* and attended their annual general meeting to give a presentation about my planned research. At the meeting I also asked growers to get in touch with me if they were interested in participating. Again this was useful for putting me in touch with more growers I could interview. Through these added avenues of radio interviews, newspaper article and attending meetings such as the *Fruit Growers Victoria* AGM, I quickly became known to the orcharding community, and a lot of growers contacted me before I even had a chance to get in touch with them. Nonetheless, being aware of the possible bias these self-selected participants may have, I also initiated contact with growers
myself; therefore my interviewee pool is a mix of growers who self-selected as well as others who had not heard of me prior to me getting in touch with them.

In order to “gain access to the field” (Flick, 2000, p.157), I also undertook some scoping trips to Harcourt, the area where I planned to do most of the interviews. I got to know a few growers in an informal way, and learned of the historical society and museum in the township, which I also used for my main fieldwork. The museum holds valuable documents and artefacts relating to the orcharding history of the region, both acting as a repository of sources, as well as contributing to place identity by reminding people of its long orcharding history. I visited the area three times before starting to hold formal interviews. On these trips I took field notes, visited the museum, and talked with local growers and historians.

3.4.4 Pilot study

In my first year of research (2012) I conducted pilot interviews to test my interview questions and to determine whether my questioning would be effective (van Teijlingen and Hundley, 2001). I undertook pilot interviews on the Mornington Peninsula with three different commercial apple growers. The reasons for choosing this growing area were that the Mornington Peninsula exhibits all my case study criteria such as exhibiting colonial landscape transformation and changes in agricultural practices, but I was certain I would not use it as my main research site as the overall changes of production in that area are not as substantial as in Harcourt. Another motive was that I would be able to use the data gained as part of my overall analysis. I concluded that the interview questions initially chosen were generally suitable and resulted in answers useful for answering my overall research questions, although I decided to add a few more interview questions. For example: “Do you adapt your growing practices to the market or do you adapt more to the growing conditions? Why?” This question enabled me to analyse in more detail how growers respond to changes in climate, market forces, as well as technologies and to explore the role
of heritage varieties. I used the interview questions as thematic cues and allowed the participants to answer as freely as they wanted.

### 3.4.5 Interviews

I conducted semi structured in-depth interviews with contemporary growers, plant nurseries, historians, as well as industry representatives in late 2012 and throughout 2013. Interviews as a form of conversation, aim to “understand the world from the subject’s point of view, to unfold the meaning of their experiences, to uncover their lived world prior to scientific explanations” (Kvale and Brinkmann, 2009, p.1). An important aspect to consider is that the data obtained from interviews is very specific to that particular conversation at that point in time and generalizations can only be made by drawing assumptions (Wengraf, 2001). While the knowledge created from an interview is contextual (Kvale and Brinkmann, 2009), the knowledge gained is rich and contributes to a deeper understanding of the phenomenon under consideration. I triangulated the interview data with the information gathered via other methods (document and artefact analysis), which allowed me to confirm the occurrence of certain events and also broaden the understanding of their social and cultural impact. For example one female grower described how her ancestors had been given land by the government and how this was the reason for coming to the area. While she was not sure why the land was given away for free, I was able to let her know that it was an economic strategy by the government to get poor people out of the city and onto newly cleared land for production. I collected this information from my document analysis.

Apple growers and others involved in the apple growing industry were asked to participate in individual interviews (see below section 3.4.5.1). The participants were informed about the topic and broader aim of the study via a plain language statement and initial conversation or email contact. This enabled the interviewees to be aware of the objectives of the research, which Jones (1985) suggests, contributes to good interview data. Semi-structured open-ended interviews were held by using an interview schedule with topics to be covered and carefully worded questions (Kvale and Brinkmann, 2009, Bryman, 2001).
Whether all questions were asked, the sequence and exact wording depended on the situation of the interview and how it unfolded. Questions were worded to address the research question thematically but also to create a dynamic interaction with the interviewee (Kvale and Brinkmann, 2009, Bryman, 2001).

All the interviews were conducted face-to-face, either in the family kitchen, the packing shed or the administration office. Three interviews were conducted off site (two in an office at my university and one in a café nearby my university), because this suited the participants better. As suggested by Flick (2000), immediately before and after the interviews I recorded field notes with my observations about the interview environment, impressions of the participants and whether I was shown any of the orchard or packing shed by the participant. This helped me to recall the interview when transcribing.

3.4.5.1 Participant selection and recruitment

Initial scoping and public responses clarified the different types of research participants:

Commercial apple growers – these are characterized by running a business aimed at selling apples at local or mainstream market places for profit. Within this category there are different kinds of growers, such as large scale corporate growers as well as small scale local producers.

Heritage apple nursery growers – these are growers who run, or have run, a commercial apple nursery for profit and for educational purposes.

Research and development sector

Other – this category consists of historians, museum curators and representatives from the research and development sector.
Potential interview participants were selected from meetings with fruit growers, nursery owners, or other organizations involved in the apple industry. Participants were asked to sign an oral history contract, an agreement between the participant and the Museum Victoria. I explained to the participants that the Museum would like to keep the interviews as part of their oral history collection. Participants were able to determine access conditions and any pseudonyms to be used. There were 40 interviewees; on average lasting 60 minutes. Interviews were audio recorded and transcribed verbatim by myself. I sent transcripts back to the participants asking them to respond with any request for changes within two weeks. Nine participants returned their transcript with changes, clarifying or elaborating statements they had made, and correcting typographical or grammatical errors. The requested changes were also made to the Museum Victoria copies of transcripts. Using pseudonyms has ensured anonymity of all participants in my thesis; however, the Museum Victoria transcripts will only feature pseudonyms when requested by the participant.

The selection process was based on a non-probability sampling strategy, which does not aim for replicable or statistical data (Burgess, 1984). Interview participants were selected purposively and by using the snowballing method (Kolb, 2008). Purposive sampling is guided by a predetermined set of characteristics that the potential participant should exhibit. In this case, the purpose was to find apple growers within Victoria who fit either of the above categories. Industry organizations such as Fruit Growers Victoria or Apple and Pear Australia Limited, as well as non-profit heritage fruit organizations were used as platforms to reach apple growers and ask for participation in the interview process. This was done by direct contact or by them contacting me following the scoping methods described earlier.

Snowballing was used to reach participants that otherwise would not have been reached. This may be due to the fact that they are not part of any industry association, nor publicly listed. Snowballing entails a chosen participant referring others with similar characteristics (Kolb, 2008, Burgess, 1984). This was particularly helpful in the case of the heritage apple growers, as unlike commercial apple growers, these types of growers are not always part of
a wider organization and therefore harder to locate and identify. The below table provides an overview of the spread of interviews by type and by location:

<table>
<thead>
<tr>
<th>Location</th>
<th>Commercial grower</th>
<th>Heritage apple nursery grower</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harcourt</td>
<td>13</td>
<td>2</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>Mornington Peninsula</td>
<td>3</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Goulburn Valley</td>
<td>4</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Melbourne</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Yarra Valley</td>
<td>6</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Gippsland</td>
<td>3</td>
<td>2</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 3.6 Overview of interviews by region and type

3.5 Data analysis

3.5.1 Interviews

Analysis of interview transcripts was undertaken based on thematic analysis (Ezzy, 2013). Ayres (2008) points out that qualitative data which has been coded can become very complex as it is removed from its context, therefore the use of qualitative data management software is recommended. I chose to use the qualitative research analysis software NVivo after attending a training course to familiarize myself with the software package and also speaking to colleagues who used the same software.

However, the criticism of this software package should not be overlooked. Especially in the advent of computer software for qualitative data analysis the risk of “alienating the researcher from their data” was highlighted (Kelle, 1997, p.2). This criticism points to the relatedness of qualitative data that is at risk of being misinterpreted when removed from its context (Kelle, 1997). Nonetheless as Bergin (2010) highlights in his review of the use of NVivo, computer software must not jeopardise data analysis as long as it is used as a tool for
administrative data curation purposes, whereby the close scrutiny of the data is still done by the researcher and reliance is not placed on the software to fulfil the role of the analyst.

After finishing my transcriptions I started coding manually. I did this by printing out hard copies of the transcripts and reading through each transcript highlighting common themes. These themes were not decided upon prior, but were ‘induced’ from the data (Ezzy, 2013, p.88). I noted the emerging themes on a separate sheet and added to it as I progressed through the transcripts. Some themes were merged into one, while for others sub-themes emerged. Following on from this manual coding, I repeated it in NVivo. This allowed me to get closer to my data, and to pick up on mistakes I did during the first coding round. I completed thematic analysis by relating the emerging themes to my research questions, theoretical framework and also analyzing the relationships among the different themes (Ayres, 2008).
3.5.2 Historical, document and artefact analysis

Data collected from the historical research as well as the document and artefact analysis was analysed in a variety of ways. Qualitative data pertaining to the history of apple growing in general was collated and summarized. Quantitative information relating more to the physical aspects such as rainfall data, apple production volumes, or details pertaining to the wax apple models was summarized in Microsoft Excel and made visual via tables and graphics.
Information associated with the wax apple collection was collated and summarized in Excel spreadsheets. By grouping data into separate columns (e.g. date, variety, origin), I created tables and overviews of the amount of models made, what variety they were and when they were crafted. I then compared this with the dates of the International and Intercolonial exhibitions and also other historical events such as the depression of the 1930s.

3.6 Conclusion

In my study, I employed thematic analysis, an inductive approach whereby coding themes and categories are not predetermined, hence, the difficulty I encountered was deciding when to stop disassembling and reassembling the data (Ezzy, 2013, p. 94). After coding initially by hand in hard copy and then again electronically, I was confident that my coding was sufficiently rigorous. At the same time, this method allowed me to constantly reflect on the relationship between the data, the emerging themes and the conceptual framework which I had decided upon prior to commencing data analysis proper. Through this iterative process and in conjunction with information collected from the document and artefact research, I could gather rich descriptions while constantly being guided by my overarching aim and research questions.

SES thinking, originating in ecological science, has been critiqued for its lack of attention to the social characteristics inherent in the SES; in particular, the underlying social construction of power that implicitly informs our interaction with the biophysical and social system. And while Bourdieu’s theory on its own does not emphasise the physical and ecological aspects of the system in question, I argue that there is an opportunity to entwine these two theories that interact with place, and in doing so, contribute to a deeper understanding of how environmental history, culture and biophysical place emerge as a coupled socio-ecological system.
In the next three chapters I present the findings from the historical research and the results from the interviews. Chapter Four deals with my first research question: What is the relationship between socio-cultural place and ecological places of apple growing? I address this question by outlining the environmental history of apple growing in Victoria and analyse it through the lens of social-ecological systems thinking. Chapter Five answers the question of how growers choose what varieties to grow and I provide a Bourdieusian field analysis. In Chapter Six I draw out the relationship between place and the growers’ practices, and address how growers respond to the stresses they experience.
4 Chapter Four, in which I explore the environmental history of apple growing in Victoria

4.1 Introduction

In this chapter I address my first research question: ‘what is the connection between socio-cultural place and ecological place?’ Based on the historical research component, I position apple growing in a wider historical context by giving an overview of how apple growing places in Victoria have been constructed and shaped. As established in Chapter Three, environmental history recognizes the relationship between the biophysical and the socio-cultural history embedded in landscapes and seeks to explain concerns of today in order to better inform future decision-making (McNeill, 2010, Dovers, 1994). To strengthen and give more meaning to the historical narrative, I also draw on interviews I conducted with apple growers and present some of their memories and stories. Theirs is a story that reflects apple growing knowledge as dynamic and capable of adapting to new technologies and market conditions. By recognising apple production landscapes as social-ecological systems, this chapter studies the connection between the socio-cultural and the biophysical place of apple growing. Chapter Two explained that the growers’ place identity is based on this connection, as well as their personal history in that place. I discuss in depth how that identity and connection to place is inherent in orcharding, but nevertheless masked by technologies that are intended to facilitate the extraction of as much economic profit out of place as possible. In this chapter I provide essential historical background that is necessary to understand the contemporary practices of orcharding discussed in Chapter Five.

4.2 Once upon a time there were only wild apples

“Apples for grafting appear to have been selected commonly, not so much for their spirited flavor, as for their mildness, their size, and bearing qualities,—not so much for their beauty, as for their fairness and soundness. Indeed, I have no faith in the selected lists of pomological gentlemen. Their "Favorites" and "Non-suches" and
"Seek-no-farthers," when I have fruited them, commonly turn out very tame and forgettable. They are eaten with comparatively little zest, and have no real tang nor smack to them." (Thoreau, 1862)

Humans and apples share a very close history (Janson, 1996, Thoreau, 1862, Pollan, 2003). Apples as we know them today are the result of a very long tradition of cultivation that goes back thousands of years to the wild apple forests of central Asia. The wild apple has its origins in Central Asia, in the mountains of Thien Shan in Kazakhstan where the wild apple tree is still the main forest tree today (Hancock, 2004). It is thought that the wild apple *Malus sieversii*, the ancestor of today’s domesticated apple, *Malus domestica*, travelled via ancient trade routes from Asia to Persia and the Middle East and then on to the Greeks and Romans and subsequently to the rest of Europe (Thoreau, 1862, Vavilov, 1929, Harris et al., 2002, Hancock, 2004, Luby, 2003). In more recent history the apple has spread from Europe to other parts of the world. Spanish, Portuguese and British colonists brought the apple to the Americas in the sixteenth and seventeenth centuries and a little later apples were introduced into the colonies of Australia (1788) and New Zealand (1813) (Luby, 2003).

Most ancient cultures have some sort of reference to fruit, and in many cases apples. There is an intimate relationship between apple trees (and also other fruit trees) and humans that goes beyond mere supply of fruit for culinary purposes. The mythical, cultural and religious affiliation humans have with fruit is laid out in detail in the pomology literature (Janson, 1996). Dating back to Neolithic farmers who are known to have gathered fruits, to Egyptian, Greek and Roman mythology (i.e. Goddess of fruit Pomona!) to Christian religious affiliation to fruit – fruit and humans have a mutual history; or to borrow Henry Thoreau’s words: “the history of the apple-tree is connected with that of man” (Thoreau, 1862, p.1).

Apples are never true to their seed, they are self-incompatible, meaning that growing a tree from seed will not result in fruit featuring the same characteristics as the tree it grew on
(Pollan, 2003, Hancock, 2004, Brown and Maloney, 2003); there are myriad possibilities of new varieties. Grafting of apple (and other fruit) trees therefore limits this natural variation and enables the cultivator to determine where and what type of variety is grown. Certainty in variety can only be achieved by using techniques such as grafting pieces of branches onto root stock, creating an interdependence between humans and apple trees that is vividly described by Henry Thoreau in his 1862 essay on ‘Wild Apples’.

Today, apples are cultivated on all continents except for Antarctica (Luby, 2003). The technique of grafting started in Mesopotamia around 4000 years ago (Hancock, 2004, Harris et al., 2002) and plays an essential role in allowing societies to shape and develop apple trees in myriad ways. Grafting reflects cultural conditions as trees can be grafted over with several varieties, creating a record of cultural preferences over time. Cultivated apple trees are also very prone to diseases and pests, calling for human maintenance and protection. While today’s main use of apples is for raw consumption, this is only a relatively recent practice. In the past apples were primarily used for cooking or for making cider (Pollan, 2003, Luby, 2003). Tracing the different uses of apples over time demonstrates not only the versatility of this fruit but it also shows how humans use apples in different ways, depending on social, cultural and physical circumstances.

For example John Chapman, the legendary North American pioneer, was key to the introduction of apples to the New World in the first half of the 19th century (Luby, 2004). He grew apple trees from seed only, never through grafting, and established orchards in yet unoccupied areas of western North America, waiting for the frontier settlers to arrive and purchase his seedlings (Pollan, 2001). After all, the Ohio Government required that settlers plant several dozen apple trees as a way of encouraging landowners to stay and also as a symbol of domestication (Luby, 2003; Pollan, 2001). Diamond (2010) discounts Chapman’s contributions to the apple industry by stressing that he did not use any horticultural practices to establish apple trees but purely relied on random seeding. Apples, which feature heterozygosity, will not be true to their parent. They are self-incompatible, meaning that growing a tree from seed will not result in fruit featuring the same characteristics as the
tree it grew on (Pollan, 2003, Hancock, 2004, Brown and Maloney, 2003). Therefore the apples John Chapman had on offer were far from being as sweet as today's varieties, but rather they were tart and probably unpalatable. Perhaps he had a similar disposition to Thoreau who preferred the wild apple over the cultivated kinds which in his view are “eaten with comparatively little zest, and have no real tang to them” (Thoreau, 1862, p. 12). Or maybe Chapman had no need for cultivated apples as after all the use was not for eating but for drinking (Luby, 2003; Pollan, 2001). In the 18th century apples were mainly used for cider making or cooking, therefore their sweetness was less paramount (Luby, 2004; Henzell, 2007). While the manner in which Chapman spread apples across America earned him the nickname of Johnny Appleseed, his story seems to be less about apples than about the alcohol they produced. During prohibition in the mid-19th century, apple growers suffered under the new laws. It was then that the sweeter cultivars had their breakthrough, becoming more popular for eating raw and saving the apple growers from ruin (Diamond, 2010; Pollan, 2001). However, for Johnny Appleseed this would have been the end, as his apple trees grown from seed were not suited for eating and as alcohol was prohibited, the boom time of his apple seedling orchards was over.

The story of Johnny Appleseed shows how when prohibition prevented apples from being consumed as alcohol, orchards were not given up on, but rather certain varieties were chosen that were more suitable for eating raw. In a similar way, when American apple blight spread havoc in Victorian orchards in Australia in the nineteenth century, nurseryman Thomas Lang introduced the Majetin cultivar as it had more tolerance to the disease than other cultivars (Fox, 2005). History can reveal parallel narratives, one of the different apple varieties grown, but also the account of deciding factors impacting the cultivar selection in direct and indirect ways. As this chapter will emphasize, there is a constant engagement with place that occurs consciously (such as choosing the Majetin variety due to better tolerance to apple blight) but also inadvertently, by the creation of individuals’ and communities’ identities that are closely linked to place. And as laid out in Chapter Three (2.6.4) this identity is not only associated with “place qua place” (Low and Altman, 1992, p. 7) but more importantly it is based on the practices that then imbue meaning to the place.
The reaction to the destruction caused by apple blight in the nineteenth century shows the commitment to continue the cultivation of apples, despite the physical difficulties.

Today’s benchmark of a ‘good apple’ appears to be the sweetness of the fruit, whereas for most of the apple’s existence, sweetness was less paramount, probably not because sweetness was undesirable, but rather because apples were not consumed in their raw state. Part of the reason for this is that prior to the twentieth century, raw fruit and vegetables were generally considered to be harmful to human health (Henzell, 2007). While there are thousands of apple varieties (excluding the many wild varieties still growing in the wild apple forests of Kazakhstan!), today, less than a dozen of varieties are grown for commercial use and sold in mainstream supermarkets around the world. Old varieties, such as those in the ancient apple forests of Central Asia, are valuable sources for germplasm to be used for new cultivar developments (Mitre et al., 2009).

Apples have been grown in Australia since European settlement and apple growing since then has developed from a backyard tradition into a global commodity. Over the last 20 years, the industry has been under pressure from competing land uses as well as declining export, and concurrently the effects of more extreme weather events have impacted the physical suitability for apple growing. Further, the diversity of apples has declined, as new and fewer commercial cultivars are favoured over traditional varieties. Current locations of established orchards are also changing.

As in other industrialised nations, the way orchards are run today is increasingly focused on industrial-scale efficiency and productivity. Short-term economic and socio-ecological decisions often take priority over longer-term choices for these producers. Today, Australia produces 0.8% of the world’s apples (APAL, 2014); and therefore is a minor player in the global apple trade that initially made it famous; but apples and the places where they are grown are imbued with significant meaning to local orcharding communities. Orchards are
influenced by international market economies and their principles, while at the same time being exposed to local issues of changing socio-cultural and ecological conditions.

4.3 Apples in Australia

The Batman Apple Tree’ is perhaps the oldest living apple tree known in Victoria (Draper, 2006). During the 1830s, John Batman introduced many varieties of plants, including fruit trees brought over from Tasmania and planted them out at his early settlement in Melbourne (Brown). After Batman’s death, some of the fruit trees were bought by Mr Frederick Flintoff, who owned a large piece of land along the River Plenty in Greensborough east of Melbourne (Draper, 2006). The orchardist who leased out some of Mr Flintoff’s land along the river was Mr Whatmough who established an orchard comprising many of his own species, but also some of the original trees from Batman (1890, Dovers, 1994). The legendary tree, still in existence today, is thought to have been a Winter Majetin apple, but over the years different varieties have been grafted on to the old tree, including Rymer and Rome Beauty (Draper, 2006). However, the more popular belief is that that the original apple variety was named after the orchardist who was responsible for passing it on to the Museum of Victoria for modeling, resulting in the name of Whatmough’s Fancy. Coincidentally both those varieties were modeled by the Museum Victoria in 1875, and have a very similar appearance.

This story demonstrates the history that can be embedded in trees. Recent news reported on the efforts by the Greensborough Historical Society to place the tree under heritage protection (Whitelaw, 2011). The tree is no longer just a plant providing apples; it is a heritage symbol. It is connected to place and social meaning is derived from recognizing its continuity within that place.

4.3.1 The beginnings
Apples arrived in Australia with European settlement and were brought from Tasmania to Victoria by the Henty family in 1834 (Learmonth, 1934). As Bolton points out, the “essential mark of a citizen was the ownership of property” (Bolton, 1981, p.12); and planting trees was a symbol of tenure. The act of cultivating food and holding livestock were markers of settlement, whereas the hunting and gatherer-like activities of sealers and whalers were not. A tree indicates permanency and demonstrates commitment, transforming immigrants into settlers (Claremont, 2001, p.122). Apple trees were part of English tradition and the first settlers brought their trees with them from previous colonies in Tasmania and planted these in their home gardens in newly established Melbourne (Winzenried, 1991, Draper, 2006, Brown, 1966, The Evelyn Observer, 1890). Victorian settlers used trial and error to select varieties and growing practices suited to local conditions, which were very different to their home countries (Green, 1985). There were also migrants from other parts of Europe, for example many Germans left their home country in search of a place to practice the Lutheran religion (Holman, 1993). Many of these German immigrants were skilled botanists or orchardists, resulting in the establishment of orchards around Melbourne.

Establishing orchards in these new conditions required a close engagement with the biophysical characteristics of place; at the same time, planting fruit trees was part of becoming settled. Hence, creating a new home resulted, by necessity, in a close connection to the physical place; initiating the formation of place identity that in many families has endured until today. This demonstrates the foundation for a close coupling of social and ecological place.

As Melbourne’s population increased, so did the requirement for produce. Market gardens and orchards formed on the fringes of the township and by the 1850s the eastern outskirts were home to Victoria’s first commercial orchards (Cowles and Walker, 2005, Green, 1985). Many of the orchardists told me in the interviews that their ancestors started orcharding in the eastern suburbs such as Balwyn and Hawthorn and then moved further east as Melbourne’s population expanded. Most growers from Gippsland and the Yarra Valley
spoke about their families’ history beginning when orchards were planted on the eastern edges of Melbourne. Aaron recalls:

“I was originally brought up in Donvale, which was, coincidentally, quite a big apple growing area on the edge of Melbourne, now covered with houses; and in the early 70s, just after my family built a house there on an acre, they cleared the orchards and put in housing estates. So I had that experience of seeing the orchards disappear.” (Aaron, March 2013, Gippsland)

As orchard land was turned into residential developments, many of the growers bought land further east where they are still today. For example, Aaron and his wife grow and run their orchard business out of Gippsland, east of Melbourne.

Orchards remained close to the growing city of Melbourne until the discovery of gold in the 1850s, which led to an expansion of apple plantings into other parts of the colony. A rapidly expanding population in Victoria during the goldrush resulted in the commercialisation of apple growing across Victoria. In the early 1850s many growers flocked to the gold fields of central Victoria where demand for fresh produce was high and apple growing benefited from technologies such as transport and irrigation available there (Garden, 1984, Holman, 1993).

Harcourt in Central Victoria would not be what it is today had it not been for the discovery of gold in nearby Castlemaine. No gold could be found in Harcourt, but the granitic soils and temperate climate were well suited for fruit growing and water supply channels built for the gold diggers were diverted to also provide water for the growing orchards of the area (Milford, 2004). So while gold might have been the trigger for the establishment of agriculture in the general area, it was the soil and the climate that caused Harcourt to be a successful orchard area in the long term. Growers confirmed this physical suitability of
Harcourt in the interviews and explained that the mineral depleted soils enable better control of tree vigour; and the temperate climate, with cool nights during ripening time in autumn, yields especially good quality red apples. Arthur sums up the suitability of the Harcourt conditions:

“It’s a combination. The climate used to be good....not sure if it still is anymore...(laughs) it used to be good. As I said, cold winters....you need cold winters because you can’t make fruit set unless you have a number of chill days to set the fruit. You know, warm summers and the ideal autumns for ripening fruit. You’ve got water, you’ve got the irrigation supply...it’s ideal for growing any sort of crop and the soil. The soil is not actually fertile soil, it’s very poor soil....granite sands, there’s not much in the way of natural nutrients there. But what that does is it gives you the ability to control the nutrients that go into the tree. You grow an apple tree in really rich fertile soil; you end up with a very big tree and often not many apples.” (Arthur, February 2013, Harcourt)

Arthur’s quote also shows the importance of irrigation which has been critical for the survival of Harcourt as a fruit growing district. Had it not been for the early irrigation infrastructure diverted from the gold mining areas, orchardists like James Lang and Henry Ely would not have written history by sending apples to England. These won international competitions and were moulded into eternity in the Museum Victoria’s wax apple collection.

Ben, a local grower, told me about the start of apple growing in Harcourt:

“[…] well gold was discovered here down the road at Specimen Gulley back in 1851, and one of the biggest downfalls of the area was that there was no water; the
channel systems were put in place somewhere in the late 1850s and then some of the businessmen didn’t want to go and look for gold and wondered if there was an opportunity to feed everybody...so the orchards, 3 orchards actually started up next to each other.” (Ben, August 2013, Harcourt)

The first vegetables and fruit trees were planted in Harcourt in 1853 and when it was evident that the physical conditions, combined with irrigation, were suitable, more and more apple orchards appeared. Early orchardists supported themselves with employment on the goldfields (Milford, 2004). Intensification of apple orcharding resulted from increased demand due to a rising population and growing export market.

By the 1860s Victorians had a vast domestic supply of fruits and vegetables. The Land Act of 1869 opened up land to farming in the northern region of the Victorian colony, and closer to Melbourne, market gardens were well established on the outskirts. Doncaster and Templestowe were thriving with orchards, as were other areas such as the Goulburn Valley, Bacchus Marsh and of course Harcourt. By the end of the gold rush the Victorian colony was the wealthiest in Australia, if not even worldwide (Henzell, 2007), and horticultural production was a big contributor to this success.

Another major apple growing area in Victoria is the Goulburn Valley, which has been well-known for its processing and canning factories. The climate features warmer autumn nights which result in less blushing of apple skins, therefore the green varieties suitable for canning, such as Granny Smith and Golden Delicious, are also especially compatible with the climate (Connor and Smith, 1987). It was the large scale irrigation scheme of the Murray and Darling rivers, that initially allowed an expansion of orchards into that area in the late nineteenth century (Henzell, 2007). This reflects the coupling of the social and ecological place characteristics; and tracing the history of apple growing exposes the different factors determining and shaping places for apple production, such as cultural and economic
changes, climate and soils, as well as technological advances to secure water supply, combat diseases and transportation.

Orchard sites were initially serendipitous, following migrating and incoming settlers to the mining towns and new settlements. But at the same time, growers paid attention to the qualities of place, such as soil, water, weather; and orchards expanded in those areas that were found to have suitable conditions. Apple trees were a part of the everyday culture and a tradition brought from ‘home’. The settlers imagined their new homes to look like what they were used to in Europe and ameliorated the soils and growing conditions of the new places to grow their desired crops. This sentiment and trajectory of ‘improvement’ continues today, although technologies have increasingly been used to override and/or improve local biophysical conditions, weakening the connection to physical place that the very early growers needed when first planting apple trees (and also other agricultural crops). In the beginning spray technologies and irrigation infrastructure were very limited, forcing growers to engage closely with their physical environment, to observe any changes in conditions, and to adjust their management practices accordingly. This need for a close connection to biophysical conditions is reflected in an early guide for farmers and gardeners in which it recommends that growers “carefully compare the operations of one year with another, and the adaptability of certain crops to particular localities” (Victorian Agricultural and Horticultural Gazette Office, 1860, p.2).

Similar to the spread of pioneer commercial apple orchards in the American West, as described by Diamond (2010), the expansion of orchards around Victoria was made possible through technology, transport and an increased demand for fresh fruit in the late nineteenth century (Roche, 2003). As England’s growing urban population encroached on precious productive land, there was a need for new food, fibre and mineral sources and Australia was seen as the solution to England’s growth (Crosby, 1986).
Early descriptions of the Victorian colony (and also other Australian colonies) emphasized the (perceived) fertility of the land for agricultural success; and the discovery of gold validated the notion of Australia being a destination for those emigrants looking for independence and a prosperous future. The potential of Australia for agriculture and livestock, and later gold, underlined the psyche of the new world settlers.

A ‘Liverpool Merchant’ put together a guide for English individuals (mainly aimed at men) wanting to migrate to Australia; he described the great opportunities waiting for those willing to put in hard manual labour:

“The market [in England] is overstocked. In Australia the case is reversed, labour commands its price; as it is too plentiful here, it is scarce there, and men who can and will work are needed. A fair days pay for a fair days work is to be gained by all. ‘It is a land flowing with milk and honey,’ with a climate much superior to our own, healthy and temperate. The earth produces in abundance; there is plenty of cattle, and labour alone is required to make things prosperous. The cry here is “labour for little food” there “food for little labour.” In Australia the working man does not merely hope that he is progressing but knows that every step he takes is towards independence and comfort.” (Liverpool Merchant, 1852, p.1)

The suggestion that ‘labour’ was all that it took to be successful in the new colonies of Australia masked the realities of harsh conditions, amongst them the extreme climate the new settlers would have encountered. Nonetheless, like in the above example, images and stories of Australia were assembled that promised limitless opportunities and productive lands.

Records from the Horticultural Society of Victoria reveal the significant role that apples played in the promotion of Australia as a good emigrant destination. In 1873, the Society
sent a case of both fresh apples and wax models of apples to the International Exhibition in Vienna. The Society highlights the success of this shipment and describes how although a label expressed “the fact in English and German, that they are real fruits, and so distinguished from the very excellent wax models in the same case, visitors can scarcely be persuaded as to the truth of the fact until they are convinced by a delicious apple smell that steals up under their noses.” (The Australasian, 1873, p.26). This reflects the usefulness of the wax models to showcase Australian fruit overseas, albeit without the smell! Indeed, the “delicious apple smell” was considered to “do more to further immigration than a dry statement by a paid lecturer” (ibid).

In 1886 the Victorian apple became a global commodity when the first commercial apples were exported to Europe where the English Royal Horticultural Society awarded a “silver medal” to apples from the Harcourt area (The Argus, 1886). This was made possible by improved cool storage technologies. The new-world Australian growers also had the advantage of being at the opposite end of the European growing season. Exporting apples gave Australia a spot in the world’s commodity market and there was no question that this was an admirable position to be in. Slogans such as ‘Australian Apples, British to the Core’ were used to promote Australian produce overseas (figure 4.1), demonstrating the aspiration to have both a unique Australian identity and a connection to their country of origin.

The below label embodies so much of what Australia was about around the turn of the twentieth century and still is to some degree, 100 years later. The trees and the bridge are icons of what it means to be in Australia - they embody artificial and natural place. The Sydney Harbour Bridge in the background symbolizes progress in the form of engineering advances and the native trees framing the image reflect the distinctive Australian identity the new settlers formed with the land. The orange and rosy coloured sky gives the impression of the sun rising on the Australian land, evoking a sense of new beginning and limitless possibilities, also reflected in the description of the apples as being ‘full of health and sunshine”. Further, half of the image is taken up by a range of different coloured apples
suggesting the potential to grow such a breadth of varieties. Notably, all apples are of similar size), reflecting the rise of the modern production system where standard sizes are wanted to improve ease of packing and shipping. The decision to display a mass of apples also points to the objective to showcase the bounty that could be reaped from the Australian soil, contributing to the impression of Australia being a land of abundance.
A similar scenario is described by Murton (2009) who, in his talk about the early twentieth century Canadian apple market, refers to Canadian apples as “winter visitors to the stores of London”. Unlike Australia, Canada is not on the opposite end of the European growing season, but holding apples there in storage and feeding them to the markets of the Empire during winter, sustained the image of colonial orchards as places “where the sun never sets” (Murton, 2009). This image of sunshine and opportunity is reflected in the overseas export label. Australia, like Canada, was being used to supply out of season production to the wintering European continent - it was about extending supply and creating all year long markets. This has implications later on in the selection of varieties as Australian growers develop technology and production practices to extend their growing season.

The important place apples had in the Victorian economy is exposed in records of the Horticultural Society of Victoria, which at its research site at Burnley once held one of the
The gardens were an outcome of a decision made in the 1830s to set aside a piece of land on the eastern side of Melbourne, for pastoral as well as recreational purposes. The so-called Richmond Survey Paddock had multiple uses and after its renaming in 1862 to Richmond Park, the Horticultural Society of Victoria was given a portion of the land for the purpose of planting experimental gardens (Andrews, 2008, Winzenried, 1991). With the help of Government botanist Ferdinand von Mueller and landscape architect Alfred Lynch the gardens were designed and supplied with a large variety of exotic as well as native ornamental shrubs and trees, with the intention to test their suitability and tolerance to the new climate. In 1863 the gardens were home to over 1400 varieties of fruit, of which 382 were apples (Andrews, 2004). The large proportion of apples mirrors the importance apples played in the economy of the growing colony. The gardens created a focus on the conditions required for ecological well-being, plant durability, and viability. This was a place for scientific experiments associated with the progress narrative of nationhood and the gardens were a manifestation of the socio-cultural ideals centered on nation building and the creation of a scientific understanding of national identity.

The site was mainly used for research, including acclimatization of new fruit and vegetable varieties, as well as advancing breeding practices in order to improve existing stock and also develop new varieties (Andrews, 2004). Due to the lack of space (Gilbert, 2007), the number of fruit trees decreased over the years, making room for those designated as likely to be more profit-making varieties. This preference for economic variety selection (Winzenried, 1991), signified that varietal choice has always been led by commercial motives.

In time with a general trend towards scientific agricultural research in Australia, compared to trial and error practices of the first half of the nineteenth century (Davidson, 1981), the Garden’s land titles were transferred to the State of Victoria and turned into Australia’s first horticultural school in 1891 (Winzenried, 1991, The Royal Horticultural Society of Victoria, 2015). Even though the primary focus of the school shifted from horticulture to agriculture
and then back again, the growing of fruit trees continued throughout. By 1897 the Burnley Gardens were home to 930 varieties of apples (Department of Agriculture, 1897).

The popularity of apples at that time is also reflected in records of the Society, when at the Autumn Exhibition for horticultural products the entry categories for apples consisted of 8 different categories (far more than any other fruit) - including one for seedling, cooking, dessert and even the heaviest apple (Horticultural Society of Victoria, 1879). This validates the breadth of uses and the interest in apples from both growers and consumers.

Similarly, Australian nursery catalogues of the late nineteenth century show a high diversity of apple varieties available for local growers; with stock imported from Europe, Russia and North America and then trialled locally for their suitability (Richmond Nursery, 1890, Lang, 1873). Nurseryman Thomas Lang of Ballarat stocked only 83 apple varieties in 1863 but by 1870 he had more than 150 varieties on offer. A plant nursery in Richmond, run by John C Cole stocked over 700 apple varieties by 1890, compared with only 80 in 1868.¹ This increase in apple varieties on offer is quite remarkable in light of the many pests and diseases growers had to face and the difficulties of securing a reliable water supply (Milford, 2004, Henzell, 2007). Indeed, it was therefore necessary to trial many apple varieties to test their tolerance to local conditions, including weather, soil, pest and diseases; and hence, match agricultural products to place. The varietal breadth echoes the ambition of the time for Victoria to become a key player in the global apple (but also other food) production market. This ambition is reflected in the great effort that was put into shipping produce overseas to be presented at International Exhibitions, and also the modelling of wax apples (and other fruit and vegetables), also intended for display at these exhibitions.

The wax apple models are a legacy of this flourishing time for the apple industry. Part of the government’s ambition to put Australian horticulture on the world stage, involved the

¹ It is also worth noting here, that there are few records of nurseries, or at least nursery catalogues, before the 1860s (Polya, 1981)
crafting of apple models for the many international exhibitions and world fairs of the late nineteenth century. As outlined in Chapter One, the making of these models peaked in 1875 when the Victorian colony itself hosted the International Exhibition in Melbourne. The models were, and still are, proof of what could be grown in the Antipodes.

4.3.2 Pests and diseases

The many migrants arriving during the gold rush brought with them plants and also pests and diseases that were previously non-existent in Victoria. The controls available at the time were limited and the most general one was to uphold the concept of a ‘clean’ orchard (Barr and Cary, 1992, p. 181). This was done by removing infected tree parts and dropped fruit, as well as ‘bandaging’ the tree trunks to trap codling moth larvae to then kill them by boiling the bandages in water (Barr and Cary, 1992) (also see Journal of Agriculture and Industry of SA, 1898, p.31-2). Other methods included allowing pigs and poultry to roam the orchards and to feed on the dropped fruit which could harbour pests and diseases.

The increasingly commercialized world of orchards led to a spread of diseases. For efficiency, trees were planted closer and this enabled pests and diseases to spread more easily between the trees. In addition, the distribution of the apples in recycled timber boxes also meant that pests could harbor in the wood and hide until the next season as well as get to other orchards (Barr and Cary, 1992, p.182). The government promoted the use of biological controls such as the protection of insect eating birds from sport hunting, but growers were skeptical and saw all birds as fruit eaters (ibid). The late nineteenth century saw an increase in pests and diseases and growers struggled to maintain ‘clean’ orchards. This constant pursuit of efficiency, whereby anything standing in the way of optimal productivity was seen as unnecessary or threat, and a risk to the concept of a clean orchard, conditioned growers to a certain expectation of what it was to be a good orchardist. Hence, good orcharding practices have been based on efficiency, good pest and disease management, and the production of high quality but foremost good looking apples. The
close connection to local biophysical place that was initially a necessity for planting a productive orchard, started to diminish. As a consequence, today’s apples have become highly standardized in size, taste and look, compared to what was available in the later decades of the nineteenth century (figure 4.2 and 4.3).
Figure 4.2 Today’s mainstream apple varieties (source: http://apal.org.au/consumers/apple-varieties/)

Royal Gala

Jazz

Fuji

Pink Lady

Twenty Ounce (1875) use: cooking, dessert

Cleopatra (1875) – use: cooking, dessert

Whatmough’s Bitter Sweet No. 3 (1875) use: cider

Figure 4.3 example of apple varieties grown in the 1870s (source: Museum Victoria)
4.3.3 The bust

While the 1880s were a time of boom, the following decade was that of bust. The domestic market was saturated and orchards were increasingly ridden with pests and diseases (Department of Agriculture, 1894). The export industry was struggling to compete with other markets supplying Britain and Europe, such as New Zealand and America. The entire Victorian economy was in dire straits, with unemployment rising, loss of labour due to some emigration, and financial institutions going bankrupt (Garden, 1984, Lake, 1987, Blainey, 2013). Life in Melbourne was nothing but a struggle and those who did not choose to leave the colony, looked for opportunities in rural areas. Land irrigated by the newly completed Goulburn dam became very attractive and many took up land there to start a new life (Blainey, 2013). Similarly, the village settlement scheme of the 1890s allowed for the “deserving poor” to take up rural land holdings in the Dandenongs and on the Mornington Peninsula around Red Hill and many took up land in the Mallee and Gippsland (Garden, 1984). One can imagine that these groups formed new communities in their respective areas, bringing with them their personal belongings to start a new life. Virginia comments on her ancestors’ early days of orcharding in the 1890s:

“they were given money...each three months there was a place down at Dromana...where there was a police man [...] and he had to say ‘come around’ and see whether they’d made any improvements. If they, sort of put up, say a fence of a 100 metres, well they were given a certain amount of money. [...] And then some of them, you read....they had no money, so he had to go out and work for someone else, which meant then that the land, his own land, wasn’t worked on. So it’s just sort of....I really don’t know how they ever got on in the first place. I don’t know.” (Virginia, Mornington Peninsula, September 2012)

Virginia describes the struggle her ancestors experienced in starting up an orchard and depending on government assistance. This situation stands in stark contrast to the early
settlers, who strived to live the yeoman ideal of independently cultivating their own piece of land. Virginia’s story echoes that of many other growers. They told me about their families’ hardships during times of depression, or drought or international economic turmoil. In order to keep up with the growing pressure for increased productivity to match national and global market demand, growers started to turn to technological solutions, which were rapidly being developed at the end of the nineteenth century.

Figure 4.4 Merrigum, Victoria, circa 1910s (source: Museum Victoria)

4.3.4 The twentieth century

The start of the twentieth century brought engineering advances in the form of improved cool storage as well as new spray technologies introduced from the northern hemisphere (Barr and Cary, 1992). Spraying was less time consuming than previous manual trapping of pests and seemed to offer instant results. The intense spraying regimes so common at the time offered quick relief from pests and diseases (Farrell, 1919), and it allowed for a fast increase in production to meet global and domestic market demands. The focus on efficient farming practices established and affirmed the productivist model of agriculture (Robin,
This model is based on the ‘optimisation approach’ which assumes little and predictable change and disturbances that can be overridden by industrial-scale efficiency (Walker and Salt, 2006). Technologies have been used to overcome ecological limitations; therefore this approach has been further driving an alienation from the physical limitations of place.

The government’s closer settlement policies of the late nineteenth century and post-World War 1 soldier settlement schemes encouraged people to start farming across the state (Robyn et al., 2004). Despite a Royal Commission concluding that the Closer Settlement Act did not lead “in the direction of the success that was anticipated” (Johnstone et al., 1915), Victoria’s government, together with other states and the Commonwealth, initiated a scheme to provide work to the returning servicemen of World War 1; as Scates and Oppenheimer (2014) put it:

“Soldier settlement clung to obsolete notions of the viability of the yeoman farmer, built on earlier selection acts and closer settlement schemes, aimed at reintegrating returned men into civilian life through land ownership and cultivation.” (Scates and Oppenheimer, 2014, p.233)

Soldiers were given pieces of land for agricultural development, but as Lake vividly describes in her eminent book on soldier settlement schemes in Victoria, the success was very limited and the “invocation of the yeoman ideal grew out of an idealized memory of England” (Lake, 1987, p.12). The belief that yet untended land could be cultivated and made into productive farms, supplying the Empire with food, proved to be an “agrarian myth” (Fry, 1985, p.29). Soldier settlers were closely supervised by the state government which aimed for high efficiency to ensure returns on the huge investments it had made in providing returning soldiers with land and recurrent loans (Lake, 1987). Many of the returned soldiers (who were previously largely urban dwellers) were still suffering from psychological and physical damage from the war (Scates and Oppenheimer, 2014); while struggling with the harsh
ecological conditions of the land they were allocated, which often was even too small and infertile for subsistence farming (Robin, 2007).

The soldier settlement scheme following WWI saw new orchards opening up in the Goulburn Valley. Many of the interview participants referred to the irrigation scheme as the reason why their ancestors initially came to the area. As Mike, a fifth generation, fruit grower replied when asked why his family started orcharding in Shepparton:

“It was because of the irrigations system [...] He [ancestor] heard about that and I think he went to Mildura first and then heard what was happening around Shepparton was probably better. So he bought a plot of land here and his sons expanded and bought more land...” (Mike, May 2013, Goulburn Valley)

The interviewees described a rush of new settlers in the region after WWI which led to an oversaturation of fruit supply and consequently to an increase in exports. However, production in post war years rose worldwide and therefore prices fell and growers struggled. The intense spraying regimes so common at the time meant that pests and diseases either developed resistance to sprays or natural predators needed to keep pests at bay were also eradicated. The government’s attempts to promote biological controls and reduce spraying were largely unsuccessful as growers were not so much interested in the long term economic benefits but looking for short term gains as the Great Depression of the 1930s took its toll (Barr and Cary, 1992). This reveals the beginning of an alienation from the land that stands in stark contrast to the initially very close connection that was needed between the new settlers and the land. At the same time it reflects the distancing from a traditional agrarian existence towards the acceptance of the capitalist market economy that has set in stone a mantra for efficiency and productivity at any cost (Krausmann et al, 2010).
The twentieth century saw the apple industry fluctuate in size, in line with other events such as the World Wars, the consequent introductions of new technologies, changes in markets as well as changes in labour availability and rising input costs. Since the beginning of the last century, production of apples has increased more than tenfold, rising from 12,000 tons in 1902 to 130,000 tons in 2011 (Department of Environment and Primary Industries, 2013). The area under apple cultivation rose rapidly from just over 8000 hectares in 1881 to 35,000 hectares in 1922, after which the total area under apple cultivation started levelling out at around 20,000 hectares (Laughton, 1922, Coghlan, 1881). A more intensive use of the land was made possible through the introduction of dwarfing rootstock, allowing orchardists to grow more trees on less land, increasing productivity, and requiring less labour. While production during wartimes fell, additional labour and the improved spray technologies resulted in rising apple production in the 1940s, 50s and 60s.

This is in line with what Krausmann et al describe as a ‘de-coupling’ of land, energy and labour (Krausmann, 2010, p.32). The rapid industrialization of the orchard (and general agriculture) industry in the twentieth century was marked by an extension of growth limits, driven by increased energy input and technological advances, resulting in large scale pollution and declining workload.
The mid 1960s show a peak in orchard area after which the total area of orchards in Victoria declined and started levelling out at around 20,000 hectares (figure 4.6). Technological innovation and scientific nous allowed orchard production to be optimised if planted more intensively. In the early twentieth century apple trees were planted at a density of around 100 trees per hectare, whereas today’s orchards hold up to 6000 trees per hectare in some cases even up to 10,000 (Robinson, 2011), explaining why orchard area is declining but apple production continues to increase (figure 4.7).
This post-war trend towards productivity was supported by government extension agencies and demonstration farms, both offering advice and support to farmers (Robin, 2007). The post-war years can be viewed as a critical juncture (Boonstra and Boer, 2014) at which many factors (e.g. government support, technological advances and labour availability) culminated and decisions were made that resulted in positive (self-reinforcing) feedback, between more
efficient technologies allowing for and encouraging higher productivity, locking growers into a pathway which some are still struggling to escape from today. Technologies acted to ameliorate the local soil and temperature conditions, and over time, affected a distancing from the underlying characteristics of that place. The flush of successful production concealed the increasing dependency on external markets and the externalisation of environmental costs from the contingencies that constituted being a viable orchard far away from the main world markets. Notably, the improvements to place through technologies and fertilizer inputs have created a sense of certainty about being able to control natural conditions.

In the 1950s the ideal of the clean orchard was still very common (Barr and Cary, 1992) and upheld by the application of organic pesticides and regular ploughing of the orchard. This also led to increased soil erosion, especially after the introduction of nitrogen fertilisers replaced the use of organic manure. Orchardists in peri-urban areas were little bothered by increased erosion as they were aware that their land would be soon sold to housing development and priced according to proximity to town, not the quality of the soil. However, grass cover in orchards to stop erosion became the norm in the 1960s and it was made possible and manageable with the introduction of systemic herbicides and fungicides.

The use of organo-phosphates and other chemical sprays resulted in instances of poisoning, soil degradation and pest resistance, which by the 1970s led to the adoption of integrated pest management (IPM) approaches (Barr and Cary, 1992). These IPM strategies resulted in more efficient use of sprays by regulating and tailoring the spray regimes to specific conditions that were aligned with the local conditions found in that place. IPM emphasised the use of multiple pest control tactics including non-chemical approaches. Even so, technologies allowed growers to grow more fruit faster, satisfying market demands, and at the same time pushing them towards large-scale production.
The United Kingdom’s move to join the European Common Market in 1973 had a dramatic impact on the Australian orchard industry. Apple production in Victoria dropped from 97,000 tonnes in 1973 to only 61,000 tonnes the following year. Part of this drop can be attributed to the biennial nature of apple trees, producing heavy crops one year and less the next. Nonetheless, the decline in apple production lasted until the late 70s, and is also reflected in the reduction of total orchard area (dropping from 26,000 acres in 1973 to 23,000 acres in 1974) and this continued until the early 1980s after which it rose again, levelling out at around 25,000 acres (Victorian Year Books). By that time technologies were adopted that allowed intensive plantings on less total land, with less labour and input costs; further driving the move away from traditional farming practices and contributing to the separation between land, energy inputs and labour (Krausmann, 2010). Shawn, whose family has grown fruit since the 1850s comments on those market changes:

“When the UK went into the Common Market, all those markets left us. So there was a change in varieties then and we grew predominantly Red Delicious, Golden Delicious, Jonathans and Granny Smith. (...) That was it, there was no more. Anything else wasn’t saleable because of the export varieties they weren’t commonly sold in Australia. We had lots of different varieties and some of them were good apples but they just weren’t accepted very well” (Shawn, April 2013, Gippsland)

Other growers from around the state echo this interpretation, and the local historian who grew up in Harcourt, an apple growing region in central Victoria, and whose family has been involved in the orchard industry since the 1850s, said:

“In the 1950s I can remember there was a vast number of orchardists and the valley was covered with orchards but when the European Common Market came into being, the orchardists primarily lost their export market and became unviable and progressively pulled out those orchards” (Anthony, February 2013, Harcourt)
The loss of the UK export market meant that certain varieties were made redundant, as they were purely grown for export, reflecting Australia’s dependence and alignment with global markets. It not only impacted on the economics of the apple industry but also the social structure of communities. They lost their income and consequently decided to pull out their orchards, beginning a landscape change that continues today. In Harcourt for example, a lot of the former orchard land is now empty grassed-over paddocks and the owners turn to off-farm income avenues, mostly in nearby towns but some also locally. For example one ex-grower I interviewed now works for the local cool store facility.

From the mid twentieth century, urban sprawl overtook the orchards on the eastern outskirts of Melbourne. Previously the orchards were a traditional spring-time attraction where urban families went on weekend outings to marvel at the sea of apple blossoms. Now these areas are residential suburbs with only street names to remind visitors of the early orchardists and the former apple industry in that area. Many of the orchards moved further east into the Yarra Valley, which continues as one of the big orcharding areas in Victoria in the twenty-first century. However, the Yarra Valley and many of the other orcharding areas are now competing with new land uses such as residential development or vineyards. Notably, the Yarra Valley is a designated green wedge; land protected for non-urban uses, in particular agriculture. While this planning mechanism may prevent any immediate threat to agricultural producers from urban expansion, there are some uncertainties in the long term with lifestyle blocks and associated complaints about hail netting and bird scare guns on the increase. Martha comments:

“But people that come and live in our areas, again that urban pressure, they say 'oh I don't like the look of that net' […] People say they want farming to happen in green wedges but they want farming to be this idyllic thing that they might have seen in a story book” (Martha, January 2013, Yarra Valley)
Apple growing has depended on the coming together of people, place and price. Growers have been selecting sites for their orchards based on their understanding of what they require to be successful in the new place over time. They utilise their memory, expertise and their future predictions about the potential for varieties, affirming or exploring the socio-ecological conditions. These historic trajectories indicate that while place was initially important in establishing orchards, from the beginning technology, infrastructure and markets dictated and shaped the social construction of place. However, the social aspects of place relied on steady economic growth and international economic success which in turn have been dependent on the physical attributes of that place. This emphasises a “utilitarian approach to land use based on intensive forms of agricultural production” (Burton, 2004, p.198). It is this linear and deterministic, sometimes mechanistic, articulation of the social and ecological relationships of production that caused some interviewees to reflect on their powerlessness at the same time that they identified having a clear focus for their work. I return to this idea in Chapters Five and Six.
4.4 The contemporary Australian apple industry

As clearly evidenced from this chapter so far, orchard landscapes are part of a larger construction of place. The trees contribute their aesthetic form to the look of the landscape; they are carefully managed for their arboriculture structure as it ensures production; and they contribute to the ecological construction of place by providing bird, bee and insect habitat. The kind of production advocated for in contemporary times, requires high maintenance of apple trees, such as grafting, pruning, spraying, irrigating and picking at the optimal time. This constant rhythm of management connects growers with the land and the trees, not dissimilar to tending some farm animals; reflecting the inherent link between the social and ecological system.

At the turn of the twentieth century apple trees were already irrigated and they were very spaced out allowing for livestock to roam in between the grass covered rows (Robinson, 2011). Today’s orchards are set up to maximize efficiency and conform to strong normative standards, but this standardizing has to some extent removed the flexibility and adaptive response options of producers. Optimal tree spacing, as recommended by the Australian government, consist of four meter spacing between the rows and one meter spacing between trees (4x1m), which is shifting towards 3x 0.5m spacing in more intensive orchards (Dart, 2008). These planting systems require secure access to irrigation with a demand of around six megalitres of water per hectare (ibid), although this can vary slightly according to the exact location. It is also useful to keep in mind that this recommendation is based on normal conditions, but with increasing climatic variation this estimated figure can be expected to change substantially.

There have also been significant changes in rootstock. As Shawn points out:

“And the rootstock is one of the biggest things. We used to have seedling rootstocks and Northern Spy rootstocks, and they both were big trees. So you had to
Growers told me that the preferred rootstocks are the M9 and M26 (developed by researchers at the East Malling Research Station in the United Kingdom), both high producing dwarfing varieties requiring support structures because of shallow root systems (Dart, 2008). The main difference lies in the vigour of the rootstock. The M26 variety is more vigorous than the M9, meaning that it is better suited to poorer soils whereas the M9 requires more input of nutrients. Interviewees told me that the aim is to have the tree not be overly vigorous so the orchardists are able to control the growth in order for the tree to have optimal fruit production. These dwarfing rootstocks enable production within 2-5 years. Nonetheless, in keeping with the continuous improvement discourse within agriculture science and technology focused on optimal production, there are new research and breeding programs around the world developing newer rootstock varieties, as the Malling series rootstocks are susceptible to common pests such as fire blight and lack winter hardiness (Robinson, 2011). This is perhaps a lesser concern in the Australian context.

Maximising efficiency and productivity is not only supported by optimising tree density and rootstock, but also by the tree shape and pruning. Tree shape is linked to light penetration, a key factor in fruit development. This requires an optimal ratio between tree height, shape and orchard density (Robinson, 2011). Growers achieve this by training the tree into a spindle form (figure 4.8) with one central leader and feathered branches to each side, espaliered on wires (Dart, 2008). The top of the tree is pruned narrower than the lower part, and every few years large upper branches are removed to maintain this conical shape (Robinson, 2011).

There is continuous new research emerging about the best and most efficient way of pruning. Orchard tours organised through Apple and Pear Australia Ltd (APAL) allow growers to inspect one another’s plantings and also learn about new growing and pruning
techniques. Interviewees also told me about the usefulness of the internet to learn about new methods, for example short online videos on tree pruning can replace the need for expensive private arboriculture consultants.

In talking with growers it is apparent that this pruning and management ‘know-how’ is very valued and respected. Being up-to-date with the newest methods is seen as a sign of professional orchard management. This expert care ethos is similar to the concept of a clean orchard a century ago. It garners respect among peers as it indicates expertise in the area of highly managed and productive orchards. These intensive production systems do not look like the older images of apple orchards that linger in the tourism and branding imaginaries. By contrast, this intensive production is a factory farming equivalent. Its beauty is in its utility and function. For those within the field of mainstream apple growing it represents good management practice, and identification among peers as a successful orchardist.
While the arboriculture - the shaping and pruning of trees - requires a high level of craftsmanship, advances in machinery have the opposite effect. Electronic harvesting platforms (and ladders) for workers, combined with automated spray and irrigation systems, have maximized labour efficiency but also tend to remove the orchardist from the orchard. Today, most growers spend more time doing administrative tasks and less actual hands-on orchard work, contributing to the alienation from the biophysical place that I have been describing throughout this chapter; as Jesse points out:
“...when I talk to my friends that I went to Uni with, they have visions of me almost being a cropping farmer where you drive your motorbike around the fields. A lot of apple farms are now mini factories. There are lots of people around you, there’s a lot of kind of industrial components to it, it’s not a rural romantic farming lifestyle anymore. And the phone, the email, it just goes, goes, goes. That’s been the biggest change I reckon.” (Jesse, May 2013, Goulburn Valley)

What Jesse describes here is that the meaning of “what it is to be a farmer” has been transformed by technologies (Bear and Holloway, 2015, p.1). Scientific advances and industrialization of orchards have led growers to view their orchards not only as sites of production but as competitive businesses in need of administrative control. Another grower reflects on the effects of changes in technology:

“we used to irrigate with big pipes. [...] his brother used to set the clock at night so there would be 4 hours one side of the pipe and 4 hours the other side and you’d take hoses out and just lay them between the trees... Set the alarm and get up at night...pick them all up and move them over. Once we put it all under automatic [...] and he has his computer set up so when we are not here, he can look at his computer to make sure that the irrigation is going properly” (Rose, March 2013, Gippsland)

Rose describes the automation of irrigation that means less manual work for her husband, enabling Rose and her husband to be more efficient and manage larger and more orchards than previously. Having more orchards in several locations increases productivity but with computerized systems and high-tech growing practices the connection that was once formed with one’s orchard is diminishing.
As most growers have a significant family history in apple growing, and because of the trees being mostly in one location, there is a strong attachment to that parcel of land. Apple trees take a few years until they reach maturity and they cannot be easily shifted, reinforcing the connection to place and contributing to place identity which, as Hawke (2012) says, is co-constructed out of personal history and physical place (Hawke, 2012, p.237). But the most significant aspect for today’s apple growers is the need to be economically viable at a scale that ensures the maximum output. Maintaining their sense of place identity is a deeply held response in the face of comments on how the market has dominated their decisions and even over-ridden their judgment about what was best for a particular section of the orchard and their place. This alienation, therefore, is from place, but also from the market.

4.5 The connection between socio-cultural place and ecological place

Initially physical place played an important role in the varietal selection and orchard management but over time technologies enabled domination over biophysical conditions and as I have established, caused a separation from place. However, as grower narratives point out, today’s physical pressures are so intense that orchardists can no longer afford all the technologies required to overcome these ecological limitations - and because it is not easy to replace more permanent crops like trees - there is a sense of a return of agency to place itself. Equally, those growers who are emerging with alternatives to the mainstream apple markets are at the same time, and out of necessity, engaging more closely with local physical conditions (see Chapter Five) to create market advantages or because they are not able or willing to play in the high technology stakes.

This chapter identifies the complexity in apple growing, and the need for constant adaptation within the dominant mode of production, as orchardists constantly react and adjust to economic, social, cultural and environmental changes and stresses from local, national and global scales. And while it is evident that the cumulative pressures from across these scales have weakened the resilience of the apple growers and their businesses – that
is, their ability to stay within the game of mainstream orcharding - the question remains as to how it can be strengthened; or more importantly, what can be done to assist those growers who are not able to do so. These growers are pushed to the brink of their existence as they know it, and face a decision of either diversifying away from the mainstream production model or exiting the apple industry (see Chapter Six).

Connecting the social and ecological history of grower landscapes through the product they grow, provides insights into how the initial, probably serendipitous alignment between social and ecological places came asunder with the global imperatives for competitive and continuous production. As the interviews attest, technology is a significant driver of homogenised practices that exploit the local ecology, place and people. Ultimately, this historical narrative indicates that the decline of resources mirrors the decline in the social fabric of place; diminishing the mainstream choices to be made across these landscapes, and hence, weakening the overall resilience of the SES.

Commercial apple growing in Victoria was defined as successful in the first half of the twentieth century, by global demand for Australian apples. Growers were able to respond to the scale of demand and became accustomed to responding to market pressures as quickly as possible. Today, less than 2% of the country’s first grade apples are exported (APAL, 2014). The scale of production nowadays has increased significantly, but interviews with growers suggest that even with advanced technologies and scientific nous, international and domestic quality standards are difficult to adhere to. Further international competition puts pressure on already struggling growers as Australian labour and input costs are much higher than in other countries. Therefore, though apple growing was lucrative at a certain time and scale in the past, the current economic trends and market realities have changed grower focus to the domestic market. As well, the physical changes in the weather, the increasing cost of buying water and its availability for irrigation mean that only a few growers see a long-term future in their orcharding businesses. In Chapter Five I will examine in detail the issues growers face today and explore the role of place and biodiversity in present-day apple orcharding. By drawing together the historical account and present day grower
narratives, I will also analyse the power relations that frame, underpin and drive this social-ecological system.

4.6 Apples, place and identity

The environmental history of apple growing shows the important role of apples in Australian society, and at the same time it is a reflection of similar scenarios across different agricultural production landscapes throughout Australia. Orcharding has created communities with a deep sense of place, and as I will detail in Chapter Five, this place identity is still drawn on today for marketing purposes. Apple trees were integral to the formation of early settler landscapes and they were part of the *taskscape* (Ingold and Bradley, 1993) of the colonial imagination of creating a nation built on the values and ‘look’ of the home country. In Chapter Two, I discussed the notion of heritage, the meaning of it and the process of how local contexts assign the term to a landscape. Most of the orchardists’ narratives reflect a common theme, that of being proud of a long history of orcharding. Their heritage is closely tied to place while simultaneously being imbued with their knowledge and everyday practices.

In her dissertation on the contribution of orchards in forming Australian identity, Claremont suggests that “orchards generate a sense of place imbued with meaning by a specific activity” (Claremont, 2003, p. 174). The act of orcharding, the clearing of the land of its native vegetation and replacing it with high maintenance fruit trees, reflects the settlers’ ambition to control and cultivate the Australian landscape. It is just as Ingold and Bradley (1993) point out, the practices, in this case *orcharding*, are rooted in social contexts. However, the story of orcharding in Australia, says Claremont (2003), is as much about the desire to belong, as it is about the ongoing quest for the perfect apple.

The pursuit of the flawless apple indeed seems to be the only constant in the history of orcharding, because even as all other aspects change, the aim to produce large quantities of top quality apples has remained the same since the beginnings of colonial orcharding. This
search for perfection is reflected in the practices adopted by apple growers. Embedded, but often hidden, in the chase for the faultless apples, are the countless technological steps taken to ensure a picture-perfect outcome. The social, cultural and environmental side effects of this quest are mostly rendered invisible to the consumer’s eye.

Perhaps this is the reason why the Museum Victoria’s collection of wax apple models is seen by so many, including myself when first encountering it, as something beautiful, something to be admired and preserved. The collection represents the achievement of the colonial project of cultivation outlined above, and as Claremont (2003) points out, the collection is part of the history of fruit growing in Victoria. But the wax models are more than that; they reflect the quest for identity and at the same time these artefacts and associated exhibitions affirm the importance placed on preserving that identity. With many orchards around the state being pulled out and families ceasing their long involvement in apple growing, the MV collection remains as physical and cultural evidence of a nation’s intention to be a world producer and the commitment of individuals to be part of the national production narrative as a way of succeeding in what was to them, a new land. The models embody the expansion of settlements across Victoria and proof of the seemingly suitable conditions to grow such a wide variety of apples. They are cultural, because the artefacts are a manifestation of the role apples played in the political economy of Australia, nationally but also globally. They were, and still are, the ‘poster-child’ for the government’s aspiration for productivity and success. However, as Chapter Five will detail, this objective, buoyed by the new technologies and scientific knowledge, has come at a social and environmental cost. Many contemporary growers are struggling to stay in the game of orcharding, and as a consequence, many are either exiting the industry or resisting by finding, and creating, new or alternative markets for their apples. This situation stands in sharp juxtaposition to the narrative of the wax apple models.
4.7 Conclusion

In this chapter I have outlined the history of apple growing around Victoria from a social and ecological perspective. In terms of place, this history overview, in combination with the analysis of the wax model collection in Chapter One, highlights certain locations around Victoria where apples have been grown since the beginnings of orcharding. This points to the recognition among early growers with regard to the suitability in a physical sense of such locations. Importantly socio-culturally, there was an embedded heritage and identification with such places as likely to provide a livelihood. These places and this heritage have provided many growers with an economic advantage. And while growers do not consider their inter-generational knowledge as valuable in terms of directly contributing to higher profits; the knowledge about the industry is still very much valued and implicitly used in their everyday practices. Further, the memories and knowledge, just as the wax models, validate their history as apple growers.

The story of apple growing in Victoria not only demonstrates a decline in the diversity of apple varieties but it highlights historic economic trajectories that have led to success and also pushed some orchardists to their financial and physical limits. In order to continue orcharding, growers have been adopting technologies to overcome ecological or economic pressures, which along the way, has instigated an alienation from the biophysical place. While initially apple growing was established because of the suitable physical conditions, today’s growers are forced to make decisions based on maximising efficiency and satisfying supermarket demand. This has been possible because apple trees, as interviewees tell me, can be successfully grown in most areas as long as there is available water and appropriate supporting infrastructure (i.e. shade/frost/hail netting). However, as the cost of irrigation is rising and extreme weather events are becoming more frequent, there is a tension between growers experiencing the realities of biophysical place, and their ingrained predispositions to continue along the traditional productivist trajectory.
Just how growers deal with today’s cultural, physical and economic production environment, and what other factors influence the growers’ everyday decision-making, is the focus of Chapter Five. The environmental history of apple growing in Victoria provides an important context from which I will draw on to demonstrate that the practices of today’s growers are often masked by, not only ecological realities (e.g. pests and diseases; extreme weather events), but by using Bourdieu’s theory of practice, I analyse how underlying power structures are in fact having a profound impact on the everyday decision-making of orchardists. This highlights how by recognising the coupling of social and ecological existence, other possibilities emerge.
Chapter Five, in which practice meets theory

5.1 Introduction

Orchards have turned into high intensity production landscapes with little room for any other crops but apple trees. While there is general awareness that reliance on one crop and on a monoculture of one variety may pose a risk in the future, many orchardists are reducing the number of varieties grown; and as Chapter Four explains, this decision is tied to historic global and domestic trajectories focused on productivity and efficiency.

The interviews with growers tell a complex history of family orcharding that highlights the dramatic changes over the last 150 years in Victoria, Australia; and their stories add depth to the historical documents reviewed in Chapter Four. Today there are only a handful of commercially grown apple varieties left: Jonathon, Gala, Golden Delicious, Red Delicious, Jonagold, Fuji, Braeburn, Pink Lady, Granny Smith, Jazz, Sundowner and Eve (Aussie Apples, 2015). All of these apples, except for the Jazz and Eve, are also part of the global consortium of commercial apples. Although growers tell me that Jonathon is no longer a commercially viable variety; because of its poor keeping qualities and its unsuitability for long supply chains, it is now considered a heritage variety. At the supermarket level the selection is even narrower. Most mainstream retail outlets only offer Gala, Golden Delicious, Red Delicious, Fuji, Pink Lady, Granny Smith, Jazz and Eve. Growers also told me that the Delicious apples are no longer a good investment as there is little demand for them by consumers.

This chapter answers the research question: what factors determine where, how and what apple varieties are grown today; and what role does place play in the contemporary variety selection process. I do this by exploring the complex relationship between social and ecological histories (i.e. market changes, technological innovations, climate change) and choice of varieties. Connecting agricultural varieties with ecological locations and socio-cultural circumstances exposes alignments of place and biodiversity that support production
at particular scales over others. Importantly, my research shows the recent disconnect between place and biodiversity, while production escalates.

Many apple growing areas have a strong place based identity but unless the physical conditions are suitable, that identity - which is rooted in the inter-generational heritage of the orchardists - has its limits in sustaining the apparently endless modernization dominated industry. And even with a strong place based identity and appropriate growing conditions, many orcharding areas are struggling for survival. These places have experienced a decline in small scale orcharding and the remaining orchards have been increasingly intensified; in addition the social context of these places - that is, decreasing rural populations, increasing farm debt and distance to markets - have limited the options for many rural families. The consequence is that many children leave home for bigger urban centers and do not want to return home to continue the orcharding business.

In this chapter, I first explore the factors influencing variety selection and the link between that choice and growing practices. The decline in apple varieties and the use of technologies have significantly changed the way of orcharding. The whole industry is fitted around the need for constant upgrades and there is intense pressure to keep up to date with the newest technological developments. I then present a (Bourdiesian) field analysis and discuss the underlying structures of hysteresis, illusio and symbolic violence that impact on contemporary apple growing practices in Victoria.

5.2 Main factors influencing variety choice and practices

The growers’ biggest consideration for variety choice is the type of market they supply, not physical suitability or personal preference. Following on from this, physical place also contributes to the decision making process as the orchardists aim for a high quality apple (red, crisp, sweet and heavy bearing) which requires optimal growing conditions. And while
a perfect match between the perfect variety and the optimal growing conditions would be the best scenario, growers made it clear that technologies are used to overcome ecological limitations (i.e. irrigation, chemical sprays, frost cloths, hail netting etc). However, these techno-scientific solutions are jeopardized by increasing problems of pests and diseases, as well as rising irrigation costs as a result of fuel based pumping systems.

Breeding programs also influence variety selection and growers are keen to be up to date with the newest cultivars entering the market, which, more often than not, are licensed varieties. This is where the complexities of place are evident as the license holders of some of those varieties impose guidelines as to what conditions they can be grown in (to optimize production), and certain places are therefore deemed by the license as less suitable for certain cultivars.

5.2.1 Physical place

While market influence is the most critical factor when choosing varieties, the physical realities of place also come into consideration. This balance between choosing a popular variety and the ability to grow it well, is described by Russell below:

“...the consumption of apples is higher than pears. ...you know, I need to balance it up with more apples and that’s what I will be planting. [...] there’s a few new varieties of apples on the horizon and that’s probably what I will have a look at and hopefully take the orchard forward with a new variety of some sort that grows well in this district.” (Russell, May 2013, Goulburn Valley)

Russell’s comment reflects what all respondents conveyed in the interviews: the need to be up to date with the newest varieties in order to sustain their orchards into the future, while at the same time making sure that local conditions are suitable. Interestingly, however,
Russell also pointed out to me that pears in fact are slightly better suited to the place his orchard is in. Nonetheless, and because apples also grow well enough, Russell told me that there is more market demand for apples and hence, his focus will shift towards planting more apple trees. His first priority is clearly market demand, but his choice of growing more apples is also based on the suitability of the conditions.

Martha describes how the geographical location especially comes into play with licensed varieties, because their production is controlled by the license holders who aim for high yields, consistency and best quality:

“The people that own the license don’t necessarily want poorer quality fruit that’s not grown in the correct climate to spoil their marketing of the particular fruit. So with the Jazz, it’s only allowed to be grown in certain climate areas and I suppose we were lucky that we happen to have a property that’s suited that mix.” (Martha, January 2013, Yarra Valley)

There are no clear guidelines or maps that delineate where the Jazz cultivar can be grown. The process described to me was one whereby anyone can apply to grow this variety and it is then decided on a case-by-case basis with the breeder in conjunction with the grower to determine if the climatic conditions are suited to the Jazz cultivar. Feedback from growers indicated that there is a big onus on the grower’s expertise about their local conditions to even consider growing certain cultivars. Even for experienced growers, expanding or operating in a new location, this may be more difficult.

Place becomes an even more important factor when deciding what cultivar strain or rootstock to use. Rootstock selection, contrary to the cultivar choice, is much more dependent on local conditions. Soil and climate determine what rootstock is used. Varieties are not selected to fit place but more so places are maintained because they suit certain
varieties, which in turn can change places, too. For example to grow good quality - i.e. red - Pink Lady apples, reflecting sheets are positioned under the apple trees to accelerate the reddening process in areas where apples don’t colour as easily.

Historically, the choice of orcharding places was serendipitous, but over time some varieties proved to be more productive in certain areas; i.e. Harcourt for Pink Ladies and Fujis; Shepparton cannery facilities attracted the canning varieties. While varieties depend intimately on being connected to ecological place, the choice of varieties is above all decided by market demand.

Ultimately market demand determines what places are maintained as apple growing places. Ben who works for a large grower with different orchards around the state, told me that while the majority of his company’s production is based in the Goulburn Valley (a warmer climate), there is still one orchard in Harcourt (a cooler climate) because that place produces especially high quality Pink Ladies and Fujis. Pink Ladies colour particularly well under the Harcourt conditions, as Arthur explains:

“Harcourt is probably the best place, in Victoria anyway, to grow Pink Ladies, mainly because of the weather that we experience here, from now until the end of May. It’s the autumn weather that’s ideal for ripening late season red apples; warm days, cold nights. You’ll see the Pink Ladies will sit there until we start getting some cold nights in April, and then they will all of the sudden colour.” (Arthur, February 2013, Harcourt)

Harcourt has the right climate for the most popular variety on the apple market at the moment, but the future of this place is uncertain due to shifts in consumer demand and because of possible consequences of climate change affecting physical growing conditions. In addition, growing a narrow breadth of varieties leaves the orchardists vulnerable to
market changes, not dissimilar to what happened with the collapse of the export market in 1970s.

Growers who supply to the mainstream retailers end up in what is described as a ‘lock-in trap’ (Boonstra and de Boer, 2014) because they are limited to growing only those few varieties that the supermarkets consider desirable; and in combination with the demand for high quantities and quality, growers are forced into adopting techno-scientific solutions to keep up with the intense production regime. Market demand and technologies reinforce each other, creating an ever increasing productivity spiral. The direction is downward, because each decision to become more efficient and commit to further investment into technology, in turn, constrains future options.

Interviews with growers show, however, that physical qualities of place are changing with regard to the wider landscape context and this is proving to be limiting to production. Birds, fruit bats and kangaroos are increasing; and extreme weather events such as hail, frost and drought are making it increasingly difficult for growers. Combined, these external realities make it difficult to sustain their businesses, even with the best technology available. All interviewees from Harcourt complained about increasing numbers of birds, fruit bats and kangaroos threatening their orchards. This was further exacerbated by more orchard land being abandoned because of unaffordable intensification of production, water costs increasing or reduced production on existing land. The smaller land areas in orchards means that the birds are more concentrated on the remaining fruit trees and the kangaroos are searching for water and food inside smaller areas of orchard.

There is an irony in this as more than ever, growers are required to quickly adjust to changing demand and market conditions; yet, the constant intensification over the last 150 years has indeed diminished the growers’ flexibility in all aspects of their production cycle. Technological changes, while designed for intensification and productivity purposes, and perhaps for flexibility, are in fact working against the growers’ ability to adjust to industry
fluctuations and ecological pressures. This is because high investment costs associated with changing varieties and orchard infrastructure have locked growers into certain production pathways, limiting their overall adaptability.

Before going into detail about the impact of technological advances and changing practices, the next section describes one of the common ways of navigating a complex production environment, that of licensed varieties.

5.2.2 Breeding programs

Breeding programs and their new licensed cultivars are a significant element influencing variety choice, and are viewed differently by the respondents. Some interviewees commented that in the past there was a broader range of varieties grown to extend the season in the absence of good refrigeration technology. And while the number of varieties grown seems to be on the rise again, due to newer breeds and strains coming onto the market more rapidly because of advances in breeding practices, only some growers seem receptive to them. The cost associated with taking on a licensed variety represents a barrier for some growers. Steve, a fifth generation orchardist, explains:

“We have stuck with the original Pink Ladies. Probably because you have to pay for all those varieties, too, that’s the other thing... because they all have royalties and things on them, patents and things, typically owned by nurseries.” (Steve, February 2013, Harcourt)

There are also concerns about the delays inherent in planting or grafting a new apple variety as it takes 2-3 years for full production to take place with loss of income during that period; also a time of great risk. In the past growing other crops in between the apple tree rows or having livestock roaming the orchards would have mitigated for this lag period; this is not
possible anymore within intensive apple orchards. Growers are therefore hesitant to change apple varieties and if they do, they only change small parts of their orchard at a time.

Others however, see the future of their orchards depending on, and needing to anticipate future market trends, and on being up to date with these new licensed cultivars. Growing licensed varieties also offers security as the marketing is predominantly controlled by those who hold the rights to the cultivar and less by the retail chains. This enables some growers to persist in the highly competitive and pressurized commercial production field. Todd, a 6th generation fruit grower explains:

“I actually think they [licensed varieties] are better, that it will save a lot of the actual people that take them up. Because with the license varieties, I believe it is one of the only ways that you can take the supermarkets' dominance out of it. [...] [if you] create the dialogue between the grower and marketer and the consumer and the consumer is demanding it, then you have taken the power of the chain out of it.”
(Todd, January 2013, Yarra Valley)

Despite the fact that the profits are shared with the license holder and fed back into marketing campaigns, the risk is also spread, making licensed varieties attractive to growers. Todd’s quote reflects a sense of danger seen in the control by the supermarkets (one that license varieties can ‘save’ growers from), yet he continues production within this main orcharding field, also implying some sort of implicit acceptance of the underlying power structures. And regardless of some breeder clubs imposing parameters on where these cultivars can be grown, as indicated by Martha above, there is little that prevents orchardists from growing varieties in places that are not suitable. Instead growers adopt technologies that enable them to manipulate their growing environments but as outlined, even this manipulation is now reaching limits (i.e. pests and extreme weather events).
Recent research in North America argues that growers who embrace licensed apple cultivars are able to withstand some of the pressures they experience from large retail chains, as these cultivars provide the orchardists with more control over the market (Legun, 2015), as Todd described. Being part of breeder clubs can “change the rules of production” by swinging the balance of power back to the growers and providing them with opportunities to regain control (Legun, 2015, p.19). Growers told me about different ways to get involved in licensed varieties, either through private breeding programs, for example commercial nursery breeding programs, or by being part of a growers cooperative. No matter what the avenue, there is a significant cost associated with it, but also a commitment of time which many growers cannot afford. Furthermore, ultimately it is the supermarket that has to accept anything new on their shelves and this, as interviewees indicate, proves very difficult.

5.2.3 Markets

All respondents confirm that it is eventually the market that dictates what varieties are grown but depending on what kind of market the growers supply to, there are differing kinds of freedom as to what varieties can be chosen and how much consideration is given to the physical conditions. This also is true for nurseries that stock heritage apple varieties and still have a conventional market to satisfy. The mix in their business allows for and demands more diversity than just what the supermarkets may require.

Domestic and international markets have always influenced cultivar selection. As explained in Chapter Four the collapse of the UK export market in 1970 had a dramatic effect on the Australian apple industry as many varieties that were purely grown for export were made redundant. The apple market today, however, has been standardized on a global scale with a universal trend for red, crisp and sweet apples. Respondents indicated that the same apple varieties are grown for the domestic market as for export.
Those who supply the mainstream retailers choose different varieties to those who sell at farmers’ markets, and again different to those having an alternate use for their apples (i.e. cider). For example an organic grower said that the ultimate aim for her is to have an even spread of varieties throughout the season. And although this is ultimately again to satisfy market demand, the farmers’ markets she sells at demand a different product range to the large-scale supermarket chains. She says:

“What we are looking for [...] is varieties that ripen consecutively. So we sell more than 50% of what we grow at farmers’ markets. [...] ideally what I like every week, from the beginning of the season till the end of the reason is 3 or 4 or 5 or 10 varieties that ripen that week in small enough quantities that I can pick them and sell them that week. [...] So when we are adding new varieties, which we do all the time, we’re replanting and planting the orchard and grafting all the time...so that’s what I am always looking for. [...] We can pretty much sell anything at farmers markets as long as we have a nice range of things, so I am looking for variety. So the more variety that I can have throughout the whole season then that’s great.” (Ann, February 2013, Harcourt)

Her market still dictates what is grown but it allows more choice as to what diversity is offered. And because a lot of the crops grown are heritage varieties, the keeping qualities are different to commercial strains that can be kept for much longer. Hence it is essential for this grower to have a broad range available. She grows many different varieties of apples, plums, nectarines, peaches, apricots and cherries; all flowering and ripening at different times and also demanding different pruning regimes. Place plays a crucial role here as the physical conditions directly affect ripening times and hence the variety of choice. Others who have found alternative uses for their apples are less focused on market demand but revert back to trial and error to make the best tasting product, in this case cider:
“It’s been trial and error. We grew them [different apple varieties], made cider out of them and watched their performance in the orchard.” (Arthur, February 2013, Harcourt)

What emerges is an implicit acceptance amongst the growers that market demand is what drives their orcharding business practices. Their choice to supply one type of market over another sets in place other decisions that affect their physical and social place. Physical because of the varieties grown, sprays and technologies used, density of their plantings, and needs for irrigation. Social, because the growers’ market choice impacts on their stress levels associated with adhering to quality and assurance guidelines, farm debt from investments in technologies and future planning of their orchard, knowing that their children are unlikely to return to the farm.

5.2.4 Technology and practices

“My father was 92 and a guy who worked for us, he died a few years ago; he was about 95. And they used to spray with a hand sprayer. We used to have the old tractor with a spray pump behind it...they had a spray wand, or a lance...they didn’t have rubber coats in those days, you had an old felt coat and felt hat, and you put that on when you sprayed, right! And the guy that worked for us he smoked all the time, he had a cigarette hanging out of his gob...old felt hat with the spray dripping onto his cigarette and it dried off and then he lit it again and smoked away. And they were spraying mercury, they were spraying arsenate of lead...they were terrible sprays, killed everything, just nuke the whole joint, right! And they never got sick a day in their lives.” (Shawn, 3rd generation apple grower, April 2013, Gippsland)

Shawn describes the chemical use in his father’s day. Similar sentiments were echoed by other growers who also talked about spraying practices in the past, and explained how it was done on a scheduled rather than a needs basis, implying that seasons were thought of
as dependable. There were also fewer trees in the orchard which were more spaced out; with pasture in between the rows soaking up excess spray. In Chapter Four I outlined the adoption of integrated pest management approach (IPM) in the 1970s, resulting in more efficient use of chemicals by regulating and tailoring the spray regimes to specific conditions and using non-chemical methods of pest control. Another follow-on effect from the change to IPM is that it requires less labour and fewer inputs, adding to the general trend in the industrialized agriculture field towards efficiency and high productivity (see Krausmann et al, 2010).

As explained in Chapter Four, maximizing output has also been supported by denser tree plantings, improved pruning techniques, and dwarfing rootstock, allowing growers to reach yields much faster (within 1-3 years) than in the past (up to 8 years). The industry is based on efficiency and growers are pressured to keep up with the fast pace of innovation but it comes at a high cost. Daniel talks about the big changes he has experienced:

“Because the cost of planting an orchard now is horrendous [...] you aim to get apples in the second year. [...] We have gone from 130 trees per acre up to about 900 or 1000 per acre. [...] See, and when you multiply that by 8 or 10, 9 or 10 dollars [per tree], it’s a lot of money plus your posts, plus your wire, plus your irrigation, so you’ve got to get apples in that second year or third year...you’re not going to make money out of them but to start paying a bit of it off.”  (February 2013, Yarra Valley)

The interview results emphasise the close link between growing practices and the technologies required to support them. Technology has always been there, but the dependence on it and the source of it has changed significantly. While in past there was a necessity for growers to possess the expertise of grafting their own trees, this craftsmanship is no longer essential as trees can be bought as whole ‘packages’ (rootstock and apple variety grafted on top) through nurseries. At the same time, today’s growers require expertise in tree training, shaping and pruning. So it is not as simple as saying that
craftsmanship is decreasing. Nonetheless, there has also been a physical distancing from the orchard, as growers are no longer required to do as much manual orchard work because of the available technologies; in particular automated irrigation and chemical spraying systems. Wayne explains how their plantings have become much denser over the last 10 years and because of that:

“you’ve got to spend money on hydro ladders...[...] You can’t use [conventional] ladders anymore because they won’t allow you to get up more than 4 feet off the ground...so you’ve got to have hydro ladders and they are expensive to buy.”
(Wayne, March 2013, Harcourt)

What Wayne describes is the occupational health and safety reason for hydro ladders, but these ladders also make harvesting more efficient. Trees can be harvested evenly as even the highest apples can easily be reached. These ladders also allow older orchard workers to continue harvesting, as Roy, a third generation orchardist from the Mornington Peninsula points out:

“And especially with the machines, we find that we can use some of the older orchard people that are physically worn out from using a ladder. But they can still operate a machine, they may be able to do another 5 or 10 years work and they are the only ones that got skills. There are no new young people that are experienced in farms.” (Roy, September 2012, Mornington Peninsula)
Roy told me that the older workers have more knowledge about apple growing and they are also more attuned to the physical demands of orchard work which, he says, the younger generation doesn’t have as they are more accustomed to office work. This shows the value orchardists place on hard work and intimate knowledge about orchard work. There is a tension here because much of the new technology overrides traditional knowledge and makes it redundant, whereas in the ladder example, technology serves to retain the traditional know-how of orchard work. The adoption of technology enables efficiency, and efficiency is essential when staying in the main field of orcharding, signifying the implicit but significant pressures to invest in technologies.
Further, practices and technologies are influenced by, and at the same time influence, what type of variety is grown. Growing practices, storage technologies and transportation methods, all call for varieties that can withstand long supply chains, extended storage times and rough handling. It therefore comes as no surprise that most growers, who are part of these supply chains, favour varieties that have these characteristics over older varieties (i.e. heritage varieties) that only keep for a few days from picking.

Next, I address three different factors within the technology and practices domain that impact on the variety selection process: technological innovations, refrigeration and irrigation. While these are all linked, the first is mainly about the growing of the trees and the impact on the physical place of the orchard, including biodiversity; the second is about the post-harvest management of the apples which is closely linked to market; and the last is about water which again deals with the relationship with physical place.

**Technological innovations**

Post-war spray technologies and advances in machineries and planting practices in the 1950s and 60s were described by the respondents as the biggest changes in the apple growing industry. The move into bulk handling, assisted by the introduction of forklifts and big timber bulk bins (opposed to smaller timber dumps or metal kerosene boxes, known as keros) is described by Todd, a commercial apple grower in the Yarra Valley below:

“Well it [the move into bulk handling] was one of the most significant structural changes that occurred to the industry. You might have had one person to handle 5000 keros or something, now suddenly they could do 3 or 4 times as many.” (Todd, January 2013, Yarra Valley)
Instead of using ladders requiring more labour, growers today have machinery that reduces the amount of staff needed, a result of denser plantings and reduced tree height taking over in the 1970s; Steven explains:

“And in the late 1970s there was more of an increased planting. There was more scientific background to it, with the Department of Agriculture heavily involved in different aspects of new rootstocks, new sprays, growing techniques, better soil nutrition and understanding tree physiology [...] They were able to grow the trees much closer together and get many more trees per acre or hectare....” (Steven, October 2012, Red Hill)

This move to efficient and intense apple production corresponds with the growing trend of the 1970s. Supported by technology and changing practices towards high productivity, and driven by deregulation and increased supermarket control over the entire food supply chain (Burch et al., 2013, Lawrence et al., 2012), orchardists faced tough decisions. The traditional layout of their orchards was considered more or less fixed, but what a tree might look like was completely re-conceptualized. Today’s orchards are still mainly in the same places as they were 100 years ago, but the look of them has changed significantly. Trees are now intensively trained to maximize light penetration for maximum yield, accessibility and harvest-ability, resulting in the trees looking more like vines than the traditional tree shape. This affects all aspects of land management.

Technologies are a driver of homogenized practices but the relationship is reciprocal; choices to supply certain markets require the acceptance of particular expertise and machineries. For example the adoption of improved cool storage to extend marketability of apples, has made many apple varieties redundant, and has also enabled growers to focus their attention on just a few varieties and to grow them as best and as efficient as their markets require. In terms of place, apart from machinery and irrigation allowing for expansion into areas where apples could not be grown previously, technology has also
resulted in more intense production landscapes with dense orchards often covered in vast sheets of sunshade or frost protection cloth. Growers told me that non-orcharding residents often perceive this as aesthetically displeasing; here the high-tech production landscape stands in contrast to the idyllic vision of blossoming orchards that some people perhaps think of when deciding to move into a rural area associated with apple growing (compare figure 5.2 and 5.3).

Figure 5.2 older planting style with more spacing in between rows and trees (source: author’s own)
While physical realities of place are seen to be important in cultivar selection, techno-scientific fixes are adopted when the conditions are not ideal. For example hail net is put up to stop damage to the apples, and frost protection measures (frost cloth and sprinkler systems) are put in place; and shade cloth is put up in areas where apples are at risk of sunburn. Chemical sprays are used to optimize production and irrigation use is a norm in all areas. Technologies are used to overcome ecological limitations of place; as Jesse states:

“We know what’s going to sell well and then we’ve got to grow that and then we have to do a lot of adjusting the physical side of it. You know, like putting hail net up over certain varieties and overhead cooling” (Jesse, May 2013, Goulbourn Valley)

Jesse is one of the growers in the Goulburn Valley who told me that many orchardists are turning towards apple growing whereas in the past other crops such as peaches and pears were more prevalent. The recent increase in apple plantings is due to a decline in stone fruit demand. With the recent drop of fruit intake for processing (especially pears and peaches) (RMCG, 2013), the local canning factory has been laying off stone fruit grower contracts and in response, some of the growers have pulled out their trees and planted apple trees.
While the region is suitable for greener varieties due to its warmer climate, red apples such as Pink Ladies are now more prevalent. The relationship is complex. Again it is the market demanding certain varieties, but it is in fact the non-demand for other (canning) crops that has caused a shift towards apple growing in recent years. Growing red apples in the Goulburn Valley is only possible because of techno-scientific fixes. A warmer and drier climate means that growers rely heavily on irrigation as well as cooling mechanisms such as overhead sprinklers or sunshade cloth to avoid sunburn. And without the cool nights the apples do not colour as well as in other more southern parts of Victoria such as Harcourt, the Yarra Valley or the Mornington Peninsula.

Interviewees said, however, that these applications of technology are limited and many growers are facing financial limits. They simply cannot afford to protect their crops against birds and other wildlife and more extreme weather events are also placing significant strain on their business viability.

There is a saying that it is unwise to put all your egg (or apples!) in one basket as it creates risk of losing them all at once. However, this is exactly what is happening. Technologies have enabled growers to become more efficient by growing fewer varieties and perfecting the practice of how to grow them. Technologies have been used to overcome physical anxieties associated with pests and diseases, but today’s growers told me a story that indicates that pests are increasing and even the best technologies are insufficient or too expensive. There is a great risk associated with current growing practices, which, despite being realized by some growers, appears to be essentially accepted throughout the industry.

Refrigeration

Interview participants made it very clear that variety selection has been hugely influenced by refrigeration technologies. Without reliable cool storage, orchardists used to grow a lot
of varieties to spread the supply over the growing season, whereas today, apples can be kept in controlled atmosphere cool storage for up to 12 months. The so-called SmartFresh technology works by blocking the fruits’ ethylene receptors, inhibiting the natural ripening process (AgroFresh, 2015). Peter comments on the effects of this improved cool storage technology:

“And that’s [cool storage technology] a tool you use for marketing, it means you can market them any time of the year when it suits...”. (Peter, January 2013, Yarra Valley)

Being able to drip feed apples throughout most of the year enables growers to respond to market demand and focus on only a few varieties. To consumers, refrigeration technology has made the seasonality of apple growing invisible, as they are made to believe that they can purchase farm fresh apples for almost 12 months of the year. Technology has created a false image, one that portrays apples as available all year long. In the past, there were different varieties for different seasons, and perhaps people accepted, or were used to, less crunchy apples because at least there were apples available. Cooking and preserving apples was more common as people planned for a winter without fresh apples. Today, because refrigeration allows apples to be stored up to 12 months, the expectation of consumers has changed.

Irrigation

Apple trees in Victoria have always required irrigation. Harcourt was able to establish an orchard industry on the back of the neighbouring goldfields by diverting and utilizing the water channels created for sluicing on the goldfields (Milford, 2004); and other areas also relied on nearby water sources. In the early days Melbourne’s Yarra River was vital for irrigation and the city’s first orchards were established on the banks of the river. While flood irrigation and the use of heavy metal piping was the norm for many years, aluminium pipes
brought a major transformation to the labour intensive irrigation practices of the early twentieth century. Martha explains:

“It was hard work screwing and unscrewing 2-inch thick galvanised pipes and our horses shifted them around the orchard. Then later they introduced aluminium pipes. Christmas festivities revolved around irrigation in the orchard.” (Martha, January 2013, Yarra Valley)

Another welcome change was the introduction of machinery. Steven, the fifth generation apple grower from the Mornington Peninsula, describes the huge impact new machinery had in the 1950s:

“…after the Second World War bulldozers became common with the technology that developed through the war as far as larger machinery went. In the 1950s a lot of private contractors bought their own bulldozers, cleared more land, were able to dig dams with the bulldozer, where before in the 1940s and before the Second World War all that they had was a horse drawn scoop which wasn’t very practical to make a dam holding tens of millions of gallons” (Steven, October 2012, Mornington Peninsula)

Having a dam on the property made irrigation a lot more convenient and allowed for intensification of orchards, supported by improvements in refrigeration, transportation and other technologies within the orchard, such as sprays.

Today’s orchards are irrigated via efficient dripper systems and soil moisture is monitored to minimize any water waste. However, while the method of irrigation has become more efficient, with less water being wasted and less labour required, the flip side is an enormous
cost of not only installing the drip irrigation pipes but also the ongoing cost of running fuel based pumping and monitoring systems.

In Harcourt issues around irrigation have already caused a decline in the number of growers. The recent 10-year drought (2000-2010) was too much for some; a lack of water coupled with an increase in birds destroying whatever what was left hanging on the trees meant the end for several growers. This situation has been exacerbated in recent years, as the water authority’s restructuring of the rural water supply system comes at a high cost to the growers. Some of growers are reconsidering whether to keep their water rights or to sell them back to the authority. Jeremy explained to me:

“Price of water is just ridiculous, just ridiculous! We’ve got 3 major reservoirs, Malmsbury was built in 1870; Lauriston was built in 1941 and Upper Colliban was built in 1999. Now it’s a fair chance that they have paid for Malmsbury and Upper Colliban...there might be a little bit of debt hanging over their head from 1941. So what are we paying for? [...] So why is it costing us so much for water? Now we got this modernisation project coming around here now, or going to. The cost of water is so high that they budgeted it on 25% of people in the district handing their water back in. [...] They got 50% handed back in. Don’t want it, it’s a liability.” (Jeremy, February 2013, Harcourt)

Jeremy voiced the same frustration that other growers also told me about and it reflects the positive feedback dilemma of aiming for higher productivity, which comes at a high cost of water and associated infrastructure. Irrigation technology also plays into cultivar selection. In the past there was less sophisticated irrigation available and combined with a lack of cool storage, there was a need for more varieties that ripen at different times of the year; also spreading the workload more evenly over the season. While irrigation has always been a necessity in Victorian orchards, today’s access to efficient large-scale irrigation systems - together with refrigeration, and trees that are trained for easy picking - enable growers not
only to be part of the constant trend towards higher productivity but also to overcome ecological limitations, i.e. lack of rainfall. However, as pointed out above, these solutions are expensive and are not the panacea to overcoming biophysical constraints.

The alienation from place, elaborated on in Chapter Four, is coming full circle. Some growers can no longer mask the ecological realities and are required to engage closely with their biophysical place. This either results in the emergence of alternatives and diversification, or a realisation on the growers’ behalf that they are no longer able to stay ‘in the game’ of orcharding.

5.2.5 Impact on place

Technology and evolving growing practices have had a significant impact on place. Physical place matters when choosing what varieties to grow, but the ways of growing and associated technologies have equally transformed the production landscapes.

There has been the initial clearing of land to make space for apple trees, and technologies have continued to shape these places. Transport and cool storage have enabled orchards to be planted further away from central markets, while new practices have resulted in orchards being more intensely managed, with less other crops and livestock around. Machinery that was introduced after the Second World War has also shaped place, as large dams could be built and apple trees planted in areas where it was impossible before. Market changes have transformed places in a more indirect way; Steven points out the effects from the booming 1950s when apple prices were high:

“So many of the private cools stores and many of the brick veneer houses in the district date from that time when the growers suddenly had a substantial amount of money. My own parents built their cool store in 1965 and their house in 58...that’s
solely as a result of having better income for several years.” (Steven, October 2012, Mornington Peninsula)

This quote shows how the profits reaped by the growers were invested back into the community by building new houses. On the other hand, today’s economic hardships are resulting in some growers leaving the industry because of too little returns. In Harcourt for example, empty grass paddocks are a common sight and Mike, an apple grower from the Goulburn Valley, describes a similar situation in his area:

“…and in the district in general there is a lot more bare land…land without orchard that used to have orchard on it.” (Mike, May 2013, Goulburn Valley)

My analysis suggests that socio-cultural and physical place is only as important as the quality and quantity of apples it can yield to satisfy market demand. Growers closely connect to places because of the suitability for apple growing and their family history, but if the economic return is insufficient, then even that place identity is not enough to keep growers ‘in the game’. As the Harcourt example shows, despite the place being suitable for apple growing in physical terms, the industry there is fraught. In this case, it is those growers who have chosen to diversify and make use of the identity of the place, that are succeeding.

As I explained in Chapters Two and Four, the notion of heritage and the embedded knowledge growers draw on in their every-day practices, is closely tied to place. There is a tension between growers identifying as inter-generational orchardists, proud of their history; and the imperative to modernise their orchards (new varieties, new technologies, new growing practices). Their family history creates and connects them to socio-cultural place but at the same time there has been an alienation from the biophysical place as techno-scientific solutions override many of the ecological realities. Some growers told me of how they removed very old orchard trees to make room for more intensive production
layouts. Despite some sort of nostalgia about the old trees, this is seen as a necessity and rational business decision.

The interviews expose that orchardists have been adaptive when they needed to be and within the dominant model; examples of this occurred during the times when growers from Doncaster and other eastern suburbs had to relocate further east to make way for residential housing developments. Their ability to adapt has been facilitated by technologies and modern pruning strategies, allowing trees to produce at high rates after 2-3 years. It would seem that moving the location of an orchard is made easier by this possibility. At the same time moving to new locations is made harder in economic terms as many growers today invest in very expensive irrigation infrastructure and technologies to protect their trees from extreme weather and animals. Moving these structures and trees is not feasible, therefore moving an orchard is practically impossible; and the financial investment it would take to establish a new orchard, especially in the current market, is unviable for most.

Variety selection for market not for place

Market forces govern what varieties are grown; whether that is just the few popular commercial varieties, or whether it is the requirement for an even spread throughout the season, calling for diversity (i.e. farmers markets). Growers adapt to market pressures more so than to the physical conditions, as Ben describes below, when asked how he chooses his varieties:

“(sighs) What the public wants. If they want a particular variety, then you go down that track. It’s no good growing a variety that’s really easy to grow and you get good looks, but people don’t want it. So it’s all about trends; what’s popular by demand. And pretty much that’s Pink Ladies” (Ben, August 2013, Harcourt)
5.3 From practice to theory

Techno-scientific fixes have allowed growers to become more efficient and to focus their attention on just a few varieties for maximum output. Robert, a commercial apple grower, describes the pressure to produce high yields:

“You know, like my great-grandfather could have been happy with 20 tonnes per hectare or something...those sorts of figures...[...] Well, unless we’re getting 80 tons, you know, we’re not in the game.” (Robert, February 2013, Yarra Valley)

And other respondents, too, have described a constant move towards increasing yields and improving quality by standardizing production management. By doing so, growers can achieve their aim to satisfy a market demand that is driven by mainstream retail chains. Recent research shows that these retailers increasingly focus their attention not only on actual retail, but also on production (Burch et al, 2013). As described, the control that supermarkets have over the entire supply chain is ever-increasing.

Bourdieu’s premise of understanding the structure of society by analysing the power relations within, resonates, as it is these relationships, in particular those between the growers and the retail outlets, that appear to determine the future of Victorian apple production places. Nonetheless, the interviews have demonstrated that it is not only about the relationship between various players in the apple production field, but more importantly, it is critical to understand the history and reasoning behind certain production management choices that determines how growers react to changes not only in economic circumstances but also in physical conditions such as expected under climate change. While market forces appear to be the main driver behind the goal for ever-increasing productivity, it is at the same time sustained and propelled by technologies. Over time, these have created a lock-in, whereby growers’ choices for adaptation are limited.
Here, it is critical to point out that the lock-in, or path dependency (Carpenter and Brock, 2008), does not happen at once, but over time. As Boonstra and de Boer (2014) emphasize, the lock-in is a gradual process; it is a “pathway” into a trap and its origin can be traced by considering historical events leading up to the lock-in, while also taking into account the geographic and place specific circumstances (Martin and Sunley, 2006). The self-reinforcing nature of the relationship between market demand and technologies is what Pierson describes as the cause of path dependency (Pierson, 2000).

To trace the roots of this dilemma, I now explore the structure of the apple growing field by first presenting a Bourdieusian field analysis. This allows for an in-depth inquiry of the underlying power relations, while taking into account the origins of individuals’ dispositions and their effect on the overall orcharding field. Acknowledging that apple growers are part of a socio-ecological system that has been shaped over many generations is very important; it aids our understanding about the diverse slow and fast variables at different scales that impact on the growers’ everyday decision making. SES thinking, however, gives limited consideration to the individual level, and this is where I draw on Bourdieu’s concepts to extend SES thinking to reflect on the underlying power relationships that directly impact on the individual growers. Further, I emphasize how history plays a vital role in shaping the actions and practices of these individuals and as a result, their history bears significant influence on the overall social-ecological system.

5.4 Field analysis

Bourdieu’s notion of a field refers to a social space, or an “analytical construct” (Swartz, 2012, p. 27). The field here is the Victorian apple growing industry, which consists of many subfields. The majority of growers are players in the mainstream commercial field of apple growing. That is, they produce apples either directly for sale to the major supermarkets chains, or indirectly via agents or other larger growers. There are subfields that are
detached from the mainstream supermarket-driven field but still propelled by the overarching aim for productivity.

No field is completely separate from another. The Goulburn Valley example shows how the stone fruit production field can influence apple growing. As Bourdieu points out, all fields are part of the predominant field of power. All fields are connected and their boundaries are where the “effects” of a field end (Waquant, 1989, p. 39). Of course the effects differ according to what the object of investigation is; therefore it is never possible to define a field in absolute terms. This ties in with social-ecological systems (SES) thinking, which stipulates that all systems are interconnected and related to one another; and that action occurring within the system involving only a few elements has implications for the whole system. As an SES is interconnected, this connectivity is what strengthens the system by providing buffers and options for adaptation.

Bourdieu suggests that the field in question should first be situated in relation to the field of power. In the case of Victorian apple growing, the field of power is occupied by the most powerful institution: the duopoly of the major supermarket chains. All interview respondents told a story of domination by the two main retailers in the country and how they hold the power to influence not only what varieties are grown, but also establish their quality and quantity.

The second step in analyzing a field involves the mapping of “objective structures of relations between the players” (Waquant, 1989). The players are not only the apple growers, but also others who are part of the apple industry – i.e. market agents, consumers, retailers, fruit pickers, processors and many more. For the purpose of this thesis, however, the players under consideration are the orchardists.
In the past, growers were co-dependent, as the packing and storage was done via centralized cool stores where much of the interaction occurred. These were hubs of social networking and cooperative interaction. Today’s industry is a lot more fragmented. This is partly due to many growers having their own storage and packing facilities, a result of the technology and market progression. Having individual packing facilities has allowed growers to optimise their economic advantage by being in direct control of their post-harvest product. Growers associations still exist but many orchardists told me that they do not partake in any of their activities, as they prefer to source their information not through the groups directly, but through easily accessible online or other international sources. Obtaining information from overseas seems to be associated with being more up to date with the latest varietal developments and technological innovations.

There are mixed views on the quality of relationships between growers. Respondents gave me different impressions, with some lamenting the old days when growers came together at the local cool store to talk about the issues they faced. This is perceived as having been a good opportunity to discuss problems and share advice. Others have a positive outlook and tell of good interactions with other growers. Interviews show that those growers who have good relationships with one another, and also make efforts to build connections through grower networks, also have a more optimistic attitude towards their apple growing businesses. These growers build their field on solidarity between growers; ‘growing good apples’ is their shared interest and this common belief is what constructs the field.

The “structures of relations between the players” (Waquant, 1989) depends on which field, or subfield, they are part of. Interviewees said that those growers who produce apples for the main supermarket chains work together with others who do the same. They might help each other out with equipment or storage space, and bigger ones act as intermediaries between smaller growers and the supermarkets. The relationship between the growers depends on their practices, which in turn depend on the field they are part of. Or in other words: those growers who share the same interest also belong to the same field. Bourdieu refers to interest as the condition for “the functioning of a field” (Bourdieu, 1990, p. 88). All
growers share in common the interest to produce and sell apples, hence they are all part of the general apple growing field; but, their individual interests in how, what and where to produce apples differ which results in the emergence of subfields.

To understand why the interest differs, Bourdieu’s third step of field analysis comes into play; that is, to analyse the habitus of the players. Habitus, as the “embodied understanding” (Taylor, 1999, p.37), formed by one’s past and constantly influenced by the fields we interact with, and the people we engage with, is defined by Bourdieu as a “system of durable, transposable dispositions” (Bourdieu, 1977, p.72). As mentioned, the habitus refers to the inner dispositions as well as the externalisation of a generative capacity (Hage, 2013, p.81). This emphasises the coupling of the SES where individuals constantly react and adapt to social and ecological dynamics.

Bourdieu’s notion of the habitus explains how some growers seem to be stuck in what they are doing, and why others are open to new practices, ideas and ways of marketing. Harcourt is a good example where newcomers to the industry have come together to form a cider making business. This has allowed them to persist with apple growing by creating a new field that stands separate to that of the dominant commercial market. Yet, they are still a part of the overarching field, as they source some of their apples from commercial growers who sell them at a cheaper rate, as they are of lesser, second grade, quality. This supports the overall apple growing field as other growers benefit economically when their lower grade apples are able to fetch a price rather than being discarded. These newcomers, or “entrepreneurs of place” (Zukin, 2011, p.164) are benefitting financially from the symbolic meaning of Harcourt as ‘good apple country’ by consciously building on the ‘brand’ of Harcourt. The same thing is happening in the Yarra Valley where fertile soils and suitable climate enable apple growers to persist and intensify production; they also build on the image of the Yarra Valley as good agricultural land through their local marketing cooperative YV Fruits (see more on YV Fruits in section 6.4.3).
5.5 Hysteresis effect

Most growers have a long family history of orcharding, at least 3-5 generations, and hence, their attitude towards their businesses and the industry, as well as their understandings of their practices have developed over a long time frame. The growers’ habitus, or ingrained dispositions, is not only a result of their families, but also the field itself they have been formed in. As Bourdieu iterates, the habitus is not fixed, it evolves in accordance with the field. As the field changes, so does the habitus, but also vice versa. As can be seen in Harcourt, changes in habitus and field impact on the practices. As the newer growers turn to innovative business ideas, the field around them changes. The field of Harcourt apple growing is no longer just focused on growing apples for supply to the mainstream market, but Harcourt is becoming recognized for its cider industry.

These narratives reflect how serendipity (the gold rush) brought apples to the physical place of Harcourt, and as the ecological conditions proved to be favourable for apple growing, an industry developed. As circumstances have changed (socially as well as ecologically), interviewees indicate that apple growing has become much less lucrative than what it was 100 years ago, because Australian growers are now competing with other export countries such as New Zealand and Chile. Those growers, whose habitus has been shaped by a long history of orcharding for the mainstream markets, are struggling for survival. This disjuncture between the generative capacity of the habitus and field is what Bourdieu describes as hysteresis effect (Bourdieu, 1977, p.78-9).

The hysteresis effect occurs across all apple growing areas in Victoria and can be attributed to the rapidly changing circumstances surrounding the apple growing industry. Not only have the economics changed significantly (i.e. high Australian dollar; competition with imported apples and fewer opportunities for export) but the physical realities also mean that growers can no longer keep up with former rates of production. Increasing pests and diseases, and more frequent extreme adverse weather events, coupled with high input
costs, make it increasingly difficult for growers to continue with the exponential growth the industry has experienced over the last century.

In SES terms, hysteresis can be likened to the loosening of feedback loops. Globalization and its de-coupling between agricultural practices, labour and energy input (see Krausmann, 2010), together with long supply chains, are resulting in drawn-out feedbacks and delays in responses to disturbances such as climatic variability and extreme weather events (Walker and Salt, 2006). And while SES thinking is focused predominantly on the implications for the system as a whole, Bourdieu’s notion of hysteresis is useful as it takes into consideration individual’s dispositions (the habitus) as well as underlying power structures (see illusio section 5.6 and symbolic violence section 5.7).

Interviewees expressed feelings of despair and for some the pressure is so intense that they are either forced into giving up their apple growing business, or if they persist, they do anything they can to survive this highly competitive and supermarket driven field. Others resist and look for ways to diversify and create new fields, or subfields. To do so requires a break with what they are used to, i.e. adapt their habitus to new and changed conditions. The pathway growers choose - that of giving in, persisting or resisting (see Chapter Six) - influences how their new environment (physical i.e. changed diversity and crops, and economic i.e. farmers’ markets, value adding business change) internalises new dispositions, which in turn generate a capacity to act. Giving up their apple growing business or resisting by refocusing on value adding or farmers’ markets means that the orchardists’ physical and economic operating environment changes, and with it new experiences are internalised. Equally, if growers choose to persist, the physical and economic environment continues to impact on their capacity to persist but their inner dispositions can remain unchanged. This scenario is described below.

5.6 Illusio
Many growers do not adapt and neither do they resist and enter new fields. Rather, they persist with the hope that next year will yield a better crop of apples. This blinkering is what Bourdieu refers to as *illusio*, or the players’ blind acceptance of the interest they are following; which often can only be realized when viewing the field from the outside (Bourdieu, 1990). This is exactly the situation John describes. He is a fifth generation apple grower who quit apple growing in 2012 and looks back on his final days as an orchardist:

”And because I’ve lived it myself and realised I spent a lot of time managing something that was not even manageable...what was I thinking? Can I add up even? Because the numbers really don’t add up if you do the numbers on paper but you keep doing it. And a lot of farmers do that, it doesn’t matter if you’re a wheat farmer or...we just tend to be optimistic that next year is better, and it has to be. Whether it’s because you owe the bank money and you need to pay them back or....and a lot of us honestly think we can’t do much, especially at our age...who’s going to employ us. So we tend to think we keep going because there’s no real choices out there for us...it’s all we’ve ever done” (John, August 2013, Harcourt)

This sentiment is described by many other growers who are struggling but still continue on with their businesses in the hope that the next year will be better. The ecological conditions are dwarfed by the effort of trying to be a better producer. This is generated by internalised disposition constructed around the growers’ identity, which is based on the productivity model; for them, hard physical work and adhering to production-oriented approaches denotes good agricultural practices. Equally, Rogers et al (2013) emphasise that farmers have a deep emotional attachment to the land they farm and live on, and their identity is rooted in this context. As Burton (2004, p.196) highlights, “farmers may also resist change on the basis of an anticipated loss of identity [...] traditionally conferred through existing commercial agricultural behaviour”. As John describes above, “there’s no real choice out there for us” – reflecting the acceptance of a reality based on productivity.
Bourdieu’s concepts of *hysteresis* and *illusio* explain what is happening across the apple industry. While growers change constantly to adopt newer technologies and more efficient practices, their underlying habitus remains unchanged. Their aim remains the same as it was 150 years ago, that is, they strive to produce more efficiently, to satisfy local and global market demand. The fact that they are struggling, barely making any profits and each year facing risks due to increased extreme weather events is suppressed by the urge to try harder. Their habitus is not changing at the same rate as the field around them, creating a disjuncture.

### 5.7 Symbolic violence

Throughout my research I kept asking myself why the growers are not changing, why they are not adapting to the changes in the field around them. Bourdieu’s concept of *symbolic violence* is useful here, which he refers to as a form of violence that is not recognized as such (Bourdieu, 1977). To explain, I return to the concept of field in relation to cultivar choice. For example growers who sell their apples at farmers markets are not limited by supermarket specifications and requirements for certain varieties. Interestingly, interviewees said that supplying to farmers markets not only calls for a greater variety but by default it also means that growers are more in tune with their physical conditions. The reason for this is that the customers at those markets often seek out older heritage varieties, which do not keep as well in conventional cool storage. Therefore, the growers are forced to consider different ripening times to allow them to have a spread of varieties across the season (see Ann in 5.2.3). The selection of varieties that ripen at different times means that those growers need to be aware of even just slight changes in conditions. For the same reason, some of the growers don’t just grow apples but they produce a range of fruit to satisfy market demand.

The growers who are part of the mainstream retail field on the other hand, are much more controlled by what supermarkets demand. Indeed, interviewees indicated that growers within this field have very little influence over what varieties they grow. They therefore rely
a lot more on techno-scientific fixes to grow exactly those varieties that are demanded by the supermarkets. Having to grow particular varieties that adhere to certain quality standards means that these orchardists depend on technologies to override any physical place specific limitations. The pressure to adopt these technologies is an “unperceived form of violence” (Schubert, 2008, p. 184), what Bourdieu describes as symbolic violence. This is especially the case for growers who supply to the mainstream retail chains, as there is an expectation to be able to supply high quality apples all year round. While there are no outspoken rules about the need to have these technologies, not having them disadvantages growers, as they will not be able to keep up with others who do. As Timothy says: “if it’s [the technology] out there, you’ve got to use it”.

Those who experience symbolic violence, while unaware of it, are not able to change it as they accept it as normal. The example of John shows how once he was aware of the losses he was making and the trapped situation he was in, the only way out for him was to give up his orcharding business. In other words, John’s changed internal disposition created a capacity to act, and to leave the industry. Others are aware of the pressure they experience from the supermarkets and cultivar license holders, like Martha from the Yarra Valley, but are not able to do anything about it as their livelihoods depend on the contracts they have with the retailers. But as described earlier, it is more than just contracts that limit growers’ capacity for change; it is their worldview that is based on the acceptance of productivist utilitarian agriculture approaches (Burton, 2001) and not acknowledging or being able to imagine alternatives.

Symbolic violence acts as a barrier against change, it is like being gradually strangled. The result is that growers are stuck in “a process of entrapment” (Boonstra & de Boer, 2014, p.261). And as the above analysis has shown, the ‘trap’ itself can appear to be very worthwhile but in fact it has unfavourable consequences. Mahoney (2001) describes this process as a result of a “critical juncture” (p. 113), a point in time when particular choices result in a course of self-reinforcing feedback, leading into path dependency. From a systems perspective of the Victorian apple industry, there is not just one critical juncture,
but I emphasise the importance of a particular critical point in time. For the inter-

generational orchardists it was after the Second World War. This was a period when
government support for agricultural intensification coincided with a growing population,
technological advances, including machinery and chemical fertilisers, as well as cheap and
abundant labour (see Chapter Four) - returns on orchard investments were high. These self-
reproducing factors and exacerbation of positive feedback loops framed the process of path
dependency most growers encounter today. There are, however, some triggers for change
and resistance. History and place play a critical role; as well as symbolic capital, which is
drawn upon by some growers who are resisting the industrial and conformity pressures they
face.

5.8 Conclusion

By applying Bourdieu’s concepts of *hysteresis, illusio* and *symbolic violence*, it is evident that
apple growers in Victoria are facing problems that are partly due to their long history and
their entrenched habitus. The other causes for their problems though, are physical - and
tied to place - over which, at first glance, they seem to have very little control. However, by
diversifying into other markets, crops and a broader range of varieties (biodiversity), and by
making use of their heritage (socio-cultural place) some growers can resist the pressures the
overall field experiences.

Apple production landscapes are social and ecological systems; hence, the growers’
practices are influenced by social settings and biophysical conditions. In this chapter I have
extended the analysis of the social setting by drawing on Bourdieu’s theory of practice. But
as I have demonstrated, the social is inherently connected to the ecological and cannot be
seen in isolation. The orchardists’ practices – their decisions about what to grow, how and
where - are impacted on by structural power relations, and at the same time they are
exposed to biophysical pressures that can no longer be guaranteed to be mitigated for by
customary techno-scientific solutions. Just how growers negotiate these power structures
within their production environment will be the focus of Chapter Six.
6 Chapter Six, in which alternative pathways emerge

6.1 Introduction

In this chapter I argue that contemporary orcharding practices are driven by the growers’ ingrained dispositions while at the same time their decision-making is influenced by their economic and biophysical circumstances. I start by exploring the role of history and the significant influence of place in the growers’ everyday practices, before outlining the way symbolic capital is drawn upon to resist the economic and ecological pressures they experience. I conclude this chapter with an analysis of how the growers negotiate these stresses and I point out what factors emerge as catalysts for change.

6.2 Relationship between practice, place and history

Orchardists’ decision-making is closely linked to the social and ecological place they practice in, and these are reflected in their family history, which is an essential contributing factor. Both, place and history influence their habitus and in turn their practices. At the same time their practices embed new experiences, which also influence their habitus. History is not something static located in the far past, rather the growers’ history is a continuous process of experiences – the relationship between their practices and experiences is reciprocal and constantly evolving; hence, it is impractical to narrow it down to a simple cause and effect.

6.2.1 Symbolic capital is relational

To draw out this intricate connection I want to come back to the concept of symbolic capital that according to Bourdieu can be anything that is recognized by others as having some kind of value (Bourdieu, 1990, p.135). Capital is what drives the field. In the apple industry, the growers accumulate - and lose - capital, which then puts them into certain positions within the field. The growers recognize this positioning and depending on which position they
strive to be in, they desire to accumulate different kinds of capital. Bourdieu describes fields as “multi-dimensional” as a player’s position is not only influenced by the amount of capital but also its “relative weight” (Bourdieu, 1985, p.724).

In considering this positioning, the use made of it in tangible terms, influences the stability associated with the field at any one time. For example someone who supplies thousands of bins of apples to a major supermarket chain, a long family history has less weight, as it does not directly play into their immediate marketing strategy. However, for another grower their long family history can be used as a marketing strategy (for example at the local farmers’ market), and therefore it becomes valued symbolic capital, as it is recognized and desired by others; comparable to the family crests and castles that are used on wine labels in France to represent longevity and nobility (Gade, 2004). Similarly, a grower who produces Pink Lady apples for a supermarket will probably see a wide range of varieties as not worth the effort, or even a bother as the spread of harvest time would potentially increase her labour costs; whereas a grower supplying to farmers’ markets benefits from a wide selection of apples as consumers at this type of market place value and perhaps seek out diversity. Importantly symbolic capital is assigned externally by the people who buy these apples at the farmers’ markets. Symbolic capital is always relational; as one person’s symbolic capital depends on another placing symbolic value on it. This reciprocal relationship between system elements is captured in the notion of “co-evolution” across different scales in time and space, superseding traditional linear and reductionist scientific thinking of direct causality (Walby, 2003, p. 3). This reciprocal co-evolution parallels the close coupling between the social and the ecological system elements, as well as the coupling between history and practices. The position in the field is affirmed or weakened by the loss or accumulation of symbolic capital.

For example one Harcourt grower who supplies to farmers’ markets told me that having a range of different apple varieties gives him an advantage, to a point where he advertises the diversity on his market banners. His decision to continue growing older varieties that have been on his property for many generations is less based on sentimental family values, rather
it is a business management decision that has co-evolved out of economic need and market demand. But, as I explained, a common interest (apple growing, and particularly growing old apple varieties) is the precondition for the formation of a field. What determines the type of interest of players is in turn driven by the players’ habitus. Just as common interest creates a field, a common habitus is also necessary for the formation of a common interest. This is also true in reverse. Being part of the same field can shape the habitus of the players. This occurred in the early days of orcharding in Victoria. Early orchardists had a similar interest, not necessarily because they came from similar backgrounds, but they came together with a shared aim for a new life and orcharding provided the key to it. Taking the early fruit growers in Harcourt as an example, it is evident that their mutual interest created the field of apple growing. 150 years later, the field has diversified into subfields because no longer are growers just interested in producing apples for the mainstream markets, but other interests eventuate; and with these new interests, new fields are emerging.

6.2.2 Habitus and the influence of the ecological

What capital is accumulated is driven by the habitus, which has been shaped over time and space. But not only that, it is also the current environment, including the physical space that impacts on the habitus. Growers experience ecological pressures, which require them to act immediately because otherwise they could face big losses of their apple crops. When kangaroos threaten to destroy large parts of their orchards by damaging fencing and trees, or flocks of birds eat the almost ready-to-be-harvested apples, then obviously growers need to react quickly. This has always been the case. While growers can plan long term for what markets they want to supply, reacting to immediate ecological threats is standard practice. Their habitus is one that has been shaped by the need to react swiftly, to protect their crops at that moment in time at whatever it costs, and as best they can.

This has been aggravated by the fact that growers only focus on very few varieties, most of which ripen at similar times (most popular apples are mid-season apples). In the past
growers had other varieties to fall back on, or even other crops and livestock to support them through the season if part of the apple crop failed, but today’s economic pressures force monocultural practices. This means that if today there is a physical threat, it needs to be dealt with immediately and very effectively, as there is not much else to fall back on. Their habitus is reactive, and it has to be because of the changed scale of production and diversity in the orchard.

This somewhat contradicts the problem described earlier, which is the result of the growers’ habitus not changing at the same rate as the field around them (hysteresis effect, see section 5.5). Again it is helpful to turn to SES thinking which would explain this scenario as a result of loosening feedback loops, or in other words, the growers who are part of long supply chains (i.e. supply to supermarkets) have less control over their products and hence their responses to changes within their ‘field’ are delayed. Further, slow system variables (i.e. economic fluctuations, climate change) are difficult to track but most critical to acknowledge in order for a system to absorb long term disturbances (Walker and Salt, 2006). Fast variables on the other hand are more obvious and easier to respond to, explaining why growers can react quickly when they are faced with ecological risks, yet when faced with changing economic conditions, or even long term physical changes, as expected under climate change, they are much slower to adapt.

I argue that this is also due to the permanent nature of the trees themselves. It is much easier to quickly cover them, spray them or protect them by shooting birds, than it is to graft a whole orchard over to a new variety, or indeed plant a new fruit variety to diversify their product base. The tight economic margins orchardists report, aggravate the situation because there is an urgent need for them to make profit to pay back bank loans and to make sure that they can stay in business for another season. As explained, the financial and economic pressures within the apple industry, especially the symbolic violence acted out by the supermarkets, together with the constantly looming potential for ecological threats, creates a trap in which growers get caught and find it hard to escape.
6.2.3 Path dependency

A grower’s decision to continue within the dominant field results in a wave of consequences that create path dependency for the grower as the pool of options diminishes with each decision made (the downward spiral). Since supermarkets only stock a few apple varieties, the grower is pressed into reducing her varieties and thus relying on that particular crop to meet the highest possible quality standards as demanded by the retailer. This in turn requires a lot of technological input. All of these decisions come at a financial cost and unless there is sufficient return on the investment, the grower will be under significant financial pressure.

And while the decision to supply the mainstream retailers may seem like a sensible decision at the time, there are unfavourable ripple-on effects that require substantial input, coupled with and aggravated through unpredictable weather events, pests and disease outbreaks jeopardizing the potential gain. Path dependency can be seen as a process of constraint whereby future options are becoming progressively limited and decision are made that exacerbate the path dependent trajectory.

6.3 A note on co-evolving system elements

Bourdieu’s theory of practice builds on the notion of co-evolution in systems thinking (Walby, 2003), as his concepts of field, habitus and capital are relational; that is, they impact on each other and individual practices emerge out of the interaction between them. These practices not only change the structures within one field but flow on to other fields and sub-fields (other systems!) so these co-evolve correspondingly.
Analysis of interviews reveals how very complex the growers’ varietal selection process is. At first glance it seems market demand is the main determinant for how orchardists chose which cultivar to grow. However, upon further reflection of the interview data, it becomes clear that it is foremost the growers’ dispositions that motivate their practices and decision making to fit certain markets. This is a mutual process that constructs and affirms the values of the field they are part of. And as Bourdieu’s theory of practice suggests, the habitus – our internalised dispositions and the externalization of the corresponding generative capacity – is constantly influenced by, or co-evolving with, changes in the field. For example, apple growers might respond to retailers demanding Pink Lady apples by grafting most of their orchards over to Pink Lady varieties, this in turn impacts on their work load as all their apples will ripen at a similar time (perhaps only fluctuating because of different strains within that particular variety); this in turn will determine their requirement for seasonal workers.

The choice to grow only one variety will also affect the biodiversity in the orchard, such as bees, insects and birds. Another way to illustrate these ripple effects, the co-evolving nature of system elements, is the case when orchardists give up their orchards, resulting in fewer orchards with less fruit for birds to feed on. This is seen by some growers as one of the reasons for the high number of birds and also kangaroos in the ongoing orchards, causing damage to their crops and hence, forcing more growers into exiting the industry.

6.3.1 Symbolic capital to counter symbolic violence

Symbolic capital, while used by the mainstream retailers to gain control and exert symbolic violence, can also be drawn upon by the growers to counter this pressure. The retailers’ symbolic capital is represented by their authority to impose strict quantity and quality guidelines and by their brand power to decide which products to sell and advertise. The growers on the other hand, can draw on their heritage and their place identity as symbolic capital. As I will point out below, the growers can use this symbolic capital to counter the
symbolic violence exerted by the retail chains, and in some cases they are able to enter or create new fields that are separate to the main productivity-oriented orcharding field.

For some growers their heritage involves the wax models at the Museum Victoria. As discussed previously, the models are a physical legacy of apple growing; they are not only proof of suitable conditions for a diversity of apples, but the models also validate the growers’ place identity. For example, when a plan for a new freeway was introduced in Harcourt, one particular family used their family heritage in the apple growing industry, including the wax models that were based on donations from their family in the nineteenth century, to successfully resist the acquisition of their land. The wax models validated the family’s history and imbued the place with historic meaning: so much, that the location of the freeway was altered.

There has been a significant decline in commercial apple growers in Harcourt, and if it were not for the cider makers, the organic growers and the orchardists who supplement their income by selling apples at farmers markets, there would be even less than five growers left out of over 100 just a few decades ago. This signifies how diversity and variation allow a system to absorb and respond to shocks. The Harcourt example shows how the complex interplay within the decision process responds to the SES, and facilitates emergence, the notion of new properties (i.e new subfields of cider making or farmers markets) “emerging from local interactions” (Lansing, 2003, p.192).

While the ones who have diversified have different interests, and hence their capital is of a different nature, their existence is also benefitting the other growers. In particular in Harcourt, the main field of orcharding is kept afloat by the new subfields emerging. For example many Harcourt growers still rely on the local cool store for storage which depends on the support of the growers who pay for its use. Without the use of the cool store by some of the growers who have diversified, the cool store would become unviable and close down, limiting the options for the other growers who also use the facilities. The cool store is
more than just a storage function; the cool store denotes a commitment, even if unstated, to continue apple production from this place. The cool store embodies *symbolic capital* for all of the growers, and the shared use of this space provides a reason for growers to have a common interest in each other. While their individual interests may have diverged from the traditional emphasis on growing apples just for mainstream markets, the growers do still have the mutual interest of needing each other, as the Harcourt cool store would otherwise cease operating.

To negotiate the supermarket dominated environment, a few growers who hold sufficient economic capital are able to continue because they have the resources to invest in the newest technology to be able to produce at a level required to stay in the game of orcharding for the duopoly. Other growers do not have adequate economic capital but they utilize their cultural capital to stay in the game, orienting themselves to other markets. But both may use their long family history of apple growing (i.e. symbolic capital) as a marketing tool, they are able to continue on with their businesses. Their symbolic capital also includes the quality of the produce they provide as well as the *place* they grow apples in – provided that this place (such as Harcourt or Yarra Valley) is recognized as *good* apple country. And they are because these sites have proven to be the source of apples over many generations.

Similar to the concept of symbolic capital is the notion of *terroir* (touched on in section 2.6.3), a geographical indication similar to the concept of labels of origin (Gade, 2004). As Barham (2003) puts it, labels of origin “hold the potential of re-linking production to the social, cultural and environmental aspects of particular places, further distinguishing them from anonymous mass produced goods” (Barham, 2003, p.129). In a very similar way, *terroir* represents not just physical place characteristics, but also embodies social aspects and cultural heritage, as it depends on a product having value because it comes from a particular place that evokes meaning and recognition by the consumer (Trubek, 2008).
As long as Harcourt and Yarra Valley are known for good quality apples, their name brands can be used to promote apples and apple products from that place. It can also be used to promote other activities in that place, like the ‘ye olde’ apple festival that celebrates Harcourt as the small country town and an apple growing region and a tourist destination. The Harcourt apple festival upholds the image of Harcourt as ‘apple country’. In this way the apples define more than just the fruit - they give the region a way of imagining itself, validating its identity, and many urban romantic idylls about country life are evoked in the idea of an apple festival with old varieties, a cider-making machine and live music. Thus, crafts people and musicians also benefit from the apple history and the cultural and symbolic capital.

However, the place of the apples’ origin is lost in long supply chains, where towns and regions are transformed to ‘Australian’ or the generic ‘local’ product labels; so this kind of place marketing is only currently promising at alternate markets such as at farmers markets or smaller fruiterers across the state. Furthermore, selling via these alternate markets requires a lot of individual farm or coop input (i.e. hours and labour) with less immediate returns, which for some growers is impossible to sustain as some of the reasons they are not in the larger commercial production arenas include access to money and labour. The symbolic capital of Harcourt or Yarra Valley as places is therefore mostly insignificant in the mainstream apple market.

My analysis suggests that the more symbolic capital growers can accumulate the more successful they are in economic terms. The way economic success is measured however, is relative to a grower’s/player’s position in the field. Being able to supply high quality apples is a form of symbolic capital as it demonstrates the use of the newest technologies and defines good growing practices; and it reflects suitable biophysical conditions, which also assign symbolic capital to place itself. Having the latest equipment is something that is valued and often used as an indication of wealth, a sign that the grower must be doing well; as John explains:
“[… ] and I always look at what orchard equipment they have got and what vehicle they are driving and all the rest … and that tells me they are not making money.”
(John, August 2013, Harcourt)

Similarly, being able to produce red apples gives growers recognition (i.e. symbolic capital), as consumers and retailers demand red apples:

“The next door neighbours over here spend a lot of time and a lot of money on producing some really Mickey Mouse fruit, their fruit is just beautiful to look at …and they market it accordingly, they want top dollar for top looking … [ ] their father, the old bloke is sorting apples this morning and their second grade I would love to have them here for first grade, they are that good, they are just magic. But that’s the way they do it.” (Jeremy, February 2013, Harcourt)

Again, place here plays an important role as even the best equipment, scientific nous, growing technique and variety choice cannot yield a good quality apple unless certain local ecological conditions are met; such as Harcourt having a suitable climate to grow red apples.

Symbolic capital is the power to make things seen; therefore in some instances it can counteract the symbolic violence represented by the retail chains. Todd’s quote earlier shows that growers try to ‘push back’ by developing their own new strains or cultivars; some of the growers are even part of breeder groups, usually run through bigger nurseries, but ultimately it is the supermarket that has to accept anything new onto their shelves and this proves very difficult. Steve, a 6th generation apple grower comments on the power the major retail chains hold in Victoria in relation to new varieties:
This quote also points towards the taken-for-granted power of the big commercial players. Unless one has enough power, capital or authority, it is a difficult process to get a new variety accepted by the retail chains. Without adequate recognition it is difficult ‘to make things seen’. While in the past growers discovered new strains of apples, they shared them amongst each other and sent them to international horticulture exhibitions to promote them; the above quote shows how for today’s growers it is difficult to get a new variety onto the commercial market.

Symbolic capital in the commercial apple production field is mainly represented by economic capital such as modern equipment and investment in the newest technologies, and having your product go to the duopoly. Growers who have access to this capital are able to persist despite the *symbolic violence* that is reflected in the economic pressures exerted by the retail chains. Heritage or place identity has little immediate symbolic value in this field. Hence, it is this type of symbolic capital (heritage and place) that when drawn upon, directs growers into other fields and subfields, and in effect is used to resist the pressures from the commercial apple production field.

But the biophysical pressures do not distinguish the fields within which the growers are operating. Nonetheless, because of the closer engagement with place inherent in some of these subfields due to the smaller scale of their operations, and because of the increased diversity of crops grown, the growers in the non-mainstream apple field seem to be better

“Oh look, if it looks good and tastes good, the biggest problem is that because of the supermarkets having so much control, the only apple that is ever going to take over from those varieties is something they basically own and promote, because otherwise it won’t get the marketing. [...] Research is being done about new varieties and things but unless some of the big players pick it up, it’s not going to happen.” (Steve, February 2013, Harcourt)
prepared to adapt to physical changes. (For example having a variety of different crops
buffers against hail or heat stress damage.)

6.4 Exploring growers’ responses

As established, growers either choose to continue their struggle for survival, or they decide
to terminate their business and leave the field of apple growing, or they resist the symbolic
violence of the industrial agricultural economy, by diversifying in a way that allows them to
access other markets and effectively enter a new field or subfield.

6.4.1 Withdrawal

The preceding chapters have exposed the significant decline in apple growing businesses
over the last 150 years. Today, there are less than ten apple growing businesses left in
Harcourt, and much of the former orchard land is now unused. Similar stories emerged from
the other apple growing regions. Most of those farms remaining, face intense ecological
pressures in the form of extreme weather events (hail and drought) and pests (birds and
kangaroos) while at the same time being under immense economic pressures due to
extended food supply chains, increasing on-farm costs associated with buying water as
irrigation systems are modernized, and the costs of spray technology.

In Chapter Five I gave the example of John who exited the orchard industry and gave up his
orchards. He described how he can see clearly now because he doesn’t experience it on a
daily basis anymore. Bourdieu’s concept of hysteresis helped me to analyse this situation. As
established, hysteresis happens when a change in the field occurs but the habitus can’t
adjust in time. It is a lag effect. Hysteresis provides the link between systemic change in the
field and individual response. In the apple growers’ case it might be that their habitus is
based on the productivity model that their ancestors have followed before them but now,
with the high cost of technologies and pests and diseases, this rate of production is not possible anymore. Without the capacity to act on their internal dispositions, growers cannot sustain their businesses. However, as I have pointed out already, leaving the industry as John did is not easy. To give up an intergenerational orchard is a very hard decision to make. Emotionally and practically, it is difficult to sell land but it is also complicated by the cost of pulling out trees, which is an assumed biosecurity requirement (to prevent diseases and pests from spreading). There is lack of support for these growers who face a predicament of not being able to afford to continue orcharding but at the same time they face high costs associated with ceasing their orcharding business.

6.4.2 Persistence

Persisting, as I frame it, involves those growers who remain in the main game of orcharding, those who continue producing apples for the major retail chains (either directly or via agents at the Melbourne Food and Vegetable Market). The growers, who I interviewed and who can be described as persisting in the dominant field of orcharding, are mostly over 55 years of age and have a long family history of orcharding. Few of them have family members who intend to take over the business after them and hence, they persist with a relative short-term view (less than 10 years). Amongst this group of persisting growers, there are some who, despite coming across as frustrated with the market system and their dependence on mainstream retail chain, are indeed doing well financially. They are abiding to the ‘rules’ of the game so to speak, by adopting new technologies, expanding and intensifying their orchards and planting the newest and up-to-date cultivars.

Some of these growers told me that they look out for chance sports on their apple trees; these are branches that bear apples with particular sought after characteristics (such as colour or shape of the apple). The wood can then be propagated and grafted onto other trees to improve the overall quality of the grower’s crop. Daniel describes this process:
“...so what we try to do, what everyone tries to do is...well we have done the same with these Gala up there...[...] 20% or 15% of the trees are absolutely magnificent, the shade and the colour and tree vigour and everything. We take the wood off them and propagate them but if you’re smart enough you can claim it as a new variety” (Daniel, February 2013, Yarra Valley)

Daniel highlights the next step, which is claiming the sport as a new variety. Even so, not many growers told me that they were indeed doing this on a regular basis. One grower and his father did go through the process of registering a chance sport as a new variety and I asked them why this wasn’t happening more broadly:

“Lack of understanding. It’s a bit of a process involved in registering a variety...it has taken us at least 15 years from when we first noticed [the chance sport] to actually getting a commercial planting overseas. So it’s a long, long way.” (Kenneth, April, 2013, Gippsland)

Registering a new variety is a long process, one that perhaps deters many growers from going down the pathway of commercialization. This shows the symbolic violence inherent in the system, as the authority of introducing a new cultivar is restricted to just a few growers, breeder groups and nurseries. Unless a grower is part of these networks it is extremely difficult to introduce a new variety to the market. Alternatively, perhaps keeping the new strain or variety to themselves gives the smaller growers an extra competitive advantage, as no other growers will have apples with these new and better characteristics. In this vein, these growers are partly resisting the authority exerted over them; suggesting that there is no definite division between so-called persisting and resisting growers.

The idiosyncrasies within the same apple variety highlight the somewhat fraught system of classifying a new variety. A Pink Lady is no longer just a Pink Lady but there are many
different strains within that variety and then each orchardist may discover even further strains. The variety classification is ambiguous, because each orchard, even each branch on a tree, can bear slightly different types of Pink Lady apples. This stands in contrast to the very essence of the underlying aim for efficient and consistent production. Yet, this inherent variation at the same time sustains the industry, as it stimulates competition, which in turn motivates the take up of technologies and scientific knowledge, both essential for economic productivity and growth.

There are also some inter-generational growers who are younger and who have a positive outlook on the future of their orchard business. These growers are mainly located in the Goulburn Valley and they don’t just rely on growing apples for the supermarkets but they have added other services to their business framework (i.e. packing for other growers or growing other fruit crops). There are several factors contributing to growers in the Goulburn Valley appearing more confident about their businesses and optimistic about their future. For one, the cost of water is considered to be more affordable than for example Harcourt; and in addition the higher amount of growers in the region has resulted in more supportive services and infrastructure. The region is not only a horticultural production centre but since the beginning of farming in the Goulburn Valley there has also been a lot of dairy production.

I was told anecdotally that numbers of growers are declining in the Goulburn Valley but overall, there are still many more orchardists than in smaller regions such as Harcourt. The Goulburn Valley has 400 apple and pear growers (Australian Pome Fruit Improvement Program Ltd, 2015), whereas interviewees told me that Harcourt has less than 10 commercial growers left. Importantly, the Goulburn Valley’s fruit growing rode on the back of the fruit processing industry, as Mike explains:

“it started in the 1920s, or 30s...there was canning and it’s been strong until about 5 years ago. It was just, people wanted canned fruit, there was a market and it could
be grown around here, so that’s how it got going. [...] you could rely on there being water and water is a key to production” (Mike, May 2013, Goulburn Valley)

Mike highlights how the ecological system supports and underpins the social system. Because of the canning industry, many of the orchardists have been growing a variety of fruit crops, giving them a diverse product base to fall back on if one of them is not doing well. With recent declines in canning and processing, the growers told me that in the region many are converting their crops from stone fruit to apples. My interview data suggests that the growers in the Goulburn Valley have always faced fluctuating markets with demand from the canneries increasing and decreasing over the years. They had to be able to adopt practices that allowed for this variation, showing the close connection between history and practice. Growing pome fruit as well as stone fruit has been an imperative to withstand the instabilities over time; as Russell says:

“Different markets accept different qualities of fruit. And then you know, the more risk you spread out, the more chance you have got of surviving. It’s an absolute must I think.” (Russell, May 2013, Goulburn Valley)

A history of fluctuating market demand, coupled with a more diverse product base, suggests that growers in the Goulburn Valley are more accustomed and equipped to deal with future market changes. Nonetheless, there is a certain reliance on affordable water supply, which is questionable as there is a significant dependence on fuel based, and hence expensive, pumping systems. With climate change predicted to increase drought conditions in south-eastern Australia, there will be an ever-increasing irrigation need.

Jesse, one of the optimistic growers in the Goulburn Valley describes his business outlook:
“I wouldn’t necessarily want to be just a grower, and I think in the case of apples it’s a bit risky and a bit insecure; I’d far rather have some vertical integration, you know...storage. Not all of our income is reliant on the fruit we grow; you know, we can make margins out of growing other people’s fruit or cool storage, or selling other things...like our stand in Brisbane sells tomatoes and strawberries and all that stuff. We’ve got a chemical business in town that’s serves farm supplies for all the farmers in this area. Because we have all that I feel much more comfortable; if I was just an apple grower I wouldn’t be as content.” (Jesse, May 2013, Goulburn Valley).

This diversification, however, still serves the main apple growing field; or in other words, their practices maintain the conditions to continue within the main field. These growers are in some ways resisting. Their resistance, however, is not directly to the dominant apple growing industry or field, but rather they are resisting possible economic defeat of their business which would occur if they relied solely on trade with the supermarkets. Their choice to invest in vertical integration indicates their ability to still have some kind of control over their marketing choices. By investing in business ventures that contribute to the standardization of their orchard production and post-harvest processing, these growers gain command and control as they do not rely on third parties for these services. Nonetheless, this control is curtailed by the financial investments needed to continue mainstream retail supply. Their choice of supplying the mainstream market by adopting technologies and infrastructure to do so represents the reinforcing progression described in section 6.2.4. Yet, by accruing symbolic capital in the form of product diversification and vertical integration, these growers are to a certain extent able to withstand some of the symbolic violence reflected in the domination of the duopoly. For example, they can focus on one of their services (e.g. packing) if one of their products is less successful because of hail damage. Nonetheless, they are still part of the commercial model with its inevitable economic pressures continuing to erode alternative pathways of production.

Investing in technologies is seen as a norm for those within the dominant field; it perpetuates the reality they practice in, while further limiting their future options (path
dependency). As established, technology has created an alienation from biophysical place, and therefore the growers’ identity with place is not so much based on the local ecological conditions but rather on the technological infrastructure that makes them feel part of the prevailing field. Their ambition for economic success is embedded in the productivity mantra which their ancestors before them have followed and which is still the prevailing focus of today’s government.

For many of those growers who keep struggling to persist, they have little control over their own products, and they undergo symbolic violence - the symbolic domination; those who experience it do not perceive it as such. Production for mainstream retailers pushes growers to adopt expensive technologies to continue with the required rate of production and this is not considered to be ‘forced’ upon them but they do this voluntarily. As reflected in Ben’s quote below:

“supermarkets want them [Pink Ladies]...you’ve got to do what you need to do. You know, as they change varieties, we have to change the varieties here, that means we have to rip out blocks and replant, or we just have to cut trees down and regraft. The process changed to cater for what the demand is” (Ben, August 2013, Harcourt)

In Bourdieu’s terms this is explained by the phenomenon of illusio, which refers to the blinkering of the players (the growers) – the non-questioning. And as Bourdieu says, illusio becomes only illusion for those outside the field. As John’s quote (section 5.6) showed, because he got out of the industry, he can see clearly how his fellow growers’ denial of their fraught economic situation and aim to have a better crop the following season is just an illusion that is very likely to eventuate.

Similarly, a descendant of a longstanding apple growing family in Victoria told me anecdotally that his brother became too frustrated with the way supermarkets controlled
the industry, and ceased his orcharding business altogether. After a few years he realized the potential of growing different types of varieties that were not commonly sold in the mainstream market. He decided to graft old rootstock on his property over with heritage varieties and started a niche business selling apples directly to the public. And despite not having any children to take over this new venture in the future, his passion for growing apples is what makes him persevere. This scenario is not common but from speaking to growers around the state this approach of creating alternate markets is used increasingly to counter the pressures they are experiencing and to resist the symbolic violence exerted by the economy through the big retailers.

6.4.3 Resistance

I have framed ‘resisting’ as a way of overcoming the symbolic violence of the market place that growers cannot control. However, as I have pointed out, some of these resisters are still affected by it because they are compelled to diversify their orcharding operation. And even once their new businesses are established, they are still invariably dominated by the supermarkets as the retailers’ product base determines and influences the general consumer behaviour, or in other words, the main retail chains can be described as having obtained the position of a “pre-eminent food authority” (Dixon, 2003, p. 34). This notion of supermarkets holding authority over the food supply chain is reflected in Steve’s discerning comments about what varieties he can sell to the retailers:

“if it looks good and tastes good, the biggest problem is that because of the supermarkets having so much control, the only apple that is ever going to take over from those varieties is something they basically own and promote, because otherwise it won’t get the marketing.” (Steve, February 2013, Harcourt)

Supermarkets being in control or holding regulatory authority (Dixon, 2003), or being described as gatekeepers (Friedmann, 1993) is very much in line with my analysis of their
conduct as *symbolic violence*. This *symbolic violence* is a form of power that has evolved in the absence of government intervention, a result of neoliberal economics agenda. It dictates the terms of trade and because growers are so used to it, there is no collective resistance to it. It is not only about the supermarkets’ economic capital in terms of market share and number of retail outlets, but it is their symbolic capital that gives them enough recognition “to be in a position to impose recognition” (Bourdieu, 1990, p.138). In that sense, the retailers recognize only those growers who are able to adhere to their strict quality and assurance guidelines; that is, to produce high quantities of three or four varieties only, of high quality apples.

Some growers resist by diversifying into cider making or fruit juicing; and by joining or creating new ‘fields’, such as organics and farmers markets. These growers resist, but they are still within the same paradigm but working at a much smaller scale. They still produce apples although for different markets which therefore allows them to diversify into a broader range of varieties and value added products.

The surge in cider making and increase in growers selling their apples at farmers’ markets is similar to the early days of Harcourt, when growers sold their apples locally and apples had purposes other than just eating (i.e. cider, baking, cooking). Importantly however, today’s cider producers are not just selling locally but aiming to sell their products across the country and even export overseas. Similarly, the growers who sell at farmers’ markets - to escape the pressures by the retailers – must travel to several of these markets across the state to make sufficient income. These growers try to resist the pressures from the retailers but they still subliminally suffer the symbolic violence as their place is a niche market (farmers’ markets, organics and craft cider making) *because of* the dominance by the main supermarket chains.

Hence, the apple production landscape is in fact very different to what it has ever been. As growers are engaging more closely with their biophysical place, this somewhat resembles
the first phase of orcharding in Harcourt. Selling at farmers markets for example often means that orchardists choose to grow some older apple varieties and perhaps even some other crops, therefore, they have to be more attentive regarding ripening times and suitable growing conditions. For example the organic grower Ann (see quote in section 5.2.3) reflects how market demand still dictates what she grows but she has more freedom as to what diversity she offers. Being an organic grower concentrating on heritage varieties means that her apples (and other fruit) cannot be kept in storage as long as commercial varieties, and therefore she aims to have a spread of different varieties throughout the season. Knowing the exact ripening times is crucial for her.

Another way growers re-engage with place is by using it as a marketing tool. In the Yarra Valley for example, growers have come together to form a cooperative called ‘YV Fruits’, trading under the name of ‘YV Marketing’. The aim of the group is to share expertise and to be more efficient in producing, packing marketing for domestic and export markets. One of the members points out how members are not limited to trading just through the group:

“...we do joint purchases and have meetings and do joint things together, but it’s a loose cooperative sort of thing...we don’t necessary sell through that cooperative, we also sell fruit under our own labels.” (Robert, February 2013, Yarra Valley)

The idea is that growers can still market their apples under their own name while benefitting from sharing expertise through the group. But having the option of trading apples through the branded box of YV Fruits seems to give them more marketing power, implying that an organized group of commercial growers is more recognized than individual smaller growers. This would largely be due to more available funds for marketing as well as higher volume of apples. In the past this has allowed the group to sell apples to one of the major retail chains. But even now, the group is not big enough to sustain this direct supply to the supermarket.
My research was not heavily focused on the intricacies of this Yarra Valley cooperative but several advantages of this group emerged. The cooperative offers a range of fruit varieties representing symbolic capital in the form of diversity (i.e. others value the cooperative for the range of varieties available). Further, the group does not bind growers to exclusively trade through the cooperative but it also allows them to market their produce under their own names. Hence, the growers can dictate their own terms of trade and as such redefine their field by being able to choose how and where to sell their produce.

In Harcourt on the other hand, growers told me that a cooperative would not work, as there are too many differences in quality and quantity of apples between the various apple orchardists. Arthur, who has been in Harcourt less than 20 years, comments on his attempt to start a cooperative when first starting to grow apples in the area:

“It was also fairly clear having been involved with the rest of the fruit growers in the valley that there was a real reluctance amongst the fruit growers to work with each other...we tried very hard to try to work with the cooperative [cool store] to market a Harcourt brand...we worked with them to develop a Harcourt box, prime fruit...you know. It was really...the heritage fruit box was really good....we tried to establish a brand where growers could put their fruit in and get into a premium market rather than off-selling their bits and pieces everywhere else. [...] It went for nearly two years and then it sort of got...yeah, they lowered their standards and they started packing lesser quality fruit into it and basically it blew itself out of the water. (Arthur, February 2013, Harcourt).

Arthur’s comments mirror the narratives of other growers, as the consistency needed to market apples under one brand is extremely difficult to achieve. And not only that, but there seems to be a social disconnect between the Harcourt growers - which stands in stark
contrast to the early days of the township when growers were closely connected, especially through the cool store. To me, from the outside, it appeared to be a good concept to jointly market apples as a Harcourt brand, especially since it seems to work well for the cider and apple juice businesses. The growers however, showed more concern about being independent from each other, pointing towards their ingrained dispositions rooted in the historic colonial ideal of the yeoman farmer.

Nonetheless, because Harcourt is well known as apple country, individual growers can use the region or the place name as a brand. And as explained already, some growers use their own family history for marketing purposes. They draw on the heritage of their families, but also the place of Harcourt, as symbolic capital.

Interviewees indicate that the alternatives to the mainstream apple growing field are not as easy to realize as one might think when looking from the outside. Giving up a business structure which is embedded in the productivity model is not simple. Not only are there economic hurdles but the cultural leap that is required to change can be even more difficult. Investing in value adding, or changing to organics can be a lengthy and costly process, in addition to the risks inherent in entering a new business venture. Ann describes the difficulties she and her husband experienced when shifting their orchard to organic farming practices:

“I think going organic… and we have been on a really massive learning curve with that. Changing over our orchard from conventional rowing to organic growing has a whole lot of issues around it ... we know all about them now (laughs) But we didn’t know anything about it when we started. So one of the main problems that you strike is that an organic grower you’re not allowed to use artificial fertilisers and so the nutrition that the trees get is really dependent on having very biologically active soil. So you need a lot of microbes in the soil to make the nutrients available to the trees basically [...] In the garden its easy, you can get that happening in 6 months or a
year in a garden, but on 5 hectares, you know, you are limited by money and time as to how quickly you can get this to happen.” (Ann, February 2013, Harcourt)

Her quote shows the close engagement with biophysical place but it also reveals the time and commitment required to change her practices and in doing so, physically reconstitute place. Despite her dispositions and underlining goals having changed, the capacity to act on them can still present a significant hurdle. It seems that this scenario (disposition changing before the capacity to act on the new disposition) results in quicker practice change than vice versa. In the following section I analyses in more depth the relationship between the individuals’ dispositions, place and changes in the social-ecological system.

### 6.5 Catalysts for change

As explained, the ingrained dispositions (the habitus) of the growers have been shaped over many generations and these dispositions have created, and at the same time they maintain, the growers’ own reality. As Hage points out, people create “the very world in which they can operate best” (Hage, 2013, p.87). The growers’ existence is historically based on the entrenched mantra of economic success through efficiency and productivity. Their habitus is rooted in this view of the world and they allow economics to dominate because they are situated within a reality in which capital accumulation sustains this reality.

History has embedded a habitus among the players who (together with other players, e.g. retailers) construct the meaning of the apple industry as a field. The constant move towards productivity and global competitiveness is so ingrained, that doing anything out of line with that mantra is generally unthinkable. Yet, it is exactly those growers who are resisting this force, who are able to sustain themselves, their families and their businesses. By creating and entering new fields, such as those of farmers markets, organics and cider making, they
are able to move away from the forces of the industrial apple growing field and re-create their existence.

The catalyst for this change is not only economics because, as I have highlighted, the growers’ reality is constructed around and based upon the very economy that is also causing them hardship; but it is the physical place that is catalysing change in the growers’ perception. As Hardy (2008) points out, hysteresis - here the mismatch between the biophysical conditions and the practices designed to maximize efficiency – is a time when new opportunities can emerge.

In other words, some growers are in a calamitous position as their habitus is rooted in the economic realities of productivism but the physical pressures limit their ability to act accordingly. Approaches to deal with extreme weather events, pests and diseases are becoming too expensive, forcing growers to envisage new possibilities that in effect mean breaking with all the norms that make up their reality. SES thinking is important here, as it points to the intricate relationship between the social and the ecological that receives little attention when applying Bourdieu’s concepts; yet, my analysis shows that this ecological consciousness is a way of re-distributing the power relations, to the benefit of the growers.

Hage (2013) points out that the body internalises the environment to perfect the ability to live in that environment; and Bourdieu acknowledges the influence of the environment in shaping the habitus, but his analysis does not take into consideration the changing nature of the environment, in the sense of acknowledging that the space we live in is not physically fixed or ‘place’ static. SES thinking assumes a dynamic relationship between the physical and the social world, whereby each constantly influences the other. And in this interaction is the opportunity for shifting relations, changes in power and in the meaning ascribed to local practice.
The diversification of products that growers have moved towards is benefiting Harcourt as a place. Those who have diversified by value adding or branch out into a broader variety range (so still staying in the apple growing field) are maintaining the image of Harcourt as ‘good’ apple country. Their businesses are attracting tourists who contribute to the overall economy of the area. This in turn also benefits the growers, who rely on, and are collectively maintaining and giving new meaning to Harcourt as a place and the brand that is ‘Harcourt’.

Diversification is in itself another catalyst for change. A more diverse product range, including farm-door businesses for cider and wine tasting and pick-your-own orchards, creates a self-perpetuating economy of niche markets. Harcourt is becoming a destination, not just for apples, but for many kinds of other products and services. This opens doors to a range of options for growers, and non-farming residents, to contribute to this emerging and diverse economy of place.

Arguably, a diverse range of interests and subfields and capitals makes the overall field more sustainable. This is in line with SES thinking, which stipulates that the more diverse a system is, the more resilient it is (Walker and Salt, 2006) - where the stability that resilience represents is about staying in the apple production system in some or many ways. A SES is complex and in order to be adaptive it needs to be able to deal with the stresses experienced and even to anticipate thresholds or triggers for changes or disturbances. As a social system is not value neutral, it will depend on the activities of individuals and the social structures that reinforce the societal norms. The activities impacting on the biophysical system - in the case of apple growing - are about adaptation. This means being able to respond to socio-cultural factors as these interact with the physical. If a field relies on only one form of capital - for example that of high quality commercially preferred apples - then it is very vulnerable. Even a small change, such as that of a single hailstorm, can have detrimental consequences for an orchard planted with only one variety. Whereas for an orchard with many different varieties, the effect would be lessened as the varieties flower and bear fruit at different times.
The immediate changes for the Harcourt industry have built on a strong place-based identity. By making use of the Harcourt brand and long family histories (social), as well as the good climate for producing Pink Lady apples (ecological), the growers there were able to change and adapt the trees and themselves to the stresses they were facing. Biophysical suitability and the growers’ connection to place have kept the industry afloat; but an inability to command and control their environment in ways that they may have previously done (through technology or scale of enterprise that allowed more waste), remains one of the major anxieties. Growers said that wildlife and extreme weather events are their biggest worries.

In addition, growers are constrained by their path dependency within the apple industry. It is reinforced through the symbolic violence that underpins the economic power relations manifested through the duopoly of the supermarkets and the expected production systems. My analysis has shown that to break this trap requires a significant change in the habitus, not only of the individual growers, but also of the industry itself. The productivity mantra has been in place since the origins of apple growing in Victoria, and most growers can no longer remain viable in this situation. Physically, conditions have become less favourable; and socio-culturally, growers are increasingly discontented with the dominance that the supermarkets exert over them. The analysis of emerging subfields of the apple industry, those that employ alternative uses and supply niche markets, demonstrates that the “reactive sequence” (Mahoney, 2001, p.114) has already commenced. The self-reproducing structures, described earlier as symbolic violence and illusio, are still ongoing, but the resistance to the dominant field does exist and appears to be growing stronger. Interestingly, the interview data suggests that it is the very productivity mantra that distances product from place that is the catalyst for interrogating the model. Growers are now suggesting the importance of initiating a closer engagement with place. Nonetheless, the acknowledgement of environmental issues and the characteristics that enhance or limit the apples in place seem to emerge only as a last resort.
Symbolic violence is a significant barrier to change, and it often is intensified by the growers’ habitus that can prevent them from acknowledging this symbolic domination. When growers are economically successful, they do not really query the system that informs their fortunes, except to note yields to price, and price returns for labour and cost inputs. Cultural, economic and physical hysteresis, particularly biophysical pressures coupled with economic anxieties act as catalysts for change because they impact on the growers’ capacity and trigger a change in practices. Consequently, industry and government strategies that strengthen productivity, while supporting the socio-cultural wellbeing of growers, need to account for the impact of underlying power structures on the individual growers’ dispositions. Further, as Hardy (2008) notes in her analysis of hysteresis, government intervention plays a big role in legitimizing practices and also changing the value – or weight - of symbolic capital, because - as I discuss in the next chapter - such leadership is expected to result in policies and programs that support such initiatives. While in her example, state intervention can be the cause of hysteresis, I want to highlight the potential in government policies for alleviating the effect of hysteresis. Whether being the initial source of it or not, government can provide viable options for growers, who without direction could bear the full burden of hysteresis. To elaborate on this suggestion and in line with Bourdieu’s call for researchers to be involved in socio-political discourse, I shift the focus of the following chapter to policy matters.

6.6 Conclusion

A focus on the individual growers’ habitus has significant potential to reshape practices and as a result, the field around them. A systems perspective, while essential to acknowledge the broader circumstances, lacks emphasis on the possibilities emerging from the individual level. My analysis suggests growers are shifting their attention towards the intricacies of place because of the pressures and anxieties they are experiencing both at large and smaller scales of production. No longer can they all afford technologies to overcome biophysical limitations; and from an economic perspective they cannot expect to endlessly keep up with the rates of production that are required to stay in the game of mainstream orcharding,
especially as technologies meet their limitations in the face of rapidly changing ecological conditions. As this chapter has shown, it is those growers who engage more closely with their surrounding ecological conditions and their history and identity as apple growers that are most able to resist the vortex of agricultural productivism. Importantly, the findings demonstrate how this complex system is undergoing constant flux, with growers at different stages of resisting, persisting and withdrawing at the same time strengthening and weakening the connectivity of the system. Hence, government strategies and policies targeted at only one part of the production system (i.e. productivity growth) will inevitably fail to deliver social and ecological sustainable farming communities. In the next chapter I will evaluate the existing policy framework surrounding apple growing in Victoria and, in considering the findings of this study, argue for some policy changes.
7 Chapter Seven, in which I shift my attention to policy matters

7.1 Introduction

In Chapter Four, Five and Six I explored the interview results in relation to my theoretical framework and discussed how social and ecological place impact on the practice of growers. I also emphasized the role of underlying power structures and their effect on growing practices and variety selection. In this chapter I extend that analysis by drawing on findings from the political economy literature, already touched on in Chapter Two. I use it as an analytical tool to establish the usefulness and gaps in the current policy framework surrounding apple growing in Australia, specifically in Victoria. As I have described in Chapter Three, my ontological position sits within constructivism as well as critical theory. And it is with a critical viewpoint that I want to bring my thesis to an end. There is intrinsic value in laying out history and presenting contemporary grower narratives, but as my aim encompasses exploration of future possibilities in dealing with social-ecological change, I consider it essential to examine and evaluate the policy setting in which apple growers negotiate their daily practices and decision-making.

I will point out implications for policy that emerge from my research. I start by reflecting on the disconnect between the enduring national focus on agricultural export and growth, and the local realities that impede this trajectory but have, more or less successfully, been masked by technologies. The implication of this hysteresis effect (see section 5.5) is the decoupling of the social-ecological system, whereby the identity of growers is lost in ever growing supply chains. I argue for a policy approach that addresses multiple and diverse pathways for agricultural production; one that focuses on the local context and supports flexibility and diversification away from the dominant market field.
7.2 National productivity mantra vs local social-ecological realities

“Australian agriculture has moved from a situation in which there was a complex array of government interventions to one of the least-supported farm sectors in the world.” (Botterill, 2003, p.21)

7.2.1 Critique of the status quo

As established in Chapter Two, there is acknowledgement that agricultural production landscapes are social-ecological systems requiring place-based management approaches that take into account diverse local contexts. However, research suggests that place-based approaches can have their shortcomings as the wider context can be neglected, and a more holistic view is proposed here; one that takes into account the idiosyncrasies of physical and social place context while also considering sector wide implications beyond the local.

The status quo within the current food regime (McMichael, 2009) is criticised for its lack of policy addressing concerns surrounding the control and authority of supermarkets (Freidberg, 2007, Lawrence et al., 2012, Hattersley et al., 2013, Burch et al., 2013). There is also a need to embrace the multi- and cross-scalar complexities inherent in farming systems (Beilin et al., 2011, Dramstad and Fjellstad, 2011).

Further, in the Australian context, the literature suggests that since the 1980s there has been a considerable change in how research and development (R&D) is undertaken and who is responsible for the extension-work in the agriculture sector. Hunt et al (2012, p. 22) propose that research, development and extension (RD&E) in Australia is “still unravelling”, referring to the diminishing extension services available to meet industry and community needs, as well as a continuing reduction in overall RD&E investment. Their view affirms the historical reality and then ongoing assumption that government is solely responsible for
providing RD&E. The historic trajectory has seen a move away from government, with the private sector becoming more involved in the delivery of RD&E services.

### 7.2.2 Changes in agricultural extension

Initially, Australian agriculture extension was government-led and aimed at assisting early settlers to develop practices suited to their new surroundings, which were very different to what they were used to from their urban environments in their European home countries. In fact, many settlers were entirely new to farming, so they had to learn everything from scratch; and the colonial orthodoxy of what it was to be a good farmer was based on European ideas. Extension was tailored to “deliver food security and economic potential” (Hunt et al, 2012, p. 10); it was supported by government agencies, and in the latter part of the nineteenth century also maintained by local agricultural colleges. As outlined in Chapter Four, the Burnley Horticulture College was a key component of horticultural extension in the Victorian colony; and similarly, the Museum Victoria wax apple models played a critical role in the provision of models for extension work around the colony by displaying what could be grown but also by demonstrating pests and diseases. The wax models embody all parts of RD&E. I was told anecdotally that initial research for new apple varieties was often done by the growers themselves, that is, because they engaged closely with their orchard trees, once a suitable new variety was discovered it was then developed and passed to the Horticultural Society which would endorse and authenticate the growers’ work. If a variety was considered to be significant enough it would be modelled into wax by the Museum. There are few records that tell us about what characteristics would make a new apple variety stand out, as there are no detailed descriptions of new varieties, except that they were considered to be fine.

While throughout the twentieth century agriculture extension was still primarily financed, designed and implemented by government, these interventionist style agriculture policies and associated extension services were slowly phased out in the 1980s. The cornerstone of this shift occurred in 1982 when the Australian government commissioned a review into
agricultural policy which produced the Balderstone Report (Balderstone, 1982). This report argued for market driven policies and resulted in significant deregulation of agricultural support services (Botterill, 2003). The report suggested that agriculture policy should be responsive to international markets and create conditions for economic growth, while encouraging efficient farming practices and adoption of new technologies (Balderstone et al. 1982, p2, quoted in Botterill, 2003). The report’s recommendations were in line with the general move towards a neoliberal policy agenda and market-based economy that was supported by successive Australian governments in the 1980s and 1990s (Tonts et al., 2012, Hunt et al., 2014), resulting in Australian agricultural producers being one of the least supported in the world (Botterill, 2003). This focus on productivity, efficiency and export is still prevalent in Australian politics today, with the recently released Agricultural Competitiveness White Paper (2015) continuing the same trajectory: Australia as an important and a successful world player in agriculture. The growers’ reality stands in stark contrast to this vision which is based on the colonial productivity model so evident in the apple export label discussed in Chapter Four.

Figure 7.1 Label for overseas export (Cowles, C. And Walker, D., 2005. The Art of Apple Branding, Apples from Oz)
There are increasing calls for an overhaul of the Australian RD&E sector (Hunt et al., 2012, Hunt et al., 2014), in particular the requirement for closer engagement with the farming communities to develop extension programs that are suited to local needs (Rickards, 2011); while taking into account the complexities across different temporal and spatial scales that are inherent in farming systems. These remain to be addressed by policy makers (Dramstad and Fjellstad, 2013, Beilin et al., 2011).

7.2.3 Wellbeing

Recent studies focusing on the wellbeing of rural farming communities highlight the importance of policy taking a multi-dimensional and long-term view when considering how to improve government services for the farming sector. While there is a clear need to alleviate economic stress in order to improve wellbeing (Edwards et al, 2015), research also emphasizes social inclusion and support measures that go beyond economic support (Winterton et al, 2014). Similarly Sysak (2013) emphasizes that government economic support for (in her study, drought affected) communities, assumes that farmers have the capacity to access the support mechanisms. However, insufficient knowledge, health and social capital - all components of habitus - represent a significant barrier to accessing this type of government support. This underlines the importance of understanding farmers’ practice, including the history and individual habitus that drive their everyday and long-term decision-making.

Bridger and Alter (2008) argue for an interactional approach which involves a policy framework that embraces economic, environmental and social wellbeing by “strengthening the relationships between the economic, social, environmental and political dimensions of social life” (Bridger and Alter, 2008). In this sense, industry associations – which are commonly funded by farmer levies and sometimes subsidised by government - are an essential place-based resource (connecting local farming communities), but importantly they are also a sector wide social capital resource reaching beyond specific locations by
providing informal and formal networks of communication (Kilpatrick et al, 2014). The idea here is that because individuals’ wellbeing is dependent on their interconnectivity between rural places and across different sectors, there is considerable benefit in implementing a multi-dimensional approach that goes beyond specific places to consider the interpenetration of individuals’ practices between temporal and spatial scales. Further, research highlights the need for policy to be anticipatory in the longer term rather than focusing on short-term reactive solutions that in fact can lead to maladaptive responses in the long-term (Sysak, 2013). This is because a narrow focus on one issue (e.g. intensification of apple orchards) can result in other problems being overlooked. Hence, industry bodies and associations need to take a more holistic approach, focusing not only on economic productivity and wellbeing, but also directing attention to inter- and multi-scalar, as well as long-term socio-cultural issues that are not directly tied to economics and productivity growth.

While the argument for multidimensional or holistic approaches represents research findings in relation to mental health, the recommendations are still very much applicable to this study of Victorian apple growers and their habitus (and SES). There is a general view amongst the growers I interviewed, that there is insufficient government support and advice, especially compared to the dairy or cropping sector. Hence, the broader research on wellbeing of rural communities offers valuable insights when considering what improvements can be made to how government designs and delivers support services. In particular, growers in my study pointed to the need for better government support for their specific local problems (for example bird plagues, specific pests etc). Growers perceive a lack of government commitment to help them with pest control and they argue it is exacerbated by the state government divide between production and natural resource management/conservation. Currently, one government department is dedicated to agriculture while the other one looks after NRM issues, including water management. Growers who face ongoing issues with pest animals complained about a lack of understanding from government about the economic impact of pests; as the division responsible for pest and disease control is not the same as the division dedicated to
agriculture. While my thesis does not have wellbeing as its focal point, it is important to acknowledge that the pressure the growers are experiencing contribute to the construction of their habitus. Growers who undergo stresses and shocks in form of ecological (eg. pests) or economic (eg. market pressures for ever more and cheaper fruit) pressures struggle to find the time and head space to identify ways of adapting to changing conditions.

7.2.4 Emerging themes

The themes emerging from my research reveal that some growers seek their own private extension services, in particular with regards to pest and disease management. These growers are generally the ones who are persisting within the dominant market environment. They have this capacity because they are productive enough to satisfy supermarket demands and through these sales they can afford to invest in technology upgrades aiming to become ever more efficient. These growers are currently not in critical need of government extension services because they have the ability to source their own consultants. However, if the focus shifts to a more holistic farming perspective, one which is creative, innovative and ecologically sustainable, then, I argue that government agencies need to be more connected to their farming communities and offer insight and advice on all parts of the production system, not only on economic and productivity aspects.

On the other hand, there are growers who do not have the resources to source private extension services, and they are not prepared – economically and socially – to participate in this dominant field. These growers are persisting by manufacturing their own options through multiple pathways of diversification or value adding. But there is little government support for these small scale and diverse businesses whose economic contribution is considered insignificant.
Other growers do not even have the capacity to recreate their livelihoods by diversification. Government support and engagement would especially assist these growers who are struggling to continue with their orcharding operations while at the same time facing difficulties when wanting to leave the industry. This could be done by helping them to renegotiate or reinvent their business models and their orchard businesses at different scales or with diversity of product and value adding. In the literature, the selling of the family farm is referred to as a process of rural adjustment; a measure that has been in place for many decades (Cockfield and Botterill, 2006). Rural adjustment not only entails exiting but it can also refer to the restructuring of a farm business to suit changing conditions by adopting new technologies or changing farming type (ibid).

Within industry associations there is consensus that government plays a critical role in not only supplying funding for RD&E programs but also training of individual orchardists to understand and prepare for changing conditions as expected under climate change (APAL, 2009). This highlights the importance of research and extension being closely linked (Hunt et al., 2014). And while traditionally this has been the case, as can be seen in the example of the Burnley research station in the late nineteenth century, the rift has widened between research and the translation of it into practice. While the Victorian Government still runs a horticultural research station in the Goulburn Valley, few growers seem to have much knowledge about it or interaction with it; as Greg describes when asked what he knows about the government research station close to his property:

“I don’t know (chuckles) I am sorry, I don’t know. When I was a kid, when I came back from...I was over there [at the research station] all the time, because it was quite progressive for what we were doing but now I wouldn’t go over there. In those days I would be there 3 days a week, especially in the growing season...looking and trying to learn off the extension people and the researchers, and now I wouldn’t go there (pauses) once a year? Maybe if they are holding a meeting for something, that’s about it. [...] I don’t think they have anyone left...it’s not like years ago where...
they were doing things and they had extension people going around." (Greg, Goulburn Valley)

His description and perception of the research institute as not being well resourced, is mirrored by other growers in the area. This highlights the potential for improving the information flow between researchers and agricultural producers. To bridge this gap, Hunt et al (2014) suggest more extension workers on the ground, working with farmers. This is in line with other recent research proposing that government employees, in combination with other stakeholders that interact with farming communities, undertake qualitative research in rural communities (Cowan, 2015). This could contribute to a better understanding of farmers’ needs. My research shows mixed messages between government agencies and farmers, with some growers not requiring or wanting government services but buying their extension advice from private consultants; and others who clearly would benefit from more government extension services because they do not have the income to seek private consultants, as Virginia points out below. Her point to me was about a lack of government advice and input into managing pests and disease outbreaks:

“Well, we had two bad years of black spot…and it [government help] would have been handy the last couple of years.” (Virginia, Mornington Peninsula)

There is no one-size-fits-all extension or government support framework. Rather, my research, as well as the wider literature, suggests that there is a need to first of all rethink the historic extension model and reimagine one that fosters the relationship between the social and ecological. Secondly this new model would then have potential to acknowledge that there are different kinds of farmers: those who are willing and able to partake in the industrial model and those who, for various reasons, are diversifying away from it. Lastly, this new framework of extension would then allow for a more holistic policy approach, one that supports and encourages multiple pathways that provide diverse options to ensure local production.
Indeed, recent research (Grigg, 2015) suggests that productivity growth is unsustainable in the long term (for the health of the environment, people and animals) as input costs are too high in Australian agriculture, and because of too little public funding into research, extension and education. Grigg (2015) proposes a move away from this narrow emphasis on productivity growth towards a focus on premium markets – i.e. high quality and diverse products. ‘Premium markets’ is a very broad term and doesn’t differentiate between those growers that are still producing within the dominant production field and those who are diversifying away from it. However, the Grigg study demonstrates the currency of addressing the pitfalls of the productivity trajectory.

7.3  Implications for policy

7.3.1  Orchard landscapes are part of the wider social-ecological system

First and foremost, my study clearly highlights the socio-economic and physical pressures that apple growers are experiencing. There is a range of government measures seeking to support farmers who are struggling to sustain their livelihoods. These are predominantly economic responses concentrated on short to medium term and with a narrow focus on making orchard businesses more efficient and productive. APAL Future Orchards program is an example and the growers I spoke to who participated in this program found it useful for networking and learning practices to increase their efficiency. However, there is ample scope to rethink what kind of support would be most valuable to growers, while taking into account that their practices are situated within a coupled and complex social-ecological system. Robert, a grower from the Yarra Valley who is now changing his orchard to grow almost exclusively pears, comments on the implications of this on his general orchard management:
“it seems to be you need to get bigger and more specialised in one line, whether it’s apples...as I say we’re dropping apples off and specialising in pears. But that narrows your risk down to one crop which is not good. Whereas in the past we had 4 or 5 different crops and if we had some sort of failure or damage in one...well it’s only a percentage lost. But in our case, pears, and if you have a major problem with it, well it’s everything at risk. But the economy of scale to keep production cost down as low as they need to be to still make a profit, you need to be on a larger scale. And we are limited here with the size of the property...we can’t go much bigger than what we actually have. The fence line is fixed. So it’s up to using technology and the growing techniques to get more production next year out of the property than what we did this year. And that is a big challenge, so we got to produce more fruit and get less money for it to stay in business. And how long that can go on for I don’t know.”
(Robert, Yarra Valley)

Robert points out the relationship between the economic decision to focus almost exclusively on pears and the ecological impact this is having on his orchard. He acknowledges the risk he is taking, but justifies it because of the need to continue viable productions rates; it is about *economies of scale*. In an ideal world he would expand his orchard but within limited property boundaries, he sees the clear need to intensify one crop and to grow it as efficiently as he can. The quote also highlights the lock-in effect; the imperative and inherent symbolic violence pushing Robert to adopt more technologies and become more intensive. The impending ecological and economic calamities are constantly lurking in his mind and these anxieties in turn affect and shape his habitus. Further, the ecological consequences are that he has less diversity to fall back on. As I described in Chapter Four, the technologies that have been used to fix any biophysical limitations, have at the same time detached growers from the land. The ecological is masked and overridden by technologies but there is an incipient awareness that this is not a long-term solution; mirrored in Robert’s sense of doubt about how long this kind of production can continue. Technology is itself an actor in the overall field, pushing towards more intensification – “if it [technology] is out there, you’ve got to use it” (Timothy, Harcourt, May 2013)
Government policies and services to support orchardists can build a useful and win-win service by acknowledging that growers are exposed to social as well as ecological changes that can be unpredictable, non-linear, and importantly, occur across different spatial and temporal scales. For example, many orchardists do not expect their children to return to the orchard for their working careers, and without succession planning, they are looking at a 5-10 year phase out period of their orchards. This means the growers are not prepared to make large scale investments in infrastructure, technologies or new varieties. Importantly, the impacts of ecological anxieties such as pests and extreme climatic events worsen their situation as they are not devoting resources to dealing with these threats to their orchards. Equally, rising input costs, especially water, are forcing some growers out of the industry even earlier than what they might have expected (see John).

Orchards businesses that are vertically integrated seem to attract younger orchardists in this study, as their expectations are not solely about the success of their orchard work. They anticipate other opportunities such as value adding, and diversification into other areas of the supply chain, for example packing and marketing. For young growers who have watched their parents struggle in the conventional production model, this diversification presents the only tactic to continue orcharding but have some quality of life. However, their activities still sit within the dominant mantra - where the ultimate aim consists of higher productivity through ever increasing efficiency.

Programs aimed at improving productivity and efficiency could take into account the very local effects of increased climatic variability and other ecological changes (like flood or drought) when considering their impacts on the social and cultural fabric of communities. For example the impacts of wildlife on apple growers in Harcourt but also other areas, especially the Yarra Valley, is a significant threat to fruit production:
“I would say I never saw a cockatoo, except in a gum tree on the eastern side of Mt Alexander until 20 years ago, but more recently they have been in this valley in plague proportions. They are destructive, they nip off the top...the ends of the growth of the fruit trees. So they are changes that have developed. Kangaroos! This is another one. No one saw kangaroos in this valley until within the last 20 years. Now they jump through the trees and rip the irrigation piping off between the trees. Because again they breed up.” (Anthony, Harcourt, February 2013).

On the other hand, growers in the warmer Goulburn Valley are less affected by birds but suffer problems from insects and fungus, as Mike points out:

“We like seeing the odd kangaroo in our orchard (chuckles), it makes us feel good that we have got some native wildlife hanging about. We have a couple of kangaroos live on our orchard, they don’t seem to do any damage. And generally birds...I mean birds are bad for cherries...starlings mostly that cause the issues. But with apples, it’s definitely insects and fungus.” (Mike, Goulburn Valley, 2013)

There are local variations that policies or programs often fail to address but because they are significant barriers to farm productivity, these idiosyncrasies should be taken into account. There is no one-size-fits-all for growers and while one area might be facing particular challenges, another area may be having very different problems but because they are at a lesser scale, policies are likely to concentrate on the higher level issues.

Further, policies could be more effective in stimulating economic growth when taking into consideration the socio-economic stresses that farmers are exposed to because of the dominance of the mainstream retail chains. Much of the government support measures and industry programs are geared towards farms increasing in size and productivity in order to align with the mainstream retailers. There is an assumption that these growers have the
social and economic capability to do so and that this is the only way to remain viable in the countryside as orchardists.

For example, the Future Orchards program “provides growers with practical and hands on education to help increase the fruit quality and productivity of their orchards and help them become internationally competitive [...] helping apple and pear growers understand intensive production systems within two years, to ensure all new plantings were intensive within five years and to have an internationally competitive industry in Australia within 10 years” (APAL, 2015). This is very much in line with the Australia Agricultural Competitiveness White Paper (2015) which affirms Australia’s explicit focus on exports, efficiency and productivity. However, Australian apple export, as a proportion of total production, has significantly declined over the last 10 years, and was at less than 1% in 2014 (figure 7.2). Further, there is blatant disregard for the historic shortcomings of this colonial emphasis on efficiency and export, and the White Paper directs little attention to the ecological realities that limit the enduring ambition for productivity. The point here is that government policies are designed around a very small percentage of farmers who are in fact able to maintain this required rate of production, let alone be able to supply the duopoly of the supermarket chains.

Figure 7.2 Australian apple export (source: Australian Bureau of Statistics)
Many of the interviewees told me that they are not planning the future of their orchard, past their retirement. For them, there is little incentive in changing their plantings or rate of production at all. My research highlights the fraught situation of these smaller orchardists who do not have the desire, knowledge or ability to invest in new efficiency and productivity technologies. They would either benefit from government assistance to exit the industry or support to diversify away from the industrial model of agriculture, for example, to niche markets and farm gate value adding.

7.3.2 Identity and connection to place

Secondly, some growers in my study voiced their concern over their identity - as orchardists associated with a particular place - getting lost in the supply chain. This erodes the pride they feel as producers and it takes the value out of place, at least in social and economic terms. While smaller grocers and farmers’ markets tend to label which growing region apples (and other fruit) come from, the major retail chains only distinguish if produce comes from other countries than Australia. Having regional differentiation has potential to increase competition between growing regions. This could result in growers feeling more connected to each other and building regional capacity in place.

The concept of terroir, touched on in Chapter Two, is relevant here. The terroir of a food product embodies the physical (i.e. soil, climate, geology) and the social context of its production, as explained by Wilson (1998): “The true concept [of terroir] is not easily grasped but includes physical elements of the vineyard habitat—the vine, subsoil, siting, drainage, and microclimate. Beyond the measurable ecosystem, there is an additional dimension—the spiritual aspect that recognizes the joys, the heartbreaks, the pride, the sweat, and the frustrations of its history” (Wilson, 1998, p.55). This statement infers the close coupling of the social and the ecological aspects of food production. And as the Harcourt interviews show, regardless of the hardships that growers are experiencing, the area itself is still thought of as good apple-country because of the suitable biophysical
conditions. Despite an increase in the price of water, their place has authenticity over an extended area because it builds on the historic and continuing ability to grow high quality apples. All the hard work that has gone into establishing the orchards, combined with the long family histories of many of the growers, validate their place in Harcourt.

Terroir is historically associated with the French wine industry but in recent years there has been a growing popularity in the use of the term for different food products around the world. The usefulness of terroir is politically and intellectually contested, partly because the use and definition of the term are constantly evolving (Barham, 2003). Without attempting a full review of the terroir-literature, I want to highlight the usefulness of terroir. In the context of Victorian apple growing, most orchardists have traditionally held a close connection to their local place. However, because this place holds little value in the food supply chain, there is potential for labels of origin to revive this sense of place identity that contributes not only to the individual wellbeing of growers but also to the connectedness of whole orcharding communities. Indeed, the YV fruit marketing cooperative in the Yarra Valley has shown that growers can benefit from place branding for their marketing. Similarly, the Harcourt cider business joint venture also utilizes the brand of Harcourt as a marketing tool.

Figure 7.3 Harcourt Cider (source: http://www.harcourtcider.com.au/)
Traditionally policy has focused on agricultural efficiency and economic output; however, I argue that the value of ‘place’ contributes significantly to a region’s economic output. My case study examples have shown that investing into place branding and marketing support the overall productivity of a place. Policy could contribute and fund marketing campaigns in conjunction with local grower groups (for example ‘Harcourt Pink Ladies’). While there is a national promotion of ‘Aussie Apples’ there is no similar place-specific campaign. A recent hail storm in the Goulburn Valley damaged a large amount of pear crops in the region, resulting in a small promotion of ‘hailstorm heroes’, a campaign asking consumers to buy hail damaged – but still edible - pears. Nonetheless, as this newspaper article explains (Long, 2015), unless supermarkets back this type of promotion, there is little value in them as it is the supermarkets that are the consumer platform. Further, the appointment of a new marketing manager at Horticulture Innovation Australia has resulted in a process of redesigning the Australian apple and pear marketing strategy. This is a welcome move, as this will involve collaboration between industry, growers as well as supermarkets; however, there does not seem to be involvement of government (APAL, 2015a).

7.3.3 Effect of ecological anxieties on wellbeing

Thirdly, my study demonstrates that there are physical consequences for the orchardists, which manifest in their ability or inability to keep orcharding. These stresses may start out as economic in nature but they impact the psychological wellbeing of growers. For example, because pests are becoming so destructive and the cost of preventing them so high, many growers have real concerns about staying in business. Some orchardist told me of lying awake at night listening out for birds in their apples trees, only to rush out and blast the scare guns to deter them. As pointed out earlier in this thesis, being awake during the night is nothing new to orcharding. In the past, growers had to wake every few hours to manually shift irrigation piping; however, lying awake because of concerns about birds destroying large parts of the apple crop creates anxiety at an unhealthy and possibly unprecedented level.
Recent research on the wellbeing of rural communities shows it is closely linked to their financial wellbeing (Schirmer et al, 2015) but as my study highlights, the sources of financial wellbeing are impacted on by complex social and ecological factors. Addressing farmers’ wellbeing with a narrow focus on economic support is insufficient and could be complemented with a long-term, anticipatory and holistic approach that takes into account often unpredictable biophysical variations as well as changing socio-cultural and economic conditions.

7.3.4 Policy needs to address the underlying power structures

Another key implication from my research comes from the analysis of the power structures underpinning the apple industry in Victoria, which is wearing away at the very identity that has been the basis of the industry for many generations. The dominance by the main retail chains needs to be addressed by government policy and there is great potential for government to support a more diverse base of agricultural producers. Not only the larger (i.e. big output) growers who are able to stay in the game of supermarket-orientated production, but also those smaller niche growers who are trying to diversify away from the mainstream model.

Growers are increasingly becoming locked-in, that is, their options are constrained because of the market they supply. Market demand for ever higher quality (at the moment crisp and red apples) and quantity of apples is fuelled by ever improving technologies, forcing growers to adopt these technologies because otherwise they are forced out of the main production field. The push by government towards more efficient and productive orchards aligns with the retail chains, and it deepens the cleft between those growers who can afford a production regime that allows them to sell apples to the supermarket duopoly, and those who cannot.
As I have demonstrated throughout my thesis, there are growers who are resisting this dominant market force and adjusting into niche markets; and the growers who do so tell stories of economic success but at a different, less intensive, scale. My research suggests there is merit in government support for those growers who are struggling in the mainstream apple production field. Extension work could play a vital role in assisting growers to change their business models; and government policy in general could provide a supportive framework for this structural change towards more small-scale farming. Importantly, the services, technologies and business support required for smaller orchards differ to those implemented for larger ones. In contrast to the traditional thrust for intensification, these small-scale orchards could be supported by start-up grants for adjusting to value-adding or other avenues of diversification.

7.3.5 The influence of field position and habitus

Returning to Bourdieu, I want to emphasize the importance of situating the farm, or orchard, in the overall field structure. For example, an orchard that has no resources to invest in growth or diversification and no succession planning can be considered to be on the edge of the field, close to exiting the apple industry but it is still there as the growers are willing to continue production or perhaps they are not able to exit because they cannot sell their farm or business. As established, this is not always easy (i.e. difficulties in selling land, biosecurity requirement of removing trees). This orchard would need very different government support to an orchard that has little resources but a vision for diversification. In this case, the orchard can be viewed as on the verge of entering or creating a subfield (i.e. niche market). Government could support this orchard by providing advice in business planning and also funding or start-up grants for diversification.

Lastly, I want to highlight the value in considering the influence of history. As my analysis has shown, the heritage of the growers plays a significant role in their everyday decision-making. This is in line with recent research by Cowan (2015) who explored decision-making
processes amongst dairy producers in Victoria, Australia, and stresses the “potential of individual farm and family contexts to play a role in appropriate adaptation responses” (Cowan, 2015, p.252). Her point, and it is relevant in my research too, is that local contexts matter when trying to understand farming constraints; not just the local geography but in particular the personal contexts of farmers. This is precisely what my analysis of the orchardists’ habitus has shown. Their everyday practices and decision-making is shaped by their heritage while at the same time their daily experiences continue to impact on the habitus. Policy approaches that are insensitive to this dynamic process will ultimately be inadequate.

But, my research has shown that for some of the growers their ancestors’ heavy focus on productivity has entrenched a *habitus* that generates and motivates practices that are in line with that reality, and thus their decision-making is constrained. Their ingrained dispositions have been shaped over many generations and their practices are therefore based on ideals and principles that may no longer match the current economic and biophysical environment (hysteresis). This is a de-coupling of the social-ecological system, whereby the economic ambition and ecological realities have come asunder. The socially ingrained habitus of many growers is in sync with the economic values of government but the biophysical realities are different and actually hampering this fundamental trajectory; similar to climate change – a hysteresis on a global scale.

In order to avoid growers from entering path dependent trajectories as described in Chapter Six, I suggest that policy makers take into account the local context – physical and social – through public consultation and participation in regional or local sustainable development programs that assist locals to define their futures, recognize thresholds and develop confidence to make innovative and perhaps, bold decisions. This can significantly contribute to developing government programs that are appropriate at an orchard level. At the same time, government has the opportunity to pay attention to its own historic trajectory and the *habitus* entrenched as a consequence, in government.
7.4 Conclusion

To effectively deal with climate change impacts and changing socio-economic conditions into the future, I argue that there needs to be a radical shift in how we, and especially the government, think about successful and efficient agriculture. The productivity mantra is deeply embedded but as my research and other studies clearly show, this trajectory has not resulted in the desired economic, social and cultural wellbeing of all farmers and their apple industry businesses. Rather, the interviewees suggest that there is a constant struggle, to a point where now many of the existing orchardists are the last ones in their families to be involved in the industry. What follows after they are gone is unknown.

“I think there will always be an Australian fruit industry, it will just be smaller or there will be less businesses but running more...well, large businesses...consolidation, you know, spreading the overhead sort of thing from a business point of view.” (Mike, Goulburn Valley, 2013)

As Mike says, it is likely that there will be fewer but larger orcharding businesses, corporate in structure and vertically integrated (i.e. not just growing, but also packing, storing and marketing) to make up for the risk associated with industrial style apple orchards (i.e. monocropping). The withdrawal of smaller orchards will have social impacts on communities; for example younger generations relocating to bigger regional centres to find employment. This is a trend that growers already spoke to me about. The viability of these large-scale intensive orchards is at great risk with rising temperatures placing increasing pressures on all aspects of fruit growing, but especially water supply.

Peter from the Yarra Valley told me about the success of his family’s orchard. It is intensive, using the latest technologies and growing techniques, and it supplies apples to the mainstream markets. However, in the interview with me he talked openly about the
inherent risks of monocultures and the diminishing crop diversity. This raises doubt about the innate values of growth and productivity, and it highlights the importance of developing multiple pathways of diversification.

I suggest that policy can have a more flexible approach in developing support programs for orchardists, ones that enable flexibility at the orchard level and are suited to small orchards, too. This could be achieved by scenario planning for individual orchards, considering the local idiosyncratic social and ecological factors and expected changes, while also allowing for unpredictable variation. The research does exist – through APAL and also government - but from what interviewees said, the findings are not reaching all the growers. This may be because the research is geared towards only those orchards that are able and willing to take up new methods and technologies. As Wilkinson et al (2011) argue, government should support smaller growers with productivity measures designed for their scale of farm.

A more flexible approach would also entail involvement of producers in generating knowledge and strategies that inform policy work. Bourdieu’s theory of practice suggests that internalized dispositions need to change in order to change practice. This implies that farmers’ capability is closely linked to their knowledge and hence, involving them in scenario planning of their own orchards could be more successful than imposing general policies that may not seem relevant to them.
Chapter Eight, in which I summarise the key findings and conclude my thesis

8.1 Introduction

This thesis explored apple growing in Victoria over the last 150 years and I have reflected on the intricate relationship between the social and the ecological processes inherent in orchard production landscapes. In this final chapter I draw my thesis together by revisiting my research questions and presenting the key findings. I also reflect on my theoretical framework before suggesting possible pathways for further research. Lastly I return to the wax apple models and discuss their role as objects embodying symbolic capital and subjects validating the apple growers’ identity and the physical ability to grow many diverse apple varieties.

8.2 What is the relationship between socio-cultural place and ecological places of apple growing?

My thesis re-imagines the importance of place in socio-cultural and physical terms, as a way of better understanding the interdependencies between the social and the ecological as a coupled social-ecological system. Apple growers in Victoria have a long history reaching back to the first orchardists of the early 1800s. They were motivated to grow apples by the demand for fresh produce, and supported by government, technologies and suitable physical conditions (with the addition of water!). The more a grower could produce the better. At that time, the scale of production matched global and domestic demand. From today’s perspective there was an alignment between the growers’ habitus, their interest and their field; and as I have argued, their habitus has been generating practices which keep creating the conditions necessary to perpetuate the growers’ ideal field.

As I described and referenced in Chapter Four, in the first half of the nineteenth century growers were still closely engaged with their biophysical place but as the focus shifted
towards export in the 1880s, there was increasing emphasis in national policies on productivity and efficiency, also reflected in the wax apple model collection. And as the growers’ focus turned towards international markets, it was these markets and the overarching trend for globalisation, rather than their local place that determined the growers’ practices, which were increasingly geared towards intensifying production levels. This was further made possible by rapid developments in science and technology in the twentieth century: new machinery, sprays and orchard practices (i.e. closer plantings and fewer varieties to suit new supply chains). The Museum Victoria wax models played a big part in this, too, as they were used to promote the horticulture industry nationally and overseas and to provide extension support services to growers (see section 4.6).

While the early European settlers grew apples predominantly for self-sufficiency, by the turn of the nineteenth century apple orcharding became a highly industrialised affair. Place was initially important, however, the take up of technologies and its ability to facilitate the overriding of biophysical place characteristics, caused an alienation from place. As this thesis shows through the interviews, the meaning of what it is to be a farmer has changed; there is more administration work and less hands-on orchard work. As production requirements have been intensifying, growers have been able to respond by utilizing techno-scientific solutions to keep up with the enduring aim for efficiency. However, interviews with growers reveal that this has resulted in a lock-in of infrastructure investment and practices. As described in Chapter Five (section 5.7), they are forced into adopting ever increasing efficiency measures which come at a high cost and risk, and are distancing the growers from place, but which are needed to satisfy economic pressures (i.e. supermarket pressures) and at the same time, local ecological pressures are becoming harder to overcome (i.e. extreme weather events and pests).

Today, the Australian export market heralds the cattle, dairy and wheat industry. Apples are no longer part of the export narrative; on the contrary, the focus has shifted to the alleged threat of Chinese and New Zealand apple imports (APAL, 2016). And while strict biosecurity guidelines are preventing a mass import, growers are concerned about what the future of
these imported apples will mean to the Australian industry (Jooste, 2014). Because input
costs are lower in those countries, their apples can be sold at lowers cost, putting extra
pressure on local growers.

The relationship between socio-cultural and ecological place is fraught with a tension that
captures the, often global, economic pressures and ecological limitations within those
places. I argue that attention to place itself - with its entire social, cultural and physical
characteristics - can contribute to a more holistic approach to agricultural production.
Adopting Bourdieu’s theory of practice and social-ecological systems thinking has exposed
underlying power structures and the analysis of their interaction with the social-ecological
system of apple growing. This systems perspective is a valuable conceptual tool when trying
to understand decision-making processes amongst apple growers – and indeed other
agricultural producers – as it allows for a comprehensive exploration of the wide range of
influencing factors.

8.3 What factors determine where, how and what apple varieties are
grown today?

Today, orchardists are struggling as a result of less market demand because of a decline in
export and saturation of the domestic market. However, since many of the growers are
dependent on satisfying supermarket requirements, and because of the symbolic violence
inherent but hidden in this relationship, they still pursue the same pathway as their
ancestors - a trajectory over the last 150 years. A scalar mismatch between individual
practices and systemic change - or hysteresis - has occurred which continues to widen as
growers deplete their resources (economic and environmental) in the hope of staying in the
global game of productivism. Illusio and symbolic violence add to their problem, as theirs is a
situation that is not recognized as unusual - everybody is in the ‘same boat’!
Grower interviews reveal that market demand is the main factor deciding cultivar choice and it is driven, supported and reinforced by technologies (see section 5.2). These create a self-reinforcing cycle of path dependency in which growers get caught and find it very hard to leave. This is because ecological pressures are so intense and the cost of techno-scientific fixes is becoming prohibitive. Kangaroos are jumping through netting, irrigation costs are increasing and it is too expensive for growers to cover their whole orchards in hail and sun protection cloth to minimize risks from extreme weather events. Yet, many growers depend on continuing their supply to the mainstream retail chains that push for higher quantities and quality of apples. Growers are squeezed into very tight margins. My research has shown that growers persist (they keep going as normal), or they exit the apple growing industry, or they resist (by diversifying or value adding).

8.4 Key findings

The story of apple growing in Victoria is a complex one, and based on my historical analysis, in-depth interviews with orchardists and the Museum Victoria wax model collection, I highlight the following key findings:

- Apple growing places and the practices within these places are co-constructed by human and non-human drivers; thus it is necessary to consider these apple production landscapes as coupled social-ecological systems;

- Building on this first finding, it is important to view apple production landscapes from a systems perspective, that is, actors within this system are interconnected at different scales, and they are undergoing continuous changes that are non-linear and dynamic.

- Applying Bourdieu’s theory of practice exposes the power structures that impact on apple growers’ every-day and long-term decision making processes. That is, symbolic violence, the unperceived form of violence, is taking control away from the growers while pushing them into continuing along path dependent trajectories.
• *Illusio* adds to the growers’ problems, as they do not perceive their situation and their lack of control as something unusual.

• The growers’ *habitus* - their internalised dispositions that then externalize a generative capacity - hinders them in recognising their situation and correspondingly changing their actions. The growers’ reality is based on conventional economic trajectories focused on productivity and efficiency. This in turn has affected an alienation from biophysical place because techno-scientific approaches have been adopted to overcome ecological realities.

• Most importantly however, the very productivity mantra causing this alienation is at the same time now initiating a closer engagement with place. This is because ecological stresses are no longer financially possible to override, and economic pressures are so strong, that alternatives to the mainstream apple production field are emerging. These alternatives often entail a need to engage with the nuances of biophysical place (i.e. ripening times, finding new varieties that suit the local conditions).

• By understanding and analysing the context and environmental history behind orcharding (and also other agricultural) practices, I argue we have insight into future possibilities in dealing with social-ecological change.

• My research highlights the critical role of the growers’ habitus. The socio-cultural history of apple producers is directly linked to their practices. But as the analysis of interviews in Chapter Five has shown, these practices are also constantly influenced by external (and often global) economic and ecological conditions. Therefore to affect the practices of apple growers, we need to understand their history because this is what has internalized dispositions that are affecting their practices.

### 8.5 Reflections on the theoretical framework
Systems are complex and adaptive, consisting of many different elements, characterized by nonlinear change and uncertainty. This adaptiveness is captured in Bourdieu’s suggestion that the habitus of the players is constantly shaped by changes in the field. It is critical however to realize that these changes are not only of a social nature but they are also ecological. This notion of “co-evolution” across different scales in time and space, capturing the reciprocal relationship between system elements, supersedes traditional linear and reductionist scientific thinking of direct causality (Walby, 2003, p. 3).

Furthermore, it is important to acknowledge that change occurs across different scales, an essential characteristic of a coupled social-ecological system (Ericksen, 2008). Bourdieu addresses this with the concept of hysteresis - the mismatch between field and habitus. The growers’ habitus is matched to global production ideals but at the local level, within their actual field, there is a mismatch, or hysteresis. Growers are still aiming for high productivity and global competitiveness but at the orchard scale this kind of production cannot always be sustained because of physical limitations, such as extreme weather events, pests and diseases. These interactions between social and ecological scales are increasingly recognized by growers as contributing to their decision processes.

While Bourdieu’s concepts of symbolic violence, illusio and hysteresis are valuable analytical tools to describe the power structures within the field – or social space – of apple growing, they do not explicitly take into account the ecological factors impacting on the apple growers’ practices. And it is those practices that shape and at the same time are shaped by place and its environmental history. SES thinking and environmental history both acknowledge the important contribution of the biophysical world, which, as I have argued throughout this thesis, cannot be separated from the social.

8.6 Potential further research
My study has focused on the practices of apple growers, and analysis of interviews has exposed the inherent power relations underpinning their everyday decision making. To unravel these power structures, more detailed research into the particular workings of the retail industry would enrich this analysis. Further investigation into the world of consumption would also enhance our understanding of the role of consumers in the apple production field and allow for more comprehensive policy recommendations.

Bourdieu’s theory of practice, and its associated concepts, has proven to be a useful analytical tool that can extend our understanding of the inherent power structures within social-ecological systems. The methodological approach I adopted could be useful in other agri-food studies that are oriented towards unravelling the relationship between the social and ecological aspects of agricultural production by focusing on the underlying power structures.

8.7 Wax apples, signposts and the significance of history

I started this thesis with the wax apples models. Indeed their narrative runs parallel to the story of orcharding. The wax apple models act as an aide memoir of other possibilities. As reflected in the Think Ahead Exhibition at Scienceworks, there has been a move to explore alternatives to the traditional economic trajectory in the agriculture sector that has followed an optimization approach for over 100 years. This shows how the models are not only objects with aesthetic and cultural value but they are also active subjects that can instigate change by generating new (if traditional) ways of imagining apples (for example by suggesting other traditional varieties and their alternative uses).

Similarly, the history of apple growing in Victoria reveals underlying power structures that have been re-produced over many generations and that are significantly affecting apple growing practices. Further, as I have described, the pressure for productivity coupled with
ecological anxieties (pests and diseases) is resulting in the emergence of alternative approaches to the mainstream apple market.

I argue that by closer engagement with place - through local markets and paying attention to nuances in physical conditions - some growers are repositioning themselves to address more than economic choices. Ironically, growers do not always seek to engage more closely with place, rather, my analysis suggests that place itself is exerting agency over the growers.

The techno-scientific and market forces within the field can contribute to alternative ways of organizing; and, in this process, some growers reconstruct their identities ‘through’ rethinking place. Identifying what motivates the growers’ practices opens up future possibilities in dealing with social-ecological change. My research contributes to a deeper understanding of how historical processes and biophysical factors impact on practice, and therefore a mechanistic response to changes within this system is insufficient. Rather, it is essential to acknowledge that changes are non-linear and unpredictable, occurring across different spatial and temporal scales, while at the same time recognising the systemic power structures affecting individual practices. The challenge for technology is one of scale and flexibility - to allow and facilitate multiple production pathways for multiple growers. Diversity of production sites may once again be as important in safe guarding apple growing as was its serendipitous reality in the first half of the nineteenth century.
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Dear sir/madam

Making the connection between history, agricultural diversity and place: The story of Victorian apples

Introduction

My name is Johanna Christensen and I am a PhD candidate at the University of Melbourne (UoM), sponsored by the Museum Victoria (MV). In my research I will study environmental history, place theory, biodiversity and food security literature to consider the role of apple growing in the context of 21st century food production. My aim is to trace the connection between place, history, climate change and biodiversity in the context of Victorian apple production. My research will demonstrate how we can use what we already have (i.e. heirloom and other food varieties) and the experience of growing them, to adapt to changing conditions.

My research is being conducted under the supervision of Associate Professor Ruth Beilin and Professor Kate Darian-Smith (both at UoM), and Liza Dale-Hallett, curator at MV.

What will I be asked to do?

Should you agree to participate in my research, I would ask you to participate in an in depth semi structured interview at a time and location convenient to you. With your permission, the interview would be digitally recorded so that I can ensure that I make an accurate record of what you say. You would be provided with a copy of the transcript, so that you can verify that the information is correct and/or request deletions. I estimate that the total time commitment required of you would not exceed 1.5 hours.
Themes to be discussed during the interview include your personal and local history, land use and land use change over time, climate and other physical conditions, as well as connections to other growers and groups.

Your participation in this study is completely voluntary. Should you wish to withdraw at any stage, or to withdraw any unprocessed data you have supplied, you are free to do so without prejudice. If you feel in any way under pressure, the interview will be terminated immediately.

How will my confidentiality be protected?

I intend to protect your anonymity and the confidentiality of your responses to the fullest possible extent, within the limits of the law. Your name and contact details will be kept in a separate, password-protected computer file from any data that you supply. This will only be able to be linked to your responses by the researchers, for example, in order to know where I should send your interview transcript for checking. In the final report, you will be referred to by a pseudonym. I will remove any references to personal information that might allow someone to guess your identity, however, you should note that due to the small number of potential participants, it is possible that someone may still be able to identify you. The data will be kept securely for five years from the date of publication, before being destroyed. However, with your approval, the transcript of your interview will be stored at the Museum Victoria as part of its oral history collection. A consent form for you to sign is attached to this letter.

How will I receive feedback?

Once the thesis arising from this research has been completed, a copy will be available to you on request. It is also possible that the results of the field work will be presented at academic conferences or published.

Further information

Should you require any further information, or have any concerns, please do not hesitate to contact either Assoc Prof Ruth Beilin ph: (03) 9035 8273, or contact Johanna Christensen mob: 0458 845682. Alternatively, should you have any other queries; you are welcome to contact the Executive Officer, Human Research Ethics, The University of Melbourne, ph: (03) 8344 2073 – reference Ethics Project 1237942.1.

I look forward to hearing from you.

Kind regards,

Johanna Christensen
APPENDIX B – interview schedule

Interview schedule
The interview is intended to be semi-structured only, so the questions listed below are merely a starting point for discussion.

Personal history

- What is your history in this landscape?
- How long have you (or your family) lived here?
- Why did you come here? (e.g. farming, business, recreation)
- Do you (and your family) intend to stay?

Landscape

- What does this area/landscape mean to you? (what do you like/dislike?)
- How would you define your place here?
- What has changed in the landscape in your time here, and in the memory of your workmates or family?
- Is this a good orchard area and if so, why? How have the orchards shaped the ‘place’?

Land use

- What land use changes have you seen in your time here.
- What have others have told you about the changes in land use that have occurred here over the last 150 years?

Awareness about local history

- Can you tell me about the history of the region in relation to food production in general?
- What do you know about the orcharding history in this region?

Climate and history and its effects on crop selection

- Do you know why orchards (or other crop depending on where this interview is held) were planted here in the first place?
- Why did you plant orchards here?
- How do you decide on what to grow?
- What varieties/cultivars do you grow and why?
• Do you adapt your growing practices to the market or do you adapt more to the growing conditions? Why?
• What aspects of local history do you use when selecting what to grow? (e.g. diaries, journals, newspapers etc)

Weather

• What is the ‘normal’ weather here?
• How does it influence what you grow?
• Has it changed much in your time here?

Relationships with other growers/groups

• Are you part of any community or industry groups? (which ones? And why?)
• If yes, do they give weather advice? (What sort?)
• Do they give extension education? (e.g. soils, pests, diseases, varieties)
• Where do you get your stock?

Biodiversity

• What does biodiversity mean to you? (or diversity)
• What are the issues for apple growing now?
• How do you view issues about genes, varieties, diseases?
• How do these issues impact on your growing practices?
• What apple variety is your favourite?
APPENDIX C – record of news items

Radio National (Canberra)
Bush Telegraph - 9/08/2012 11:43 AM
Presenter: Cameron Wilson

ABC Ballarat (Ballarat)
Vic Country Hour - 9/08/2012 12:40 PM
Presenter: Warwick Long

Delving into core business
Weekly Times, 04/07/12, General News, Page 77