Individuals, organisations, and local context shaping small-scale agricultural initiatives addressing sustainability

Two case studies in Hawke's Bay, Aotearoa New Zealand

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Abstract

Experts have recognised agricultural land-use is in need of transformative change to become sustainable while feeding the world population. In this thesis it is assumed based on changing regulation, literature, and media coverage there is an on-going agricultural sustainability transition in Aotearoa New Zealand. Scholars highlighted the potential of local initiatives to address sustainability issues in locally fitting ways. The role of initiatives collectively driving transformative change has been studied in sustainability transitions literature. However, how individual initiatives are being shaped at the level of individuals and initiatives has not been studied extensively.

To inform people seeking to support agricultural initiatives navigating sustainability transitions, this thesis answers the research question: *How are agricultural initiatives seeking to address local sustainability being shaped in the context of a sustainability transition?*

After a scoping phase to identify agricultural sustainability initiatives, two agricultural initiatives addressing local sustainability in which farmers and local government were involved, were selected and studied.

Insights into how these initiatives were being shaped revealed forces associated with an ongoing transition were experienced at the individual level in both cases and shaped the initiatives through mechanisms including funding requirements and expertise. Local contexts being defined by strained historical relationships in the first case and challenged practices in the second shaped how boundary objects emerged in their functions. It also shaped the role of the intermediary that had a role to mediate relationships in the second case. Relationships with organisations in both initiatives were embodied by individuals and personal relationships shaped their roles in initiatives. Personal attributes of individuals were found to shape those roles as well as the involvement of farmers and the role of the intermediary.

This thesis exposes a rich field of enquiry at the level of individuals and initiatives in sustainability transitions that can be further explored by conducting additional research into small scale initiatives navigating sustainability transitions in agricultural contexts as well as other fields. More insights into this micro-level of sustainability transitions may assist organisations in their efforts to support small scale initiatives navigating a sustainability transition.

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Also, as we agreed, Aniek wrote acknowledgements for me, to save me some time at the final stages. Even though, I decided to write my own too, I still wanted to include them:

*Balance is **key** – to finishing a **PhD**:*

Completing it requires skills in time management,
which, luckily, is Flo's greatest talent.

She did not just work, but also had dinners with friends and played outside,
The balance was – mostly – exactly right.

Many hours of work went into writing this book,
And the support received by many is something we can't overlook:

Ebony (coffee), Whittakers (chocolate) and Ding Dong kept inner-Flo g(r)o(w)ing,
And helped her in the journey of increasing her level of (scientific) "knowing".

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Inspiration was important to keep Flo's spirit going:
Flotography and playing the guitar kept those creative juices flowing.

Over Lockdown, Flo worked extra hard on her dissertation
and the "Penthouse TV" creation,
was an excellent (and creative) way of releasing some thesis frustration.

Then the support from people around Flo were essential,
all, in different ways, influential:

Supervisors were there to help with writing and content,
Making sure that readers understand what all these words meant

The academic and content-specific feedback,
Was complemented by support from whanau - who always have Flo's back.

Doreen to kick (and compliment) her ass once a while,
When she took (too many) glorious naps, in authentic Flo-style

Papa, mama & Michiel sent packages with deliciousness,
Which sparked in Flo some extra ambitiousness.

Opa & oma on Skype could brighten any day,
and always knew the right thing to say.

Flatmates' frequent banter outweighed their occasional untidiness,
and from time to time, the boys managed to relax Flo by inducing (some) state of tipsiness.

Then friends would know many ways to put a smile on Flo's face,
with Dixit, boxing, hiking, the odd football game, (acro)yoga or climbing in a beautiful place
her latest love derby is also high on the list and is played with some amount of grace 😉

We know that you don't want to boast around about your well-deserved and newly acquired title,
and admire that you care about things that are more vital.

The only thing left to say is that we're all super proud of you for getting this far, Flo, you really are a super star!

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List of acronyms

CMG	Catchment Management Group
CMP	Catchment Management Plan
CSA	Clean Streams Accord
DOC	Department of Conservation
FEP	Farm environment plan
NPS-FM	National Policy Statement for Freshwater Management
MaP	Multi-Actor Perspective
MoU	Memorandum of Understanding
MLP	Multi-Level Perspective
RMA	Resource Management Act
SLO	Social License to Operate

Chapter 1: Introduction

1.1 Introduction

This chapter outlines the rationale, research question and approach of the research presented in this thesis. It summarises the practical and theoretical research context, illustrating the relevance of the topic, the contribution this thesis seeks to make and the place of this research in the wider field of research. Fieldwork was conducted from 2016 to early 2018, so context provided in this thesis focuses on this time frame, acknowledging that some aspects have changed since.

Sustainability in pastoral agriculture, is considered a global issue. In Aotearoa New Zealand, people seek to address agricultural sustainability in a range of ways and an ongoing sustainability transition (a societal shift towards sustainability, as more elaborately defined in Chapter 2.2.2.) can be recognised. Local grassroots responses have been recognised as an important component of sustainability transitions. However, limited research has focused on individuals and the local level of these initiatives, in the context of a sustainability transition. This research seeks to gain a deeper understanding of how sustainability transitions are being navigated at the level of initiatives and individuals involved in these initiatives. How sustainability initiatives are being shaped in the context of a sustainability transition was research by conducting two qualitative case studies.

To provide a context for these case studies, Section 1.2 describes sustainability issues related to pastoral land use in Aotearoa New Zealand, how these issues have been addressed and studied internationally, nationally, and regionally. A brief review of studies about local sustainability initiatives is then presented and research gaps are identified in Section 1.3. These lead to Section 1.4 in which the research question and a summary of the research approach taken in this thesis are presented. Finally, Section 1.5, outlines the structure of the rest of this thesis.

1.2 Research context: addressing sustainability issues in agriculture

This thesis presents research about how agricultural sustainability initiatives are being shaped in the context of a sustainability transition in Aotearoa New Zealand. Arguably, the sectors that are most in need of transformative change for sustainability, are energy, transport, and agriculture (Geels, 2011), but comparatively few studies have been conducted investigating agricultural transitions (El Bilali, 2019b). In a frequently cited review article, Tilman et al. (2011) highlighted there are significant scientific and policy challenges that need to be addressed to achieve the needed increase in

agricultural production, while maintaining environmental integrity and public health. It is recognised that large scale societal sustainability transitions are ultimately connected to the practices (way of doing things or procedures) of individuals. For example, it is recognised that farmers, as land managers will eventually have to 'make' the envisioned agricultural sustainability transition on the ground (Göpel, 2016; Mills et al., 2017; Soubry et al., 2020; Tilman et al., 2011). As such, a better understanding of the role of individuals in this agricultural sustainability transitions can provide insights useful for the development of strategies promoting sustainability.

An important underlying assumption in this thesis is that Aotearoa New Zealand is currently undergoing a transition towards agricultural sustainability. Evidence of such a transition can be found in several societal and regulatory changes. For example, changing agricultural regulation and voluntary industry schemes is putting pressures on producers to adopt more sustainable practices (e.g. Blackett et al., 2016; Crofoot, 2016; DairyNZ, 2018). These changes came in response to public concern, activism and media coverage of sustainability issues (e.g. Blackett et al., 2016; Duncan, 2017; Holland, 2015; Tall et al., 2018), and increasing emphasis on agricultural sustainability within the political agenda (Cooper et al., 2014). Another indication of a transition is significant research effort seeking to understand and address various aspects of agricultural sustainability issues (e.g. Chapin III et al., 2012; Dodd et al., 2008; Rosin et al., 2017; Small et al., 2016). Environmental sustainability and productivity in agriculture can be antagonistic and result in trade-offs which must be reconciled by industries, governments and ultimately farmers (Baines et al., 2012; Tanentzap et al., 2015; Trodahl et al., 2017). These issues are not unique to Aotearoa New Zealand and globally researchers are seeking to address these challenges.

1.2.1 Agricultural sustainability, a global concern

The 1970s and 80s, saw growing recognition of the unsustainability of industrial and agricultural practices. This led to the formation of the World Commission on Environment and Development by the United Nations in 1982 (Kates et al., 2005). The Brundtland report, published in 1987 by the World Commission on Environment and Development, is recognised as having popularised the concept of 'sustainable development' (Jordan, 2008; Kates et al., 2005), which it defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987, p. 43). Predicted world population growth poses major challenges to agriculture to produce enough to feed everyone, while not compromising the abilities of future generations to continue to do so (Rockström et al., 2017). Although agricultural production has grown over the past decades, this has not happened without costs to the environment. The pesticides and

fertilisers that have enabled increased productivity, have contributed to pollution and degradation of natural ecosystems (Steffen et al., 2015; Tilman et al., 2011). Replacing natural vegetation with pasture has increased the risk of erosion and is associated with biodiversity decline (Rockström et al., 2017; Tilman et al., 2011). Agriculture is also responsible for an estimated 24% of greenhouse gas emissions globally (Edenhofer, 2014; Mateo-Sagasta et al., 2015). Agricultural and other human impacts have reached the extent that scientists are arguing humans are now the largest driver of environmental change, and that the Earth has entered a new geological era: the Anthropocene (Steffen et al., 2007).

Aotearoa New Zealand's international commitments to environmental agreements shapes national policy governing agriculture's impact on the environment. The United Nations, of which Aotearoa New Zealand is a member state, is committed to promoting collective environmental standards and goals. In 2015, seventeen Sustainable Development Goals were developed with 169 targets around sustainable development (social, economic and environmental), that all member states committed to. Changes in agriculture are arguably critical to achieving the Sustainable Development Goals of "healthy food for all", "sustainable freshwater" and "sustainable consumption and production" (Rockström et al., 2017; United Nations, 2015b). Aotearoa New Zealand is also a signatory to the Paris Climate Agreement under which Aotearoa New Zealand has agreed to reduce its greenhouse gas emissions by 30% by 2030, compared to 2005 levels (United Nations, 2015a). In Aotearoa New Zealand, agriculture is the largest emitter of greenhouse gasses, contributing 48% of total national greenhouse gas emissions. In addition, with pastoral farming being largely export based, regulation and standards in the country's products are exported to, also affect Aotearoa New Zealand practices (e.g. Campbell et al., 2006; Ministry for the Environment & Statistics New Zealand, 2015).

1.2.2 Pastoral agriculture in Aotearoa New Zealand and associated sustainability issues

The agricultural industry represents a major land use in Aotearoa New Zealand and makes a significant contribution to the economy. About 11.3 million hectares, or 42.2% of land in is used for pastoral agriculture (Statistics New Zealand, 2015). While flatter areas are predominantly used for dairy farming, sheep and beef farming and some deer farming are the main pastoral land-uses in hill country (Quinn et al., 2009). The dairy industry is a major industry in Aotearoa New Zealand, contributing 3.5% to Gross Domestic Product (GDP) in 2016 (New Zealand Institute of Economic Research, 2017). Pastoral agriculture in Aotearoa New Zealand is largely export based, and together milk products and sheep related exports were $16.4 billion in 2016, making up about 30% of total exports (Statistics New Zealand, 2017).

While contributing significantly to the economy, agricultural land-use in Aotearoa New Zealand is associated with a wide range of environmental issues, including water quality decline, soil erosion, and climate change (Bunnik et al., 2007; Larned et al., 2016; Ministry for the Environment & Statistics New Zealand, 2015). Aotearoa New Zealand has a relatively short agricultural land-use history, with native forests first cleared when Māori arrived around 500 years ago, and only on a large scale when European settlers arrived in 1870 (Wilmshurst, 1997). This clearing was relatively rapid, so much so that in 1921 Guthrie Smith famously predicted that Lake Tūtira (a lake in the north of Hawke's Bay), where he farmed, would be filled with soil, because of the erosion caused by the lost vegetation cover (Guthrie-Smith, 1921). Although Aotearoa New Zealand's soils are naturally prone to erosion, the state-led conversion of forest into pastures from around 1870, had the unintended result of significantly increased erosion (Ewers et al., 2006; Wilmshurst, 1997). This is mainly because of the reduced stabilizing capacity of the replacing vegetation that consists of mostly shallow rooted pasture vegetation (Ministry for the Environment & Statistics New Zealand, 2015; Wilmshurst, 1997). In addition, infiltration capacity is reduced, causing increased surface runoff, due to the reduced depth of pasture root systems in comparison to native forest (McCaskill, 1973). Compared to native and planted forests, streams in pasture have been found to have a higher concentration of nutrients such as nitrogen, phosphorus and dissolved carbon (Quinn et al., 2009).

Accelerated erosion has been regarded as a major problem since the beginning of the 20th century and is currently considered the most critical issue that affects the productivity of hill country land (Ministry for the Environment & Statistics New Zealand, 2015). In a report prepared by Mackay et al. (2013) soil quality monitoring examining soil acidity, organic reserves, fertility and physical properties between 2008 and 2013, demonstrated only 44% of soils farmed with sheep, beef or deer were within the accepted limits set by the Land Monitoring Forum of Regional Councils. Pressures on Aotearoa New Zealand's water continue to mount as well, and pastoral farming is one of the main land uses associated with water quality and quantity issues through nutrient losses, faecal contamination and irrigation pressures (Gluckman et al., 2017). Water quality has declined significantly between 1989 and 2009 (Ballantine et al., 2014). This water quality decline is associated with intensification of agriculture and an increase in non-point pollution which has been attributed largely to the doubling of the amount of dairy cows over that time period (Ballantine et al., 2014; McNeill et al., 2013).

Pastoral farming, particularly dairy farming has contributed significantly to the on-going deterioration of water quality in rivers and lakes (Ballantine et al., 2014; Ministry for the Environment, 2017; Quinn et al., 2009) which has led several scholars to challenge the legitimacy of the agricultural practices (Foote et al., 2015; Weeks et al., 2016). Scholars like Foote et al. (2015) and McNeill (2016) have

criticised the national government and argued leniency of regulations favour economic interests of the dairy industry over environmental values. Foote et al. (2015) conclude that the costs of cleaning up the effects of dairy farming on the environment could in fact be higher than its export revenue and contribution to the GDP. The diverse environmental issues combined with significant economic and social pressures, pose challenges to sustainable land-use in Aotearoa New Zealand, as highlighted by many scholars (e.g. Burton et al., 2014; Duncan, 2017; Hunt, 2015; Jay, 2007; Jay et al., 2007).

1.2.3 National regulation and agricultural sustainability

In 1984, agricultural subsidies and state support for agriculture were stopped in Aotearoa New Zealand, which is commonly referred to as 'deregulation'. Farmers had to make drastic changes because of this deregulation (Forney et al., 2014; Liepins et al., 1999). There have been significant conversions from sheep and beef farming to the more intensive and at the time more profitable dairy farming, that have been attributed to the deregulation (Forney et al., 2014; Quinn et al., 2009). Forney et al. (2014) argued that besides financial reasons, these conversions were driven by a motivation to preserve their professional identity as farmers and pass on their farm to the next generation. However, it has also been argued that these conversions have led to an increased environmental impact, in particular in relation to water quality (Quinn et al., 2009).

Through the 1991 Resource Management Act (RMA) and the National Policy Statement for Freshwater Management (NP-FSM), Regional Councils have a duty to engage local communities to develop the changing management with the people affected by those changes (Ministry for the Environment, 2014; New Zealand Government, 2002). The RMA promotes sustainable resource management and an integrated approach to land, freshwater, coastal, marine and air quality. The NP-SFM, developed under the RMA, was put in place in 2011 and revised in 2014, to further safeguard Aotearoa New Zealand's fresh water (Ministry for the Environment, 2014). In 2011 the national Government also initiated several funds, like the Hill Country Erosion Control Initiative and the Fresh Water Clean Up Fund, to promote water quality improvement. However, McNeill (2016) pointed out that the same amount of funding became available for irrigation projects to increase dairy farming in 2011. In 2008, the National Land and Water Forum representing 51 stakeholders with interests in freshwater, was established in response to public concerns about water quality. The forum developed processes for collaborative methods to plan water management and they made recommendations to the government related to freshwater management (Baines et al., 2012).

Regional councils were formed in 1989 and are based on catchment borders to facilitate integrated environmental management (McNeill et al., 2013). Aotearoa New Zealand's regional and district

councils have the mandate under the RMA to safeguard the environment, whereas national government develops policy directives, so this structure functions like a two-tier system. The rationale for this two-tier approach, with highly autonomous councils, is that policy can be better tailored to the differing contexts of each of the regions and districts (McNeill et al., 2013; Ministry for the Environment, 1991). Regional councils develop regional policy and are responsible for monitoring and compliance of central government policy. Regional councils are required to prepare regional plans, and consulting the public is an important part of this process. When decisions are contested, they can be appealed through the Environmental Court. Approaches and policies addressing environmental sustainability differ significantly between councils (e.g. Crofoot, 2016; Manderson et al., 2007; McDowell et al., 2016). In an opinion piece about the effects of natural resource management policy on hill country agriculture, Crofoot (2016) highlighted some of these differences. He described how some councils take a prescriptive approach to implementing the National Policy Statement for Freshwater Management (NPS-FM) in which measures are specified, while some other regions take a more effect-based approach in which limits are set for outputs. Because of differences between local government approaches, a single region, Hawke's Bay was selected for this research.

1.2.4 Industry responses

Organisations in the dairy industry responded to concerns about water quality by developing the Clean Streams Accord (CSA), a non-binding agreement that was agreed to in 2003. This agreement was made between the Ministry for the Environment, the Ministry of Primary Industries, Fonterra and 15 out of 16 Regional Councils (Ministry for the Environment, 2018b). It set targets for for 2012 and interim targets for 2007 to implement measures to protect streams on dairy farms. The outcomes the accord sought to promote, were to: fence-off 90% of waterways and wetlands, encourage the installation of culverts and bridges to prevent stock from entering waterways, and reduce nutrient and effluent losses by achieving compliance with regional plans, and through the implementation of nutrient input and output management plans. Swaffield (2013) pointed out that there was scepticism of the plan, because of its voluntary nature. The successor to the CSA, the DairyNZ's Sustainable Dairying Water Accord, was implemented in 2012 to continue industry efforts to improve water quality. The DairyNZ Sustainable Dairying Water Accord, is supported by additional organisations in the dairying industry. Like the CSA, it is a voluntary agreement. The accord outlines what is expected of each of the organisations, including dairy companies, fertilizer companies, regional councils, Dairy NZ and national government ministries. It outlines targets up until 2020 and how they are monitored (DairyNZ, 2013). In their fifth yearly report in 2018, it was concluded that the majority of targets were achieved or 'on

track', with the exception of stock exclusion from wetlands on grounds it cannot be measured (DairyNZ, 2018).

1.2.5 Local community initiatives' role in achieving sustainability objectives

Some scholars argue that local collaborative approaches, such as community environmental initiatives can facilitate holistic, inclusive, locally appropriate approaches to resolve inherently complex sustainability issues (Cradock-Henry et al., 2017; Curtis et al., 2014; Patterson, 2016). Local, community-based initiatives already play an important role in the protection and restoration of natural resources more broadly in Aotearoa New Zealand (Curtis et al., 2014; Peters et al., 2015). In 2009, it was reported that there were over 600 active community environmental groups in Aotearoa New Zealand (Ross, 2009). Peters et al. (2015), surveyed representatives of 296 of these groups and found that 90% of the groups were supported by external organisations, such as local government agencies. The surveyed groups consisted of mostly volunteers, and 70% of the groups combined social and environmental objectives. They did not specify how many of these groups were focusing on agricultural land, but they found that 27.9% were based on privately owned land (Peters et al., 2015). Community engagement is argued to enable building local capacity to respond to sustainability issues and support from local communities (Curtis et al., 2014). In this thesis, the focus is on initiatives in which local government is involved.

1.3 Sustainability initiatives in the context of an agricultural sustainability transition

This thesis builds on and adds to literature studying sustainability initiatives (Figure 1). Sustainability initiatives have been researched in various ways. Sustainability transitions theory offers a theoretical framework to study how changes towards sustainability in a system occur (Loorbach et al., 2017). Mechanisms through which a sustainability transition can occur, are studied with the use of the multi-level perspective (MLP). In transitions theory, the MLP conceptualizes transitions by identifying three levels: niche, regime and landscape (Geels, 2002). A sustainability transition can be defined as a slow, transformative shift in the regime that is influenced by both the landscape and niches (Geels, 2002; Geels, 2011). A transition is defined as a shift in the regime, which may occur through interactions between the niche and regime levels (Ingram, 2015). To date, a few scholars have studied the place of small-scale agricultural initiatives in an agricultural sustainability transition (e.g. Bui et al., 2016; von Oelreich et al., 2017). These studies framed sustainability initiatives as niches and focused on interactions with the regime, rather than how individuals and their roles and relations shaped the initiatives. The need for better understanding of social aspects of changes to sustainable land-use in Aotearoa New Zealand, has been recognised by researchers (e.g. Dodd et al., 2008; Tyson et al., 2017),

yet there has been limited sustainability transitions research undertaken in Aotearoa New Zealand to date (e.g. Duncan et al., 2018; Haylock et al., 2018). Currently, limited research has been conducted, especially at the micro level of individuals within sustainability transitions, (e.g. Wibeck et al., 2019). This thesis contributes to the understanding of the roles of individuals in transitions and adds to empirical sustainability research in the context of Aotearoa New Zealand. In addition to sustainability transitions theory this thesis draws on concepts from innovations studies including the concepts of 'intermediaries' and 'boundary objects' (Figure 1) to further explore findings, extending the use of these concepts and linking them to sustainability transitions.

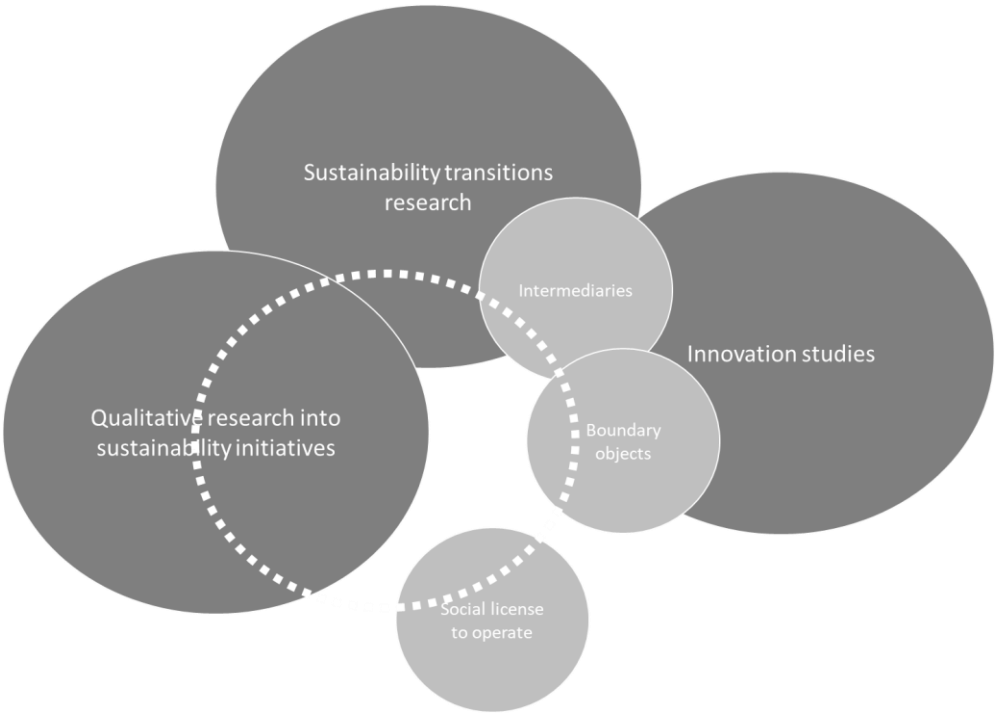

Figure 1: This thesis draws on several sometimes-overlapping fields of literature. The white dotted line in this diagram indicates the place of this thesis (white dotted line) in relation to the main fields of research (dark grey circles) and concepts (light grey circles) was informed by.

1.4 Research question and approach

This thesis seeks to add to the understanding about individuals and initiatives in agricultural sustainability transitions. It also seeks to contribute to the growing body of literature on sustainability transitions research in Aotearoa New Zealand. Ultimately, this study aims to inform how organisations involved in natural resource management can support agricultural initiatives navigating a sustainability transition. A better understanding of how people shape initiatives, can contribute to improving support. The research question this thesis aims to answer is:

How are agricultural initiatives seeking to address local sustainability being shaped in the context of a sustainability transition?

This question is addressed through research into how environmental challenges were navigated locally by two agricultural initiatives. To select these initiatives, first an overview of agricultural sustainability initiatives in Hawke's Bay was developed. Two agricultural sustainability initiatives navigating an ongoing agricultural sustainability transition were subsequently selected and studied in depth. Initiatives were selected in which the regional council (the local government agency responsible for environmental management in Aotearoa New Zealand) and farmers were involved. Fifteen semi-structured interviews were conducted with people involved in or with knowledge of, each of the initiatives. In addition, relevant documents were collected. Both the interview transcripts and documents were analysed thematically using NVIVO.

1.5 Thesis outline

Figure 2 provides an overview of the structure of this thesis. Chapter 2 describes the theoretical framework underpinning this research and provides a review of empirical studies investigating sustainability initiatives or theory relevant to this study. The research design is then explained in Chapter 3 which describes the case selection, data collection and data analysis. Chapter 4 then provides additional information about the region in which the case studies are based, background information about the organisations involved as well as a description of the trajectories of both initiatives. In Chapter 5 the findings of both case studies are presented. Chapter 6 begins with a cross case analysis followed by the discussion. Finally, the conclusions are presented in Chapter 7.

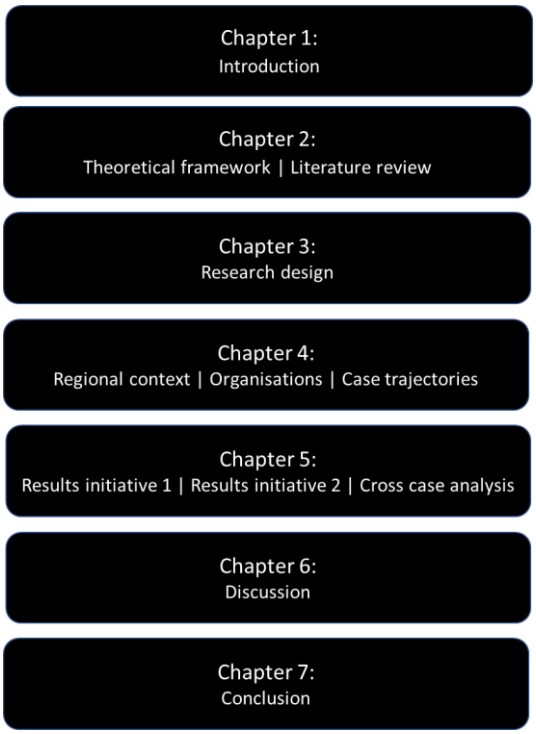

Figure 2: Thesis outline

Chapter 2: Theoretical framework and literature review

2.1 Introduction

This chapter reviews literature related to agricultural sustainability initiatives navigating a sustainability transition. The chapter consists of two parts. In the first part theoretical literature is reviewed and in the second part, starting at Section 2.6, empirical literature is reviewed. Empirical studies included research that applied sustainability transitions theory or either of the other concepts reviewed in the theoretical part, as well as empirical studies that researched initiatives or people pursuing sustainability in similar contexts to the cases researched in this thesis.

The history and development of sustainability transitions literature is summarised and the multi-level perspective, transition management and how actors, roles and relations have been conceptualised in this field are reviewed. Theory in the sustainability transitions field was found to lack concepts to explore some of aspects relevant to this thesis, so some concepts from other fields of literature are also reviewed. In particular, the concepts of 'boundary objects' and 'intermediaries' from innovation studies which are used to study people and objects that enable links between people across boundaries are discussed. The negotiation of acceptable practices is also explored by reviewing literature about social license to operate (SLO). Relations between each of these fields and concepts are highlighted throughout the chapter. Differences and similarities between the context in this current research and these studies are highlighted and will be discussed in more detail in Chapter 6 in relation to findings in this thesis.

Section 2.2 reviews the development and central ideas of sustainability transitions literature as well as the multi-level perspective and its various interpretations. In Section 2.3, the way actors and their roles have been studied in sustainability transition research is reviewed. Section 2.4 is about boundary objects and intermediaries, concepts from innovation studies a field closely related to sustainability transitions. Next, Section 2.5 discusses the concept SLO to explore changing societal expectations in the context of a sustainability transition. Sections 2.6 to 2.10 then review empirical studies applying the MLP, studying small-scale initiatives, SLO and boundary work. Finally, section 2.11 concludes this chapter by summarising the main insights.

2.2 Studying societal changes towards sustainable practices: sustainability transitions

Sustainability transitions is a field of research that studies societal changes towards sustainable practices. It is argued by sustainability transitions scholars, that sustainability transitions take place

over a time span of decades (e.g. Hinrichs, 2014; Loorbach et al., 2017; Rotmans et al., 2001). Furthermore, sustainability transitions are argued to involve multiple actors (Farla et al., 2012; Wittmayer et al., 2017) and have multi-dimensional and uncertain dynamics (Geels, 2011; Loorbach et al., 2017). Scholars studying global sustainability argue there is a need for transformative change towards sustainable practices (e.g. Folke et al., 2016; Hinrichs, 2014; Markard et al., 2012; Rockström et al., 2017). Arguably, the sectors that are most in need of transformative change for sustainability are energy, transport and agriculture according to Geels (2011) who is recognised as a seminal scholar in the sustainability transitions field. Until recently, the majority of studies have focused on sustainability transitions in the energy, transport, while the agriculture and food sectors (often combined into agri-food) where this thesis can be positioned, remains relatively underexplored to date (El Bilali, 2019b; Markard et al., 2012). Sectors in which sustainability transitions have been studied, including agriculture, are generally considered to be dominated by large, powerful commercial organisations that benefit from maintaining established practices (El Bilali, 2019a; Geels, 2011). It is suggested that, because of this, the tendency of powerful organisations is to seek to prevent change, civil society as well as public authorities play important roles to make necessary changes for sustainability (Chapin III et al., 2012; Geels, 2011). Sustainability transition research explores the tension between the established rules and practices, versus alternative more environmentally sustainable options and the factors shaping these tensions. In this thesis, examples of the way tensions that can be characterised as illustrative of a sustainability transition in the agricultural industry shaping sustainability initiatives are explored on a local scale.

2.2.1 History and development of sustainability transitions research

Sustainability transitions research has gained popularity over the past two decades. Since the 1990s, sustainability transitions scholars have developed an empirical and theoretical body of literature (Hinrichs, 2014; Loorbach et al., 2017; Rip et al., 1998; Rotmans et al., 2001). Research into sustainability transitions originated in Europe, but a global research network has developed since.

Three dominant approaches in sustainability transitions research developed in the following chronological order: the socio-technical, socio-institutional, and socio-ecological approach (Loorbach et al., 2017). Loorbach et al. (2017), who is recognised as a seminal scholar in this field, described the development of sustainability transitions research. He highlights that in the 1990s sustainability transitions research emerged in innovation, environmental and sustainability research. Scholars highlighted that in the earlier sustainability transitions literature, the majority of studies had a strong focus on technocratic innovations and processes of substitution of a socio-technical regime (Hinrichs,

2014; Loorbach et al., 2017; Seyfang et al., 2012). Later, sustainability transition researchers started studying societal sustainability transitions more broadly, through what Loorbach et al. (2017) identified as the socio-institutional approach. In the socio-institutional approach, scholars study institutionalised aspects (e.g. culture and practices) of society as the regime, focusing on agency and governance. Then the socio-ecological approach developed drawing upon principles from ecology and adaptive systems theory such as resilience and ecosystem services. The most recently emerging developments, further extending beyond those initial three approaches, has been a shift in the focus towards specified geographical scales (e.g. a catchment or a city) and a wider range of systems (e.g. socio-economic, socio-political systems) according to Loorbach et al. (2017). Outside of academia, there are examples where the concept of a 'sustainability transition' has been introduced into policy. According to Kemp et al. (1998), the first instance was in the Netherlands in the context of a transformation in waste management. More recently, the concept 'sustainability transitions' has been integrated into global directives, including environmental policy making and priorities of the OECD (Hinrichs, 2014; Loorbach et al., 2017). Hence, sustainability transitions research can be characterised as a well-established field, in which the approaches and focus of research have expanded and developed as has the use of these ideas into practice.

2.2.2 Defining sustainability transitions

Besides referring to a field of research "sustainability transitions" is also a term central to the field that has been defined in several ways. Confusingly, the words "transition" and "transformation" have been used interchangeably in some studies, but to describe different phenomena in others. This research will follow Olsson et al. (2006) and refer to a 'transition' as the process of radical societal change and 'transformation' as the outcome. Like 'transition', the meaning of the word 'sustainability' is not fixed. There are many different ideas about how to define, research and achieve sustainability (Markard et al., 2012; Salas-Zapata et al., 2017; van Mierlo et al., 2017). The following definition specifically focuses on sustainability in agriculture, defining sustainable agriculture as "practices that meet current and future societal needs for food and fibre, for ecosystem services, and for healthy lives, and that do so by maximizing the net benefit to society when all costs and benefits of the practices are considered" (Tilman et al., 2002, p. 671). It is important to acknowledge that in practice, not all costs and benefits will be able to be identified and costs and benefits may be different for different actors. Moreover, some aspects may be antagonistic, benefiting one aspect of sustainability, while compromising another (Andersen et al., 2019; Ferguson, 2016).

A commonly used definition of "sustainability transitions" is: "radical transformation towards a sustainable society, as a response to a number of persistent problems confronting contemporary modern societies" (Grin et al., 2010). However, the notion that sustainability transition has to take place in modern societies is disputed, as some scholars argue historical sustainability transitions can also be identified (e.g. Geels, 2011). Schäpke et al. (2017) identified a discourse in literature between scholars that view transitions as open-ended processes and scholars that view transitions as a radical system change in a predetermined direction. Ingram (2015) argued that specifically in agriculture, a sustainability transition may be more likely to resemble the accumulative effect of adaptive changes, rather than a clear regime shift. In this thesis, an agricultural sustainability transition is viewed as the process of making more sustainable agricultural practices, common practice.

2.2.3 The multi-level perspective

The MLP is a framework that has been used to frame the multi-dimensional and dynamic characteristics of sustainability transitions. The origins of the development of the MLP are attributed to Braudel (1982). Schot (1998) and Rip et al. (1998) further developed the framework, and Geels (2002) is acknowledged for popularizing it (Loorbach et al., 2017; Raven et al., 2012). The MLP was originally developed in the context of studies exploring technological transitions, but later was applied more broadly (Geels, 2002; Rip et al., 1998; Schot, 1998). The MLP is used to explain how a sustainability transition may occur by distinguishing between three interacting levels: niche, regime and landscape (Geels, 2011). The regime can be viewed as established rules and practices, niches as spaces for innovations and alternative practices, while the landscape represents the broader parameters that shape a system such as the climate. There are differences in the nuances in the ways each of these levels have been defined and used (El Bilali, 2019a; Geels, 2011). El Bilali (2019a) reviewed the application of the MLP in agricultural and food sustainability transition studies expressing criticisms about aspects of the MLP and questioning if it has been usefully operationalised in agri-food sustainability transitions. El Bilali (2019a) highlighted a common criticism of the MLP is that the levels are presented as clear-cut, whereas empirical findings show the distinction is much more ambiguous.

Early work on sustainability transitions focused on technological innovation initiatives as niches (e.g. Geels, 2002), but more recently there are examples of studies that focus on niche initiatives in which new visions and social or organizational innovations were developed (e.g. Bui et al., 2016; Gernert et al., 2018). Considering the focus on actors and their interactions in this study, the way niche initiatives are viewed in this thesis concurs with the latter view. Some scholars define niches as an initiative or

alternative practice that take place in that protected space (Bui et al., 2016; von Oelreich et al., 2017), others refer to the practices taking place in a protected space as 'grassroots initiatives' (Gernert et al., 2018). El Bilali (2019a) notes that in the agro-food field, rather than a protected space, niches are more commonly defined as alternative agro-food systems, with agro-ecology, organic agriculture, permaculture, urban agriculture, conservation agriculture, integrated farming, care farming and alternative food networks referred to as examples of niches in the agro-food field. In this thesis, 'niche' is accepted to refer to the space and 'niche initiative' refer to the activities taking place within that space. A review by Gernert et al. (2018) focused on urban food systems and how initiatives can shape sustainability transitions. They referred to 'grassroots initiatives', which they characterised as initiatives aiming to enable people to develop alternatives for local communities through democratic, inclusive, and participatory processes. Based on the literature they reviewed, they argued that although not independent of what happens in other levels of organisation (regime and landscape), the accumulation of many of these small grassroots initiatives and the learning that takes place in each of them, can lead to systems change (Gernert et al., 2018). Gernert et al. (2018) discussed how the local connections of these initiatives may legitimize and empower progressive ideas developed locally, potentially challenging existing power structures. Although there were similarities between the initiatives studied in this thesis and niche initiatives as described in some sustainability transitions literature, the term 'niche initiative' was not found to capture the complexity of interactions and influences associated with multiple levels of the MLP within each of the initiatives studied. Nevertheless, due to the similarities such as the focus, size and involvement of different groups of people in the initiatives, empirical insights into niche initiatives as reviewed in Section 2.6 provided useful insights to further explore small scale initiatives in the context of a sustainability transition.

Within the MLP, a regime is described by Geels (2011) as the central level. Sustainability transitions are defined by Geels (2011) as regime shifts. Geels (2011) highlighted that what may be characterised as a regime shift on one level, may be viewed as an incremental change on another. In this thesis the importance of considering scale when studying sustainability transitions and operationalizing the MLP is also highlighted and extended with insights at the grassroots level. In more recent literature, the regime was characterised as the structure, or a set of various types of rules, from shared beliefs to regulation, that stabilize the current system, and allow only for incremental change (Geels, 2011; Ingram, 2015). As such, these include more explicit as well as implicit rules. It is this latter definition, that the current research will follow. Fuenfschilling et al. (2014) argued that regimes are presented as homogenous entities, while internal tensions and differences can be identified which may in turn present opportunities for new practices.

In the multi-level perspective, the wider context of the system has been conceptualised as the landscape. This external context consists of factors that are generally not easily affected by actors (Geels, 2011). Examples of factors that make up the landscape include: physical geography, climate, resources, political structure, wider economy, cultural context and other societal trends. Transitions can be driven by the prospect of shifts, or by unexpected shifts, in the landscape level, such as natural disasters or political changes, according to Hinrichs (2014). The landscape and changes therein, may put pressure on existing regimes and create opportunities for niches (El Bilali, 2019a). For example, after a destructive earthquake, people may look for alternative housing structures, creating the opportunity for new initiatives in the housing market. Conversely, stable aspects of landscapes can also inhibit transitions by exerting a stabilizing effect on a regime, as highlighted by Geels (2011). The majority of empirical MLP literature has focused on niche and regime (e.g. Bui et al., 2016; Ingram, 2015) and as Geels (2011) discussed, the landscape level has been largely left out of consideration (El Bilali, 2019a). However, landscape forces emerged to shape one of the cases in this thesis through pressure on parts of the regime and provides an empirical example of how people experienced these shifts at the landscape level in an ongoing transition.

The ways each level may shape other levels and interactions between levels has been the focus of sustainability transition scholars. The focus of studies has generally been on niche-regime interactions, and in particular, how the regime hinders the adoption of niche practices or how niche practices are adopted into regimes (e.g. Bui et al., 2016; von Oelreich et al., 2017). A dominance of studies researching sustainability transitions driven by grassroots initiatives and not driven from the top down (for example by enforcing regulation) has been observed (El Bilali, 2019a; Geels, 2011) while theoretically the MLP does not exclude those pathways, as during a transition the regime changes. In contrast, interactions with the landscape level have been left underexplored according to several scholars (e.g. El Bilali, 2019a; Geels, 2011). A similar dominance of studies researching bottom-up initiatives can also be observed in the field of sustainability transitions and niche management. Based on the MLP it would be expected that antagonistic niche and regime forces would emerge to play a role in the initiatives studied in this thesis, that, as argued in Chapter 1, are situated in a system that is undergoing a sustainability transition.

Scholars have studied sustainability transitions from the perspective that sustainability transitions, and/or aspects of sustainability transitions, can be managed (Kemp et al., 1998; Loorbach et al., 2010; Rotmans et al., 2001; Seyfang et al., 2012; Shove et al., 2007). Research about managing sustainability transitions and niches is in many cases focused on the role of niches as catalysts for sustainability transitions (e.g. Hargreaves et al., 2013; Kemp et al., 1998; Seyfang et al., 2013), but examples of more

regime driven sustainability transition management have also been presented (e.g. Loorbach et al., 2010). The field of strategic niche management was developed from the perspective that niches can be deliberately developed by removing or reducing barriers (Kemp et al., 1998; Shove et al., 2007),. However, scholars have challenged the idea that sustainability transitions can be managed, and argue that, in recognition of the unpredictability and emergent nature of sustainability transitions, the focus should be on studying favourable conditions for transitions (Brown et al., 2013; Chapin III et al., 2012; Duncan et al., 2018). Shove et al. (2007) also challenged assumptions underlying transition management related to power distributions and the ability of transition managers to foresee turning points and shape the trajectory of transitions. Nevertheless, Shove et al. (2007) argued the feeling of agency over a sustainability transition, may be necessary to motivate action that can ultimately lead to a sustainability transition. Therefore, although sustainability transitions may be only manageable to a limited extent, people believing they can make a difference, may be necessary for change to occur. It is widely recognised that people shape sustainability transitions (e.g. Farla et al., 2012; Geels, 2011; Loorbach et al., 2017). In the next section, how people and their roles in sustainability transitions have been conceptualised is reviewed.

2.3 Characterisations of actors and roles in sustainability transitions

People shape sustainability transitions in various ways. How people shape sustainability transitions has been studied by studying actors and roles, (e.g Avelino et al., 2016; Farla et al., 2012; Fischer et al., 2016; Wittmayer et al., 2017). Sustainability transitions are accepted as being multi-actor processes (Farla et al., 2012; Geels, 2011). The relevance of people shaping sustainability transitions is broadly recognised, yet a common criticism of sustainability transitions literature, is that due to a focus on higher scales and abstract conceptualization of processes, people have not commonly been the main focus of sustainability studies (e.g. Avelino et al., 2016; Fischer et al., 2016; Geels, 2011; Wittmayer et al., 2017). In particular, there is a gap in the literature at the level of individuals in initiatives and their experience and perceptions (Duncan et al., 2018; El Bilali, 2019a), which is where this thesis makes a contribution. The review below discusses how other scholars have conceptualised and discussed people in sustainability transitions literature.

Many sustainability transition studies refer to actors as social groups, when discussing people in their research. Not all sustainability transitions scholars discussing actors explicitly define ‘actors’. Fischer et al. (2016, p. 2) defined actors in relation to sustainability transitions as “individual and collective actors as participants in purposive actions in an attempt to prevent or generate change” based on Bos et al. (2013). This definition divides actors (or their actions) into those driving change (niche actors)

and those preventing changes (regime actors). However, it was found that this classification does not capture the nuanced positions held by actors involved in the grassroots initiatives studied in this thesis. A more general definition of actors, that this thesis follows, is provided by Avelino et al. (2016, p. 634) who define an actor as a: "social entity, that is, a person or organization, or a collective of persons and organizations, which is able to act".

Scholars that discuss actors often group people and organisations into actor categories defined in relation to the sustainability transition they study. Categories into which actors have been categorised include the levels of the MLP (e.g. Brown et al., 2013; Bui et al., 2016; Ingram, 2015) and societal realm or sector (e.g. Avelino et al., 2016; Shove et al., 2007). A classification based on roles was proposed by Wittmayer et al. (2017). Each categorization has different implications and underlying assumptions. To determine an appropriate approach to conceptualize people in this thesis, categorizations according to the MLP, societal realm, and roles are reviewed below. In addition, intermediaries have been argued to be critical in sustainability transitions (Kivimaa et al., 2019b; van Lente et al., 2012). Intermediaries will be discussed in Section 2.5, because of their role in relation to boundaries.

Scholars that classified actors using the MLP based the classification on the place of actors and their actions in relation to the levels of the MLP in a sustainability transition according to Fischer et al. (2016). Holtz et al. (2008) argued that regimes can be defined as a network of actors that follow certain rules and practices. According to El Bilali (2019a) this notion also applies to niches, but with rules and practices that are different from the ones followed by regime actors. It is argued that regime actors often have the tendency to oppose a sustainability transition as they are associated with benefiting from maintaining existing norms, rules and practices (Fischer et al., 2016; Geels, 2014). According to Avelino et al. (2016) scholars have generally framed the government and the market as forming the regime. Niche actors on the other hand are described as actors with practices that are different from the regime (Fischer et al., 2016). Although some scholars argued that landscape actors can have weak agency through for instance public opinion, the landscape level is generally not associated with actors, as it is defined as the external background or context that actors have little effect on according to Fischer et al. (2016).

Scholars have characterised segments or domains of society as 'societal realms' and discussed actors in each of these realms as fulfilling particular roles in relation to sustainability transitions (e.g. Avelino et al., 2016; Farla et al., 2012; Fischer et al., 2016). Examples of societal realms most commonly distinguished in studies include: government, market and civil society (Farla et al., 2012; Fischer et al., 2016). Some scholars also add other categories such as consumers, social movements, expert and

research organisations, and individual actors, as highlighted by Farla et al. (2012). These examples illustrate that these categories are not standardised or clear cut, as for instance, a consumer could also be viewed as part of a market. Actors in each of these realms have been associated with different roles in relation to sustainability transitions and the MLP. For example, it is suggested that, while commonly associated with the regime, government actors can have an important role facilitating niches, by for example financing and providing other resources (Farla et al., 2012; Fischer et al., 2016). Actors in the market realm, can also have different roles in relation to sustainability transitions, either promoting transitions or stabilizing the regime. They can facilitate and involve others in innovations, while in other cases market actors may benefit from further promoting existing practices and preferences (Farla et al., 2012). Fischer et al. (2016) highlighted criticisms regarding how the category civil society is conceptualised. They describe civil society as a heterogeneous group with an ambivalent role in sustainability transitions, so actors from this group can both challenge or stabilize the regime. Scholars discussing classification of actors by the societal realms they are operating in, also highlighted that actors do not operate in isolation of one another in a sustainability transition context. For instance, politicians rely on re-election by civil society and therefore their actions will be influenced by public opinion (Fischer et al., 2016).

Avelino et al. (2016) sought to further develop classifications based on realms and proposed the multi-actor perspective (MaP). They drew on empirical cases in state welfare and community energy initiatives in which sustainability transitions had been identified. In the MaP Avelino et al. (2016) distinguished actor categories along three axes (Figure 3). They argued actors that have been recognised to have agency in sustainability transitions and can be characterised based on the following axes: formal to informal, non-profit to for-profit and public to private. For example, they placed government actors in non-profit, formal and public, market actors as formal, private and for profit, while 'community' was placed in private informal and non-profit. In the centre they identify a 'third sector' which includes actors that cross boundaries. They suggested non-profit organisations could be placed here. To address actors' levels of organisation, they distinguished three levels: sectors, organisations and individual actors (Avelino et al., 2016). Avelino et al. (2016) argued that the MaP can aid the representation of horizontal power dynamics on each level of organisation, as opposed to assumptions in other studies, in particular in line with the MLP, that assume vertical power dynamics with increased power in higher levels of organisation. One individual may be a voter, government staff and consumer at the same time and therefore, as an actor, be placed in multiple places along these axes (Avelino et al., 2016, Figure 3). Avelino et al. (2016) highlighted that the boundaries between each of these axes should be viewed as permeable. Although this approach enables a more detailed

analysis, on the local scale studied in this thesis other factors than those along the axes also emerged as shaping how people shaped the initiatives.

Figure 3: The MaP, actors are placed along 3 axes on the level of individuals (Avelino and Wittmayer 2016).

Wittmayer et al. (2017) also reviewed how roles have been conceptualised in sustainability transition literature. Wittmayer et al. (2017) described actors as social groups embedded in and actively shaping the levels of the MLP. They defined roles as "a set of recognizable activities and attitudes used by an actor to address recurring situations" (Wittmayer et al., 2017, p. 7). Wittmayer et al. (2017) explored the field of social interaction research to identify conceptualisations of roles for sustainability transition research and transition management. Wittmayer et al. (2017) argued that the analysis of roles, particularly changes in roles, can indicate a sustainability transition, because these are the kind of changes associated with a sustainability transition. When analysing roles in sustainability transitions, Wittmayer et al. (2017) suggested that there can be two objects of analysis: single roles and role compositions (an overview of roles being played by different actors and the relations between them). They suggested each can be studied at a specific moment in time or over a period of time. Roles can be actively created, changed, removed, or assigned to shape sustainability transitions and can therefore be indicative of turning points in the process of a sustainability transition (Wittmayer et al. 2017).

This literature exploring how people and their roles are conceptualised in sustainability transitions research suggests the actors can be classified based on their occupation or affiliation, or their position in a sustainability transition (niche vs regime actors), and specific roles are associated with these categories. In contrast to most of these studies, this thesis focuses on initiatives at a local level and the roles of individuals and small groups of individuals. In this context, multiple attributes, including the occupations, affiliations and relationships of individuals, were found to be relevant to understanding how people shaped sustainability initiatives.

2.4 Boundary concepts

The interactions between individuals in initiatives and initiatives and other actors in this thesis encompasses several spaces between these groups. The concept of 'boundary' has been used by scholars to explore these kinds of spaces. Studying boundaries and related concepts were found to be a helpful way of conceptualising the spaces between the groups studied in this thesis. Boundary objects and intermediaries are two boundary concepts used to explore objects and people enabling links between groups across boundaries. Boundaries between actors have been be defined as barriers or obstacles that limit the exchange of information and practices. These barriers can arise as a result of different knowledge systems (Fox, 2011; Ingram, 2018). Actors may use different knowledge systems, vocabularies, and perspectives on an issue, which may contribute to these barriers. Leigh Star (2010) characterised boundaries in almost the opposite way: as a shared space between different groups where exchange can take place by. Despite these contrasting ways of defining boundaries, empirical findings have generally highlighted both barriers and opportunities for exchange (e.g. Ingram, 2018; Klerkx et al., 2012). In this thesis it is argued these characteristics of boundaries are not mutually exclusive and boundaries are characterised as the space between groups of actors, which can constitute of both barriers and opportunities for exchange. Due to their ability to capture and illustrate how processes across boundaries are being moderated the concepts boundary objects and intermediaries are of interest to explore boundaries in this thesis.

2.4.1 Boundary objects

Boundary objects can serve as tools or an interface enabling communication about an issue or situation between actors across boundaries and may help overcome communication barriers (Clark et al., 2016; Tisenkopfs et al., 2015). Star et al. (1989) are credited with introducing the concept of 'boundary object' (e.g. Fox, 2011; Oswick et al., 2009). They defined boundary objects as ''an entity shared by several different communities but viewed or used differently by each of them, being both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet

robust enough to maintain a common identity across sites'' (Star et al., 1989, p. 393). The concept of boundary object was found useful in this research to capture and illustrate how formal agreements and plans shaped the interactions between people in initiatives.

Boundary objects have been studied to explore ways to enable actors with different views to work together. An empirical example was presented by Eden (2011) who described food labels as boundary objects enabling communication between the food industry and consumers. Another example is the use of scale models as boundary objects in a collaborative design process for more sustainable poultry housing (Klerkx et al., 2012). Boundary objects can have a role in identifying and resolving disagreements between actors, as well as identifying areas of common ground according to Klerkx et al. (2012). As noted by Klerkx et al. (2012), there are scholars that argue boundary objects emerge in their function as a boundary object, while others suggest boundary objects can be deliberately developed or chosen. This thesis provides examples of contextual factors that shaped what emerged as boundary objects and what their functions were. Based on their literature review, Oswick et al. (2009) concluded that studies reporting on shared authorship of text-based boundary objects were reporting on cases in which no big power differences between actors emerged, while in cases where authorship was found to be more one-sided, this was linked to power differences and conflicting interests. Boundary objects may represent some perspectives and neglect others depending on who they are developed by (Oswick et al., 2009). Several scholars have emphasised the limitations of boundary objects to connect actors and facilitate interactions (Klerkx et al., 2012; Oswick et al., 2009; Tisenkopfs et al., 2015). For instance, it is argued that boundary objects can be more applicable or significant for some actors than to others, they may lose their relevance to an issue over time or be altered in response to developments. Disparity between actors can occur when complex models emerge as boundary objects, which some actors may be able to engage with better than others due to required technical knowledge. Moreover, the effectiveness of boundary objects cannot be fully predicted, which makes it hard to purposefully develop them. Although all the boundary objects identified in this thesis were text-based documents, authorship was blurry with several forms of co-authorship, and findings did not clearly show the relationship between authorship and represented perspectives or power dynamics.

2.4.2 Intermediaries

Intermediaries have been described by Howells (2006) in the context of innovations, as individuals or organisations that work to connect initiatives with one another and with other actors. Several scholars, generally studying intermediation on large scales, studied intermediary organisations

(Hamann et al., 2013; Moss et al., 2009; van Lente et al., 2012), while others also argued that an intermediary may be an individual (Howells, 2006; Kivimaa et al., 2019b). Based on a review of studies that explored intermediaries in sustainability transitions, Kivimaa et al. (2019b) concluded that there are different interpretations of what intermediary actors are and what they intermediate between in sustainability transitions research. Differences include the position of intermediaries in a transition, whether they are considered neutral or not, and how their role may change over the course of a transition. In this thesis, empirical examples were identified of individuals fulfilling a role that could be described as facilitating connections across boundaries between groups of individuals. The concept of intermediary was identified as useful to explore how an individual fulfilled a role connecting groups in one of the cases.

2.5 Navigating changing societal expectations: social license to operate

To study changing expectations of what constitutes socially acceptable practices by industries or organisations, scholars have explored the concept of SLO (Edwards et al., 2016; Moffat et al., 2016). As highlighted in Chapter 1, there are significant societal concerns associated with agricultural practices in Aotearoa New Zealand, which in the context of this literature can be characterised as challenging agriculture's SLO. Changes in public opinion as to what are acceptable farming practices are identified as placing pressure and influencing farmers' practices and the wider agricultural industry in Aotearoa New Zealand (e.g. McWilliam et al., 2017). Changing societal expectations or public opinion are associated with sustainability transitions (Geels, 2011). The sustainability transition being studied in this thesis is arguably ongoing, so it is relevant to study changes in public perception and social norms. While civil society is acknowledged as playing an important role in sustainability transitions (e.g. Farla et al., 2012; Fischer et al., 2016) limited research has been published that explores how societal pressures, that can be viewed as examples of landscape pressures and/or a changing regime, related to acceptable practices may shape sustainability transitions. The concept SLO has been used to study negotiations between different actors in contested spaces. It has been argued that the process of sustainability transitions inherently generates friction between people renegotiating new norms and the redistribution of power. Although still emergent in the agricultural context, SLO has been used to explore the negotiation of acceptable practices between society and a given sector. In this thesis SLO is used to further explore the way changing societal expectations can shape initiatives in a sustainability transition.

Most of the literature on SLO focuses on the mining industry (e.g. Bice, 2014; Michell et al., 2013; Ruckstuhl et al., 2014), but the concept has also been applied to other sectors, including agriculture

(Shepheard et al., 2008). Social license to operate is determined by the relationships between an industry and broader society. Social and legal licences to operate are not always aligned: approval on a regulatory level does not necessarily mean practices are socially acceptable (Moffat et al., 2016; Shepheard et al., 2008). It is argued that social licence to operate reflects current societal values, expectations and perceptions, and is negotiated and implied rather than overtly acquired. Loss or compromise of the SLO can lead to conflict between the industry in question and the broader community (Moffat et al., 2016). It is argued that the development and maintenance of SLO is a continuous and evolving process and that gaining and keeping SLO involves on-going negotiation between industry and society, during which industry practices must continue to be found acceptable (Shepheard et al., 2008). This thesis adds an empirical example of how challenges to license to operate shaped the second case and how challenges of SLO were experienced and responded to by individuals operating in the dairy industry. In the following sections, empirical literature is reviewed to illustrate what others have found in studies seeking to understand sustainability initiatives and studies that have applied and explored the concepts discussed in this theoretical framework.

2.6 Empirical sustainability transitions research studying initiatives and individuals

In this second part of this chapter, empirical research addressing agricultural sustainability and empirical findings in relation to the concepts reviewed above are reviewed to further inform this research.

To date, empirical research into small scale initiatives with an agricultural focus are limited in the sustainability transitions field. This thesis contributes to this literature by using the MLP to research small scale initiatives in the context of an agricultural sustainability transition in Aotearoa New Zealand, adding empirical insights into how the levels of the MLP are manifested on the scale of individuals and small scale initiatives.

2.6.1 Small-scale sustainability initiatives studied through the multi-level perspective

Several scholars have studied local, small scale initiatives as niche initiatives to gain insights into the role of the initiatives in changing regimes (Bui et al., 2016; Haylock et al., 2018; Ingram, 2015; Konefal, 2015; von Oelreich et al., 2017). Initiatives that were more radically different from the regime, in terms of practices and/or culture, were found to link less with the regime, while initiatives that were less different from the regime generally linked more with the regime in several studies undertaken in agri-food contexts (Hubeau et al., 2019; Ingram, 2015; von Oelreich et al., 2017). In a similar line, in the study by Konefal (2015) resources being provided by regime actors, were associated with the influence

of regime actors. In identifying this regime influence, Konefal (2015) challenged the legitimization of the metrics that were being developed in the case they studied. In contrast to these findings, Haylock et al. (2018) suggested more genuine and collaborative ways of engagement with local government lead to critical relationships built on trust, which they argued enable more radical changes. Linking with the regime has been associated with an increased adoption of niche practices or support for niche practices in the regime (Bui et al., 2016; Hubeau et al., 2019; Ingram, 2015; von Oelreich et al., 2017). An Aotearoa New Zealand based study into local food programs suggests that intensive government involvement in such initiatives may lead to dependency on government and more government driven outcomes (Haylock et al., 2018). On the other hand, it was found a high level of government involvement in initiatives can mean that local communities have a stronger likelihood of influencing the regime and ultimately a transition (Haylock et al., 2018; Ingram, 2015). Moreover, Konefal (2015) argued that changes in the practices of regime actors were evidence that a sustainability transition was on-going. Most of these studies characterised the initiatives they studied as niche initiatives, while some of them were not radically different in their practices from the regime or were placed within the regime. Findings of these studies suggest the nature and level of involvement of government agencies in initiatives in this thesis would likely be associated with the extent of alignment with regime practices to address the issues each of the initiatives is navigating. In particular, there are similarities in the research context of this thesis and the study by Haylock et al. (2018). Based on their findings, government involvement would be expected to be shaped by the perceptions of the local government of people involved in the initiatives.

Actors and their roles and relations were studied in different ways in empirical studies researching initiatives, but generally were not the focus of this research. Both von Oelreich et al. (2017) and Bui et al. (2016) discuss that in niche initiatives local actors developed new ways of operating. They referred to a range of people in various categories according to their activities or occupation in relation to the initiatives, including parents, farmers, facilitators, employees of an education centre and consumers, and described their involvement in general terms (e.g. which actors initiated the initiatives and who else got involved). In their discussion, Bui et al. (2016) distinguished between niche and regime actors, while Ingram (2015) referred, in a similar fashion, to niche and regime actors throughout their paper. Although they did not specify who they viewed as regime actors, Konefal (2015) implied that large food retailers and processors as well as farmers that are not part of niches such as organic growers, are regime actors. According to Bui et al. (2016) niche actors were people that were part of the new alliances between, for example, local farmers and parents. Local government employees and other local authorities were categorised as regime actors. There were no explicit references to individuals

being part of multiple actor categories or changing between actor categories as suggested by theoretical literature that reviewed actors in sustainability transitions (Avelino et al., 2016; Wittmayer et al., 2017). Specific individuals and how and why they shaped initiatives were not discussed by Bui et al. (2016), Ingram (2015) or von Oelreich et al. (2017). On the other hand, Haylock et al. (2018) identified an individual that fulfilled a critical role connecting actors in one of their cases and characterised this individual as a particularly committed staff member. This individual was recognised for forming a connection between the initiative and local government, which enabled tailored government support for the initiative. In that case, involvement of local and national government was found to give credibility to the initiative, and was perceived as enabling the initiative to achieve its goals. However, in the second case Haylock et al. (2018) studied, they found that the perceived power differences between the initiative and local government was a motivation to limit the involvement of government employees in order to remain independent. In contrast to this thesis, the focus of the studies discussed in this subsection was on the level of initiatives, while in this research individuals, their roles, drivers and motivations are also studied.

2.6.2 Individuals in sustainability transitions research

This thesis studies people at the level of individuals in initiatives in sustainability transitions. There are relatively few empirical studies to date that have studied how individuals experience a sustainability transition. However, an Aotearoa New Zealand study by Duncan et al. (2018), focused on how individuals experienced various aspects of transformations, and Wibeck et al. (2019) studied people's experiences of transitions in several countries. These authors recognised transformations as a disputed concept that meant different things to different people, but also highlighted consistencies. Duncan et al. (2018) found that experienced sustainability transitions were taking place "in the hearts and minds" of people. Similarly, Wibeck et al. (2019) highlighted the importance of awareness, education, knowledge sharing, and a sense of belonging. Importantly, both Wibeck et al. (2019) and Duncan et al. (2018) found that participants emphasised that although sustainability transitions need several types of change, including social, political and cultural change to achieve sustainable changes related to natural resource management, ultimately they start with individuals. The main conclusion was that a transformation in their view is emergent and not the result of a planned process (Duncan et al., 2018) and transformations are experienced differently by different people (Wibeck et al., 2019). Adding to those, findings this thesis adds examples of groups of people navigating a sustainability transition collectively as well as individually, showing how these relationships also shape how sustainability transitions are experienced.

How and why people, outside actors associated with the existing regime, resist transitions has not been researched extensively to date. This is of relevance, because one of the initiatives explored in this thesis can be viewed as an example of people seeking to challenge aspects of an on-going transition. Meek (2016) studied why individuals and communities in Brazil did not transition towards agro-forestry practices. They found that spatial and cultural politics limited a sustainability transition to agro-forestry. For example, they highlighted how short-term contracts in combination with the way they were appointed to communities, limited the possibility for extension workers to work for longer with the same community and thus to build relationships with farmers that they deemed necessary to achieve change. This exemplifies a top down approach to drive a transition. They observed trade-offs on farm between agro-ecological practices and other practices. For example, they found a farmer having to negotiate new practices with his father's and neighbours' practices and values. Meek (2016) also highlighted how cultural values attached to practices can limit the uptake of new practices. Like Duncan et al. (2018), they also concluded that these cultural values need to be addressed for change to happen, adding that education through extension can provide new ideas about different options. The importance of attention at the individual level in combination with other levels was highlighted by Meek (2016). Farm level change was recognised as being subject to a micro level political sphere between the values of a farmer, extension workers, banks, and neighbours. The complexity of individual decision making in relation to sustainable practices that is presented by Meek (2016) on a farm level, is further explored in the next section which reviews studies that researched drivers and motivations of individuals, particularly farmers.

2.7 Drivers promoting sustainable practices

As highlighted above, relatively few sustainability transitions studies have focused on actors at the level of individuals. However, outside this field there is a range of other studies capturing what drives or motivates people to undertake activities to achieve agricultural sustainability outcomes (or not).

The role of regulation as a driver for sustainable agricultural practices has been studied widely. Findings of several studies highlighted a preference of farmers for tools that give them agency and independence (Barnes et al., 2013; Burton et al., 2011; Cocklin et al., 2007). It is therefore argued that those types of approaches might be more successful in changing behaviour and practices (Barnes et al., 2013; Burton et al., 2011; Cocklin et al., 2007). Burton et al. (2011) suggested that the prescriptive nature of commonly used voluntary policy tools often does not allow farmers to demonstrate and apply their skills. Cocklin et al. (2007) found that farmers preferred voluntary and education-based tools rather than market-based instruments, and least preferred command and control measures. In

an agricultural study conducted in Scotland, it was found farmers that in areas that had been marked by the government as risk areas and subject to increased regulations, were less likely to adopt voluntary measures than people outside these areas (Barnes et al., 2013).

Barnes et al. (2013) also concluded that the adoption of measures by farmers did not increase by reducing choice by enforcing regulation. In contrast, McWilliam et al. (2017) suggested that an absence of regulation, may result in a lack of motivation to change practices. In their study into 'green infrastructure' (e.g. planting vegetation that improves the health of natural ecosystems) on dairy farms in Aotearoa New Zealand, McWilliam et al. (2017) concluded that companies as well as farm businesses lack motivation for investing in green infrastructure, and that in the absence of government led policies it is unlikely that effective programmes will develop. In summary, some scholars argued that regulation is necessary for the uptake of sustainable practices, while others suggested other drivers are more important in determining or inspiring the uptake of sustainable practices. The cases studied in this thesis were subject to different combinations of approaches to inspire the uptake of sustainable practices. In one of the cases, regulatory and industry standards as well as public perception emerged as ways farmers experienced pressure to adopt measures, while in other initiative the incentives consisted of an invitation from the local community to take part in improving the environment. These differences, in combination with other contextual factors, were found to have inspired different responses in each case. These findings extend the findings of the studies above that highlighted preferences of farmers for voluntary tools and a sense of agency.

Several scholars have sought to gain understanding of the links between behaviour, preferences and practices of farmers using quantitative surveys in Aotearoa New Zealand (e.g. Fairweather et al., 2009; Small et al., 2016) and internationally (e.g. Greiner et al., 2009; Kuhfuss et al., 2016). Fairweather et al. (2009) found that not only farmers that formally identified as organic adopted sustainable practices in Aotearoa New Zealand. They found that among farmers that did not identify as organic there were clusters that adopted sustainable measures through, audited, market based, and best practice programmes, and argued that a gradient rather than a dichotomy characterised the uptake of sustainable farming practices in their study. Based on a survey of Aotearoa New Zealand farmers in different industries including dairy and sheep and beef farmers, Small et al. (2016) concluded that farmers are more likely to adopt practices when they see them demonstrated successfully. They also found that the size of a farmer's social network, and trust were also important factors that determined the uptake of selected sustainable practices. Greiner et al. (2009) researched how risk perception and motivations of farmers shaped the uptake of a voluntary environmental program in in Australia and demonstrated a correlation between risk perception, motivation, and the adoption of the program.

Kuhfuss et al. (2016) studied whether incentivised environmental practices were sustained once the reward had been received. They found that both monetary and non-monetary feedback can promote the uptake of environmental practices and suggested that sharing benchmark information can help maintain environmental practices. Although these quantitative studies found factors that affect farmer's uptake of sustainable management practices, the underlying motivations and mechanisms were not explored in these studies.

What drives farmers to adopt sustainable practices has also been studied in qualitative studies. Farmer environmental decision making can be viewed as a product of internal and external factors including willingness, ability to act, advice, and available support networks (Mills et al., 2017). Mills et al. (2017) found that willingness can be especially hard to affect and can be viewed as the product of someone's norms, beliefs, and efficacy (one's belief in their own ability to achieve what they intend). Willingness was found to be shaped on three levels: farm level, community level and societal level (Mills et al., 2017). In these three levels, different aspects play a role in a farmer's willingness to adopt practices. On a farm level these might have to do with leaving the land in a good state for the next generation. On the community level this might include what sort of pest management regime is commonly accepted. Lastly, on a societal level it can be about public expectations of farmers to produce food sustainably (Mills et al., 2017). In relation to public expectations, the role of visibility and acknowledgement of farmer's adoption of voluntary sustainable practices has been highlighted by some scholars (de Krom, 2017; Kuhfuss et al., 2016; Mills et al., 2017). For example, Kuhfuss et al. (2016) found that social acknowledgement of their efforts improves the long-term uptake of environmental practices, but that many voluntary schemes have not incorporated feedback, and thus do not facilitate this positive feedback loop. It has also been found that farmers participated in local environmental initiatives to demonstrate their willingness and ability to contribute to a better environment in order to improve the public perception of farming and negotiate their social license to operate (de Krom, 2017; McCallum et al., 2007). The role of farmer engagement, including extension and the personal network of the farmer, in combination with these factors has also been highlighted (e.g. Mills et al. 2017).

The importance of a sense of place as a motivation for supporting sustainable alternatives has also been highlighted by other scholars (Chapin III et al., 2012; Larson et al., 2013; Raymond et al., 2016). Chapin III et al. (2012) used the following definition of sense of place: ''the collection of meanings, beliefs, symbols, values, and feelings that individuals and groups associate with a particular locality'' (Williams et al., 1998, p. 19). They highlighted how different actors connected to place in different ways and found that recent immigrants can develop a sense of place driving stewardship within a few

years. These studies suggest individuals' values and motivations, including connections to place and perception of risks, influence the uptake of sustainable practices or involvement in the studied initiatives and are therefore relevant to study. Chapin III et al. (2012) also argued that in three of their case studies a facilitator helped to focus participants on the shared goals and processes associated with sense of place. They highlighted that these individuals gained trust by their understanding of diverse perspectives, their commitment, persistence, and impartial prioritizing the shared interests. Similar characteristics were identified by Haylock et al. (2018) as having enabled a government staff member to build critical relations. This thesis extends these findings by presenting empirical examples of how attributes, including trust, sense of place, and historical relationships shaped the roles of facilitators, government employees, and other participants in the initiatives.

Scholars have highlighted how ideas of good practice shape practices (e.g. Raymond et al. 2016, Haggerty et al. 2008, Hunt et al. 2013). It is recognised that increasingly environmental and animal welfare considerations are a part of what is considered good farming (Haggerty et al. 2008; Hunt et al. 2013). Sheep and beef farmers in Aotearoa New Zealand, according to Haggerty et al. (2008), experienced market drivers in seemingly opposing directions: to increase production and improve environmental practices. Hunt et al. (2013) found that an increased focus on efficiency since deregulation in the 1980's of farmers and orchardists, who increasingly identified as business focused, also had led to the incorporation of environmentally better practices. Similarly, Raymond et al. (2016) discussed how farmer's ideas about stewardship, their values and land management actions related to each other in the UK. They identified four farmer types related to farmers' ideas about the meaning of landscape stewardship: production focused, environmental focused, holistic focused and instrumental focused. Values and actions could be partly explained by these characterizations, but it was also found that other factors may shape actions and values too (Raymond et al., 2016). What are considered good farming practices can be shaped by many factors including media representation.

Several studies have highlighted an example of media driving industry responses on a national level in Aotearoa New Zealand. Tall et al. (2018), Holland (2015) and Blackett et al. (2016) examined the impact of a media campaign, 'the Dirty Dairying Campaign', and changes in public perception challenging industry practices of the dairy industry in Aotearoa New Zealand. Tall et al. (2018) found that this campaign changed the agri-environmental discourse and associated the dairy industry with increasingly visible, but complex water quality issues. In turn the dairy industry was found to respond with the 'Clean Streams Accord' (Holland 2015) using similar framing juxtaposing 'dirty' with 'clean' (Tall et al. 2018). This move was characterised by Blackett et al. (2016) as a shift from local government led environmental governance that had been demonstrated to have been unsuccessful in protecting

waterways from farm practices, to industry led self-regulation (Blackett et al. 2016). This shift has been attributed various reasons including desire to maintain the reputation of being 'clean and green', the acknowledgement of the industries environmental impact and a desire to address this and to avoid stricter government led regulation (Blackett et al. 2016; Jay 2007, Tall et al. 2018). Tall et al. (2018) suggested this process made the problem governable by removing some of its complexities. In contrast, Holland (2015) voiced criticisms of the accord and argued the campaigns outcomes were limited to addressing current issues and failed to address larger scale issues such as intensification and expansion.

To achieve long term changes, scholars argue for the inclusion of an understanding of people's personal values and motivation in tailoring efforts to engage people in sustainable practices (e.g. Chapin III et al., 2012; e.g. Greiner et al., 2009; Mills et al., 2017; Raymond et al., 2016). However, when considering the nuances of differing values and motivations between individuals and their responses, processes and dynamics in community initiatives have been characterised by many scholars as inherently messy, unpredictable, complex and heterogenous (Cradock-Henry et al., 2017; Curtis et al., 2014; McCallum et al., 2007; O'Brien, 2018) tailoring efforts may be hard to put in practice.

2.8 Sustainability initiatives

In addition to the studies in the field of sustainability transitions discussed in the previous sections, other theoretical frameworks have been used to research initiatives seeking to achieve changes towards sustainable practices. Insights from these studies provided additional insights and examples of factors that may shape what an agricultural sustainability transition may ultimately look like in Aotearoa New Zealand.

Research undertaken in Aotearoa New Zealand has highlighted how elements of both Pākehā (European-descent New Zealanders) and Māori worldviews have shaped sustainability initiatives. For example, Chapin III et al. (2012) recommends strategies that seek to promote the inclusion of different cultural backgrounds and the recognition of different values and beliefs, respect for both traditional and scientific ways of knowing and monitoring, and the creation of a safe environment to express differing beliefs. Duncan et al. (2018) sought to coproduce their research and explicitly draw on knowledges and experiences of Māori and other New Zealanders, based on the argument that Māori have been excluded from "culturally meaningful and sustaining engagement as tangata (people) with whenua (land), or what Pākehā might describe as natural resources" (Duncan et al., 2018, p. 8). They

highlighted the frustrations of Māori participants with the regime, but also visions and studies they viewed as successful in which indigenous values were adopted. Harmsworth et al. (2016) described the process through which indigenous world views informed the NPSFM, highlighting the importance of ongoing relationships with local government employees and adequate resources being allocated. They also suggested the adoption of Māori frameworks, or mātauranga Māori, for working together by adopting more inclusive language and principles from the outset. Other studies identified Māori as one of the groups of actors, without going further into detail how this may have shaped their findings specifically (i.e. Baines et al., 2018).

Collective efforts to improve environmental sustainability in Aotearoa New Zealand, of a similar small scale and environmental focus as the initiatives in this thesis, have also been studied (Chapin III et al., 2012; McCallum et al., 2007). McCallum et al. (2007) studied 6 case studies to gain insights into the role of trust, reciprocity, norms, and social engagement in community environmental management projects. They found different conceptualisations of nature by different actors in these initiatives and predicted the impacts of the initiatives on sustainability outcomes. They concluded that trust, reciprocity, shared norms, and social engagement, did not guarantee that the outcomes sought by the projects would be achieved. Their research suggested that ideas about nature were negotiated and shaped by how actor groups, like farmers or local government, used the environment. These different perceptions of nature lead to different ambitions and considerations among the actors within a project. For example, farmers' concerns with loss of productivity were contrasted with fishers' appreciation of improved water quality as a result of fencing of areas around streams (McCallum et al., 2007). They conclude with a critical view of initiatives as a way to achieve environmental sustainability. A contrasting view is presented by Chapin III et al. (2012) who developed a set of design principles for transformations toward sustainability. They refer to sustainability transitions when changes towards more sustainable ways of managing natural resources were achieved on a local level (e.g. catchment) and did not refer to the sustainability transitions theory. They selected four case studies of local initiatives that were considered by the authors to have transitioned from pathways of environmental degradation to more sustainable pathways (Chapin III et al., 2012).

Chapin III et al. (2012) observed that scale and the diversity of views in these initiatives had a strong effect on the likelihood for sense of place to inspire stewardship and different views on solutions based on different types of connections to place made decision making challenging. Generally, they found that in the initiatives with a smaller number of views and a smaller geographical scale, agreement was more easily reached. Chapin III et al. (2012) partly attributed the successes they identified among efforts to make local sustainability transitions to the simple structure of government,

in particular the high autonomy of regional government, as well as favourable economic conditions in Aotearoa New Zealand. Although not specifically focusing on sustainability, Turner et al. (2017) studied the engagement of 'change agents' which they define as actors like policy makers, industry leaders and researchers in 'communities for change' in Aotearoa New Zealand through the lens of innovation studies. The community for change they studied was the agricultural innovation system. They found engagement of change agents led to progress on the level of projects, but highlighted that progress at the level of the agricultural innovation system was more challenging. Findings from these studies suggest that the initiatives studied in this thesis are likely to be shaped by the qualities of relationships, including trust and shared values, and the negotiation of different interests between groups and individuals involved in them. Empirical literature studying boundary work, activities in the spaces between different groups related to initiatives or transitions, is reviewed in the next section.

2.9 Boundary work

A wide range of aspects of boundary work have been studied empirically in several fields of research. The role of boundary objects and boundary work in innovations for sustainable agriculture have been studied by Tisenkopfs et al. (2015) and knowledge flows across the boundary between permaculture and conventional agriculture as an example of a boundary between niche and regime have been explored by Ingram (2018). It was argued by Tisenkopfs et al. (2015) that boundary work and boundary objects need to fit their specific context to be able to facilitate learning within initiatives and between initiatives and external actors. Ingram (2018) highlighted that interactions across boundaries need to be negotiated to maintain the integrity of both systems and that intermediaries play a role in the process of negotiation. The nature of interplay between brokers and boundary objects was found by Kimble et al. (2010) to vary depending on whether the broker selected boundary objects to further common goals or to further individual goals. The authors highlighted that deliberate choices of boundary objects can enable actors that select or develop the boundary objects to influence inclusion and outcomes in favour of their agenda. In relation to knowledge flows across boundaries, Ingram (2018) also highlights intermediaries facilitating this process may not be value free. As with the selection of boundary objects, examples have been found of the deliberate creation of intermediary roles (Kivimaa et al., 2019b). These findings highlight that there is a range of processes at boundaries can be facilitated by different types of boundary objects and intermediaries, and that decisions and negotiations about their nature are associated with negotiations between different actors as discussed further below.

2.9.1 Boundary objects

Boundary objects have been categorised by several scholars based on their functions and characteristics. For example, Star et al. (1989) identified four types of boundary objects: repositories, ideal types, coincident boundaries and standardised forms. Repositories can be described as an organised collection, like an herbarium. Ideal types are models or diagrams. Coincident boundary objects can be described as having the same boundaries but different content for different actors (e.g. a regional map used by an ecologist versus a volunteer). Lastly standardised forms are developed to be used across the different groups in the same shape, for example sheets developed to standardize data collection. These types are about the shape of the boundary objects that emerged in their case study, while other typologies of boundary objects are more focused on their functions (Klerkx et al., 2012). Based on their literature review Klerx et al. (2012) identified the boundary objects they identified in their case study as having binding, guiding, and convincing functions (Klerkx et al., 2012). Kimble et al. (2010) identified similar functions in their case studies. They found multiple boundary objects played a role in each case. These boundary objects had combinations of several roles: facilitating ways to work together by containing rules of engagement, containing technical information for actors to use, enabling or limiting the exchange of information between actors, and facilitating the coordination of actors (Kimble et al., 2010). Several characteristics of boundary objects that shaped their role were identified by scholars including: which interests are served (collective interests or particular actor's interests), static or dynamic nature, their function (content for collaborating vs technical information), crossing internal or external boundaries, authorship, and tangibility (Kimble et al., 2010; Klerkx et al., 2012; Oswick et al., 2009). Rather than characterizing boundary objects based on one characteristic, several characteristics including their context, functions and shape were explored to gain a better understanding of their role in the initiatives in this thesis.

Although not using the term boundary object, several scholars described documents and metrics being used in transitions research in a way that resembles how boundary objects have been described. For example, Rosin et al. (2017) described the use of metrics in the governance of sustainability in wine production in Aotearoa New Zealand. The metrics were developed as a learning tool to improve sustainable practices and were viewed as an effort to manage a transition. Functions of the metrics included roles in addition to the functions they were intended for (Rosin et al., 2017). Three additional functions of the metrics emerged: promoting compliance to regulation, communicating complex information and facilitating self-evaluation. These functions were associated with different actors, so like boundary objects, different actors used the metrics differently. The metrics were used by producers to justify practices and by producers as well as by the developers of the metrics to improve

regulation (Rosin et al., 2017). Rosin et al. (2017) found people engaging with the metrics were not just passive recipients and responded differently to the metrics. While some were just reactive, others pro-actively incorporated their own goals. They highlighted that although the stated intention of these metrics was to give agency to producers to drive a sustainability transition, there could be the potential for friction when the metrics were also used for regulatory purposes (Rosin et al., 2017). Rosin et al. (2017) argued that it was important to recognise how the metrics shaped relationships and that the metrics in their study could be viewed as active agents in the process of a sustainability transition due to the functions they identified.

Konefal (2015) studied metrics in the context of a sustainability transition from a different perspective, focusing on governance of Multi-Stakeholder Initiatives (MSI's) in the US. These metrics had similarities to how boundary objects have been characterised. They studied how the metrics were being shaped by different governance processes and highlighted that governance processes including membership selection and the presence of regime actors and democratic decision-making processes, have favoured metrics that fit the existing regime, versus metrics that could challenge the regime. Another example of a study exploring the use of documents in sustainability transitions literature was is provided by Bui et al. (2016), who described the use of documents to set rules and principles between the actor groups in one of their case studies. The document in their case study was adapted to reflect the evolving objectives that changed with the enrolment of new actors. So, although not characterised as boundary objects, the characteristics and use of these documents and metrics as discussed by Rosin et al. (2017), Konafal (2015) and Bui et al. (2016) share similarities with how boundary objects have been characterised, in the different ways they were used by different actors, the emergent nature of their application, and the agency attributed to these metrics. This suggests that although there is limited research to boundary objects in sustainability transitions studies, this is a relevant concept to explore in this context.

2.9.2 Intermediaries

Typologies and functions of intermediaries were proposed by several scholars focusing on different characteristics of intermediaries. Firstly, building on earlier research, Hargreaves et al. (2013) studied the functions of intermediaries in grassroots initiatives in the energy sector in the UK, and sought to extend the typology by Geels et al. (2006). Geels et al. (2006) had identified three functions of intermediaries: aggregating lessons from initiatives, establishing institutional infrastructure, and coordinating local projects. To better represent the roles of intermediaries, Hargreaves et al. (2013) extended this typology with a fourth function: brokering and coordinating partnerships. Other

scholars addressed the dynamics of boundary work by highlighting how roles and functions of intermediaries changed over the course of the development of transitions. Also building on earlier characterizations, Kivimaa et al. (2019) proposed a typology of five types of intermediary actors taking into consideration their emergence, context, goals, normative position and development of their role over time: systemic intermediary, regime-based intermediary, niche intermediary, process intermediary and user intermediary. They also acknowledged neutrality as an attribute relevant to intermediaries operating on a systemic level rather than promoting a particular part of the system. Compared to the roles identified by Hargreaves et al. (2013) that are based on intermediaries' functions, these roles are related to their position within a system as conceptualised by the MLP. Studying actor's dynamics and intermediary organisations involved in the different context of Melbourne's desalination system, Brown et al. (2013) identified similar roles to Hargreaves et al. (2013). Brown et al. (2013) discussed how the main role of intermediaries changed over the course of the development of a sustainability transition they studied. Initially, bridging organisations were found to have focused on developing an understanding and building relationships, next they built confidence with stakeholders, then worked on spreading the niche innovation to a wide range of actors, finally the focus shifted to putting pressure to achieve policy shifts (Brown et al., 2013). Each of these characterizations views intermediaries as promoting transitions. Most of these studies have focused on longer time frames and larger scales than the initiatives in this thesis and were not found to explore the roles of intermediaries in the initiatives in this thesis. This thesis presents examples of intermediaries on a small local scale and a relatively short timescale.

2.10 Social license to operate

As highlighted in Section 2.5, challenges to the SLO of farming practices can be viewed as changes indicative of a sustainability transition. One of the few examples of empirical research using the concept of SLO in Aotearoa New Zealand, is an exploratory study on aquaculture (Baines et al., 2018). Baines et al. (2018) take SLO to mean that communities give their approval for the use of resources by an industry or a company. They studied the role of relationships in acquiring and keeping SLO. They found that the size of companies and whether a company is locally owned, were important determinants of relationships with the public (Baines et al., 2018). Large, externally owned aquaculture companies' relationships were characterised as transactional and mostly maintained by professionals hired for this task. Smaller, locally owned companies' relationships were found to be more effective in achieving SLO because of more personal connections in their (heterogeneous) community that were found to lead to more trust (Baines et al., 2018). Attributes Edwards et al. (2016) identified from literature to be important for the development of relationships of companies with the

community were collaboration, transparency, honesty, credibility, reciprocity, and good communication. They also highlighted that connections are not necessarily formal or directly between aquaculture operations and people not directly involved. Rather, these connections may be through different parts of the community that can include people providing services to the operation, but also friendships between employees and other people. Although this study was not in an agricultural context, it does highlight qualities of relationships and how they may shape SLO that could be applicable in an agricultural context. Aotearoa New Zealand's agricultural context can be characterised by small individual farm businesses as well as big corporations (e.g. milk corporations). If the findings of Baines et al. (2018) translate to an agricultural context, relations of smaller scale, locally owned farms would be expected to be more based on personal connections similar to small scale aquaculture companies. Large industry organisations involved in the cases may have relationships with the public that are more transactional. Findings in this thesis show more complex, interrelated relationships. It highlights an example an example where views of an industry could not be separated from small local businesses.

Limited examples of empirical studies that used the concept of SLO in agricultural contexts were identified. Shepheard et al. (2008) researched SLO in the context of agricultural irrigation in Australia. They concluded that the lack of limits of who can have input into what is socially acceptable along with continuously changing expectations, makes it challenging for irrigators to keep their SLO (Shepheard et al., 2008). In Aotearoa New Zealand, it is argued that the SLO of several industries, including the dairy industry, are being challenged (Edwards et al., 2016). Famers are viewed as needing to be engaged to negotiate a new SLO and it is suggested that to do this, the progress farmers are making to more sustainable practices needs to be communicated (Edwards et al., 2016). In other industries in which practices have been called into question (e.g. the mining and oil industries), toolkits to engage with the community have been developed. These toolkits are seen to provide a mechanism to both demonstrate and communicate the alignment of practices with society's expectations (Mercer-Mapstone et al., 2017). The use of these toolkits to communicate across boundaries has similarities to the way boundary objects have been characterised.

2.11 Conclusion

This literature review presents the theoretical and empirical research that this thesis builds on. Sustainability transitions and the MLP are used as the overarching theoretical framework for this thesis. However, the sustainability transitions literature did not provide concepts to fully explore the findings that emerged about the initiatives studied in this thesis, so literature about boundary objects,

intermediaries and SLO was also reviewed to provide additional concepts that will be used to further explore dynamics between the participants in each case. Empirical literature using these concepts to explore initiatives promoting changes towards sustainability were also reviewed.

The MLP enables the articulation of different forces and levels in relation to initiatives navigating a sustainability transition, however it is criticised for not enabling the exploration of the micro scale that this research focuses on. As demonstrated in this review, many authors addressing the participation of people in sustainability transitions studies sought to classify them into actor categories. These classifications have been criticised for their coarse grouping of actors and the vagueness of levels of aggregation (individuals, organisations, realms, roles). This thesis extends ideas about how actors can be characterised by describing individuals and groups by multiple attributes to reflect how they were found to shape initiatives. Boundary concepts and SLO emerged as useful concepts to explore the findings of this thesis related to individuals and documents that enabled people from different groups to connect. However, these concepts have not been commonly applied in sustainability transitions research. In addition, the role intermediaries was reviewed to capture people with a role linking different groups. This concept has been mostly applied to a higher scale than this current research. To date there have been limited agricultural sustainability transitions studies and sustainability transitions studies in Aotearoa New Zealand. Empirical research agricultural sustainability initiatives are likely to be shaped by local government, and the nature of involvement may shape how innovative practices are. Furthermore, due to the nature of multiple groups of actors being involved in the initiatives, findings of earlier studies suggest that relationships may be shaped by intermediaries and boundary objects that can have different and changing functions and operate on boundaries between these groups. Finally, an Aotearoa New Zealand based study about aquaculture suggests the negotiation of SLO at a farm level would be likely to be shaped by personal relationships.

The next chapter will describe how data about two case studies was collected and analysed, grounded in the theory presented in this chapter, and also drawing upon literature about social science research methods.

Chapter 3: Research design

3.1 Introduction

The purpose of this chapter is to explain the rationale that guided data collection to answer the research question. It also outlines the practical steps that were taken to collect and analyse the data as well as the ethical considerations that were made.

To research the complex nature of factors shaping agricultural initiatives addressing sustainability locally, a qualitative research approach was taken to answer the research question. The research design consisted of two phases. In the first phase, initiatives promoting sustainable agricultural practices in the selected region were identified. In the second phase, two of these initiatives were selected as case studies. The data collection consisted of interviews and document analysis, and the data was analysed thematically to identify themes.

First, in Section 3.2, the underlying frameworks and key assumptions of qualitative research that underpin this study are outlined, followed by a description of the case study research design in Section 3.3. In Section 3.4, a description of the methods of data collection, semi-structured interviews and document analysis, are presented. Section 3.5 then outlines the process of thematic analysis of the collected data. In Section 3.7 ethical considerations are outlined. Finally, Section 3.8 concludes this chapter by providing a summary and linking it to the next chapter.

3.2 Research approach and perspective

A qualitative research approach and a constructivist perspective was taken in this study, because this research examines a complex system, rather than an isolated problem. It seeks to gain understanding into how initiatives promoting sustainability are shaped. An in depth understanding of peoples' roles and relationships was required to meet this objective. To that end, accounts from people involved in, or with knowledge of, the studied initiatives promoting sustainability were obtained. The nature of the research question and the aim aligns with a constructivist perspective, because this view assumes that meaning is constructed by people and their interactions and interpretations (O'Leary, 2004; Thomas, 2015); in other words, there is not one truth. The present study took an inductive research approach as opposed to a deductive approach. As such, it seeks to derive meaning from data, as opposed to testing existing theory (O'Leary, 2004).

Taking a constructivist perspective also implies acknowledging that the perspective of the researcher, or the positionality (Thomas, 2015), shaped the research. In line with Thomas (2015), the position of the researcher is therefore made explicit in the positionality statement below, to enable the reader to consider the researcher's position related to the research.

"When I started this research, my background was in biology with specialization in ecology. In most of the nature conservation courses in my degree, the people in and around these environments were rarely being taken into consideration. This inspired me to follow several courses outside my program that focused on the relationship between people and the environment, which formed my minor: 'environmental communication and education'. Following my interest in the link between people and environment, I continued to work on projects in my professional career that focused on that link. This interest was also my main motivation to undertake this doctoral study. As an ecologist, I had developed beliefs about agricultural land-use in relation to the environment, but in this research, I was interested to gain insights into the perspectives of agricultural professionals. I grew up in the Netherlands, so when I started, Aotearoa New Zealand agriculture was an unfamiliar research context for me. I did however work on a Massey Dairy Farm for two months prior to my research. At the early stages of my research, I further familiarised myself with the Aotearoa New Zealand and agricultural context by staying at a sheep, beef and deer farm for a week, attended a workshop about Te Tiriti o Waitangi and two local agricultural conferences."

3.3 Comparative case study design

A case study approach was selected to obtain an in-depth understanding of initiatives responding to agricultural sustainability issues. Case studies have been described as holistic enquiries into social situations (like an event, group or policy) in context and examples of a phenomenon of interest (e.g. O'Leary, 2004; Ritchie et al., 2013; Thomas, 2015). The case study approach is an established approach in empirical, qualitative research into studying sustainability transitions in agricultural contexts (e.g. Bui et al., 2016; Ingram, 2015). Following Merriam (1998), and in alignment with a constructivist perspective, a case can be defined as "a thing, a single entity, a unit around which there are boundaries" (Merriam, 1998, p. 27). Compared to other commonly used definitions by Stake (1995) or Yin (1994), this definition can also encompass processes (Yazan, 2015), which fit with the interest in the process of development of the cases. This research consists of two cases to enable the analysis of the cases individually, as well as a cross-case analysis. Each of the cases was first studied individually to gain in depth insights into each case. In the cross-case analysis, cases were then compared to gain higher level insights about the phenomenon of interest, as also argued by Ritchie et al. (2013). The

cases in this research represent examples of initiatives responding to local sustainability issues related to agricultural land-use in the Hawke's Bay region (as outlined in Section 3.4.2).

This research aims to gain insight into how initiatives that are aiming for sustainable pastoral land-use, are being shaped in the context of a transition towards sustainability (as discussed in Chapter 1). Studying initiatives in different regions would lead to differences in the regulatory context of initiatives because of the regional differences in environmental management (which will be discussed further in Chapter 4). A differing regulatory context may shape research outcomes from comparisons between initiatives. The aim of this research was not to compare how these differing regional regulatory contexts shape initiatives. Therefore, the decision was made to carry out the research in a single region in Aotearoa New Zealand.

The Hawke's Bay region was selected for this research. Approximately 50% of the land in Hawke's Bay, is used for pastoral farming (Hawke's Bay Regional Council, 2013) and, in 2011, pastoral farming contributed 12.4% of Hawke's Bay's GDP (Bevin, 2012). The Hawke's Bay Regional Council (HBRC) was involved in multiple multi-actor initiatives aiming for sustainable agricultural land-use across the region (Hawke's Bay Regional Council, 2015a). At the outset, contacts at the HBRC had been established which provided information about initiatives and additional contacts involved in these initiatives. This information and the contacts enabled the identification of key-informants, and ultimately assisted case study selection and data collection in the region. Hence, Hawke's Bay was regarded as a suitable region for this research, because of the relevance of pastoral land use in the region, the involvement of HBRC in multi-actor initiatives aiming for sustainable land use, and the established contacts.

3.4 Two phases

At the outset of this research, no overview of initiatives responding to sustainable land-use issues in Aotearoa New Zealand or Hawke's Bay, specifically, was available. For this purpose, 'sustainability initiative' in this research was defined as: a collective aiming to affect practices related to sustainable agricultural land use. To make a well-informed decision on case study selection and relevant criteria, information was needed about the nature and range of on-going initiatives in the region. The study, therefore, consisted of two phases: a scoping phase and a case study phase (Figure 4). In the scoping phase, an overview of initiatives in Hawke's Bay aiming for sustainable land-use was developed. In the second phase, initially one of the identified initiatives was selected and studied and after preliminary data analysis a second case was selected from these initiatives.

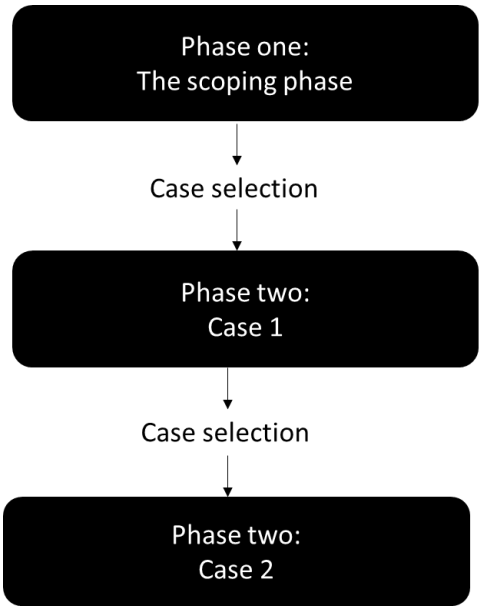

Figure 4: Steps of data collection.

3.4.1 The scoping phase

Aim and rational

The main objective of the scoping phase was to develop an overview of initiatives aiming to promote sustainable pastoral land-use in Hawkes Bay. The overview was developed to facilitate well-informed case study selection for the second phase, by identifying potential initiatives to be studied. The overview also enabled the development of further specifications of selection criteria based on the range of initiatives identified. Secondly, the objective of the interviews during this phase was to gain familiarity with this form of data collection and gain confidence conducting interviews. The information that was collected for each of the initiatives included: which people were involved, the main aims and strategies of the initiatives and, at which scales, initiatives operated. These characteristics were expected to vary between initiatives and be indicative of the nature of initiatives and therefore assist the selection cases for the next phase.

Approach

Current initiatives were identified and characterised by interviewing key-informants and doing desktop research. Three key informants were selected through organisations that have been identified as being actively involved in sustainable land-use in Hawke's Bay. One Massey University researcher and two HBRC staff members were selected. The selected interviewees had all been working in this field for many years and were therefore able to share relevant information about ongoing initiatives,

as well as contacts of other organisations and individuals involved in agricultural sustainability initiatives. They were asked by email, or in person, to participate and were provided with an information sheet about the aim and process of the interview (Appendices 3a and 3d). All individuals who were approached agreed to be interviewed after giving written consent, agreeing to the conditions (as further discussed in Section 3.7) outlined in the information sheet. The key informants were interviewed for 40 minutes to an hour, using semi-structured interviews (Section 3.5.1). Afterwards, interviews were transcribed and summarised. Key informants were also asked to list initiatives, people involved, and initiatives' main aims and approaches. An interview guide was used for this process (Appendix 1). Desktop research involved searching the websites of organisations mentioned by key informants and other organisations known to be involved in pastoral industries or sustainable land use. The websites were searched for additional information about initiatives, and to identify more initiatives. Additionally, more open-ended web searches were conducted using a wide range of search terms such as: community, initiative, group, grassroot, environmental, nature, conservation, water quality, planting day. Data collection was completed when no new information emerged using these strategies. Data obtained in the scoping phase was summarised in a table (Appendix 2). This overview provided the required information to select cases for the second phase.

3.4.2 Case study phase

Aim and rationale

The main aim of the second phase was to gain deeper insights into how initiatives responding to environmental issues related to agricultural land use, were shaped by, a transition towards more sustainable practices. Initially the research drew on 'resilience thinking' to select the first case and collect data for it. This is a theory that like 'transitions theory' is placed by scholars under the sustainability science umbrella. However, upon preliminary analysis of the first case, sustainability transitions was drawn on to inform the second case study and further analysis. As discussed in Chapter 2, sustainability transitions have been defined as multi-actor processes, and changes in roles of actors and relations are at the core of transitions (e.g. Wittmayer et al. 2017). Understanding actors, their roles, and relations, is therefore considered an important aspect of understanding a sustainability transition. These cases focused on gaining an understanding of individuals, (changing) roles and relations that shaped the initiatives over the course of their development.

Case study selection

Among the initiatives identified in the scoping phase there was large variation in characteristics. Initiatives with a more scattered nature (for instance, organisations offering advice or resources to

individual farms across a region) were not considered suitable for this study, because of the focus of this thesis on individuals and their relationships. Initiatives had to be established for at least three years, because of an interest in the development and processes shaping and changing initiatives over time. Initiatives that did not involve farmers were not considered suitable for the purpose of this research, owing to the agricultural focus of this study. The involvement of multiple individuals in the initiatives, including farmers and local government staff, was a pre-requisite in selecting case studies, because of an interest in interactions between individuals typically associated with the regime and niche (as explained in Section 2.2.3). Based on these criteria, an initiative that formed Catchment Management Group (CMG) to protect the local environment was selected as the first case study for the second phase. The CMG was established in 2011. The catchment is located in the north of Hawke's Bay and multiple individuals, including local government agency staff, are involved (figure 5). The group aims to address a sustainability issue, namely, to improve water quality locally. Thus, the CMG met the selection criteria and was selected.

In accordance with Ritchie et al. (2013), it was considered that the characteristics of the second case needed to be sufficiently similar, to be able to draw comparisons between factors of interest between the two cases. The second case study was selected, based on the same criteria as the first case study, after data collection and initial insights from the preliminary analysis of the first case study. Additionally, in line with the inductive approach taken in this research, between the first and second case studies, sustainability transition literature was consulted. Resilience thinking as a theoretical framework was not found helpful to conceptualize the obtained results, due to its normative application in earlier literature. The framework and how it has been operationalized by other scholars was found to be rather prescriptive in nature. In addition, it was found to be not well applicable to the time and spatial scale of the initiatives researched in this research. It was found more useful to study the cases from the perspective an ongoing agricultural sustainability transition is occurring that is being navigated by the initiatives studied. In addition, a key-informant interview was conducted to obtain additional information about a potential case that was eventually selected. Informed by sustainability transitions literature and the preliminary insights about the first case suggested the CMG could be characterised as a community-driven 'niche' initiative supported by government agencies. To contrast with the first case, a second case was sought in which 'regime' actors played a larger role in driving the initiative. A dairy farmer discussion group, also in the north of the Hawke's Bay region, was selected as the second case (figure 5). As in the first case, there was a waterbody with recognised water quality issues to which a group responded, and in which local government agencies played a role. At the time of the interviews, the discussion group consisted of thirteen dairy farmers.

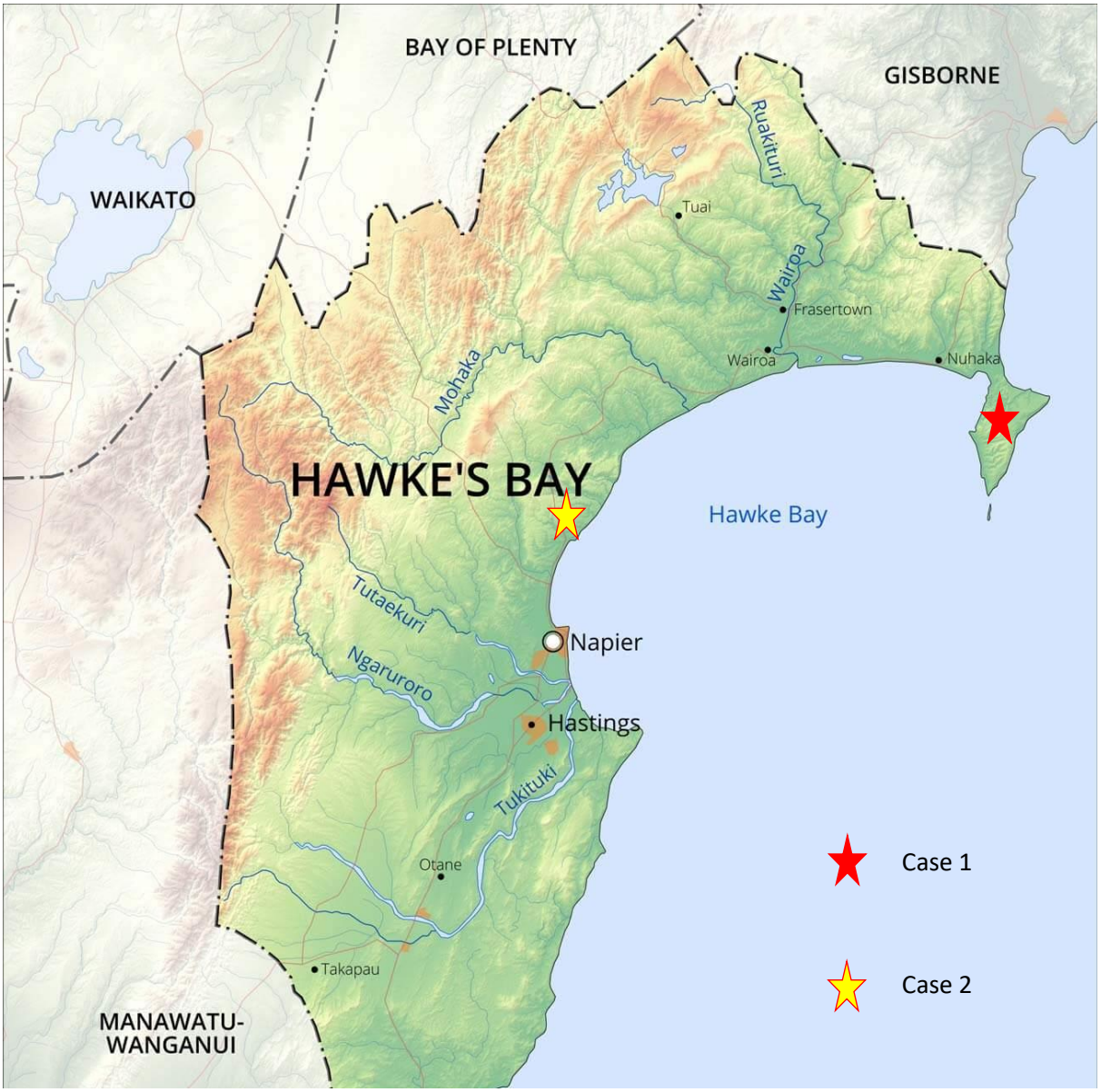

Figure 5: Case study locations. Case 1 is located at the red star in the Whangawehi catchment on the Mahia Peninsula. Case 2 is located around lake Tūtira.

3.5 Data collection methods

Qualitative methods were employed to collect and analyse data. Both semi-structured interviews and document analysis were undertaken to enrich the data, as suggested by Thomas (2013).

3.5.1 Semi structured interviews

Semi-structured interviews were chosen as the main method of data collection in this study because they enable the researcher to gain the in-depth insights and rich data needed for the analysis of the

cases. There is no set order and questions can be formulated freely around themes or topics, allowing for flexibility and clarification (Doody et al., 2013). Therefore, another advantage of collecting data using semi-structured interviews is that they allow for flexibility and provide the opportunity to ask follow-up questions (Thomas, 2013). This enabled the researcher to gain more information about a statement or topic that emerged and was particularly relevant. This flexibility fitted this research, because it enabled the interviewees to elaborate on their interests related to the respective initiative, which gave additional insights about their perspectives.

Interview guides (Appendices 3c, 3f and 3g) were used as a tool to help collect relevant data and maintain consistency in the topics discussed in each interview, while still allowing for flexibility. Based on the research question, prior knowledge about the initiative, and concepts from resilience thinking in the first case, and sustainability transitions literature in the second case, the interview guides were developed in accordance with processes suggested by Ritchie et al. (2013). Themes and topics aimed to encourage interviewees to discuss the initiative, motivations, and changes in relation to the adoption of sustainable agricultural practices, the interviewees' role, and the roles of other individuals in the initiative. A list of these themes and topics with example questions was developed and formed the main part of the interview guides. The guides also outlined the interview process (e.g. introductions, consent, closure) and follow-up questions (e.g. how, why, example). Initially, the interviews were guided more strongly by the example questions. After the first interviews, interview guides were evaluated. Minor adaptations were made to some of the topics to avoid misunderstandings and the order of the interview guide was adjusted to help facilitate a more logical interview flow as recommended by Ritchie et al. (2013).

3.5.2 Document analysis

The interviews were complemented by document analysis (which refers to both document collection and analysis). Document analysis is the use of documents as data. Contrary to interviews, documents contain data that has not been influenced by the researcher and can be used to confirm data, identify topics, provide context, track development and provide data for analysis as highlighted by Bowen (2009) and Ritchie et al. (2013). For these purposes, a wide range of document types can be used as data sources. Documents in this study served to identify topics for the interviews, provide further contextual understanding and in some instances provide further data. Most documents were available online. Other documents were gathered through requests to interviewees and their organisations, for example, environmental court documents and the complete Catchment Management Plan (CMP) for the first initiative. Most of the documents available online were reviewed prior to the interviews, to

inform the interview process. Documents written at different stages of the initiatives gave additional insights into changes in the perspectives and motivations during their development. Available documents from each case study were summarised to become familiar with the data and to inform the selection of documents for further analysis and background information. Multiple newspaper articles relating to each of the initiatives were collected. Websites provided further information about the relevant organisations. Information about the geographical context and history of both catchments was found in reports and journal articles. And, for Case 1, a timeline, plans and agreements of the group were available (Table 1).

Table 1: An overview of documents collected in both case studies.

Document types	Case 1	Case 2
Newspaper articles	27	11
Reports and journal papers	-	7
Court case documents	2	-
Group documents	3	1
Newsletters	8	-
Organisation website	3	3
Example of farm plan	-	2
Initiative website	1	-
Total	**44**	**22**

3.5.3 Interviewee selection and recruitment

The aim was to interview people with different positions and roles in each of the initiatives. An overview of the interviews is presented in Table 2. The objective was to obtain insight into the trajectory, people and context shaping the initiative by studying the perspectives of different groups represented in the initiatives and the perspectives of individuals knowledgeable about the initiatives. A combination of snowball sampling and deliberate selection, based on individuals identified from documents, observations, and the initiatives' websites, were used to select interviewees. An overview of most people involved could be developed based on the information available prior to the field work.

Several members with central roles in the initiatives were first selected to initiate the interviewing process. When interviewees mentioned other individuals or organisations, they were considered to be interviewed (snowball sampling) if they were likely to provide additional insights or new perspectives. In this way, multiple starting points of interviewing were used, combined with purposeful snowballing. This prevented remaining within one person's network and a diversity of perspectives were captured.

Table 2: An overview of interviews conducted in both case studies. In Case 2, two of the industry organisation interviewees were interviewed twice. Two farmer interviews in each case were with both partners, in a single interview.

	Interviewees	**Case 1**	**Case 2**
Interviews	Farmers and foresters	4	6
	Government employees	4	2
	Industry organisation employees	n/a	6 (4 individuals)
	Iwi	5	n/a
	Project manager	1	n/a
	Total	**14**	**14**

In both cases, the initiative involved a group of individuals: a CMG in the first case and a farmer discussion group in the second case. A meeting of each group was attended. During these meetings, the purpose of the research was explained, interest in gaining participation of members was expressed and contact information of potential interviewees was obtained. Interviewees were subsequently invited through emails, phone calls, or in person. The invitations were always followed up by an email with an information sheet and a confirmation of the appointment. The information sheet contained information about the nature of the research and conditions of the interview (see Appendices 3a and 3d). In the first case study, all the individuals who were approached agreed to be interviewed. The coordinator and members were willing to participate and were helpful in providing further contact details and information. Interviews for the first case study were held between November 2015 and January 2016. Recruiting interviewees for the second case study was more challenging, as four out of eleven farmers who were contacted were not willing to participate, and one indicated co-owners did not agree to their participation. The unwillingness to participate was possibly because of the sensitivity of the topic of sustainability locally, and a relatively low attendance at the meeting that was attended

(only five out of thirteen farmers were present). Only one of the farmers that was not at the group meeting, agreed to be interviewed. However, in total, six farmers were interviewed and together with seven interviews of other individuals involved in the initiative, this was considered enough to complete data collection, as no new information emerged about the initiative. Data collection for the second case was completed between October 2016 and June 2017.

The structure of the group in the second case was different from the first case. Rather than consisting of one group of people making decisions together, the case encompassed two subgroups: the farmers involved in the discussion group and external key informants who interacted with the group on a regular basis. In the second case study, farmer interview guides (Appendix 3f) were different from the key-informant interview guides (Appendix 3g), an approach suggested by Ritchie et al. (2013) in the case of different subgroups. The same main topics were covered, but with a slightly different angle. For instance, both groups were asked about changes in relation to the environment, but farmers were asked to describe changes they had made on their farms, while other interviewees were asked about their role in their organisation in relation to the environment and how that had changed over time.

A standardised protocol was followed for each interview, similar to phase 1, and following ethics guidelines, with some minor variations made, depending on circumstances. Interviewees were first contacted by email, phone, or in person, to ask if they would be willing to participate in this research. Detailed information about the research, the interview process, and the interviewee's rights was provided in the information sheet that was attached to the email or sent after a conversation. Locations and times for the interview were agreed. Generally, farmer and iwi interviews took place at the interviewees' homes, while the interviews industry and government employees, took place at their respective workplaces. An effort was made to build rapport with each of the interviewees, as suggested by Ritchie et al. (2013). This was done by letting them choose a time and location comfortable for them, taking time to explain the procedure, taking time to 'meet and greet' before the interview, and by actively listening during the interview. At the start of each interview, the main points on the information sheet were reaffirmed, and a hard copy was given to the interviewee. After all questions about the process were answered, a consent form (Appendices 3b and 3e) was signed by the interviewee. Then, the recorder was switched on and the interview was held. During the interviews, notes were kept in case the recordings failed, and to remember any follow-up questions that could not immediately be asked. At the end of each interview, the interviewees were asked if they had anything to add, if they had suggestions and contacts of other individuals, and if the interview could be followed up if any further questions arose, and the interviewees were thanked for their time.

Interviews took between 25 minutes and nearly five hours, but most interviews were between 45 minutes and a little over an hour. Shorter interviews were held with the two people who had only recently become involved in the initiative and therefore could not comment on some of the questions related to the development of the project. The five-hour interview was held while the interviewee took the researcher on a tour through the catchment on which the first initiative focused, which also added to the contextual understanding of the initiative. Most interviews were with one interviewee but, in five interviews, both partners on a farm were interviewed together. One interview was held via Skype, because the interviewee was based in Hamilton; the others were all conducted in person.

In total, fourteen interviews were held for each case study. Data collection was completed when no relevant, new information emerged, also known as information saturation. Boddy (2016) and Malterud et al. (2016) argue when this occurs, depends on the characteristics of the research. Taking a constructivist approach implied that the research is not aiming to prove or disprove any hypothesis, which would require a large sample size, but rather study a case as an example of a phenomenon. In the interviews, data relevant to answering the research question was collected by a single interviewer, following the interview guides. Interviews were recorded and transcribed verbatim, so that data was captured accurately. The resulting quality of the collected data and additional supporting documents supported the decision to not collect additional data. In both cases, between fifteen and twenty people were strongly involved, and the 14 interviews, of around 50 minutes on average, were conducted for both case studies. Thus, the constructivist nature of the research, the comparative case study approach, the small number of individuals involved in the case study initiatives, the quality and duration of the interviews and the availability of relevant documents, were taken into consideration in the decision that the collected data was sufficient for this research.

3.6 Thematic content analysis

Thematic data analysis was used to analyse the interview transcripts. This is a commonly used method of analysis for qualitative data according to O'Leary (2004). Interviews from the first case study were transcribed by the researcher, and the interviews from the second case by a professional transcriber. The data that was gathered in phase two in both cases was coded and thematically analysed to derive meaning from the text, which is referred to as thematic content analysis (O'Leary, 2004). Coding for both cases followed the same process and was done by iterations of coding and sensitization by theoretical concepts. Coding was data driven (inductive) to derive meaning from text and enable in depth analysis, as also described by O'Leary (2004). Initially, interviews were annotated, identifying themes, sensitised by concepts from literature and the research question. After revisiting relevant

literature, the coding framework was adapted, and interviews were coded accordingly using NVIVO. Additional themes were identified in this iteration and the literature was consulted again. Themes were then further explored in the next iteration, by the development of a table in Excel. In the table, summaries of data under each code were entered, a process that enabled further systematic analysis of findings and helped gain insights for each code (Table 3). As a result of this process, codes differed between the two cases. The analysis was further refined in this process and some codes were split or reorganised and more abstract, higher level themes and patterns emerged. Further insights were drawn, and comparisons and links were identified. The process of writing the results and discussion chapters and a conference paper (Appendix 5), was informed by the emerging themes, but also required revisiting the data as further questions arose or context was needed. This process further deepened the analysis.

Table 3: Example of the data analysis process.

Data	NVIVO coding		Excel analysis
Q If you would have to describe three pivotal points in the history of the group, what would be.. I know there are many more. But if you would have to name three? **MS** I would say the first one was actually [name] standing up to the council and getting some recognition from the council and forming the group in the first place. That was a key step. I think getting a whole lot of significant agencies involved was another one. And probably at the same time was appointing [name] as a coordinator. You know, he has just got a really good skill set. And lots of energy so I guess you would put that as a third point.	initiator role agencies involvement project coordinator role	Turning points in the trajectory of the initiative	All data coded under "trajectory turning points" sorted chronologically could be categorized into 4 distinct phases, with distinct actors, roles and objectives, following clear turning points.

Documents were used in the analysis to establish initiatives' trajectories and provide further information about context and involved organisations. The documents also further illustrated some of the insights that came out of the interviews. For example, in case one, the project manager was frequently cited as being thorough and good at reporting. On the website of the CMG, that is maintained by the project manager, there is a large amount of well-organised information available.

3.7 Ethical considerations

Ethical principles outlined in the "Massey University Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants" were evaluated and principles relevant to this research were considered and approved by the Massey University Human Ethics Committee (Appendix 4). Following these principles, it was made clear to prospective interviewees, through the provision of an information sheet via email and hard copy, that participation was voluntary and interviewees could choose to not answer any question or ask the recorder to be switched off at any time during the

interview. Interviewees were also informed they had the right to withdraw from the research within six months of the interview. The information sheet also provided information about the research, confidentiality, and data treatment (Appendices 3a and 3d). Complete anonymity could not be guaranteed as there were a limited number of people engaged with the selected case studies. This was also outlined to interviewees and included in the information sheet. Prior to the interviews, the content of the information sheet was discussed, and any questions from the interviewees were answered. As such, interviewees were enabled to make an informed decision about the information, and if they were comfortable to participate in this study, under the proposed conditions. Data was handled in accordance with the information sheet and will be destroyed after seven years.

3.8 Conclusion

In summary, a qualitative constructive case study approach was adopted for this research, because of the nature of the research question: How are agricultural initiatives seeking to address local sustainability being shaped in the context of a sustainability transition?

Two case studies were conducted to enable the analysis of individual cases as well as a cross-case analysis. Semi-structured interviews and document analysis followed by thematic analysis of the data were selected as fitting methods for data collection and analysis for answering the research question. University Ethics guidelines were followed throughout the data collection process. The following chapter provides a more detailed description of the research context and trajectories of the selected cases.

Chapter 4: Case study descriptions

4.1 Introduction

The context and characteristics of the two initiatives selected as case studies as outlined in the previous chapter are described in this chapter. The purpose of this chapter is to provide contextual information needed for the interpretation of the findings presented in Chapter 5.

This chapter draws on interviews with key informants and participants of both initiatives, to establish the key characteristics of the initiatives, their development, and the people involved. It also draws on other sources including reports, organisations' websites, and published (grey) literature.

In Section 4.2, the region in which both cases are located is described. Environmental policy and the physical characteristics of the region, play an important role in shaping the cases. Information about organisations and programs that play important roles in the cases are introduced in Section 4.3. Each of the initiatives studied in this thesis and their development are then described in Sections 4.4 and 4.5. The concluding section, Section 4.6, provides a short summary and links this chapter to the next chapter.

4.2 Regional context

Hawke's Bay is a region of about 14,000 km² on the east coast of the North Island of Aotearoa New Zealand (Figure 5). Approximately 50% of the land in Hawke's Bay is used for pastoral farming (Hawke's Bay Regional Council, 2013). In 2012, approximately 11% of Aotearoa New Zealand's sheep and beef cattle were in Hawke's Bay (Statistics New Zealand, 2015). The dairy industry is less prominent in the region with approximately 88,000 dairy cows in Hawke's Bay, which is about 1.4% of the national dairy herd (Statistics New Zealand, 2015). In 2018 a combined total of 12.4% of the region's population was employed in the agricultural, forestry and fishery industries (Statistics New Zealand, 2018).

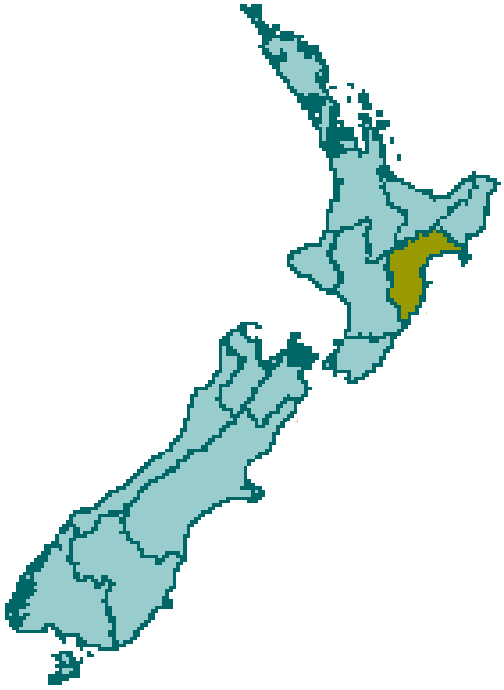

Figure 6: Aotearoa New Zealand, with highlighted in green the Hawke's Bay region.

As for much of Aotearoa New Zealand, Hawke's Bay faces several environmental issues associated with agriculture. Hawke's Bay Regional Council's 'State of the Environment' Report highlights surface water quality along with groundwater levels, riverbank erosion and the management of wetlands as the main environmental issues in the region (Hawke's Bay Regional Council, 2019). Freshwater quality is declining due to nutrients and sediment entering waterways as a result of agricultural activities (Hawke's Bay Regional Council, 2019). Additionally, Hawke's Bay ranks among the regions with the most highly erodible hill country, which is mainly considered a problem when the land is farmed (Ministry for the Environment & Statistics New Zealand, 2015). Large parts of the region have increasingly dry summers and can suffer from severe droughts. Climate change has altered average temperatures and precipitation. The implications for pasture-based agriculture in Hawke's Bay can be partly predicted with the use of models, and adaptation strategies are being developed (Lieffering et al., 2012). Predictions of the effects of climate change suggest that by 2040 there will be a moderate increase in spring pasture growth and reduced autumn and summer growth. Furthermore, increased variability in pasture production is expected, which will require adaptations by farmers (Lieffering et al., 2012). These diverse environmental issues pose major challenges and complications to sustainable land-use in the region.

4.3 Individuals, organisations and affiliations

Several employees of organisations played important roles in each of the cases. These organisations are introduced below. This will provide some context to the nature of involvement of these employees. In addition, several individuals referred to their affiliation with the local maraes and iwi in relation to their involvement with the initiatives, so a brief introduction of these will also be presented. Finally, it was relevant in some instances to identify farmers as well as local inhabitants. This thesis refers to farmers as people farming the land irrespective of ownership. In this thesis, it is considered local inhabitants constitutes anyone living in or near the catchments where each of the cases were located.

4.3.1 Hawkes Bay Regional Council

Hawke's Bay Regional Councils (HBRC) is the regional council that governs the Hawke's Bay region. The region has 166,000 inhabitants (Statistics New Zealand, 2018) and is located along the central east coast of the North Island. Individual councils have different approaches to environmental management. Some regions have predominantly sought to address land use sustainability issues by developing whole farm plans (Manderson et al., 2007). The approach in Hawke's Bay has been more focused on issues at the catchment scale rather than the farm level. Historically, land management policy in Hawke's Bay was implemented through Catchment Boards (Heath, 2017). Since 1989, HBRC has had a Land Management team that implements policy around land management in the region (Heath, 2017). Heath (2017), characterised the approach of the council as working closely together with a small group of successful projects, but argued that this approach had brought about limited change at the regional scale. He stated that this approach has changed radically under the influence of the NPS-FM and land managers are now required to adhere to more rules and regulations which aim to achieve freshwater objectives under the NPS-FM and catchment plans. In 2012, a plan for the implementation of the NPS-FM in Hawke's Bay was published, and in 2015 it was updated following changes to the NPS-FM (Hawke's Bay Regional Council, 2015b). HBRC implemented the NPS-FM through changes to plans, consent processes[1], and non-regulatory approaches (Hawke's Bay Regional Council, 2015b). For example, the proposed 'Plan Change 5', articulates the adaptations and additions required to ensure that existing policies conform to the NPS-FM(Hawke's Bay Regional Council, 2015b). Other plan changes targeted the three largest catchments in the centre of the region individually: Mohaka, Tukituki and Greater Heretaunga/Ahuriri. Development of an East Coast Hill

[1] "Resource consents are the mechanism through which local authorities give approval for activities involving the use of natural and physical resources" (Ministry for the Environment, 2018a).

Country Strategy is planned for 2020 (Hawke's Bay Regional Council, 2015b). Both initiatives studied in this thesis are located outside this central area, where addressing water quality issues was prioritised. The local area in which farmers of the second initiative are based received support from HBRC as part of a 'Hot Spots' project, through which the Council focused on several areas within the region.

4.3.2 Wairoa District Council

In Aotearoa New Zealand, district councils' responsibilities include infrastructure, environmental health and safety, building control, public health inspections and controlling the effects of land use (New Zealand Government, 2002). Close to 9,000 people inhabit the Wairoa district: 66.9% identify themselves as being of Maori decent, compared to 16.5% nationally (Statistics New Zealand, 2018). Agriculture, fisheries, and forestry are the main industries, employing 23.5% of the working people in the district (Statistics New Zealand, 2018). Most of the land is hilly, so the main industries are sheep and beef farming and forestry. Wairoa is characterised as isolated and rural, as there are no major cities in the district (Wairoa District Council, 2020).

4.3.3 Fonterra

Fonterra is Aotearoa New Zealand's largest corporative (Altman, 2017) and is owned by over 10,000 farmers (Fonterra, 2020). Fonterra was founded in 2001 (Fonterra, 2020). Fonterra contributes 25% of Aotearoa New Zealand's total exports, exporting 95% of their milk products (Fonterra, 2020). Jay et al. (2007) observed that, due to a strong export focus, Fonterra's management is influenced by international markets and other global trends. The state of the overseas markets affects the scale and intensity of production, the efficiency of production, and the formation of alliances with other multinational dairy organisations.

Nationally, Fonterra has sought to address calls to address water quality issues through various initiatives including the CSA and the Tiaki program (Cullen et al., 2006; Fonterra, 2020; Jay et al., 2007). The Tiaki program bundles Fonterra's services that seek to support farmers to improve environmental practices through nutrient budgeting, Farm Environment Plans (FEPs) and consent support (Fonterra, 2020). Fonterra employs several 'sustainable dairy advisors' to deliver these services to farmers. FEPs are a tool used at the farm scale to achieve environmental outcomes in Aotearoa New Zealand. These plans have different names depending on their specific focus and who has developed them including Whole Farm Plans, Environmental Farm Plans and Farm Environment Plans. There is a wide range of FEPs, that are each based on different parameters and have different scopes and aims, but they are

generally developed to assist farmers to assess the farms natural resources and adopt tailored environmental practices (Manderson et al., 2007). Recently, Fonterra also started offering FEPs to farmers for free through the Tiaki program and aimed to have 1,000 plans developed in 2018 (Fonterra, 2020). With these plans Fonterra aimed to help farmers achieve adapting to new regulatory limits (Fonterra, 2020).

4.3.4 DairyNZ

DairyNZ was formed in 2007 (DairyNZ, 2020). DairyNZ conducts research, provides business advice to farmers, provides training for non-farming staff in the dairy industry, represents industry interests at the local and national government levels and helps address environmental issues. Each year, DairyNZ holds 1,700 discussion groups annually in which DairyNZ in collaboration with other organisations seek to provide information on best practice to farmers (DairyNZ, 2020). These discussion groups are facilitated by a Consulting Officer according to a standard format with rotating visits of farms of the farmer members, sharing farm statistics and presentations of relevant topics.

4.3.5 The Department of Conservation

The Department of Conservation (DOC), is the government agency in Aotearoa New Zealand that oversees nature conservation and maintaining historic heritage since it was established in 1987 (Department of Conservation, 2020). As such, DOC is involved in work related to the following five objectives: to maintain and restore the diversity of our natural heritage, to protect history and 'bring it to life', to get more people to participate in recreation and conservation and value its benefits, and to gain more from business partnerships" (Department of Conservation, 2020). They seek to achieve these objectives by "working with whānau, hapū, iwi and communities, working in partnership with others, ensuring that caring for nature is seen by New Zealanders as everyone's responsibility, embedding the new structure and strategy, and improving the efficiency and effectiveness of core work programmes" (Department of Conservation, 2016). As such, DOC works with many volunteer organisations across Aotearoa New Zealand. According to their website, they work with about 1,000 of the 4,000 community groups involved in conservation and about 14,000 volunteers work with DOC yearly (Department of Conservation, 2020).

4.3.6 Iwi and marae

An 'iwi' can be characterised as a local Māori tribe in Aotearoa New Zealand. Each iwi is connected to a particular area and these areas do not overlap (Kahui et al., 2014). Within each iwi there are several 'hapū' (sub-tribes). Iwis and hapū were first based on the Waka (canoe) with which ancestors arrived

to Aotearoa New Zealand (Taonui, 2015). Later, as the population grew, groups split of. Maraes are meeting places for hapū which are also connected to a unique area within the boundaries (rohe) of their iwi (Kawharu, 2010). It is the place where people that are linked through their ancestors have celebrations, grieve and discuss (Taonui, 2015). Maraes are led by elected Trustees who are approved by the Māori Land Court (Taonui, 2015).

4.4 Initiative one

The first initiative is in the north of the Hawke's Bay region and is based in a small catchment, the Whangawehi Catchment, on the Mahia Peninsula. The catchment can be characterised as rural and is far from any major urban centre. Two small towns are located close to the catchment. The land is characterised as rolling hill country. Land-use is mixed in the catchment and consists of sheep and beef farms, a forestry section and a nature reserve managed by DOC. Land ownership is diverse. Some of the farms are locally owned, while at least one farm and the forestry section are owned by a remote owner. Each of the people that were identified by interviewees, or in documents, as having played a role shaping the initiative were interviewed.

In 2010, the Wairoa District Council sought to apply for resource consent for a wastewater treatment plant to replace the septic tanks in the small township. Individuals that were members of two local maraes, challenged the plans for the wastewater treatment plant being built in their local area, because they were concerned about wastewater entering the waterways if the system failed.

The initiator sought to mobilize people from her marae, as well as people from neighbouring maraes. Initially she wanted to prevent the construction of the wastewater treatment plant in the local catchment. To do so, an environmental lawsuit against the district council was filed by members of two of the maraes in the area near the wastewater treatment plant. In December 2010, the Environmental Court approved the building of the wastewater treatment plant. But the Environmental Court also ordered regional and district councils to engage with the local community to develop a CMP to ensure water quality would not deteriorate. Regular meetings between members of the two maraes and employees of the regional and district councils were held. A Memorandum of Understanding (MoU) between these parties was negotiated and written, and a CMP developed by a consultancy company.

Initially water quality in the catchment was monitored with funding from both regional and district councils to establish a baseline measure of the water quality in the catchment. This baseline data was intended to serve as a reference to determined when an intervention would be needed in response

to any changes in water quality indicators resulting from defects in the wastewater treatment plant. However, initial insights from these data, identified water quality issues that the people involved at the time were interested in addressing. The group that had formed out of the Māori community members, Wairoa District Council and Hawke's Bay Regional Council, continued regular meetings and a project manager was employed by the regional council. Initially the project manager was appointed for a year and was tasked with further developing the catchment management plan and obtaining funding for the envisioned work to improve water quality.

A CMG was formally established as an incorporated society in 2012. This required the CMG to have a formal structure and an accounting system. An initial CMP was developed by a consultancy company. The CMP was further developed by the end of 2012 facilitated by the project manager, with input from the other people in the CMG. In 2013, external funding was obtained by the project manager. A farmer, a forestry company and DOC signed the MoU in 2013. This coincided with the first physical work in the catchment, which included riparian planting and fencing on the properties of the first farmers to sign the MoU.

The initiative grew in the consecutive years, both in numbers of members and in the range of activities undertaken. At the time of the interviews, all but one of the farmers in the catchment had signed the MoU and work had been done, or was planned, on these properties. A shelter was built along the river as a space to host visitors. In 2015, a part-time community engagement officer was employed. Community planting days and guided walks were organised. The local school had field days focused on the work of the CMG, water quality and biodiversity. A covenanting scheme was in the final stages of development, so that the work that had been carried out through the initiative would be protected, including provisions for when the ownership changed. Based on the collected water quality monitoring data of regional council, employees concluded there was a reduction in faecal contamination since the first measurements in 2011. A blog was started and kept current by the project manager, to keep people informed about the activities and other news from the CMG. Pest control became part of the initiative in recognition of the necessity to protect the planted vegetation and biodiversity more broadly, as the DOC employee highlighted. Over the years, the CMG received media attention (including 27 local newspaper articles and a dedicated episode on a national television program) and the initiative and members have received multiple local and national awards for their efforts to restore and protect the environment.

4.5 Initiative two

The second initiative is also based in a catchment around Lake Tūtira in the north of Hawke's Bay. The land can be characterised as rolling hill country and erosion and sediment loss are major issues in the catchment. Land-use in the area is mixed, including sheep and beef farming, dairy, forestry, and a regional reserve. This area can be characterised as rural. The largest lake in the catchment has been subject to algal blooms since 1957 and has been subject to several restoration and research projects. Since the 1970s there have been efforts in the local area to stop these blooms. In an effort to reduce sediment and nutrients entering the lake, the stream flowing into the lake has been diverted. Additionally, HBRC bought significant areas of land around the lake to plant a pine plantation and reduce the quantity of sediment and nutrients entering the lake.

The second initiative is centred around a dairy farmers discussion group that took action in response to experienced pressures. The dairy farmer discussion group that meets on a monthly basis to discuss topics related to dairy farming. It is unclear when the group was first established, however one farmer had been in the discussion group for over fifteen years. Although thirteen dairy farmers were members of this discussion group, as discussed in Chapter 3, not all were willing to be interviewed. Over time, there had been several moderators. Some of the interviewed farmers had farmed elsewhere before moving to the study area and most had been attending the discussion group since they started dairy farming. In addition, employees of several other organisations, including HBRC, Fonterra and fertiliser companies attended some meetings of the discussion groups. However, not all of these individuals were found to have a role shaping the initiative's response to sustainability issues.

At the time of the interviews, the discussion group was responding to rising pressures they experienced in relation to their environmental practices. Farmers referred to a meeting in the catchment with several people in the area including local inhabitants, HBRC employees and sheep and beef farmers in which the dairy farmers were, in their experience, being singled out as the cause for the local environmental problems. In addition, farmers and industry organisations mentioned mounting pressures of increasingly strict regulations being imposed and a negative image in the media. In response, the discussion group sought to respond to these criticisms by demonstrating their current practices and emphasizing the efforts they had already made to address sustainability issues. All the farmers in the discussion group were having Environmental Farm Plans (EFP's) developed by Fonterra to demonstrate their good practices to people in their local community who were challenging their practices. HBRC employees viewed these plans as an opportunity for dialogue and a saw a

possibility to make the plans more holistic by including several values, like biodiversity, that had been identified in their consultation with the local community.

4.6 Conclusion

This chapter has provided an overview of the context and development of the two initiatives investigated in this research. The first case describes a group that overcame historical frictions and worked together towards common local sustainability goals. The second case describes a group that experienced pressures at multiple levels in relation to sustainability issues linked to farming practices. They responded by communicating their efforts to address those issues to the wider community. Although these initiatives can both be viewed as examples of agricultural initiatives navigating a sustainability transition, the trajectories and characteristics of the cases differ in various ways. These specifics are important for understanding findings of each of the cases. The next chapter will present the findings regarding how each of the initiatives described in this chapter were shaped in the context of the broader sustainability transition currently occurring in Aotearoa New Zealand.

Chapter 5: Results

5.1 Introduction

This chapter presents the findings from the analysis of the data collected for each of the case studies. As explained in Chapter 3, both the interview data and selected documents were analysed thematically. Findings are illustrated with quotes to provide supporting evidence.

The analysis focuses on the two individual initiatives and the role of individuals within each initiative. The roles of individuals, the drivers motivating individuals to participate, the relationships between groups and individuals, and the use of documents emerged as the main factors shaping the initiatives.

Section 5.2 and 5.3, describe the findings of each of the cases in turn. Each section begins by describing how people and processes shaped the initiative. Next the drivers motivating individuals to participate in the initiatives and the sustainability transition more broadly will be explored. Finally, how artefacts shaped each case will be considered.

5.2 Initiative one

This section describes the findings relating to the first initiative, a group that sought to improve water quality and later environmental sustainability more broadly in a small, rural catchment in the north of Hawke's Bay. Chapter 4 describes the trajectory of this initiative in more detail. Here, findings from the analysis of the collected data about how this initiative was shaped are described. The focus is on individuals involved in the initiative.

5.2.1 People and processes shaping the initiative

Several ways people and processes shaped the initiative were identified. Roles of people and processes in the initiative changed over the different stages of the trajectory of the initiative. Table 4 provides an overview of the participants in the first case.

Table 4: Overview of interviewees in the first case and how they are referred to in the text. The second column indicates what groups, relevant to the results, they were also identifying with.

	Individual affiliation	Part of group(s)
Interviewee 1	Initiator	Local community, iwi
Interviewee 2	Other founding member	Local community, iwi
Interviewee 3	DOC employee (community ranger)	Local community
Interviewee 4	Monitoring officer	Local community, iwi
Interviewee 5	Secretary	Local community, iwi
Interviewee 6	Community engagement officer	Iwi
Interviewee 7	Project manager	
Interviewee 8	District council employee (engineering manager)	Local government
Interviewee 9	Farmer	Local community
Interviewee 10	Famer	Local community
Interviewee 11	Regional council employee (field officer)	Local government
Interviewee 12	Farmer	Local community
Interviewee 13	Farmer	Local community
Interviewee 14	Iwi chair	Iwi
Interviewee 15	Forester	

Mobilisation of people to protect the awa

One individual was recognised as the initiator of the catchment management group through her actions, and by inspiring others to take action to protect the local stream. When plans of the wastewater treatment plant were proposed, the initiator sought to engage people in her marae and neighbouring maraes. She raised awareness about the plans for the wastewater treatment plant and sought to inspire people to support the cause. The initiator and another founding member referred to

the proposal to build the wastewater plant and the subsequent consultation process from district council as triggers for them to take action:

> *For many years [the district] council had been trying to find a site to establish a wastewater system. But every site they found, they were actually rejected and blocked. […] But this particular site, when they mentioned setting those ponds in the head waters of the [stream], I knew I had to do something (Interviewee 1).*

> *Council needed to consult with us, meaning tangata whenua, to make sure that their project, what they were trying to achieve with the wastewater system was not going to infect any of our cultural values. That is how we became involved (Interviewee 2).*

The initiator was recognised to have gained support of several local marae to initially oppose the wastewater treatment plant, and as outlined in Chapter 4, the case was taken to the Environmental Court.

Once the court case was decided in favour of the district council, the initiator was recognised by most interviewees, for gathering support for the changed focus from opposing local government plans for the wastewater treatment plant, to working with local government to protect water quality. The outcomes of her actions were recognised by most interviewees as critical in the establishment of the CMG. The DOC employee pointed out:

> *I would say the first step was actually [the initiator] standing up to the council and getting some recognition from the council and forming the group in the first place. That was a key step (Interviewee 3).*

However, her contribution was not undisputed. Some interviewees viewed her role at times as divisive and it was suggested that some people were not involved due to her involvement. For example, the monitoring officer argued that:

> *[The initiator] is not a public-spirited person. She is sort of negative... [She] has the ability to put people's backs up (Interviewee 4).*

It was noted by a few interviewees that motivating and mobilizing marae members to work with regional and district councils was initially challenging and time consuming. She was met with scepticism based on a poor historical relationship and "had to sell them the idea" (Interviewee 5). However, the majority of interviewees acknowledged the initiator's persistence, motivation and sense of duty to protect the local environment. As the community engagement officer explained:

> *And [the initiator] thought, well stuff you, I will show you, and she did, and succeeded. There were a lot of her own that were quite negative towards her and what she was aiming to do (Interviewee 6).*

The significant cultural value of land and water to the initiator as Māori was foundational to her motivations to challenge the location of the proposed waste-water treatment plant. She explained the significance to the local stream that was at risk of being contaminated by the plant:

> *This awa [river] is her [the female chief that her tribe is named after] sacred awa. It may be a little stream, and it is, but it is a big awa to us (Interviewee 1).*

Due to ill health, after the establishment of the group the initiators involvement diminished. This was considered by several interviewees to have enabled a gradual change in focus. However, most interviewees identified the original ideas and focus of improving or maintaining water quality of the stream as the main aim of the CMG. It was argued by multiple interviewees that the founding members of the CMG sought to maintain this focus, as the project manager pointed out:

> *The focus is still strong, it is water and sometime when we develop [other foci], our historical members just remind us that our focus needs to remain on the water and the river (Interviewee 7).*

While the group's agenda, particularly around the scope of the initiative was seen to be changing, the legacy and resistance to moving away from the original ideas by founding members was recognised. The group needed to overcome his resistance to make changes, as illustrated by the following quote from the district council employee:

> *There was a bit of resistance to [expanding the scope of the initiative beyond the catchment], from some of the older girls here, saying no this is just about the Whangawehi catchment. But you can't sort of rush over that, because it was their marae and their passion that got it to where it was. So, there is a bit of a gentle stepping over that (Interviewee 8).*

Other founding members including representatives of the two maraes, employees of regional and district council, and the project manager also sought to gain more group members. Once the CMG was established, a CMP was developed and funding was obtained, members of the CMG encouraged farmers and a forester managing land in the catchment to get involved in the group. This was done by raising awareness about the CMG and inviting them to participate. The district council employee explained:

> *We started off inviting [farmers] to meetings, by sending them information, by talking to them, getting them to participate in the group and showing them what*

> *they were doing. Getting the community on board so they were talking to [farmers]. One by one most of [the farmers] have come on board (Interviewee 8).*

To carry out the proposed riparian planting and other work to improve water quality, it was considered necessary for these farmers and foresters to become involved in the initiative. One of the group members expressed the importance of landowners for the implementation of the CMP:

> *But the landowners were the key [..]. The river flows through their private property. And while we have that concern out here, we are outside, that is not our land, they have to agree to this (Interviewee 5).*

In particular, the first farmers to sign the MoU and get work done as part of the CMG, were considered critical for the initial success of the CMG that later inspired others to join, in turn mobilizing additional farmers. The district council employee reflected on the importance of this, because in his opinion, farmers were worried about losing autonomy over their land:

> *Getting the landowners to sign up and buy in was quite challenging. You know, because they would look at the group and basically feel that we were just trying to take over a section of their farm (Interviewee 8).*

Interviewees, including the first farmers themselves, commented on the environmental mindset of the first farmers who became members of the CMG. Some interviewees saw their decision to have work done on the farm through the CMG as risky. One of the founding members and the secretary explained the involvement of the first farmers set an example and how their prior environmental attitudes informed their decision to become involved:

> *[The first farmer] was the trial I guess landowner through the process. So obviously we started doing his plot at first. And obviously, I guess landowners are more practical, they want to see on the ground how it will operate and what could, how it affects their bottom line, how it affects their business, how it affects them. Taking that first step by [the first farmer] was a big risk, but he kind of knew, because he had previously done some of the [environmental] work (Interviewee 2).*

> *[The first farmers] were already doing conservation work, even before the catchment [group] came into existence. They are passionate about the land. They are passionate about what they do on the land, protecting it, and to pass it on to the next generation (Interviewee 5).*

The first farmers themselves did not mention viewing getting involved as a risk. Instead, they indicated that they viewed obtaining funding through the CMG as an opportunity for them to do additional environmental works on their farm that they considered they would not otherwise have been able to afford:

> *But we wouldn't have imagined that we had done all this [environmental work] in 15 years [..]. We knew that we wanted to fence the river out, and fence our back hill country, but the financial constraints of doing so, we couldn't (Interviewee 9).*

Initially people were mobilised to support resistance against plans of the local government, while later this process focused more on getting people involved to support the CMG in their project to improve water quality and sustainability more broadly.

The development and management of processes and structures shaping the initiative

In the early stages of establishing the CMG, regional and district council employees led processes shaping the structure of the CMG. The formalization of the CMG, writing the MoU and the CMP and the organisation of monthly meetings were processes put in place by these individuals. The MoU and CMP were viewed by most of the interviewees as having been critical in shaping relationships and ultimately the CMG, as further explored in Subsections 5.2.3 and 5.2.4. One of the interviewed farmers described how "in the early stages of the formation of the group, the role of these agencies was quite crucial in establishing a structure (Interviewee 10)".

Once the structure and processes were considered established, the majority of interviewees, including government employees, highlighted that the roles played by regional and district council employees changed. The position of chair was passed on to a farmer member. Regional and district council employees felt they had fulfilled what they viewed as their role: guiding processes to run the group. This is illustrated by the following quotes from regional and district council employees in the group:

> *I suppose, moving from bureaucrat led, to on the ground led. […] But to be handed over to the locals and say 'hey look, we have done all we need to do, you guys can handle it now' (Interviewee 11).*

> *Everyone was watching me, and so they were learning what they needed to do what needed to be done to carry on forward. So, I suppose I was some role model (Interviewee 8).*

The group was expected to run largely independently from local government support after the initial stages, with some on-going support like monitoring still provided. A district council employee explained:

> *And we are at the point now where [district council] is a partner. We [district council] also contribute the monitoring information, so that is always in place (Interviewee 8).*

The project manager had an important role liaising between people involved in the CMG and between the CMG and external organisations. Interviewees spoke highly of the project manager, referring to his social and management skills as well as his passion and commitment to the project. A farmer in the CMG highlighted:

> *[The project manager] is a great people person and I think getting that right person and at the top level with the right people skills and the right drive. And he has managed to get quite a lot of support from the community (Interviewee 12).*

The project manager's independence and lack of agenda or affiliations also emerged from participant interviews as an attribute valued and one that was considered to have contributed to this ability in his job. Even though he was not a New Zealander, he was not viewed as an outsider, with one interviewee remarking "*you would say [the project manager] was born and bred [locally]*" (Interviewee 10).

However, his independence was considered by some interviewees as enabling him to engage with all the different parties involved in the CMG and gain support for plans. A DOC employee involved in the CMG expressed the following view in relation to the project manager's ability to liaise between groups in the CMG:

> *And in some ways that has been actually quite good, having someone like [the project manager] who being a Frenchmen, he has got no particular affiliation in any way, so he has been able to tread a pretty neat pathway (Interviewee 3).*

The project manager and chair were seen to fulfil process and project management roles in the initiative. The employee of regional council in the initiative pointed out:

> *The process is that quite often [the project manager] will come up with a great idea, and he will be thinking through, work out some options, prices, and then usually he will foresee the kind of discussions that is going to take place, not always, you can't possibly foresee everything. But you know, we have chairmanship, so we keep to the point where there is a consensus usually (Interviewee 11).*

Different types of knowledge informing decisions in the CMG

Individuals from regional council, district council, DOC and the monitoring officer were recognised for their expertise informing decisions of the CMG. The monitoring officer was acknowledged as an expert for his work conducting measurements and undertaking 'cultural health indexing' (a widely recognised method to monitor the environment that incorporates Māori perspectives and values). The monitoring officer pointed out how this differs from other monitoring programs:

> *They [other monitoring programs] are not worried about eels living in [the awa]. It does not matter. But with the cultural health indexing you are supposed to consider*

> *whether there are eels in there, crayfish, what animals come and what birds are there (Interviewee 4).*

The monitoring officer described various activities as part of his role including presenting information to the CMG, and explained taking his audience into consideration:

> *I email it to [the project manager] and [the secretary], and then present a verbal report at a meeting. Many of the people that are at the meetings are used to listening, but they are not used to reading and analysing (Interviewee 4).*

Farmers in the group developed plans together with regional council employees and the project manager to plan how precisely to implement the measures proposed in the CMP on their land. This included advice on the type of fences that were used, the tree species that would be planted and where they would be planted. The regional council employee highlighted considerations for advising about tree species:

> *[The regional council employees and farmers] try to find species that deal with water quality, that deal with soil erosion, that do not negatively impact the farm business, and hopefully even add more value through other means like flowering for bees, those sort of extras. Or timber you know (Interviewee 12).*

One of the farmers in the CMG expressed their trust in the expertise of regional council employee in providing this advice:

> *[Regional council] obviously know what trees work and how to plant them (Interviewee 13).*

This section illustrates importance was given by several interviewees to multiple types of knowledge informing CMG decisions.

Funding enabling activities and shaping actions

Funding shaped the CMG through several processes. It shaped the CMG by subsidising farm work. It also ensured the continuation of the initiative through ongoing services and maintenance. Finally, funding shaped the initiative through the need to continue to find new sources of resources for the continuation into the future.

Funding shaped the CMG through the direct impact of the availability of funds on the initiative. The project manager highlighted that the group had raised “so far, one point five million [dollars]” (Interviewee 7). Farmers argued that they could do more and better environmental work as a result of this available funding, as one farmer highlighted:

> *With funding you can do things a lot better. If it was just us farmers putting a fence across the stream, we would put in a little culvert, because it is cheaper. Whereas if you got funding, you can do it properly, you can put in a big culvert. Because when we do something, we like to do it properly, so it will last forever for our next generation (Interviewee 13).*

The project managers position was jointly funded by regional and district council. In turn, he was responsible for applying for funding for the CMG. According some interviewees, other external funders would not usually fund employing a person. Most interviewees highlighted they found it difficult to obtain the funding to continue to employ the project manager. The project manager considered the reason funding bodies were reluctant to pay for his position was because they did not value it:

> *And the hardest thing is, it is pretty difficult to fund a coordinator's position, [funders] don't value it (Interviewee 7).*

A DOC employee involved in the CMG described the types of outputs DOC looked for when they funded initiatives:

> *We want to see the funding spent in a practical way. So, we want to see plans put in a box and then we can tick a box when it is finished (Interviewee 3).*

The DOC employee listed things that had been funded by DOC:

> *A fence or a tree, fence maintenance, tree maintenance. We contributed to a cultural survey (Interviewee 3).*

Some of the fencing and planting were funded jointly by DOC, district, and regional council and other works were funded by external funders.

In addition to the direct impacts of funds, funding also shaped the initiative through the need to comply with the funders' requirements. This was linked to reporting and application processes and the requirement to protect funders' investments in the long term. Interviewees highlighted ways in which funders sought to ensure funds were spent in line with their requirements, thereby shaping the initiative. When discussing covenant schemes that were being developed with the farmers in the CMG, one farmer explained that this was being done because some funders required this:

> *Funders are requiring that land is protected. They want to protect their investment (Interviewee 10).*

Another example of how funding shaped the CMG, was that at the time of the interviews, access to funding had diminished and most interviewees were questioning the viability of the initiative and its ability to continue its work into the future. Some funders had funded the CMG multiple times and were looking for new projects. This was pointed out by the regional council employee:

> *What is happening unfortunately now, is that their bosses now go "hang on, you have funded this twice, that is enough" (Interviewee 11).*

The DOC employee also raised concerns about how reduced access to funding could affect the work already carried out by the CMG:

> *The funding stream is starting to diminish. So, that means we can't pay [the community engagement officer]. The projects, the trees that we have planted don't get maintained. The fences that we put in there don't get maintained. So, coming into the future those are some of the big questions that need answering just around the CMG (Interviewee 3).*

However, the interviewee, who conducted the monitoring, expressed some criticism that the group was dependent on external funders. He argued that local residents should contribute:

> *All this aroha [love], but a bit of koha [donation] would be nice too. You know, talk is cheap, but put your hand in your pocket. Let's see the colour of your money, put your money where your mouth is. And that is where this is so much funded and supported by government groups, but not that much from the local population (Interviewee 4).*

Concerns about funding led the group to seek alternative ways to secure funds to support the continuation of the CMG. Ideas included crowd funding and developing a local brand to be able to sell products at a higher price. The project manager explained to the idea of generating additional income to compensate for the cost of more sustainable management by creating a brand:

> *If you make more money with less stock, you kind of release the pressure on the sensitive area, so we have always looked for ways of creating a brand (Interviewee 7).*

Interviewees also indicated that the reduction in funding had led the group to consider alternative futures such as expanding the initiative beyond the catchment to assist in attracting additional funding or reducing activities to focus on maintaining earlier work rather than starting new efforts.

5.2.2 Drivers of people to support the initiative

The commitment of people involved in and supporting the initiative was acknowledged as having generated momentum. In the previous section roles shaping the initiative were discussed, but support did not always involve explicit roles shaping the initiative. Attendance, involvement, and cooperation of a core group of people making up the committee steering the initiative was recognised by many interviewed to have been critical for maintaining momentum. The CMG as the district council employee expressed:

> *Well, having our committee out there, having that core group […] just keeps the wheels turning, keeps thinking of new initiatives and projects and how they expand our project. That's what really provides the momentum and incentivises the group and keeps it together, and those monthly meetings (Interviewee 8).*

The willingness of people involved in the CMG to support the initiative was viewed by many interviewees as genuine irrespective of whether involvement was by choice or associated with a job in another an organisation. This genuine commitment to the initiative of participants was argued by interviewees to have reinforced the authenticity of relations between those involved in the CMG. An example was provided by the secretary who highlighted the exceptional commitment of a HBRC employee:

> *When we were in the early stages [the HBRC employee that was involved at the time] travelled up from Napier every month to our meetings, rain, hail or snow, he never missed one meeting (Interviewee 5).*

One of the employees of the district council expressed that unlike others, who volunteered time to fulfil roles in the CMG, they were being paid as their involvement was part of their job. The interviewed district council employee felt he had additional responsibility to do his job well:

> *The luxury that people from the agencies have got is, we are paid, and so and I acknowledge that my responsibility is to commit to [the work] and ensure it is successful (Interviewee 8).*

Personal motivations and connections also inspired some interviewees to be involved. Several interviewees expressed feeling a responsibility and a drive to do something about environmental degradation, seeing it as part of something bigger. For example, the secretary expressed:

> *There are environmental problems everywhere around the world. And even though we are a little place. You start small in your own back yard, and can be an example that could develop into bigger things (Interviewee 5).*

Most of the interviewed members who lived in or close to the catchment referred to their heritage or history in the area in relation to their connection to the land in the catchment. They articulated that this heritage inspired a sense of responsibility for the environment and their involvement in the CMG. All interviewees that identified as Māori referred to their connection to the land as *tangata whenua*, as the following quotes by the secretary of the CMG and iwi chair illustrate:

> *I am Māori, culturally sensitive to the environment, as you will probably find most indigenous races are. An automatic connection to the land, it is something we are raised with (Interviewee 5).*

> *I like to think I am a semi-conservationist. You know, when I say semi, it is because I don't actually physically do it, but I have that leaning. Because, most Māori people do (Interviewee 14).*

Local government and DOC employees were involved through their occupation, however they also expressed personal connections to the locality. They cited environmental values, localness, and an appreciation for the place more broadly. For example, a DOC and district council employee highlighted what their personal connection to the area meant for them:

> *I am local, I have become more involved than my predecessor who was based in Napier. […] I have got a responsibility to represent DOC at the committee, they don't want to see a passing parade of people from DOC just turning up to a meeting, listening and then going away. You need to actually be more involved than that (Interviewee 3).*

> *I take great pleasure in going there in Christmas time and going for a walk with one of my boys through the Whangawehi Catchment (Interviewee 8).*

Farmers interviewed referred to their personal connections to the land in the catchment and a sense of responsibility for the land they managed as motivations to be involved in the initiative. The identity of the first farmers that got involved in the CMG were viewed as an example. Their identity was important, as this couple were respected in the community and identified as environmentally minded. Farmers that owned the land they farmed, indicated investing in environmental management for future generations and the environment. Two farmer couples interviewed referred to a long family history with the land they were farming. They indicated that this connection inspired them to manage their land sustainably and get involved in the CMG, as one of them expressed:

> *Not just leave it [the issues] for the next generation, it is a [multi] generational farm, so it will be passed onto the next generation. If we can do our bit for Mother Nature and the farm, pretty cool (Interviewee 13).*

On the other hand, some interviewees did not express strong local connections to the land. A farmer and a forester that were interviewed, managed land for others and did not have a family history locally. These managers emphasised that major decisions had to be approved by the (remote) owners. One of them highlighted:

> *At the end of the day, the forest owners have to be happy with what we are doing [with the forest], and what costs are imposed upon [the company] and what expectations there are [from the CMG] (Interviewee 15).*

In both instances, these managers characterised the remote international owners as environmentally minded and supportive of the CMG, as one of them pointed out:

> *The owners of our forest out there, they are environmentally minded, so they are retiring [taking out of production] areas. They think long term. And they see a forest with multiple uses. It is not just a financial return that they are looking at (Interviewee 15).*

In sum, drivers of people to be involved in the CMG were diverse and included different kinds of local connections, pro-environmental attitudes and financial reasons.

5.2.3 Changed relationships enabling the initiative

Most interviewees highlighted that the relationship between regional and district council, and members of the local community prior to the initiative was strained and lacking in trust. Interviewees identified examples of opposing positions on land use and land management in the local area as having shaped these prior relationships with regional and district councils and the local Māori community. The initiator shared a number of examples:

> *They [district council] refused to maintain our road. [..] I was saying to them, maintain our road, and they said, well it is private land. And I said, well if you don't maintain it, I am going to fence it off and they laughed at me. So, I fenced it off (Interviewee 1).*

> *They [district council] were going to set up an estuarine reserve with toilets and camping facilities on it. But in the meantime, until they had actually put the facilities in place, they were allowing campers to actually camp on our ancient pa [settlement] and dig toilet holes in it and rubbish holes (Interviewee 1).*

The monitoring officer, who is also a member of one of the local maraes, highlighted an example in which the regional council did not respond to the marae's calls to assistance but acted when the issue was raised by tourists:

> *When that log jam [wood from forestry blocking the stream] happened. How long did it take for regional council to get in there? Months, didn't it? We had the prospect of some tourist complaining […] and the council sends some diggers and trucks to remove the logs off the beach (Interviewee 4).*

The involvement of the district council in the initiative was identified by some of the interviewees as being required rather than done by choice. The DOC employee suggested that:

> *[District council] had to, they were forced to have an engagement. And they have, part of their resource consent for the wastewater scheme was that they had to be involved in the CMG (Interviewee 3).*

The district council employee confirmed the view held by some interviews that there was one requirement of district council to be involved, however also added that they sought to go beyond these requirements to work with tangata whenua:

> *[District council] needed to be able to work effectively with tangata whenua for infrastructural reasons, but tangata whenua had big concerns with any effects on their awa and we recognised that and we actually went a step further to say ok, we will form [the CMG] that monitors the impact of the waste water scheme on the awa, but we will also, another task of that group would be to enhance the health of the awa (Interviewee 8).*

On the other hand, a few of the early community members of the CMG viewed the outcome of the environmental court case as a license for the local government to implement their plan for the waste-water treatment plant, without further engagement. One of the community members expressed:

> *In reality, when the environmental court approves anything the councils really don't have to come and talk to [tangata whenua] (Interviewee 5).*

However, it was recognised by most interviewees, including government employees and local inhabitants, that the CMG had built trust between the local government employee and the Māori community members involved in the initiative. The initiator described the current relationship:

> *[DOC, regional and district council] treat us as equals. And the beauty is, they will say, well what do you think? What do you want? And I like that, because they are considering us, the tangata whenua (Interviewee 1).*

The DOC employee highlighted the importance and willingness of people in the group of finding middle ground in the process of working together:

> *It is all about [the people in the CMG] talking and everyone being able to give up a little bit, but also accept that there is a group think mentality and lets just get on with it. Rather than saying that is the only way you can do it and unless you do it my way or our way, we are not on board this process (Interviewee 3).*

Most interviewees indicated that although it was not always easy, the relationship that developed between community members and district council employees enabled them to work together. These relationships were considered an important achievement of the initiative by several interviewees including community members and government employees. The district council employee involved in the CMG described his experience:

> *[District] council and regional council and DOC and landowners and tangata whenua, even though everyone had slightly different backgrounds, because we were all working for the common good, we developed a lot of common ground. I am not saying, all the meetings were a bed of roses, there was a lot of honest discussion, meetings that start at 1 and sometimes they would not finish until half past three. But we would always have a cup of tea and a sandwich afterwards (Interviewee 8).*

He went on to describe how his relationship with others had changed through involvement in the initiative, suggesting the impact went beyond just the initiative and had improved the relationship between district council and tangata whenua more broadly:

> *Whether I am talking about roading or whatever I am discussing with them, we have developed that level of trust, which allows council to engage with tangata whenua and stakeholders out at Mahia that was much harder before that (Interviewee 8).*

The initiator expressed that she felt that the initiative and the nature of involvement and engagement with local Māori had empowered and motivated local Māori (including herself) to actively manage the natural resources in the catchment. She argued this occurred because their voice and connection was being formally acknowledged. She explained:

> *Our relationship and our relationship also with those landowners […] has given our people [Māori] passion to actually manage and care for our sacred awa, and our freshwater fisheries and our marine. We are protecting our freshwater fisheries and our marine fisheries, the catchment from erosion and all that (Interviewee 1).*

Trust between people involved was attributed, by most interviewees, to the way people with different interests were enabled to work together enabling them to learn about each other. As expressed by the HBRC employee:

> *People have gotten to know each other a lot better, a lot more confidence in each other. A lot more trust (Interviewee 11).*

In addition to the role of people in shaping relationships in the CMG, the process of building trust and changing relations between local government and the local community was considered to have been aided by the MoU and CMP. The role of these plans and agreements are further discussed in the following subsection.

5.2.4 Plans and agreements shaping the initiative

Two documents emerged to have played key roles shaping the CMG: the MoU, which set rules of engagement, and the CMP, which articulated and specified plans.

Most interviewees acknowledged the changed relationship with local government and the local community and the significance in this of the MoU and formation of the CMG. Many interviewees attributed the success of the project to the MoU. A reason expressed by many interviewees was that there was trust in the MoU as an agreement on responsibilities between the people involved. This included responsibility related to potential issues with the wastewater treatment plant, which local inhabitants perceived as a significant risk to the river. One farmer emphasised that "there is nothing stronger than the MoU that we have with the district council that ensures that they meet their obligations to make everything safe, it is monitored, so it is robust" (Interviewee 10).

The MoU articulates the intent of signatories to engage in a respectful decision-making process striving for mutually beneficial outcomes in the catchment. The MoU states that:

> *The parties wish to engage in a respectful, meaningful, balanced, enduring and mutually beneficial decision-making process, and as a result the parties wish to record their understandings by this Memorandum (p.3)*

Besides the content of the agreement, interviewees argued that their involvement in the MoU showed a willingness by signatories to collaborate and compromise. As such, it was viewed as a turning point in the relationships between local government and the local inhabitants. One of the farmers illustrated the significance of the MoU when asked about turning points in the trajectory of the CMG:

> *The memorandum of understanding, most people signing that, because that shows commitment and willingness to work together and move forward (Interviewee 10).*

Most interviewees believed that the MoU demonstrated a willingness to engage between the different parties that were engaged at the time the MoU was written (members of two maraes and employees of regional and district council). A farmer and the district council employee explained:

> *Obviously, the memorandum of understanding, most people [in the catchment and employees of involved organisations] signing that, because that shows commitment and willingness to work together and move forward really (Interviewee 10).*

> *This memorandum of understanding was just acknowledging everybody's interest and a wish to work together really (Interviewee 7).*

Some people that were approached did not sign the MoU. People who did not want to be involved were said by several interviewees to still associate the group with the wastewater treatment plant that they were opposed to. As one community member stated when asked about why people opposed the group that "a lot [of community members] did not want a sewage system in place" (Interviewee 5).

The local iwi as an entity did not sign the MoU. The iwi chair argued that this was due to a number of reasons including the association of the CMG with the waste-water treatment plant, and previous experiences with council where council had failed to genuinely work in partnership with iwi. He explained:

> *The first reason was, how the Whangawehi Catchment [management group] came to be. That the iwi did not want part of that. They never wanted the sewage system. That is what initiated [the initiative]. [..] Secondly, just when I started [as iwi chair], they started talking about wanting to grow the [name] Catchment [meaning extending the initiative beyond the catchment border] and the position from our iwi is we don't want that. […] If we are going to be part of a group, we will lead a group. [..] For too long that is more a nice little tick box, to have the iwi endorsing stuff (Interviewee 14).*

The iwi also did not sign the MoU because not all maraes in the area were supportive of the engagement with local government. The initiator expressed disappointment with this outcome:

> *That really hurt me, because you know, the iwi should have been the ones trying to prevent any contamination (Interviewee 1).*

Interviewees who were part of the local community felt the MoU, like a contract, enabled them to hold district council and regional council accountable to their commitments. As such, they felt the

MoU protected the river from potential negative environmental impacts of the waste-water treatment plant. The secretary and one of the founding members explained:

> *It is a give and take. And the idea is that now with that MoU, again heaven forbid [a leak of the wastewater treatment plan] should happen, if it should happen, the whole system gets shut down (Interviewee 5).*

> *Yeah, we wanted to make sure that council were aware that we were watching them (Interviewee 2).*

The content of the MoU addresses accountability of regional and district councils and future engagement in relation to the management of the wastewater treatment plant and water quality monitoring conducted as part of it. The development of a CMP was also part of the commitments included in the MoU as is illustrated in the following statement in the MoU:

> *In furtherance of a desire of the parties to better manage natural, physical, cultural and spiritual resources within the rohe [boundaries], [name district] district council and Hawke's Bay Regional Council will engage and consult with Tangata Whenua and Landowners for the development of a Catchment Management Plan for the Whangawehi Stream. (p. 4)*

Interviewees cited the MoU as having on-going significance. After the initial signing the MoU became the way for people to become part of the CMG, aligning themselves with its intentions. People that subsequently joined the CMG were asked to sign the MoU in a signing ceremony, acknowledging the established relationships and goals.

The CMP also emerged as central in shaping the CMG. After monitoring water quality to establish baseline data, the members of the CMG decided to seek to improve water quality in the catchment. The CMP solidified plans and stipulated responsibilities of people. The main objective formulated in the CMP is:

> *To maintain or improve the different cultural, ecological, recreational and economic values of the Whangawehi* catchment *identified by the community, in short, maintain or improve a healthy awa [river] (p. 3).*

The development of a CMP was viewed by most interviewees as a shift from a preventative approach, to a proactive approach, as one member of the founding members pointed out:

> *We moved from preventive and reactive, to more proactive stuff. Which was not our intent, you know what was our intent was not to improve the water quality. It was more to make sure that we knew our baseline data (Interviewee 2).*

The plan was seen to ensure continuation of activities organised by the CMG. The CMP was written by a consultancy company and stage two, with more detailed plans, by the project manager. The specific details were further developed in shorter term plans included in the CMP, as explained by the interviewed district council employee and the project manager:

> *Maintaining a working group that worked towards objectives, developing objectives, annual objectives, three year plans, and long term plans for the group (Interviewee 8).*

> *So, basically in in the catchment management plan, we got the situation in 2013 we had all our short term, medium term goals. […] We put in place all our activities, that is how our catchment management plan is built (Interviewee 7).*

The CMP had two main functions shaping the CMG: formalising the shift from preventative to proactive approaches to maintaining water quality in the catchment and ensuring the continuation of the CMG by planning activities for the short and longer term.

In summary, several changing roles were identified as shaping this initiative. Personal attributes were found to shape roles that were played by individuals. In addition, changed relationships were found to have been the foundation on which the initiative was built. The MoU and CMP also played a key role in establishing these relationships and maintaining momentum.

5.3 Initiative two

This section explores the second initiative researched in this thesis. As described in Chapter 4, this initiative consisted of a dairy farmer discussion group in the north of Hawke's Bay. The group responded to pressures to change their practices by using farm plans as a communication tool. Based on the analysis of the interviews and documents relevant to the initiative, this section presents the findings on how this initiative was shaped.

5.3.1 Processes and people shaping the initiative

As in the first initiative, several processes, people, and organisations shaped the trajectory of the second initiative. The facilitation of the dairy farming discussion group by Dairy NZ led to the formation of the initiative to respond to pressures to adopt more sustainable practices. The provision of the farm plans by Fonterra then was viewed as an opportunity to respond to these pressures by communicating current practices. Table 5 provides an overview of the interviewees quoted in this section and their roles within the initiative.

Table 5: Overview of interviewees and how they are referred to in the text in the second initiative

	Individual identity in relation to the initiative
Interviewee 16	Dairy NZ employee (consulting officer)
Interviewee 17	Fonterra employee (sustainable dairy advisor)
Interviewee 18	Dairy NZ employee (catchment engagement leader)
Interviewee 19	Farmer
Interviewee 20	Farmer
Interviewee 21	Fonterra employee (programme manager)
Interviewee 22	Farmer
Interviewee 23	Farmer
Interviewee 24	Regional council employee (catchment manager)
Interviewee 25	Farmer
Interviewee 26	Farmer
Interviewee 27	Regional council employee (project manager)

Facilitation shaping the group

A key actor within this initiative was the Dairy NZ consulting officer. Part of his role for Dairy NZ was to facilitate discussions and exchange between different group members and visiting representatives of companies. The consulting officer explained:

> *It depends, like I invite different people depending on the different topics, but it's an open forum and [discussion group members] all have access to the website or a text if they're already on the database, to attend (Interviewee 16).*

For example, the facilitation of the discussion group provided a platform for the Fonterra employee to explain FEPs that were ultimately used to respond to pressures experienced by members of the discussion group, as expressed by the Fonterra employee:

> *I guess the discussion group piece came about for Tūtira because these guys wanted [farm plans] off their own back and it was a proactive thing. So, I just happened to be at the discussion group that day when it came up, so that's how [the discussion group getting FEPs] started (Interviewee 17).*

According to the consulting officer, encouraging farmers in the group to engage and share their experiences for others to learn from and presenting additional information to support them were important parts of his role:

> *That's my job really is to try and get [discussion group members] to participate because farmers by nature are quite reserved and could stay quite quiet. So it's about sharing what's happening on the different farms, what's working, what's not, as well as taking a bit of science or something that we can back up and give them some ammunition and just some good stories, you know, this could be worth trying (Interviewee 16).*

Dairy NZ employees explained that one of the roles of Dairy NZ is to help farmers comply with regulation. They explained that Dairy NZ established connections with local councils and that it coordinates between industry organisations, so that these organisations provide consistent advice and tools that are tailored to local regulation. For example, two Dairy NZ employees explained:

> *[Dairy NZ are] working closely with the regional councils, to understand what's required. […] Then internally DairyNZ with our consultants, consulting officers and then externally with our industry stakeholders with Fed Farmers, Fonterra, Open Country, Ravensdown, Ballance [industry organisations and fertilizer companies], so all of those groups have farmer facing [employees]. A lot of what I do is networking between those parties to make sure that we're consistent [in advice to farmers] (Interviewee 18).*

> *Quite often we would front foot that and take information [from council] to the farmers. […] Initially, it's driven from a council and we will go and inform the farmers and show them the tools that are available to mitigate* (Interviewee 16).

The Dairy NZ employee that facilitated the discussion group viewed his role as presenting information to farmers. He pointed out:

> *It's also about taking out to farmers new learnings, new research developments that could be from the DairyNZ team and the development teams and the scientists, or it could be just industry stuff that's happening at the time that we're involved with just disseminating that information out to farmers (Interviewee 16).*

He highlighted that having been a farmer himself helps him relate to the farmers. He expressed his empathy for the frustration farmers felt about the reporting they are required to do to comply with different organisations they need to work with:

> *Putting my ex-farmer hat on that is probably a really big issue with all this compliance. We're really duplicating the information because you're absolutely right, the councils want a budget, a nutrient budget. Fonterra wants your nitrogen pages which contributes to that. Your fertiliser companies want it as well (Interviewee 16).*

The facilitation of the discussion group shaped the initiative by putting structures in place for regular meetings that enabled the initiative to form from these meetings and connections developed through them.

Industry organisation providing Farm Environment Plans

Fonterra made farm plans (as described in Chapter 4.3.2) available to farmers in the discussion group. The process of developing and implementing the farm plans included a farm visit by a Fonterra Sustainable Dairying Advisor, the development of the plan, and updating of the plan. A Fonterra employee described the process of writing the FEP as follows:

> *I would go out onto farm, I would get them to do a little bit of gathering of information before I get there, so getting together fertiliser records, soil tests, any maps of the farm, consents. I would get a good understanding of the system, of the farm, how they manage different things. Then we would go out onto the farm, look at the different areas that we want to put into the farm environment plan, talk about the risk of those features. Then if there's any actions that the farmer and I want to put around managing that we would talk about those actions and timeframes (Interviewee 17).*

There was a sense among several farmers interviewed that dairy industry organisations had an obligation to support famers to meet their environmental requirements. A few of the farmers expressed dissatisfaction with Fonterra in that respect. This is illustrated by the following quote of a farmer expressing his dissatisfaction with the current support and the focus on improving Fonterra's image:

> *[Fonterra]'ve got this big room full of people and I said how many - to the girl who came here - how many [farm plans] have you done of the 13,000 farms in New Zealand, dairy farmers in New Zealand have you done? They haven't done even 1,000. We need less Fonterra ads about Ritchie McCaw [rugby player] and more do (Interviewee 19).*

Several interviewees suggested Fonterra was predominantly concerned with Fonterra's image. Two interviewed farmers from the discussion group argued:

> *Fonterra want to be seen to be doing their thing environmentally (Interviewee 20).*
>
> *Fonterra are trying to change their image because there's all this anti dairy farming. Ritchie McCaw used to be the captain of the New Zealand All Black's team, so they've got him out there on TV saying how good Fonterra is. (Interviewee 19).*

Statements made by Fonterra employees interviewed suggested that they viewed Fonterra as focused on improving the image of the dairy industry as a whole, rather than just the cooperative's image as suggested by some of the farmers, by showcasing current farming good practice. Two Fonterra employees explained:

> *We could really demonstrate the work that farmers had done at all those baseline minimum standards, all the work that they'd done (Interviewee 21).*
>
> *It's about getting that good story out there about all the good things that dairy farmers are doing on-farm. For example, the work we're doing under Tiaki [Fonterra's environmental management support program] and stuff like that (Interviewee 17).*

In contrast, a farmer felt it was not Fonterra's place to be involved in environmental management but rather that it is the job of the regional council:

> *For sure, they [Fonterra] push the clean green image, so naturally they're going to want to jump on it and make sure you are doing it. But to me that's the regional council's job, that's why you pay the money to them for your consent and that (Interviewee 22).*

The FEPs being made available to the members of the discussion group by Fonterra, were seen by all interviewees as an opportunity to communicate farmer's current practices to people in the catchment who were criticising their practices. FEPs were viewed as an important tool to address issues collectively faced. This point is illustrated by a Fonterra employee:

> *I guess how [the farmers in the discussion group] started this whole farm environment plan journey was they wanted to do something proactive to show their commitment to improving the lake and also to show that they were doing their bit. Traditionally dairying gets a lot of blame in the environmental space. So, I guess these guys just wanted to show that they are actually doing their bit (Interviewee 17).*

The way these farm plans were used as a communication tool by farmers is further described in Subsection 5.3.3. In both processes central to the development of this initiative, the facilitation of the discussion group and the provision of the farm plans, industry organisations played a central role in responding to pressures. These pressures and drivers to adopt more sustainable practices and responses to them are further elaborated on in the next subsection.

5.3.2 Drivers, pressures to adopt sustainable practices and responses

In this case, the drivers that emerged for interviewees to support the initiative were mostly external factors. Most of the farmers that were interviewed explained that they experienced an array of external pressures to adopt more sustainable practices. Two main drivers were identified: public perception and increasing regulation. Each engendered a different response by the farmers in the discussion group.

Increasingly strict requirements and staying ahead of regulation

Increasing environmental regulation was identified by interviewees as contributing to farmers adopting new farming practices. However, concern was raised about pressures regulations and policies were placing on farmers. In relation to this, a regional council employee expressed how he found it difficult to ask dairy farmers to do additional environmental work:

> *Having talked to the farmers in this area in the past, and some of them have done [environmental works] that have cost them a lot of money, I've got to the stage of becoming uncomfortable with going on, asking people to do more and more without knowing where it's going to get to and if it's going to be enough [to improve water quality in the lake] (Interviewee 24).*

Farmers interviewed referred to council regulation and requirements from their milk processor, Fonterra, as important drivers for the adoption of measures reducing environmental impact. The CSA that requires farmers to fence off streams, and council consents were mentioned by almost all farmers in relation to limitations they faced on environmental grounds. Some interviewees expressed the expectation that regulation was getting increasingly stringent, and expected this to be ongoing, as one farmer reasoned:

> *[Regional council is] looking at that closer and closer, not so much the effluent because the effluent's all pretty up to scratch, but the water-take, they don't like us taking water from the surface water from the creeks and rivers. So, whenever you go to renew your consent that's a time for them to put more pressure on you to tighten up what you're doing (Interviewee 20).*

A Fonterra employee identified her main challenge with farmer engagement was to keep farmers "up to speed" (Interviewee 17) with new developments and to help them accept that there is not one target, but a moving target. Both Fonterra and Dairy NZ employees interviewed referred to "best practice" in the context of environmental management, which in their view meant staying ahead of regulation. Both Dairy NZ and Fonterra were promoting 'stay ahead', by not merely complying to regulation, but by proactively aiming for best practice. A Fonterra employee explained this as follows, also illustrating she viewed farmers' understanding of sustainability as limited:

> *You just have to help farmers understand that there will never be an end point to sustainability, you've just got to help them keep moving forward. I think one thing that I mention to farmers is if you're just focusing on being compliant, you'll always be just keeping up (Interviewee 17).*

In line with this, most of the farmers interviewed explained that they sought to respond to continuously changing requirements by complying to regulation and going beyond the requirements. For example, some indicated they had also side streams fence off, stayed deliberately well below the maximum number of cows they could legally have, and adapted grazing management to improve grazing efficiency and reduce runoff, as one farmer outlined:

> *What a lot of the guys have been doing, and we have as well has always been going further or doing more than the minimum. Staying ahead of [regulation], like if they say the minimum 30 days, we will have 90 days storage [of effluent water] in the ponds. If they say you're only allowed to put on so much Nitrogen per hectare we'll be half of that, things like that (Interviewee 25).*

The industry organisation Dairy NZ and milk company Fonterra were also promoting staying ahead of regulations, and employees from both organisations acknowledged changing requirements as a continuous process as a DairyNZ employee and Fonterra employee expressed:

> *I tend to find if farmers understand [a new practice] they'll do it, whereas nutrient management is another thing altogether because it's modelling, you don't see it, it's movement through a soil profile (Interviewee 18).*

> *Science is always improving, regulation's always changing to reflect that from government level and regional council level. Yeah, to keep up and also to help farmers keep up, so that's a challenge. I think sometimes that can also create a bit of uncertainty, so farmers can't really see the end goal (Interviewee 17).*

Another way an interviewed farmer sought to prepare for increasingly strict regulation was by collecting data, because he expected to have to defend his practices to council to be able to retain an irrigation consent. He explained his approach:

> *Knowing full well that in the future we're going to have to be fighting for [consents] with council, environmental things, so we thought that was a smart move to get that independent [data]. Because that's the most important thing is independent information (Interviewee 23).*

In summary, interviewed farmers, as well as employees of the different organisations explained that regulation was getting stricter and interviewees prepared for anticipated increases of regulatory restrictions into the future.

Social pressures challenging dairying practices and defending practices

In addition to regulatory pressures, all interviewed farmers expressed feeling pressure from their non-farming neighbours, the wider public and the media to adopt more environmentally sustainable practices. Locally, a visibly polluted lake had raised concerns in the wider community. One farmer described feeling a sense of shared responsibility in relation to those issues:

> *It's visible, yeah. All of us have ownership of the lake and no one wanted to see it like that (Interviewee 26).*

One farmer highlighted that the attention on the lake also informed environmental topics being discussed in the discussion groups:

> *But because like Tūtira has now become a pretty focal point from a regional council perspective, water quality - and the local iwi, the regional council and DOC were all working together with the community to try and solve the problem of algal bloom*

and toxicity and the horrible smell in the middle of the [site]. So, as a rub off of that there's much more environmental input to our discussion groups with respect to dairy farming (Interviewee 23).

However, there was a strong sentiment among interviewed farmers that the dairy industry and dairy farmers received an unreasonable amount of scrutiny compared to other sectors. Two farmers discussed perceived differences between attitudes toward dairying compared to urban sewage overflow to illustrate the disparity they perceived:

But if [farmers] have a mistake we get in trouble, if we have a rain event like we had an inch of rain in 30 minutes and everything starts overflowing or anything like that we get in trouble, but if that happens in town and raw sewage goes into the sea or the lake or whatever that's fine (Interviewee 25).

Yeah, we can't afford to not be proactive, again because of the public perception thing. Sheep and beef farmers can possibly get away with it but dairy farmers can't (Interviewee 26).

The idea that dairy farmers are getting more scrutiny than other agricultural industries and that there is a stigma against the industry was also acknowledged by regional council employee:

So, the assumption that people make most of the time is how much dairying have you got, that dairying's really bad, that will be causing the problems. But actually, from a sediment point of view it's going to be on those higher slopes which is sheep and beef, it's going to be traditional soil conservation stuff (Interviewee 24).

Another farmer felt that although the dairy industry contributes to environmental issues, the industry was being singled out by media as the sole polluter:

We accept that maybe we do some environmental damage, but we're not the only ones. But if you listen to the media it appears that we are the only ones (Interviewee 23).

Overall, most farmers expressed feeling vilified by the public, media, and their non-dairy farming neighbours in relation to their environmental impact. One of them said:

We [dairy farmers] are pretty much hated by everyone (Interviewee 26)

Several farmers got emotional when speaking about public perception and linked it to mental health issues. In relation to this, one farmer expressed finding it difficult dealing with being singled out:

[It is] hard to be confronted in a way like sometimes, especially when people start pointing fingers (Interviewee 22)

Farmers and industry employees alike, argued that it was hard to change public perception. A farmer emphasised:

> *Because perception becomes reality even though it's not the truth, and that's what we're finding (Interviewee 23).*

Most of the interviewed farmers brought up what they referred to as an increasing "urban-rural divide" as one of the main obstacles to change perception, as one farmer pointed out:

> *There was huge respect from people in the city for farmers and how hard they work and what they do because they regularly visited farms. But now that's all stopped (Interviewee 19).*

It was argued by most interviewees that there was a lack of understanding of farmers' position. For instance, it was highlighted that non-farmers may underestimate the time it takes to implement changes on a farm and to see the improvement of water quality as a result or generalise images they see on television. As a Dairy NZ employee and a farmer expressed:

> *The general public need to understand, before the change happens the farmer learning has to occur. You've got to get that knowledge and understanding, then you get the buy-in and then the change occurs and that takes quite a long time (Interviewee 18).*

> *People just seem to see the dairy farms on the TV and think that's how everyone operates (Interviewee 25).*

Collectively, interviewees expressed frustration at the combination of with blame locally for declining water quality and negative media attention leading to what they perceived as disproportionate criticism of their practices.

Practical reasons not to adopt additional measures

Besides the time it takes to change practices and see the differences, farmers identified their financial situation as limiting their ability to adopt additional sustainable practices.

Most farmers cited financial reasons as a limitation to their efforts, and felt an expectation that they bear the costs of improving practices towards more sustainability:

> *To be fair in the last few years we haven't really had the cash flow to do it [planting vegetation] (Interviewee 26).*

> *So, you're still treading water and you're not paying a lot of debt off. Then they want you to plant trees and do this and that, it's sort of a fine line (Interviewee 22).*

These financial trade-offs farmers referred to, were also highlighted by industry organisations and regional council. For example, a Fonterra employee explained:

> *That realisation, it's a bit of a cliché and it came out during the elections a bit is it's hard to be green if you're in the red. So, if you're not financially viable, how do you make environmental improvement? So, the balance is very much forefront (Interviewee 16).*

For one farmer, their bank's policy made it hard for them to farm less intensively. He explained that he could produce more, but that would require him to have a higher input and more wear on the farm, so not more income at the bottom line:

> *It was quite hard with the banks, they have this whole vision that you have to do so many kilos for the money you borrowed and things like that and the more kilos you did the better.[..]I could do 120,000 kilos if you wanted, I said, but I wouldn't be making any more money (Interviewee 25).*

Two farmers indicated that they were not investing much in environmental measures, because one of them was close to retirement, while the other was leasing the land for a short term. They indicated that there was little incentive for them to make long term investments in the farms they farmed. The farmer who leased land explained:

> *Well in my situation is that I don't own the farm, I lease it. So, it's a different scenario is that as a leaseholder of the property how much money am I going to invest in future-proofing it environmentally when I'm only going to be here another four years? (Interviewee 19)*

Additionally, some farmers and a regional council employee argued that the measures they were taking to reduce effluent water entering waterways are more effective than the more visible measures demanded of them by Fonterra through the Sustainable Dairying Accord, such as fencing streams and planting trees. A regional council employee held a similar view, and added that the main issue in the catchment was sediment and implied that dairy farmers have done more soil conservation work than other industries in the area:

> *The other thing about dairying is that they've all got their streams fenced off and they've done other work as part of their conditions of supply to the dairy company and so a lot of those issues have been dealt with on dairy farms. So how can [farmers] position themselves to show other people in future when the heat comes on, actually they have done everything they can? (Interviewee 24)*

Most interviewees did not deny that the dairy industry has damaged the environment, however several interviewees also felt farmers and the industry were seeking to address these issues, which they argued also needs to be recognised. Two farmers articulated this:

> *Maybe we've done some environmental damage through ignorance, but we're fast learning what we should do or shouldn't do. New Zealand, well the rest of New Zealand has to recognise that we are trying to do that, we're not just telling them to stick it (Interviewee 23).*

> *But to be fair, dairy farming is a more intense land use so we do need a little bit more scrutiny, but we're probably getting more than our fair share and we're not really being recognised for what we are doing (Interviewee 26).*

Interviewees presented several practical reasons why not to adopt additional sustainable practices, citing financial reasons, ownership status, future plans and challenging the need to adopt additional measures in addition to what already has been done.

Peers and family shaping practices

Besides the regulatory pressures and public perception, the practices of other dairy farmer and considerations around farm succession were also identified as influencing decisions to implement environmental measures. One farmer highlighted an example of a neighbour's practice that he was keen to also implement:

> *I'm quite keen to do what [name other farmer] has done with that fencing. They've already fenced - all the waterways are fenced off but even those little ones that are semi-wet (Interviewee 25).*

Several farmers emphasised they did not want to be behind compared to their peers. As one farmer highlighted:

> *Because no one wants to be the odd man out and then get the finger pointed at them (Interviewee 19).*

The demonstration of examples and peer pressure was further facilitated by the discussion group visiting each group member's farm over time. One farmer explained how he thought farmers in the group shaped each other's practices:

> *Peer pressure's a big thing and that's why community groups and discussion groups are good, […]. Yeah, then when people say yeah I'm doing that or I'm doing this or whatever, I've got this good idea here, this really works well, then people think I haven't done anything about that, I'd better do something (Interviewee 19).*

Three of the farmers in this initiative referred to succession as a driver to adopt additional sustainable practices. They indicated they felt a responsibility to leave the land in a good state for their children. As one of them expressed:

> *I'm just trying to get a sustainable farm and it's there for the next lot of kids (Interviewee 25).*

Not all farmers were keen to implement additional measures. Some farmers expressed apprehension to changing their practices. Two of the farmers indicated they were happy with the way they do things and only want to change when it is legally required, as one of them expressed:

> *We don't chop and change around on those fundamental things, that's set-in concrete and you match what's happening [in the weather] to suit, basically (Interviewee 23).*

Responses to negative perceptions of the dairy industry and the accumulated pressures to adopt sustainable practices led interviewees to express a need to communicate the practices they were already implementing, rather than change their practices. The farmers and other interviewees viewed, the public pressure they faced as unfair and disproportioned, and expressed the need to defend their and the wider dairy industries' practices against those notions. One Dairy NZ employee, and former farmer, highlighted the sentiment among farmers:

> *So, they [farmers] are living it every day, so I would imagine they'd like to have their story heard (Interviewee 16).*

In response to the combination of pressures, the discussion group collectively sought to better communicate their position by developing FEPs, demonstrating their on-going efforts. The development and use of FEPs in this initiative will be further outlined in the next Section.

5.3.3 Farm plans shaping the initiative

The farmers in the farmer discussion group had collectively elected to develop Fonterra FEPs for their farms, partly in order to demonstrate their efforts and progress regarding environmental stewardship. At the time of the interviews, these plans were being developed. Two farmers and a regional council employee explained the purpose of the farm plans as follows:

> *This is why we were pushing to get these farm environmental plans done so we've got them to take [to local community group meetings], so we've got evidence on it (Interviewee 22).*

> *We just need to defend [our practices] and if we can defend it with science, which was what we're doing all these farm environment [FEPs] things, etcetera (Interviewee 23).*

> *There's a bit of local peer pressure and community interest in we're doing our bit. Then [farmers] can present that in future have some publicity around well actually this is what we're doing, what's everyone else doing? (Interviewee 24).*

In contrast to these farmers who suggested that they had pushed for the farm plans, Fonterra employees highlighted they had explained the process and content of the FEP in discussion group meetings and to farmers personally before farmers agreed to have FEPs developed, as one Fonterra employee argued:

> *But what we've done with the Tūtira and those Patoka farms as well is we've had quite a lot of discussion with those farmers building up to the implementation of farm environment plans around what they look like, what they involve, what the process is, the sort of actions that will be in it. So that pre-work and the engagement piece is quite important and explaining what they are and what they involve (Interviewee 17).*

Fonterra employees explained how FEPs were developed. These documents were developed based on information provided by the farmer to develop plans agreed to by the farmers. A Fonterra employee that develops the plans with the farmers explained:

> *We discuss those timeframes and it's agreed upon by the farmer. That's something that we explain to them beforehand, hey we're not going to come in here and tell you you've got to do this tomorrow, it's definitely a work in progress (Interviewee 17).*

Initially, the primary intention for creating the FEPs was not to act as a mechanism of communication to third parties, but as a tool to help farmers with environmental planning and benchmarking. As a Fonterra sustainable dairying strategic team representative pointed out:

> *[The plans were] more about our farmers understanding where they sat [with regard to environmentally sustainable practices] and how we could support them (Interviewee 21).*

One of the farmers expressed using the plan to improve practices, but also linked the plans to public perception:

> *I mean I've just had a farm environment plan done by Fonterra. So, because of the issue with the lake, our water doesn't go in the lake but they want it to, Fonterra*

have come out and done full farm environment plans for us. That was a really good focal point for making some changes and trying to address some of those point source pollution areas. So, the waterway thing, the public will be happy when everything is fenced off and no stock are on water (Interviewee 23)

The local community catchment group sought to incorporate these FEPs into catchment plans. Opportunities were identified by a regional council employee to develop ways to integrate cultural and biodiversity values that the local community group felt were missing from the plans and sought to align the FEPs with future objectives of the catchment plan. Regional council employees expressed the following views:

Some of the key areas that we don't see in the Fonterra plan… like the cultural section, the biodiversity, biosecurity section and… making sure that the farm plans are plugged into the integrated [catchment] plan (Interviewee 27).

So that work that I mentioned with dairy farmers, I've mentioned to them that there's this freshwater improvement [project] and that what they're doing can link in with that and is aligned with that. So, just trying to fit all the pieces together (Interviewee 24).

Regional council had recently started a conservation program in which 'hotspots' were identified and received additional funding. Tūtira, is one of those areas. Through the 'hotspot project', regional council was putting resources towards improving the area and an employee was appointed to lead that program, as two council employees explained:

Tūtira has been identified as a hotspot by council, by councillors and they've set up this hotspot funding for some key areas of Hawkes Bay that they want more work done on (Interviewee 24).

My role has been established through the councillors wanting to try and get some work done in that space (Interviewee 27).

One regional council employee expressed how he expects the representation of the dairy farmers in the wider local community the 'governance group' that was established in the area to improve the water quality in the lake, can change relationships between groups (e.g. local government, dairy farmers, foresters, sheep and beef farmers) in the area and enable these groups to hold each other accountable:

If it's that governance group or another governance group that's established, to drive it and to hold councils to account to do things and other agencies to account to do things, also to landowners to do things as well (Interviewee 27).

Through the discussion group, farmers also organised to have their positions represented at hot spot meetings with the wider community. One of the motivations farmers presented to develop the FEPs was to communicate farming practices and measures they were taking to address environmental sustainability in the governance group. The farmer discussion group appointed two farmer representatives to advocate for the dairy farmers at this governance group and sought to be pro-active as a group. As a farmer said:

> *No, as a discussion group we got together and decided to front foot it and just it's better to be ahead of the game (Interviewee 26).*

Key factors identified as shaping this initiative, of the dairy farmer discussion group, included the roles of organisations and groups, relations with actors outside the dairy industry and pressures as drivers for actions.

5.4 Conclusion

The findings presented in this chapter highlight how at the scale of individuals and initiatives, personal characteristics of individuals, relationships, organisations, and drivers shaped the initiatives. Key findings in the first case include how the renegotiation of relationships between a local community and local government enabled these parties to work together towards common goals. This process was enabled by several individuals, rules of engagement and a project plan. Other key findings in the second case show how people active in the dairy industry experienced being subjected to a combination of pressures that led them to unite and seek to respond by communicating their practices using farm plans. Farm plans were used as a communication tool to communicate their current efforts around sustainable practices.

The two cases in this thesis had some notable differences in their characteristics which in part shaped the different findings in each of them. Differences and similarities between the cases will be further analysed in the cross-case analysis that forms the first part of the next chapter. This cross-case analysis informs the discussion which makes up the rest of the next chapter, and discusses how the findings presented in this chapter answer the research question and how these relate to the theoretical framework and empirical research reviewed in Chapter 2.

Chapter 6: Discussion

6.1 Introduction

This chapter discusses the results presented in the previous chapter in the context of the literature which was reviewed in Chapter 2. In doing so, this chapter seeks to answer the research question: *How are agricultural initiatives seeking to address local sustainability being shaped in the context of a sustainability transition*? Both practical and theoretical contributions made by this research are highlighted.

Findings and characteristics were compared to gain further insights into agricultural initiatives navigating sustainability transitions. Changes reflective of an ongoing sustainability transition were experienced in both cases through for example government support for sustainable practices and challenges to practices regarded as unsustainable. Furthermore, boundary objects were identified to have shaped both cases through several functions. People shaped the initiatives through roles and relationships and the importance of considering individuals and their personal attributes rather than characterising them is discussed.

Section 6.2 presents a comparison of case characteristics and a table presenting a comparison of findings. In Section 6.3 the ways the cases relate to a sustainability transition and the levels of MLP is discussed. The use of boundary objects and the role of intermediaries in processes on boundaries between groups in each of the cases are then discussed in Section 6.4. Finally, section 6.5 discusses the roles of people shaping initiatives and how these have been conceptualised in this research.

6.2 Cross case analysis

The findings about each of the cases cannot be seen in isolation of their characteristics. As outlined in Chapter 3, cases with similar characteristics were selected to be able to compare them. Both cases are small scale, local initiatives. They are focused on a small, sub-regional geographical area. In both initiatives people inhabiting the area of focus were involved as well as remotely based people. Both initiatives were responding to local sustainability issues, and in both cases this was ultimately related to water quality. Related to the focus being on a small geographical area, people involved had personal relationships with each other, which was found to also be reflected in the relationships with organisations, including the government and industry organisations involved. Relationships of each of the groups with organisations were embodied by the employees engaging with the initiatives, which was mostly experienced as genuine and inspiring trust. This affected the way these organisations

shaped the initiatives. Another selection criterium of the cases was that farmers were involved. In both cases farmers, as managers of land, were viewed by others involved as having a key role to improve water quality. Cases were also selected on the basis of local government involvement. The nature of involvement and the way local government shaped each case was different due to differences in historical relationships which are further discussed in Section 6.4.

Besides characteristics that both cases were selected on, other characteristics emerged that shaped the findings in each case. The goals of the initiatives differed. While the first initiative ultimately sought to collectively improve sustainability in their local area by various activities including education and planting trees, the second initiative sought to challenge some of the criticism to the sustainability of their practices. These goals are related to the history and development of each of the initiatives. In both cases people mobilized in response to not feeling heard in relation to an environmental issue relevant to them. In the first case, a major turning point in the history that was identified as crucial for the development of the initiative was the shift in relationships between the local community and local government that had historically been strained due to the local community not feeling heard. This shaped the importance being given to inclusive decision-making processes and the impartiality of the project manager. In the second case and important contextual factor experienced by the farmers was the increasing pressures from local community, the public and regulation challenging the sustainability of their practices. This is illustrative of other differences between the industries in which farmers in each case engaged.

The main findings, as presented in Chapter 5, in relation to relevant concepts, discussed in Chapter 2, of each case are compared in table 6. Implications of the comparisons are also highlighted in the table.

Table 6: Summary of the cross-case analysis. This table discusses elements that emerged to have shaped each of the cases. When a theme did not emerge from the data to have shaped the case, it was left blank.

	Case 1	Case 2
Regime shaping the cases	Regime forces were found to shape the case through several mechanisms including funding and expertise.	Regime forces were found to shape the case differently between industry and regulatory parts of the regime. Mechanisms included government regulation and industry advice.
	Although in both cases influences of the regime were identified, the forces associated with regimes were different in each case and shaped the cases differently too. The specific local contexts and historical relations explained some of these differences.	
Landscape shaping cases		Public perception regarding dairy farming was experienced by people engaged in the industry, comments, and media reporting
	The changing public opinion of the industry was experienced by farmers and others engaged with the dairy industry, through negative media coverage as well as comments of people outside the industry, illustrating a negative image of the industry.	
Status of SLO of agricultural practices in the initiative		Farming practices were challenged by the local community and wider public opinion
	The second case experiencing challenges to SLO, shaped attitudes and responses to calls for the adoption of sustainable practices.	
Boundary objects linking between groups	Boundary objects played a role and functions included holding people accountable and ensuring continuation.	Boundary objects played a role and functions included communication of practices.
	Differences between relationships across boundaries in the cases shaped how boundary objects emerged in their functions. In both cases boundary objects gained additional functions over time. These developments reflected the developed relationships that were linked by the boundary objects.	
Intermediaries facilitating connections between groups	The role of intermediary was significant in facilitating between groups involved in the initiative.	
	In the first case, a key individual fulfilled a role associated with linking people across boundaries and could be characterised as an intermediary. Due to historically strained relationships this role was important in the first case.	

6.3 The cases in the context of a sustainability transition

Findings of this thesis illustrate how an ongoing sustainability transition is experienced at the scale of initiatives and by the individuals involved in them. It has been highlighted by earlier studies researching transitions at an individual level that a transition is a disputed concept and means different things for different individuals (Duncan et al. 2018; Wibeck et al. 2019). This thesis shows how groups of people navigate a sustainability transition collectively as well as individually, showing how these relationships also shaped how sustainability transitions were experienced. The first case was characterised and experienced by those involved and external organisations, as a new way of working together to govern natural resources by forming new alliances, characteristics that have been associated with niche initiatives (e.g. Bui et al., 2016). However, few of the practices that were employed by people in either of the case studies could be described as novel or radically challenging norms, and would thus not fit with niches or how initiatives that would take place in a niche have been described by seminal sustainability transitions scholars (e.g. Geels, 2011; Loorbach et al., 2017). On the other hand, Geels (2011) also highlighted that what may be characterised as a regime shift on one level, may be viewed as incremental change at another. This illustrates the debate related to the extent initiatives that conform with the regime shape broader societal shifts towards sustainability (e.g. Haylock et al., 2018; Ingram, 2015) and ultimately what an ongoing sustainability looks like on the ground. Several scholars have argued that niche initiatives can exist within or closely aligned with the regime and do not have to involve practices radically challenging regime practices (Haylock et al., 2018; Ingram, 2015; von Oelreich et al., 2017). Moreover, other empirical studies that researched small-scale initiatives as niche initiatives promoting sustainability, found incremental changes to practices were being made on that scale, rather than radically different practices (Hubeau et al., 2019; von Oelreich et al., 2017). The initiatives studied in this thesis also show that when considering a sustainability transition as taking place over the span of a several decades, single sustainability initiatives in the middle of a transition, like the ones studied in this thesis, cannot necessarily be characterised as unique or radically challenging the regime in isolation of broader changes.

Intensive local government and industry organisation involvement in initiatives in this research was associated with these organisations shaping processes, structures, and actions through different mechanisms. Other studies characterised local government and industry organisation involvement as regime influences shaping sustainability initiatives (Haylock et al., 2018; Ingram, 2015; von Oelreich et al., 2017). Examples of mechanisms through which these influences occurred at the scale of local initiatives were identified. Firstly, government and industry organisation employees were viewed, and viewed themselves, as experts both in terms of the structures and processes (such as establishing a

committee and regular meetings) as well as in terms of environmental knowledge and mitigation options. Secondly, in the first case, the organisations providing funding, which included the government organisations, were seen to further promote established practices through funding requirements. Funding requirements specified outcomes and favoured predominantly direct environmental outputs, such as planting trees, rather than for example the employment of a project manager. The processes through which these organisations traditionally associated with the regime shaped the initiatives had similarities with processes of exchange between niches and regimes identified by Ingram (2015). She highlighted examples of structures, such as regular meetings facilitating exchange between people that she characterised as niche and regime actors. The findings in this thesis extend those findings, by highlighting these did not only provide a platform for exchange, but also shaped the nature of exchange. By taking the role of experts, government and industry employees shaped processes, structures, and actions of the initiatives. The mechanism of the regime influencing outcomes through funding requirements have been highlighted by other scholars in various contexts, including Konefal (2015) in an agricultural context on a large scale in the US, and Haylock and Connelly (2018) in an urban context in Aotearoa New Zealand. The authority and influence of local government and industry organisations was accepted by most involved in the initiatives and the involvement was viewed as benefitting common goals.

Farmers in the second case experienced a shift, that can be viewed as occurring at the landscape level, in broader sentiment towards farming. Farmers were also confronted at a more personal level by criticism and comments from community members, raising tensions locally. In addition, they highlighted experiencing increasingly strict regulation and industry standards, which is associated with a changing regime. These types of changes in public perception and regulation and the associated friction of people challenging this change, that emerged in the second case, have been associated with an on-going transition and a changing regime and landscape (Geels, 2011). This thesis contributes to sustainability transitions literature by describing examples of how these forces were experienced and navigated on an individual and initiative level.

To further explore how pressures from a changing regime and landscape were experienced and navigated, these pressures were captured as what scholars argue to be a shift in SLO of dairy farming practices (Edwards et al., 2016; Moffat et al., 2016). SLO is a useful concept to articulate the types of changes and pressures that emerged in the second case and which also correspond to that articulated in MLP. Viewing the second case as an example of individuals experiencing the SLO of dairy farming being challenged, extends earlier findings about SLO that often focused on large organisations, mostly in the mining industry at the scale of industries and large organisations (e.g. Baines et al., 2018; Moffat

et al., 2016). Frictions resulting from challenges to SLO were found to have led to farmers feeling frustrated, and in some cases, farmers illustrated it impacted their wellbeing. Ultimately, this was the main reason highlighted by farmers to feel a need to respond. These findings extend the work of SLO scholars that argued that challenge to SLO can result in friction and ultimately impact the viability of businesses (e.g. Moffat et al., 2016; Shepheard et al., 2008). The way people involved in the dairy industry in the second case experienced challenges to SLO on multiple levels, personal by the local community and more widely through public perception experienced through media, demonstrates a complex picture. Views of the dairy industry could not be separated from individual farmers, whose SLO was not only challenged by their local community but who also experienced their practices being challenged by the wider public. This can be contrasted with findings of Baines et al. (2018) who highlighted that small businesses in Aotearoa New Zealand negotiated SLO through personal connections, while the nature of relationships shaping SLO of large organisations was characterised as transactional in the aquaculture industry. This suggests that the negotiation of SLO of the dairy sector will likely need to involve a multi-level approach, as findings of both industry and farmer responses also illustrate is occurring.

6.4 Boundary objects and an intermediary shaping relationships

Artefacts in the form of rules of engagement, a catchment plan and farm plans, emerged in their roles shaping the initiatives and were operating in the spaces between different groups represented in them. The uses of these artefacts are in line with how boundary objects have been described in literature (e.g. Kimble et al., 2010; Klerkx et al., 2012; Star et al., 1989). In line with characteristics attributed to boundary objects in earlier research, the functions of both the rules of engagement and plans in the first case and the planning tools in the second case, developed over the trajectory of the initiatives and they were used differently by different groups between individuals and organisations in a small local initiative (e.g. Kimble et al., 2010; Klerkx et al., 2012; Star et al., 1989). Although the content did not change, the way the rules of engagement were used throughout the development of the first initiative evolved. It was initially used to establish rules of engagement and was later used as an ongoing contract. In contrast to the rules of engagement, different versions of the project plan and farm plans were developed or proposed to adapt to changes. These dynamics are in line with findings of Klerkx et al. (2012) who highlighted that when boundary objects are not flexible in form, their interpretation might still change over time, while boundary objects with more flexible forms were associated by with ongoing processes.

A key characteristic that shaped differences in how boundary objects were used in each of the cases, was the nature of relationships across boundaries between groups of people. In their research into the use of boundary objects in an IT and a medical context, Kimble et al. (2010) highlighted how the nature of relationships in relation to boundary objects as well. In this thesis rules of engagement were viewed by the local community as a tool to hold local government accountable to comply with jointly agreed rules. This emerged as important due to frictions and a history of non-inclusion by local government and this boundary object facilitating ways for people to work together by guiding actions and building trust. Similarly, Kimble et al. (2010) linked potential competition between two groups needing to work with the emergence of rules of engagement as a boundary object. The historical exclusion of Māori leading to challenges to the legitimacy of decision-making processes and distrust in sustainability initiatives in Aotearoa New Zealand have also been highlighted by other scholars (e.g. Chapin III et al., 2012; Duncan et al., 2018). This thesis provides an example in which a boundary object in the form of rules of engagement had a role in building trust, enabling iwi and local government as well as others to work towards a common goal. The function of building trust by establishing rules, has also been identified in boundary objects in empirical research by Kimble et al. (2010) as well as Klerkx et al. (2012). They studied agricultural (Klerkx et al., 2012) and non-agricultural (Kimble et al., 2010) cases where groups with diverse interests and backgrounds sought to work together towards a common outcome. Hence, this doctoral research confirmed findings of Klerkx et al. (2012) and Kimble et al. (2010), and added how a boundary object establishing rules of engagement did not only help people with diverse interests work together, but had a role overcoming negative prior relationships. The second boundary object that emerged in the first case was a project plan. Plans have been characterised as boundary objects by Klerkx et al. (2012), but in that case had the function to facilitate collaborative design processes. The project plan in the first case was found to help ensure continuation by inspiring ongoing motivation and engagement in the project, illustrating a different function than identified in earlier studies.

In the second case tools, originally designed to help farmers change practices, had a function to make practices visible, arguing for the legitimacy of these practices, which can been viewed as a convincing function as identified by Klerkx et al. (2012). However, this boundary object was used to argue the legitimacy of current practices, while in the example of Klerkx et al. (2012) organisations were convinced to support novel practices. The examples of boundary objects identified in this thesis studies confirm a wide range of functions, building trust, communicating the legitimacy of practices and ensuring continuity, identified in earlier research in different contexts. This illustrates the diversity of processes that also occur on a local scale on boundaries between groups active in sustainability

initiatives. Initiatives as studied in this thesis are shaped by processes on boundaries facilitated by boundary objects through the ways they shaped critical relationships.

A practical implication of the observed uses of rules of engagement, project plan and farm plans as boundary objects in these cases is that these types of documents may in the future be further developed to better support their use as a boundary object. In the case of the FEPs, this could be achieved by adapting the language to non-farmer audiences and providing key summary information that could be easily understood. Additionally, in response to the demand of dairy farmers to demonstrate the sustainability of their practices and negotiate SLO, other tools could be deliberately designed to be used as boundary objects, as was done in the mining and oil industries (Mercer-Mapstone et al., 2017). These tools may be deliberately designed to facilitate dialogue to enable relationship building as highlighted as being an important process by Mercer-Mapstone et al. (2017). Based on the need expressed by farmers in this research for people to better understand their position, the content could also go beyond demonstrating current and intended efforts to environmentally sustainable practices to also incorporate other parameters farmers need to account for to sustain their livelihoods. However, as pointed out by Tisenkopfs et al. (2015), boundary objects also have their limitations, and careful consideration of the relevance of a boundary object to different people is important. The unpredictable and emergent nature of boundary objects that characterised boundary objects in this these and is also pointed out by Klerkx et al., (2012), should be anticipated when seeking to adapt or develop artefacts that emerge as a boundary objects in sustainability initiatives.

The concept “boundary object” has to date not been widely applied in sustainability transitions literature. This thesis highlights three examples in which the role of artefacts on boundaries between groups could be usefully captured and further explored by describing them as boundary objects. In addition, earlier research was identified that highlighted findings that can be viewed as boundary objects that emerged in functions including establishing rules of engagement and enabling communication in agricultural sustainability transitions contexts (e.g. Bui et al., 2016; Konefal, 2015; Rosin et al., 2017) as discussed in Section 2.9.1. This suggests this concept can be used to capture the roles of artefacts at boundaries between groups shaping relationships in future sustainability transition research.

In the first case, the project manager shaped the relationship between groups across boundaries had similarities with how intermediaries have been characterised (Howells, 2006; Kivimaa et al., 2019). Typologies of intermediaries proposed by other scholars (e.g. Brown et al., 2013; Hargreaves et al.,

2013; Kivimaa et al., 2019) as described in Section 2.9.2 apply to larger time scales and higher organisational scales than the initiatives studied in this thesis, and they have not discussed personal attributes in relation to this role. This thesis contributes to literature about intermediaries by showing an example of an intermediary operating at a more intimate scale. At this scale it was found that personal attributes shaped how this role was fulfilled. The perceived impartiality of the individual fulfilling the intermediary role enabled him in this role. In a context where there is a history of non-constructive interactions between groups, this research suggests that an impartial person is well placed to fulfil the role of intermediary. The benefit of an impartial position of intermediaries has been highlighter in earlier work. For instance, Kivimaa et al. (2019) studying the roles of intermediaries in relation to a sustainability transition, argued neutrality of an intermediary can gain trust when intermediaries act at a system level rather than promoting for example niche practices. In addition, abilities to communicate with different groups and dedication were highlighted to have enabled the intermediary in his role. This example shows how personal attributes of an intermediary and local historical context shaped how a relationship between groups was mediated at the level of a small-scale agricultural sustainability initiative.

6.5 People shaping the initiatives

Farmers arguably had a critical role in both cases, because agricultural sustainability is argued to ultimately rely on farmers changing practices (e.g. Tillman 2011). Farmers highlighted several personal attributes and drivers that shaped their uptake of sustainable practices. Limited research has focused on the role of individual farmers in sustainability transitions, but the adoption of sustainable practices by farmers has been studied extensively (e.g. de Krom 2017; Mills et al. 2017). As highlighted in Section 6.3, farmers in the second case experienced a range of pressures to adopt additional sustainable practices to which they felt a need to respond by presenting and defending their current efforts. This finding extends findings of Barnes et al. (2013) who also showed existing pressures to adopt sustainable practices experienced by farmers shaping their responses to voluntary sustainability practices. However, their research context was Scotland and they found farmers in areas that had been marked by the government as risk areas and subject to increased regulations were, in contrast to findings in this thesis, found to be less willing to adopt additional voluntary measures than people outside these areas. Succession, ownership structure, plans, economic conditions were highlighted by farmers in this thesis to shape their adoption of sustainability measures. A practical implication of these findings is, in accordance with suggestions made by other scholars studying factors that shape farmers decisions to adopt sustainable practices in UK and Australia based research in various agricultural contexts (e.g. Greiner et al., 2009; Mills et al., 2017; Raymond et al., 2016), an appeal

might be deliberately made to personal attributes by tailoring advise and incentives to individuals. This might be done by for instance making an appeal to aspects relevant to individuals, such as a long family history or environmental values when mobilizing farmers to take action.

In the preceding sections several examples of individuals and groups shaping each of the initiatives are described. Some roles were identified that had similarities with roles that have been identified in other studies, like intermediaries. Other roles that emerged were linked to what has been characterised as how the regime shaped practices through funding for example. In the first case some roles were linked to the trajectory of the initiatives. For example, an individual was recognised for having mobilised people to engage with local government and a local government process. Farmers responses to calls to adopt more sustainable practices were found to be shaped by a combination of contextual factors and personal attributes as discussed in Section 6.3. Hence, these examples of how individuals and groups shaped initiatives in this research demonstrate that at the level of individuals, people do not necessarily fit neatly into one set of categories of actors or roles, while in other sustainability transitions research studying transitions at a higher scale this is a common way to describe the roles or positions of people in (e.g. Farla et al., 2012; Fischer et al., 2016). At the level of local initiatives a messier picture emerged. Therefore, a less structured, more mixed way of describing and discussing how people shaped sustainability initiatives was used in this thesis to do justice to the complexity that emerged.

6.6 Conclusion

This chapter discussed the findings of this thesis in the context of the literature to answer the research question. In doing so, this thesis makes several theoretical and practical contributions.

Forces associated with an ongoing transition were experienced at the individual level and shaped the initiatives through mechanisms including funding requirements and expertise. Local contexts being defined by strained historical relationships in the first case and challenged practices in the second shaped how boundary objects emerged in their functions. These historical relationships in the first case also shaped the role of the intermediary who had a role mediating relationships. Relationships with organisations in both initiatives were embodied by individuals and personal relationships shaped their roles in initiatives. Personal attributes of individuals were found to shape those roles as well as the involvement of farmers and the role of the intermediary.

Insights into initiatives at an individual level in a sustainability transition extend the current understanding of people's experiences and roles in this context by highlighting examples of how

individuals experienced regime and landscape forces and how small scale initiatives were shaped by them. Additionally, to study this relatively underexplored scale of sustainability transitions, the concepts boundary object and SLO were found useful to further explore emerging roles of artefacts and challenges to practices associated with sustainability transitions. The role of intermediary was explored on this local scale extends literature that has to date focused on larger scales. Rather than their place in MLP or roles throughout a transition on the basis of which others have characterised intermediaries, at the scale of initiatives, personal attributes shaped the intermediary in his role.

The next chapter summarizes the answer to the research question based on the insights discussed in this chapter. The practical implications of these findings are then outlined, and a reflection of how the research design shaped these findings is discussed. Finally, avenues for future research that would further extend this work are suggested.

Chapter 7: Conclusions

7.1 Key Findings

This thesis focused on the experiences of people in sustainability initiatives in answering the research question: *How are agricultural initiatives seeking to address local sustainability being shaped in the context of a sustainability transition*?

Local agricultural initiatives will be shaped differently in a sustainability transition depending on whether the initiative comprises individuals enabled and empowered to change or impelled and challenged to change by the transition. For farmers whose taken for granted ways of farming are questioned and challenged in a transition their experiences of the transition are likely to be very different to those whose ways of farming are supported and celebrated. However, what is also confirmed is the heterogeneity of farmers and people engaged in local agricultural initiatives. The requirements placed on initiatives by funding entities can both enable and constrain initiatives. The agendas of funding entities may align closely with or diverge from the goals and intent of initiatives. The extent to which initiatives are dependent on external funding will therefore also then shape the initiatives.

On a more intimate level, people and their relationships were found to shape initiatives on different levels: collectively in groups and individually. In both cases government and industry organisations were found to be intensively involved through the involvement of individuals. These organisations shaped the initiatives by taking on the role (and being accepted in the role) of expert and intermediary, shaping the structure and actions of each of the groups. Relationships of initiatives with organisations were embodied by individuals and their personal relationships with other individuals in the initiatives. Furthermore, personal attributes of individuals were found to shape roles that were played including the nature of involvement of farmers in sustainable practices. Predominantly in the first case, examples of personal attributes of individuals shaped individuals' roles and ultimately the initiatives were identified. Another example of this is the intermediary in case one, whos' independence enabled him to fulfil his role. In both cases key relationships were shaped by boundary objects that emerged in their various functions connecting groups across social boundaries.

Contextual factors shaped initiatives navigating a sustainability transition. These factors included the strained historical relationships in the first case and challenged farming practices in the second case. Contextual factors were found to have shaped how boundary objects emerged in their functions in

both cases. In addition, the strained historical relationships shaped the role of the intermediary mediating relationships across boundaries.

7.2 Theoretical findings

This research contributes to sustainability transitions research with insights into what a sustainability transition looks like and how it is experienced and navigated at the level of small-scale local initiatives and individuals. For instance, regime and landscape forces shaping the initiatives could be identified, through, for instance, funding and funding requirements and shifting in public opinion experienced through comments of neighbours, media coverage could be conceptualized as landscape dynamics reflective of an ongoing transition. These mechanisms have not been identified at this local scale in relation to a sustainability transition. In addition, the combination of regime and landscape forces challenging farming practices identified in one of the case studies was captured by viewing these changes in public perception as an example of changes in the SLO of dairy farming practices. The use of the concept of SLO to capture how changing regime and landscape forces reflective of an ongoing transition, shape people operating in that system, is a novel way of conceptualising these forces.

Relationships between groups and individuals were central to both cases and artefacts and in the first case an individual, appeared to shape these relationships. 'Boundary objects' and 'intermediaries' are concepts that captured artefacts and people with functions and roles in the space between different groups. Boundary objects are a novel way to capture these links in sustainability transitions literature, however considering the multi-actor focus of sustainability transitions studies, this concept usefully extends the framework to explore processes occurring on boundaries.

In relation to this research seeking insights into local government shaping agricultural initiatives navigating a sustainability transition, there has been limited research to sustainability transitions in Aotearoa New Zealand to date. Aotearoa New Zealand has a different government structure then Europe and most European countries, where most earlier studies researching sustainability initiatives in sustainability transitions were conducted. This thesis highlights personal involvement of government employees, which has not been commonly found in other sustainability transitions research that was predominantly conducted in Europe. The ways government shaped each of the cases, was shaped by their personal connections. Although, also promoting regime practices in line with earlier research, some of them also identified as locals and had personal relationships with the other individuals in the cases.

7.3 Reflections on research design

Data collection and analysis were conducted in accordance with accepted practices for case study research by collecting data conducting semi-structured interviews, supplemented by documents, and conducting a thematic analysis. This qualitative research approach was well suited for gaining in depth insights into the complex cases illustrating how agricultural sustainability initiatives navigated an ongoing transition.

Upon reflection, data collection in the first phase could have been improved by focusing on the outset on localised initiatives and defining these more clearly. This would have aided the key informant interviews by enabling more specific questions and could have yielded more results from these interviews. In turn, this could have resulted in more options for the selection of case studies. However, the case studies selected based on the information obtained in phase one, gave relevant insights into how sustainability transitions are navigated by initiatives and individuals involved.

Given the identified importance of boundary objects identified in this thesis, more specific questions could have been asked for participants to further reflect on their functions and importance. Other artefacts may have emerged if questions were tailored to identifying boundary objects. In addition, more data could have been obtained about the boundary objects that emerged from the collected data. Boundary objects in the context of sustainability transitions research is a novel way of capturing how artefacts were used in bridging relationships across boundaries, so the use of boundary objects was not anticipated.

Finally, more insights could have been obtained by conducting an additional case study. More mechanisms of the regime shaping initiatives and additional functions of boundary objects could have been identified. However, there was a trade-off between conducting an addition case study and the time spent to analyse each case in depth. To gain more in-depth insights into the data obtained, it was elected to focus efforts and limited time on the two selected cases. In addition, preliminary analysis of the data also confirmed the quality of the data and relevant insights could be drawn from the cases and their comparison.

7.4 Practical implications of the findings

How an ongoing sustainability transition was navigated by initiatives, gave insights into how these might be better supported by both government agencies and industry organisations. Findings in this research suggest that he type of support needed from organisations depends on the specific local

context. For example, in a context where relationships are compromised support should include the explicit recognition and inclusion of groups that were formerly excluded, enabling new local alliances to respond to sustainability issues. When long held practices are being challenged as part of an on-going sustainability transition, people may need to be empowered to communicate about their practices. This type of support may enable a dialogue that can ultimately enable those whose practices are challenged to have an input in the negotiation of what a sustainability transition may look like locally.

Although the need for communication to justify farming practices was broadly accepted among people involved in the dairy industry, concerns were voiced regarding industry organisations style of communication that focused on maintaining a 'clean and green image' as opposed to seeking to genuinely addressing environmental issues. Communication can be better aligned with the views and sentiments of the farmer community by making sure the message resonates with farmers. This also highlights a role of industry bodies to communicate, or to assist farmers to communicate, to the wider community in relation to how they are navigating an agricultural sustainability transition.

As also highlighted in Chapter 6.4, there may be a role for industry organisations to design artefacts that emerge in functions as boundary objects to better support their functions to communicate to a broader audience. For example, cconsidering the existing widespread application of FEPs and other types of farm plans among farmers in Aotearoa New Zealand, this novel way of viewing FEPs as boundary objects opens potential new uses of the plans for many farmers. As boundary objects, FEPs may enhance communication between farmers and their communities, and ultimately facilitate the negotiation of SLO on a higher level. Similarly, intermediaries could be introduced to help manage processes between different actors. Local context may dictate which characteristics can enable an intermediary in their role.

Staff members of industry organisations and regional government helped farmers address these changes, while also having a role in the enforcement of these standards and regulation. There is widespread industry and government (central and local) recognition for the need to support farmers in adapting to increasing environmental regulation. However, support might also be provided to those having dual roles enforcing and advising farmers during a sustainability transition. In addition, the way agricultural sustainability initiatives were being shaped by people, including government and industry employees was linked with individual attributes and relationships. This finding could be operationalised by taking personal attributes into account when appointing or mobilizing people by selecting those that have a local connection or appealing to people's connections to the area.

The way funding and support are allocated shaped initiatives in several ways. Funding and support requirements of industry organisations and regional councils limited both allocation of funds, ability of continuation and feasibility of replicating similar initiatives. At the same time, resources received by the initiatives enabled outcomes, helped maintain momentum and helped obtain additional resources. Processes governing the allocation of funding and other resources should be conducted in consideration of the multiple ways these may shape initiatives.

7.5 Remaining questions and challenges for future research

This research focused on the initiative and individual level, which led to findings about relationships and personal attributes. On a high level, this thesis exposes a rich field of enquiry to be further explored at the level of individuals and initiatives in sustainability transitions, not only in agricultural contexts, but also more broadly. Insights into how the initiatives and individuals involved in them studied in this thesis experienced and navigated transitions showed diverse responses and experiences shaped by local contexts, that suggests more research in this field of enquiry will illuminate additional insights. For instance, there are likely more mechanisms through which regime and landscape forces shape initiatives that can be identified at this scale. In addition, it is likely that recent regulatory changes would result in different findings if the data collection were conducted after 2018. The recent regulation changes, involving additional monitoring of water quality by regional councils, are likely to have increased the contrast between the two cases, by putting additional regulatory pressures on the dairy farmers in the second initiative. Hence, findings would likely be different if this current research was conducted later. Ongoing research into these or similar initiatives can therefore show how initiatives navigate later stages of a sustainability transition.

Based on the findings in this research related to the important and diverse functions boundary objects had in agricultural initiatives navigating a sustainability transition, research focusing specifically on the use of boundary objects in similar context can extend insights into how contextual factors shape their functions and the types of artefacts that emerge in this role. This may also further inform how they may be more deliberately adapted or developed. Additionally, future research, including farmer surveys with greater participant numbers, could be used to confirm whether findings exposing the desire to communicate and demonstrate practices is shared by dairy farmers in Aotearoa New Zealand more broadly, as is suggested by some of the data and literature, which could then inform an industry response.

This research highlighted relationships characterised as genuine between individuals employed by organisations and others involved in agricultural sustainability initiatives, helped building trust that

enabled working together. This was linked to personal relationships of individuals employed by organisations forming the relationships of initiatives and the individuals involved with them with organisations. Further insights about how these relationships are established and maintained by professionals can inform future efforts of organisations seeking to support and engage with small scale initiatives.

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Appendices

Appendix 1: Interview guide key-informants

Interview guide

Test recorder. Geen haast, uit laten praten, netjes schrijven, ook niet verbaal noteren, plaatsing recorder, zo kort mogelijk.

Introduction:

Intro, thanks, formalities

Info sheet (have you had time to read it?)

Aim of research: gain insight in sustainable agricultural land use in Hawke's Bay's hill country in order to help inform decision making.

Aim of this phase: get an overview of initiatives that are intended to promote sustainable, agricultural land use in HB's hill country. I am particularly interested in who are involved in this and what strategies are being used.

Aim interview: with this interview I aim to get to know about initiatives that you are aware of in order to, together with interviews with other key informants, create an overview to select cases for the second phase of this research.

Ethics and procedures:

Sign consent form

You can ask me to stop the recorder at any time during the interview.

Any questions?

Start recorder

General

Role (within organisation, how long, background)

What do you consider to be the main issues in hill country related to land use in Hawke's Bay?

Has this changed?

What initiatives are you aware of that are aiming to affect hill country land use in HB (or broader)?

Are they similar?

Why established?

What are the main goals of these initiatives?

In terms of land use? Outcomes sought?

How well are they succeeding to meet those?

With regard to focus around environmental/social/economic aspects?

How are the goals in these initiatives achieved/approached?

What are the main strategies in these initiatives?

(probes/examples: policy, financial incentives? Catchment groups? Communication? participation? support? information?)

Who are involved in these initiatives?

Which organisations or individuals?

Roles or people/organisations involved? (Who funds? Whose initiative?)

Interactions with? Nature of those? Collaborations?

How have initiatives changed over time?

General trends?

With regard to who is involved, aims and strategies?

HB hill country different from other areas (if relevant)?

End

Thanks, things to add?

Who else should I talk to?

If I missed anything can I contact you?

(if relevant) Contact for second phase?

Probes: example, tell me more, explain, compare, elaborate, specify, when, why, how, is that common

Appendix 2: Findings phase 1

scale of practice	initiative
national	red meat profit partnership
	PFSI permanent forests scheme
	te tumu poreoa
	afforestation grant scheme
	fed farmers think tank
	land and water forum
	PGP
	poplars research
	farm forrestry association
	EMaR
	LAWA
	Te Ture Whenua Māori Reform
	NZAGRC (ag greenhouse gas)
	PGgRC
east coast	east coast forestry scheme
	east coast forestry scheme
regional	Hawke's Bay Regional Investment Company Ltd
	regional land care grant scheme
	Regional growth programme
	hb forrestry group
	wintercrpping group in hb
	Sustainable Land Management Hill Country
district	LABs
	farmer focus groups
catchment	Whangawehi
	Tukituki
	Tank group
	Mountains to sea freshwater management
subcatchment	Nuhaka
	Tutira
	papanui catchment focus group
	Huatokitoki
	Whakaki
farm	profit partnership
	Riparian planting scheme
	landcare scheme
	accreditation programmes meat comps
	FITT programme

Appendix 3a: Information sheet initiative 1

MASSEY UNIVERSITY

COLLEGE OF SCIENCES

TE WĀHANGA PŪTAIAO

Sustainable hill country land-use in Hawke's Bay

INFORMATION SHEET

Introduction

My name is Flo and I am undertaking this research as part of my doctoral study at the Institute of Agriculture and Environment at Massey University in Palmerston North.

Project description

The aim of my research is to gain insight into sustainable land-use in Hawke's Bay hill country in order to inform organisations like regional councils. With two case studies, insights from initiatives that aim to achieve sustainable land-use in Hawke's Bay will be gained. I am particularly interested in how initiatives developed and how people and organisations are involved.

Participant identification and recruitment

I would like to invite you to participate in this research by agreeing to be interviewed.

I have identified the Whangawehi Catchment Management Group as an initiative that I would like to study as one of the two case studies. I am seeking your input, because you have been identified as someone with knowledge of the Whangawehi Catchment Management Group. Individuals directly involved in the Whangawehi Catchment Management Group have been selected. Your name can also have been given by other participants or informants.

Project procedures and data management

With your consent, I will conduct and record the interview. Interviews will be securely stored for 7 years and then destroyed. Data will only be accessed by me and my supervisors. Interviews will be taken in person at a time and location that is agreed to by you. The interview may take up to one and a half hours. Your name will

be dealt with confidentially and will not be stated in the research. It is important to be aware however, that based on the position, organisation or name of the initiative, it may be possible to identify individuals from this research. If a quote you provide is chosen to be used in the thesis, you will not be identified as the source, without your consent. The interview may be transcribed by me or someone under a confidentiality agreement. I will analyse the data and exclusively use it for the completion of the doctoral research and related academic publications.

Participant's rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- ask for the recorder to be turned off at any time during the interview;
- decline to answer any particular question;
- withdraw from the study (within 6 months);
- ask any questions about the study at any time during participation;
- provide information on the understanding that your name will not be used unless you give permission to the researcher;
- be given access to a summary of the project findings when it is concluded.

Project contacts

If you have any questions about the project, please contact me or my supervisor:

Researcher: Florentine van Noppen

f.d.vannoppen@massey.ac.nz

[redacted]

Main supervisor: Dr. Janet Reid

J.I.Reid@massey.ac.nz

06 3505268

[redacted]

"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Dr Brian Finch, Director, Research Ethics, telephone 06 356 9099 x 86015, email humanethics@massey.ac.nz".

Kind regards,

Florentine van Noppen

Appendix 3b: Consent form initiative 1

MASSEY UNIVERSITY

COLLEGE OF SCIENCES

TE WĀHANGA PŪTAIAO

Sustainable hill country land-use in Hawke's Bay

PARTICIPANT CONSENT FORM - INDIVIDUAL

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree/do not agree to the interview being sound recorded.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... **Date:** .....

Full Name .....

Appendix 3c: Interview guide initiative 1

Interview guide

Test recorder. Geen haast, uit laten praten, netjes schrijven, ook niet verbaal noteren, plaatsing recorder, zo kort mogelijk.

Introduction:

Intro, thanks, formalities

Go over info sheet (have you had time to read it?)

Aim of research: gain insight in the dynamics and development of initiatives aiming sustainable agricultural land use in Hawke's Bay's hill country in order to help inform regional council's support.

Aim of this phase: The aim of this case study is to gain insights from two initiatives that aim to achieve sustainable land-use in Hawke's Bay.

Aim interview: I am particularly interested in how the initiative got where it is today. Who have been involved, what has been done, what worked, how challenges are dealt with, how things have changed over time.

Ethics and procedures:

Sign consent form

You can ask me to stop the recorder at any time during the interview.

Any questions?

Start recorder

Interview questions

	related questions	**answers**
Catchment	**How did you get involved? Role? How did org get involved?**	
	How would you describe this catchment?	
	How has this changed?	
	What impact has the initiative had in the catchment?	
Group	**Can you tell me 3 pivotal points in the history of the catchment group? (how did it start etc, timeline)**	

	(ask when talking about specific action or decision) Can you reflect on the main motivations or drivers for actions or decisions?	
	Have individuals played a pivotal role? Leadership? Ideas? Other roles? Group dynamics literature: roles!	
	Could you describe the roles of the main organisations involved? (funding, publicity, knowledge?)	
	Has role organisation changed?	
initiative and personal dynamics	**What has changed in the initiative? Learning? Personally?**	
	Have any principles stayed the same?	
	What is high on the agenda now?	
	What is going really well now?	
	What are current challenges?	
	What is seen as good practice? Changed?	
	Reflect on challenge that was overcome?	
Achievements	**What has been achieved? Most important?**	
And ambition	**What has enabled the achievements?**	
	Has the initiative had an impact outside the catchment?	
	What will this catchment look like in 10 years?	
	Why is [Catchment] important?	

End

Thanks, things to add?

Who else should I talk to? (role, why)

If I missed anything can I contact you?

Probes: example, tell me more, explain, compare, elaborate, specify, when, why, how, is that common

Appendix 3d: Information sheet initiative 2

MASSEY UNIVERSITY

COLLEGE OF SCIENCES

TE WĀHANGA PŪTAIAO

Sustainable land-use in Hawke's Bay

INFORMATION SHEET

Introduction

My name is Flo and I am undertaking this research as part of my doctoral study at the Institute of Agriculture and Environment at Massey University in Palmerston North.

Project description

The aim of my research is to gain insight into sustainable land-use in Hawke's Bay by developing an understanding into how sustainable practices become more common, and ultimately how organisations like regional councils can support these initiatives. Insights from two initiatives that contribute to achieving sustainable land-use in Hawke's Bay will be gained. I am particularly interested in how the initiative helps to change practices and which other factors help (or impede) farmers.

Participant identification and recruitment

I would like to invite you to participate in this research by agreeing to be interviewed.

The Tūtira Dairy Discussion Group is one of the two case studies of my research. I am seeking your input, because of your knowledge of, or involvement in, an organisation relevant to the case.

Project procedures and data management

With your consent, I will conduct and digitally record the interview. The interview will be securely stored for 7 years and then destroyed. Data will only be accessed by me and my supervisors. The interview will be at a time and location that is agreed to by you and will take up to one and a half hours. Your name will remain confidential and will not be stated in the research. It is important to be aware however, that based on the position, organisation or name of the initiative, it may be possible to identify individuals from this research. If a quote you provide is chosen to be used in the thesis, you will not be identified as the source, without your consent. The interview will be transcribed by me or someone under a confidentiality agreement. I will analyse the data and exclusively use it for the completion of the doctoral research and related academic publications.

Participant's rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- ask for the recorder to be turned off at any time during the interview;
- decline to answer any particular question;
- withdraw from the study (within 6 months);
- ask any questions about the study at any time during participation;
- provide information on the understanding that your name will not be used unless you give permission to the researcher;
- be given access to a summary of the project findings when it is concluded.

Project contacts

If you have any questions about the project, please contact me or my supervisor:

Researcher: Florentine van Noppen

f.d.vannoppen@massey.ac.nz [redacted]

Main supervisor: Dr. Janet Reid

J.I.Reid@massey.ac.nz 06 3505268 [redacted]

Co-supervisors: Karen Hytten K.Hytten@massey.ac.nz

Lucy Burkitt L.Burkitt@massey.ac.nz

David Horne D.J.Horne@massey.ac.nz

"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named above are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Dr Brian Finch, Director, Research Ethics, telephone 06 356 9099 86015, email humanethics@massey.ac.nz".

Kind regards,

Florentine van Noppen

Appendix 3e: Consent form initiative 2

MASSEY UNIVERSITY

COLLEGE OF SCIENCES

TE WĀHANGA PŪTAIAO

Sustainable land-use in Hawke's Bay

PARTICIPANT CONSENT FORM - INDIVIDUAL

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to the interview being sound recorded.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature: ..... **Date:** .....

Full Name .....

Appendix 3f: Interview guide initiative 2 employees

Test recorder. Geen haast, uit laten praten, netjes schrijven, ook niet verbaal noteren, plaatsing recorder, zo kort mogelijk.

Interview guide

Introduction:

Intro, thanks, formalities

Go over info sheet (have you had time to read it?)

Aim of research: to gain insight into sustainable land-use in Hawke's Bay by developing an understanding into how sustainable practices become more common, and ultimately how organisations like regional councils can support these initiatives.

Aim of the interview: to learn more about organisations and initiatives identified by discussion groups' participants to shape sustainable practices. Particularly what these organisations and initiatives see as their role, by what this role is shaped, how they try to achieve it, who else is involved, and what they perceive as challenges and enablers.

Ethics and procedures:

Sign consent form

You can ask me to stop the recorder at any time during the interview.

Any questions?

Probes: example, tell me more, explain, compare, elaborate, specify, when, why, how, is that common, changes

Start recorder

Interview questions

	related questions	**answers**
Role	Role person? (since?)	
	What do you try to achieve in your role? Why? How? (enabling/informing/encouraging farmers?)	
	What part is focused on water quality and other environmental issues?	

	What (other) actions does organisation/initiative (of the interviewee) take to change practices in water quality and other environmental issues? (how, why?)	
	Has that changed? (how, why?)	
	What shapes the content of the role that you have in water q and other environmental issues? (organisation? How does media shape it? Who or what else?)	
	Has that changed? (how, why?)	
Engagement	How do you engage with farmers?	
	How do you know what to talk about with farmers (DNZ & Font)? (how is the agenda made?)	
	In an ideal world, what would (you) have been achieved in 5 years? (what do farmers do differently?) What is needed for that change?	
	What challenges your role? What enables?	
	How do you bring up topics like water quality?	
Network	Do you interact/work together with other organisations about environmental issues? (which? Why?)	
	Have interactions with farmers or other organisations changed?	
	Have other organisations changed around their approach of water quality and other environmental issues?	

- Media
- HBRC awards
- Tutira group
- Discussion group
- App
- Clean streams and Fonterra farm plans
- Tiaki

End

Thanks, things to add?

Who else should I talk to?

If I missed anything can I contact you?

Appendix 3g: Interview guide initiative 2 farmers

Interview guide

Test recorder. Geen haast, uit laten praten, netjes schrijven, ook niet verbaal noteren, plaatsing recorder, zo kort mogelijk.

Introduction:

Intro, thanks, formalities

Go over info sheet (have you had time to read it?)

Aim of research: to gain insight into sustainable land-use in Hawke's Bay by developing an understanding into how sustainable practices can arise and diffuse, and ultimately how organisations, like regional councils, can support these initiatives.

Aim of the interview: to learn more about discussion groups' participants experiences and views with regard to sustainable practices. How do they learn about measures, which considerations are taken into account for uptake (what hampers, what helps), what role does the discussion group play in promoting sustainable practices.

Probes: example, tell me more, explain, compare, elaborate, specify, when, why, how, is that common

Ethics and procedures:

Sign consent form

You can ask me to stop the recorder at any time during the interview.

Any questions?

Start recorder

Interview questions

	related questions	**answers**
	Could you tell me something about your farm?	
Discussion group	**How (and when) did you get involved in the discussion group? (role?)**	
	Since when are you involved?	
	Have topics/aim changed over time?	
	(Could you describe the roles of the organisations involved? (funding, publicity, knowledge?))	
	What are the most important reasons for you to have joined the discussion group?	

	Are there things you do different because of something you learned at the discussion group? Why? What not?	
	Specifically with regard to environmental sustainability have things changed?	
Land use	**(How can the area be characterized?) Are there major changes you have seen in the area with regard to land use? Have practices changed? Rules/regulations? Views?**	
	Did you change anything yourself?	
Mechanisms	**What has enabled/caused the changes?**	
	What is the role of the discussion group in this? (if not already mentioned)	
	Are there other things (initiatives/regulation/organisations) that inspired changes?	
Current	**What are current challenges you face? (how do you approach that?)**	
	What is going really well now?	
	(Reflect on challenges that were overcome?)	
Future	**What will this catchment look like in 10 years (hopes and expectations)?**	

End

Thanks, things to add?

Who else should I talk to?

If I missed anything can I contact you?

Niche-regime interactions	◯
Linkage mechanisms	◯
Multi-Scalarity	◯
Boundaries	◯
Socio-spatial embeddedness	◯
Actor role, level and sector	◯

Appendix 4: Human ethics approval

Human Ethics Notification - 4000015847

humanethics@massey.ac.nz <humanethics@massey.ac.nz>

Wed 18/05/2016 11:12

To: Lindsay, Alice <A.Lindsay@massey.ac.nz>; Florentine.van.Noppen.1@uni.massey.ac.nz

<Florentine.van.Noppen.1@uni.massey.ac.nz>; Reid, Janet <J.I.Reid@massey.ac.nz>

Cc: Thomas Vincent, Miralie <M.E.Thomas@massey.ac.nz>

HoU Review Group

Ethics Notification Number: 4000015847

Title: Resilience and sustainable hill country land-use governance in Hawke's Bay

Thank you for your notification which you have assessed as Low Risk.

Your project has been recorded in our system which is reported in the Annual Report of the Massey University Human Ethics Committee. The low risk notification for this project is valid for a maximum of three years. If situations subsequently occur which cause you to reconsider your ethical analysis, please log on to http://rims.massey.ac.nz and register the changes in order that they be assessed as safe to proceed.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

A reminder to include the following statement on all public documents: "This project has been evaluated by peer review and judged to be low risk. Consequently it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research. If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Dr Brian Finch, Director (Research Ethics), email humanethics@massey.ac.nz. "

Please note that if a sponsoring organisation, funding authority or a journal in which you wish to publish require evidence of committee approval (with an approval number), you will have to complete the application form again answering yes to the publication question to provide more information to go before one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

You are reminded that staff researchers and supervisors are fully responsible for ensuring that the information in the low risk notification has met the requirements and guidelines for submission of a low risk notification.

If you wish to print an official copy of this letter, please login to the RIMS system, and under the Reporting section, View Reports you will find a link to run the LR Report.

Yours sincerely

Dr Brian Finch
Chair, Human Ethics Chairs' Committee and
Director (Research Ethics)

Appendix 5: Australasian Dairy Science Symposium paper

Responding to Pressures to Adopt Environmentally Sustainable Practices: Farm Environmental Plans as "Boundary Objects"

FD van Noppen[1]*, JI Reid[1], K Hytten[1], DJ Horne[1], L Burkitt[1]

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*Corresponding author. E-mail: f.d.vannoppen@massey.ac.nz

Abstract

How farmers navigate pressures to adopt increasingly environmentally sustainable farm practices can inform organisations including local government agencies and enable support for change initiatives. This paper presents preliminary findings from a case study of a dairy farmers' discussion group in Hawke's Bay, Aotearoa New Zealand. This discussion group represents an example of an initiative seeking to address recognised, local water quality issues. Farmers indicated that they perceived pressure from industry, the public, local government and a local community group to change practices in order to improve local water quality. Farmers reported proactive implementation of environmentally sustainable practices, but expressed that these efforts were not acknowledged. Farmers expressed a desire to address negative perceptions of dairy farming; recognising the influence of negative societal perceptions upon their social licence to operate. The farmer discussion group responded collectively by developing Farm Environment Plans (FEPs), in part as evidence of their efforts with regard to environmental sustainability in their farms. This unconventional way of using farm plans to demonstrate environmental practices, has implications for how these plans (and additional tools) could be developed in the future to improve communication between farmers and other actors in the transition to sustainable practices.

KEYWORDS: *boundary objects; environmental issues; multi-actor initiative; stakeholder groups; non-regulatory pressures; public perception*

Introduction

Environmental sustainability and farm productivity are often regarded as antagonistic considerations which must be reconciled by farmers across agricultural industries. The dairy industry is a major industry in Aotearoa New Zealand, contributing 3.5% to Gross Domestic Product (GDP) in 2016 (New Zealand Institute of Economic Research 2017). At the same time, the dairy industry has contributed significantly to the on-going deterioration of water quality in rivers and lakes (Ministry for the Environment 2017). In recent years, public campaigns including campaigns by Fish and Game and Forest and Bird (Fish and Game 2018; Forest and Bird 2018) and policy measures, such as the National Policy Statement for Freshwater Management (Ministry for the Environment 2014) have been launched, aiming to improve water quality. These initiatives, along with increased public awareness of water quality issues, have brought attention to the effect of dairy farming practices on environmental health and dairy farmer's Social License to Operate (SLO) is arguably being challenged (Foote et al. 2015; Edwards and Trafford 2016). Understanding how farmers navigate these challenges can inform organisations, including local government agencies, as to how they can support farmers and ultimately help facilitate a transition towards more environmentally sustainable farm practices.

This paper reports on research into how farmer practices are shaped in the context of a transition towards more environmentally sustainable agricultural land-use by exploring the following research question: how do farmers navigate pressures to adopt more environmentally sustainable practices? The research focused on how actors, their interactions and the local context were perceived to influence practices. This paper reports on interviews with members and key informants involved with a dairy farmer discussion group in Hawkes Bay, New Zealand, who have actively worked to mitigate the impact of their dairy farming practices on local water quality.

The social licence to operate

To study changing expectations of what constitutes socially acceptable practices by industries or organisations, scholars have explored the concept of SLO (Edwards and Trafford 2016; Moffat et al. 2016). Most of the literature on SLO focuses on the mining industry, but the concept has also been applied to other sectors, including agriculture (Moffat et al. 2016). Social license to operate is determined by the relationships between an industry and broader society and the social and legal licence to operate are not always aligned: approval on a regulatory level does not necessarily mean practices are socially acceptable (Shepheard and Martin 2008; Moffat et al. 2016). Social licence to operate reflects current societal values, expectations and perceptions and is negotiated and implied rather than acquired. Loss or compromise of the SLO can lead to conflict between the industry in question and the broader community (Moffat et al. 2016). Development and maintenance of SLO is a continuous and evolving process. Gaining and keeping SLO involves on-going negotiation between industry and society, during which industry practices must continue to be found justifiable (Shepheard and Martin 2008). For the New Zealand dairy industry, the SLO has been challenged, and it has been suggested that there is a need for farmers to communicate evidence of progress towards more environmentally sustainable farming practices, in order to retain SLO (Edwards and Trafford 2016). In other industries in which practices have been called into question (e.g. mining and oil industries), toolkits to engage with the community have been developed. These toolkits provide the mechanism to both demonstrate and communicate the alignment of practices with society's expectations (Mercer-Mapstone et al. 2017).

Boundary objects

"Boundary object" is a concept that refers to tools, ranging from documents to concepts, with the ability to enable communication between stakeholder groups. The concept was first introduced by Star and Griesemer (1989), who describe the use of boundary objects in their social study about the development of a museum in which people from different backgrounds needed to collaborate. Boundary objects emerge in their function as tools that connect stakeholder groups, and can vary in tangibility and flexibility (Klerkx et al. 2012). They can mean different things to different people, or groups of people. For instance, food labels have been described as boundary objects facilitating communication between the food industry and consumers (Eden 2011). Boundary objects can help identify and resolve disagreements between stakeholder groups, as well as identify areas of common ground. However, it is also important to consider the limitations of boundary objects. For example as, Tisenkopfs et al. (2015) highlights based on their research on empirical case studies examining the use of boundary objects in agricultural innovation; boundary objects can be more relevant to some stakeholders then others, or may lose their relevance to an issue over time. Boundary objects and SLO are both related to negotiations between people of different stakeholder communities who share an interest in the same "space". Boundary objects can serve as a connecting tool that enables interactions between people to negotiate SLO.

Methodology

A qualitative single case study approach was used. The selected case is an example of a local response to a natural resource management issue. The criteria for the selection of the case included: that it was a multi-actor initiative aiming for sustainable land-use in Hawke's Bay; and that the initiative has been active for at least three years. Based on these criteria, an existing farmer discussion group, run by DairyNZ (the national dairy industry good organisation) based in Hawke's Bay region was selected. The farmer discussion group was based in an area that has recognised water quality issues. At the time of the interviews, the discussion group consisted of thirteen dairy farmers who met to discuss farming practices once a month, on one of their farms. Findings presented here originate from six in depth, semi-structured interviews with members of the farmer discussion group (individually or in two cases both partners), eight key informant interviews with people from industry and government organisations linked with the group, and the analysis of documents (including reports from local government agencies, webpages of the organisations involved and newspaper articles about the local water quality issue). All interviews were recorded, transcribed, digitally coded (in NVIVO) and thematically analysed (Coffey et al. 1996).

Navigating expectations

In addition to regulatory pressures, all interviewed farmers expressed feeling pressure from their community, the wider public and the media to adopt more environmentally sustainable practices. There was a strong sentiment among farmers that the dairy farming industry and farmers received an unreasonable amount of scrutiny compared to other sectors. As expressed by one farmer about perceived differences between attitudes toward dairying and urban sewage overflow:

> *But if we have a mistake we get in trouble, if we have a rain event like we had an inch of rain in 30 minutes and everything starts overflowing or anything like that we get in trouble, but if that happens in town and raw sewage goes into the sea or the lake or whatever that's fine* [Farmer 1].

Additionally, farmers argued that the measures they were taking to reduce pollution are more effective than the more visible measures demanded of them by Fonterra (dairy corporative they belong to) through the Sustainable Dairying Accord, such as fencing streams and planting trees. So, farmers felt the need to defend their practices from notions they considered incorrect or unfair.

In response to these non-regulatory demands, farmers mentioned several ways in which they were actively trying to change perceptions through communication. Interestingly, the farmers in the farmer discussion group had collectively elected to develop Fonterra Farm Environment Plans (FEPs) for their farms, partly in order to demonstrate their efforts and progress regarding environmental stewardship. One farmer explained the purpose of the farm plans as follows:

> *This is why we're pushing to get these farm environmental plans done so we've got them to take* [to local community group meetings]*, so we've got evidence on it* [Farmer 2].

Initially the primary intention for creating the plans was not to act as a mechanism of communication to third parties, but to facilitate environmental planning and benchmarking. As a Fonterra sustainable dairying strategic team representative explained:

> [The plans were] *more about our farmers understanding where they sat* [with regard to environmentally sustainable practices] *and how we could support them.*

The local community group in the catchment sought to incorporate the FEPs into catchment plans. Opportunities were identified to develop ways to integrate cultural and biodiversity values that the local community group felt were missing from the plans, and sought to align the FEPs with future objectives of the catchment plan. One local government employee expressed the following view:

> *Some of the key areas that we don't see in the Fonterra plan… like the cultural section, the biodiversity, biosecurity section and… making sure that the farm plans are plugged into the integrated [catchment] plan.*

In addition to developing their FEPs, the farmer discussion group appointed farmer representatives to advocate for the dairy farmers at local community group meetings. Farmers saw the wider dairy industry, in particular milk processor Fonterra, as actively trying to improve public perceptions about dairy farming environmental responsibility, both locally and nationally. Farmers cited examples including investments in sustainable dairy advisors, creating their FEPs, TV commercials promoting industry environmental sustainability, and the 'Clean Streams Accord' as evidence of responsible, effective stewardship. Farmers had responded to regulatory pressures and other motivations by making changes on farm, but during interviews the dairy farmers responses to negative perceptions and non-regulatory pressure reflected the need to communicate more effectively.

Discussion

In this study, farmers were found to navigate pressures to adopt more sustainable practices by seeking ways to communicate. This study identified differences in beliefs about what constitutes sustainable farm practices between the interviewed farmers and what they perceived the public believed. This difference drove farmers to seek to demonstrate and defend their practices. A parallel trend was seen by the participants in the wider industry, with industry organisations seeking to improve the industry's environmental reputation. Therefore, in line with the work of Edwards and Trafford (2016), this empirical study suggests that dairying practices in New Zealand can be seen as an example where the SLO is being challenged. More specifically, farmers indicated that they were responding to regulations by adapting their practices, yet they felt further pressure from their community, the media and the wider public to adopt more sustainable practices. This can be described as an example of the legal and social licence not being aligned (Moffat et al. 2016) and different responses to each of them were observed.

In this case study perceived challenges to farmer's SLO resulted in a mobilization of farmers who sought new ways to demonstrate their practices to their local community. The present study demonstrated that FEPs could act as boundary objects to communicate and demonstrate practices in the negotiation of SLO. The way the FEPs were used in the wider community was not anticipated or planned by the designers of these FEPs. Their use emerged because of a combination of local social and environmental circumstances. The FEPs were viewed and used differently by different stakeholder groups, and facilitated interactions that could be characterized as negotiations between these stakeholder groups. These attributes and uses of the FEPs are in line with what has been described in literature as boundary objects (Star and Griesemer 1989; Klerkx et al. 2012). Viewing FEPs as boundary objects is a novel way of viewing FEPs, which potentially broadens the scope of their application.

A practical implication of the observed use of FEPs as boundary objects in this case study is that future FEPs may be further developed to support this use. This could be achieved by adapting the language to non-farmer audiences and providing key summary information that could be easily understood. Additionally, in response to the demand of dairy farmers to demonstrate the sustainability of their practices and negotiate SLO, other tools could be deliberately designed to be used as boundary objects, as was done in the mining and oil industries (Mercer-Mapstone et al. 2017). However, as

pointed out by Tisenkopfs et al. (2015), boundary objects also have their limitations, and careful consideration of the relevance of a boundary object to different stakeholder groups is important.

Conclusion

Evidence from this case study shows that FEPs were valued by farmers as a mechanism to communicate and make the sustainable practices farmers are implementing visible for people beyond their farms. Simultaneously, other actors saw opportunities to build on these plans. It is argued that FEPs are facilitating communication between stakeholders, shaping views and potentially contributing to a renegotiation of their SLO. Future research, including farmer surveys with greater participant numbers, will be needed to confirm whether this desire to communicate and demonstrate practices is shared by dairy farmers nationally. Considering the existing widespread application of FEPs among farmers in Aotearoa New Zealand, this novel way of viewing FEPs as boundary objects opens potential new uses of the plans for many farmers. As boundary objects, FEPs may enhance communication between farmers and their communities, and ultimately facilitate the negotiation of SLO.

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