



LUND UNIVERSITY
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Revitalising Triple-Wins within Pathways

The importance of the priorities of local stakeholders

by

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Abstract

Triple-win projects have been failing in Sub-Saharan Africa. The top-down approach of policymakers and donors lead to the priorities of local stakeholders not being accounted for which in turn leads to trade-offs. Instead of disregarding triple-wins, researchers have suggested they could be used as building blocks in the emerging pathways literature, therefore accounting for a broader set of goals. However, there is no empirical evidence of this. Thus, aim of this thesis is to explore to what extent understanding the priorities a group of local stakeholders can indicate where interventions would have the best chance of success. To do so, semi-structured interviews were conducted with 10 large-scale farmers in South Africa. A Content Analysis tool, derived in Pathways literature, was applied. The outcomes show understanding the priorities of the farmers provides a strong indication of where interventions would have the best chance of success, indicating triple-wins could function within pathways. Keywords: Triple-wins, Pathways, Sustainable Development, Sub-Saharan Africa

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1 Introduction

“Sustainable development requires human ingenuity. People are the most important resource.”
- Dan Shechtman, Winner of the 2011 Nobel Prize in Chemistry.

Background

Anthropogenic climate change has become a focal global challenge as its disastrous impact become more apparent (Perera & Hewege, 2018). How society should react is not straightforward (Keohane & Victor, 2016). Stakeholders need to simultaneously:

- adapt to an already changing climate
- attempt to mitigate further change
- promote economic development.

Even in the most well-intentioned projects in one sector can have unintended consequences or require trade-offs elsewhere. Climate change is still considered a long-term problem whereas demand for economic development presents an immediate problem, so trade-offs are often taken to the detriment of the climate.

Sub-Saharan Africa is poised to play an important role in this challenge. As its population increases and development levels improve, consumption of resources such as energy (Calvin, Pachauri, De Cian & Mouratiadou, 2016) and food (Conceição, Levine, Lipton & Warren-Rodríguez, 2016) will rise. Agriculture, as one of the largest contributing industries to greenhouse gas emissions, is concurrently very sensitive to changes in the climate, but must persist as an industry in order to provide for global food security (England, Stringer, Dougill, & Afionis, 2018) This multifaceted challenge can be summarized by the “Sustainable Intensification paradigm” which attempts to satisfy growing global food demand whilst reducing the burden on the environment created by agriculture (Bonfiglio, Arzeni & Bodini, 2017, p. 123).

How the agricultural sector uses land has global ramifications due to elements such as carbon sequestration (Houghton, House, Pongratz, van der Werf, DeFries, Hansen, Le Quéré & Ramankutty, 2012), biodiversity loss (Newbold, Hudson, Arnell, Contu, Palma, Ferrier, Hill, Hoskins, Lysenko, Phillips, Burton, Chng, Emerson, Gao, Pask-Hale, Hutton, Jung, Sanchez-Ortiz, Simmons, Whitmee, Zhang, Scharlemann & Purvis, 2016) or moisture fluctuations (Boisier, de Noblet-Ducoudré & Ciais, 2014). Among other challenges, farmers must adapt as farmland is damaged by climate-change-related phenomena, such as flooding in some areas washing away fertile soils (Abah & Petja, 2016, p. 683) and drought in others damaging crops and soil health (Duku, Zwart, van Bussel & Hein, 2018). They are also vulnerable to coinciding economic and social burdens (O'Brien & Leichenko, 2000), and many farmers do not have the resources or training to manage their agricultural assets in the most efficient, sustainable way (Kansiime, van Asten & Sneyers, 2018). Indeed, many farmers are reacting by expanding to regions with more nutritious, untouched soils, such as that of natural grasslands and rainforests

(Kovacic & Viteri Salazar 2017, p. 113). Destruction of such habitats is devastating for wildlife populations residing there, but also compounds climate change through loss of carbon-sequestering vegetation (Di Vita, Pilato, Pecorino, Brun & D'Amico, 2017).

The farmers of the Conquered Territory (Coplan, 2001), a region in of the eastern Free State, South Africa which borders Lesotho, face a unique set of challenges as the border with Lesotho is unrestricted and crime rates are high.

Problem Statement

Clearly, this calamitous situation requires an intervention. However the question of where, when and how to intervene is a complicated one. Many policymakers and climate-conscious donors have championed *triple-win* (Nunan, 2017) projects as, in theory, they account for the adaption to and the mitigation of climate change, whilst also supporting economic development. Such interventions are very ambitious and popular as they aim to solve problems without trade-offs.

However, an increasing number of studies have indicated that triple-win projects without trade-offs are rarely achieved (Suckall, Stringer & Tompkins, 2015) primarily due the priorities of local stakeholders being ignored (Wood, Dougill, Quinn & Stringer, 2016). Furthermore, as the priorities of many local stakeholders can be extrinsic to the triple-win objective (Tanner, Mensah, Lawson, Gordon, Godfrey-Wood, & Cannon, 2014) therefore even if triple-wins are achieved, there can be negative outcomes beyond the three focal challenges (Wood, Stringer, Quinn, & Dougill, 2017).

In response, Ellis and Tschakert (2018) make a compelling argument that conventional triple-wins are purely rhetoric and that a broader *pathways* approach offers the means to greater understanding of the priorities of such stakeholders. Greater understanding can be a guide of which, when and how interventions have the best chance of success.

Research Aim and Objectives

The aim of this thesis is to explore to what extent understanding the priorities a group of local stakeholders can indicate where interventions would have the best chance of success. The term 'intervention' in this thesis refers to action with the goal of either directly achieving triple-wins or to resolve problems that have been hindering triple-wins. This aim is inspired by a gap found in literature where scholars had suggested that the failing triple-win approach may still have part to play in the emerging pathways literature, but there was no empirical evidence of this. This thesis therefore hopes to provide such evidence.

To achieve this, the researcher conducted in-depth semi-structured interviews with a group of large-scale farmers from the Eastern Free State in South Africa to gain an understanding of their priorities. This is the basis of the secondary research question. A Content Analysis tool,

specifically O'Brien's (2018) *three spheres*, will then applied to the results of the interviews. The stakeholders in question are a group of ten large-scale farmers in the Conquered Territory in the Free State, South Africa.

Research Questions

RQ1: To what extent does understanding the priorities of the farmers indicate where interventions would have the best chance of success?

RQ1b: What factors do South African farmers take into account when making decisions?

Outline

This thesis is in five chapters. Following this introduction, Chapter Two constructs a theoretical framework including a review of previous literature and a breakdown of the Content Analysis framework. The third chapter is a description of the research methodology. Chapter Four begins by proving a brief historical context. It then presents the results of the data collection followed by discussion within which the content analysis framework is applied to the results of data collection. The Chapter Five concludes this thesis including implication and suggestions for further reading and research. Following this is the Appendices and References.

2 Theoretical Framework

The goals of a theoretical framework are to show how this research fits into existing literature and how it will make a contribution to that literature (Maxwell, 2005). This chapter does this by reviewing triple-win and certain pathways literature, which highlights a demand for understanding local stakeholders', particularly farmer priorities. The chapter also sets out a Content Analysis tool that will be applied during the discussion.

Literature Review

Triple-wins

There is a clear consensus that anthropogenic climate change has been brought about by societal pursuit of economic development in an unsustainable manner (Flöser & von Storch, 1999; Oreskes, 2007; Cook, Nuccitelli, Green, Richardson, Winkler, Painting, Way, Jacobs & Skuce, 2013) Triple-win projects are attempting to intervene and to change this. They are attempting to continue the pursuit of economic development whilst also adapting to climate change and mitigating further climate change effects (Nunan, 2017) normally at a smaller scale, targeting a group of villages or a primary recourse enterprises.

England et al. (2018, p. 9) considers triple-win projects as particularly imperative to developing countries as many of their economies are based around natural resource sectors which are being impacted by climate change. Copious research of triple-wins has focused on developing countries in Sub-Saharan Africa as it is one of the most vulnerable regions to the impacts of climate change and is a region forecast to see huge progress in development (England et al. 2018; Favretto, Dougill, Stringer, Afionis & Quinn, 2018; Leventon, Dyer & Van Alstine, 2015; Sietz, Boschütz, & Klein, 2011; Stringer, Sallu, Dougill, Wood, & Ficklin, 2017; Suckall, Stringer & Tompkins, 2015; Suckall, Stringer & Tompkins, 2015; Tanner, Mensah, Lawson, Gordon, Godfrey-Wood & Cannon, 2014; Wood, Stringer, Quinn & Dougill, 2017; Wood, Dougill, Quinn & Stringer, 2016).

The determination to achieve triple-wins has led to the development of a range of models with variations in the spatial and conceptual emphases on each dimension (Favretto et al. 2018, p. 779). Arguably most developed model for seeking triple-wins is that of Climate Compatible Development (CCD), first defined as “development that minimizes the harm caused by climate impacts, while maximizing the many human development opportunities presented by a low emission, more resilient future” (Mitchell & Maxwell, 2010, p. 1). Regardless of the variations, the three key goals remain the same.

As ambitious and as positive as triple-wins appear to policymakers, donors and the public, and despite the wide range of triple-win models, there has been criticism amongst researchers about their practicality and feasibility (Suckall, Stringer & Tompkins, 2015). Indeed, there is a scarcity of cases where triple-wins have been fully achieved (Maxwell, 2017). Furthermore,

even in circumstances where triple-wins appeared to have been achieved, trade-offs between the three challenges are continue (Tompkins, Mensah, King, Long, Lawson, Hutton, Hoang, Gordon, Fish, Dyer & Bood, 2013) or trade-offs outside the three challenges occur (Wood et al. 2017).

Recently, a reason for these failures has been emerging in literature. The first reason concerns the typical design approach of triple-wins, which is top-down (England et al. 2018). Monast, (2016, p. 175) indicates that, prior to 2009, a top-down approach in climate policy as a whole tended to be unsuccessful and thus there has since been a shift to a more tailored bottom-up approaches. Clear examples are observed in developing countries where policies that regulate land from cultivation clash with the desperation of citizens for food or income and the weak rule of law is not enough to dissuade people from breaking those regulations. This is noted in case studies for Indonesia and Thailand (Safrina, 2014, p. 236), Uganda (Tumusiime, Byakagaba & Tweheyo, 2018, p. 143), Ecuador (Kovacic & Viteri Salazar 2017, p. 113), Mexico (Hansen, 2017, p. 91) and Brazil (Viola, 2013, p. 123). Supporting this, there is evidence that a bottom-up approach in climate policy has had more success. Kattel and Mazzucato (2018) noted that there is value in identifying what capabilities are required to form these kinds of policies from the bottom-up such as public-private partnerships and grass roots social engagement. Eriksen, Nightingale and Eakin (2015) asserted that reacting to climate change was a political but also a social process. Stringer et al. (2017) suggested that triple-wins there can only occur through a systematic change across all governance levels.

The second reason, building upon the failing top-down approach, suggests that triple-wins are poorly designed as they do not account for the unique priorities of all local stakeholders in the regions where interventions have been attempted, particularly in Sub-Saharan Africa (Atela, Quinn, Minang, & Duguma, 2015; Hurlbert & Gupta, 2015; Sova, Vervoort, Thornton, Helfgott, Matthews, & Chaudhury, 2015). The priorities in question are varied and often unique to the location. The needs of local stakeholders are short term and thus don't align with triple-win goals (Tanner et al. 2014) Suckall, Stringer & Tompkins (2015) highlighted how essential it is to implement localised climate policy and community-based management. Dyer, Stringer, Dougill, Leventon, Nshimbi, Chama, Kafwifwi, Muledi, Kaumbu & Falcao (2014) showed that vital elements of achieving triple-wins are community engagement and local participation, combined with the establishment of multi-stakeholder partnerships. Wood et al. (2017) presented that ability to apply the triple-win template across various local environments is unfeasible due to community-specific needs that the outcomes of triple-win projects were uneven across stakeholder groups with some ending up worse off.

A third reason for failure, building on the difference been all forms of stakeholders, are that values and worldviews that define one's impression of climate change varies greatly (Boyd, May, Chang, & Veiga, 2007; Jindal, Swallow, & Kerr, 2008). Indeed, it can be difficult for project designers to understand local priorities if they do not align with Western, scientific worldviews (Sova et al. 2015).

Of course, not all preferences of local stakeholders can and should be taken into account. In a discussion of improving the design of triple-win projects, Hurlbert & Gupta, (2015) recommend a dialogue during which assorted stakeholder preferences are examined and critiqued to ensure the best outcome is achieved.

The objectives between donors and policy makers, and local stakeholders is not always contradictory. Common ground has been observed in a number of projects that ended with *double-wins* (Wood et al. 2016), specifically adaptation and development. Although the motivations of the two groups to adapt and to develop the area may differ, their goals can still align. For example, a policymaker may want to adapt to flooding so as to preserve infrastructure in the region. A local stakeholder may only want to keep his or her house intact. What differs is how they adapt, and often local stakeholders' options are limited due to capital and information (Nhemachena & Hassan, 2007).

Unfortunately, when these “lesser” double-wins occur, mitigation of climate change has been disregarded. Wood et al. (2016) found that actions with intended mitigation benefits, such as solar lighting, were the least prioritized by local stakeholders. A likely cause of this is contrasting worldviews between local stakeholders and policymakers and donors (Wood et al. 2016), most commonly locals not believing in anthropogenic climate change.

The final, recurring reason for not achieving triple-wins was governance. Antwi-Agyei, Dougill & Stringer (2017) showed that failed triple-win projects were plagued with poor coherence between public institutions and stakeholders. Additionally, Tanner et al. (2014) presented how governments blemished by corruption create a significant hinderance.

Triple-wins as the Building Blocks of Pathways

Does this failure of conventional triple-wins thus far mean that their positive ambitious goals must be disregarded as impractical? Some evidence indicates that they be achievable. In a curious finding, Leventon, Dyer & Van Alstine (2015) observed that mining corporations in Zambia were realigning their Corporate Social Responsibility (CSR) activities to improve the livelihoods of local residents and that these CSR activities could be described as CCD projects. Therefore, they were briefly and inadvertently achieving a triple-win because the needs of locals were accounted for, indicating it is possible under certain circumstances.

Ellis and Tschakert (2018), in a thorough and persuasive paper, argue that, in their current form, triple-wins are purely popular rhetoric. They contend that triple-wins could rather find a fitting place in the emerging conceptual architecture, supporting *pathways* thinking. Broadly, pathways signify movement along a trajectory from a current problematic condition to a future desirable state. “Although open to multiple interpretations, pathways show promise as a bridging concept” (Ellis and Tschakert, 2018, p. 3). It is here that the admirable objectives of the triple-wins template may be revitalized.

Pathways investigate how diverse priorities, needs and perspectives might intersect and unify in the pursuit of common objectives (Ellis and Tschakert, 2018). Robinson and Shine (2018) argue that pathways account for aspects external to the triple-win, such as political factors, and acknowledging that trade-offs may be required is the start of the process that leads to the best possible outcome across numerous objectives.

Rosenbloom (2017, p 46) elaborates on this by explaining,

“the promise of the concept of pathways is not simply to incorporate long-term climate considerations into policy and planning but also to help negotiate among priorities by exposing the implications (political or otherwise) of immediate choices for long-term objectives around climate change, economic development, and even sustainability more broadly. By more explicitly exposing the trade-offs embodied by choices, a pathways frame may help to broaden and deepen debates surrounding the possibilities pursued to unlock low-carbon transitions.”

There are three groups of pathways: biophysical, techno-economic, and socio-technical (Rosenbloom, 2017). Due to the scope of this paper, there will only be a mention of certain socio-technical pathways due to the appropriateness of this group for social research, however, refer to Figure 4 in the appendix for further explanation of the difference between the three.

The promising nature of pathways does not mean that triple-win research should be disregarded. For one, they helped inform research constructing pathways (Denton, Wilbanks, Abeysinghe, Burton, Gao, Lemos, Masui, O'Brien & Warner, 2014). For example, climate-resilient development pathways' main goals are essentially triple-wins but are also aimed at social equity, resilience and justice (Olsson, Opondo, Tschakert, Agrawal, Eriksen, Ma, Perch & Zakieldean, 2014). Furthermore, research in triple-wins has shown that the trade-offs vary greatly depending on the specific scenario (Thornton and Comberti, 2017).

To address these trade-offs, Ellis and Tschakert, (2018) state that there should be less focus on the type of intervention that could achieve triple-wins and **more focus on understanding socio-political conditions as they determine whether positive outcomes are possible, for whom, and through which instruments.** This means having to closely examine who makes decisions, how those decisions are made, what factors are taken into account, which trade-offs are chosen, why they are chosen and what course of action is considered desirable. This informs the main aim of this thesis.

To achieve this aim, farmers are a perfect local stakeholder for examination. Obersteiner, Walsh, Frank, Havlík, Cantele, Liu, Palazzo, Herrero, Lu, Mosnier, Valin, Riahi, Kraxner, Fritz & van Vuuren (2016) detailed that articular land use is crucial for sustainable transitions. Indeed, there has been a call for further study on farmers and triple-wins as Esham and Garforth (2012, p. 535) state, “[i]n order to develop appropriate strategies and institutional responses, it is necessary to have a clear understanding of the farmers' perception of climate change, actual adaptations at farm-level and what factors drive and constrain their decision to adapt.” Nearly

all the literature reviewed so far on triple-wins in agriculture examined small-holder farmers. Whilst crucial research, large-scale farmers are also local stakeholders and, given their scale, have greater potential to implement sustainable actions around them.

To aid in this examination Ellis and Tschakert (2018) suggest five varieties of pathways which are aimed at sustainable development goals whilst also addressing a various genres of trade-offs. Patterson, Thaler, Hoffmann, Hughes, Oels, Chu, Mert, Huitema, Burch & Jordan (2018) reviews the role of social justice as an organizing principle. Roy, Tschakert, Waisman, Abdul Halim, Antwi-Agyei, Dasgupta, Hayward, Kanninen, Liverman, Okereke, Pinho, Riahi. & Suarez Rodriguez (2018) looked at an interconnected approach facing sustainable development, poverty eradication and reducing inequalities. Harris, Chu & Ziervogel (2017) develops the concept of ‘Negotiated Resilience’. Fazey, Carmen, Chapin, Ross, Rao-Williams, Lyon, Connon, Searle and Knox (2018) laid out the ten essentials are presented for community resilience. Finally, O’Brien (2018) presented the three spheres of transformation as a way of understanding where interventions would be most successful. For the region in question, all of these concepts would be useful and it’s encouraging that research exists on them. However, it is beyond to the scope of this paper to examine them all and thus only one will be used. This paper argues that O’Brien’s work is very appropriate for the case of the farmers, as discussed in the next section.

Content Analysis Tool

This section summarises O’Brien’s (2018) three spheres to aid in its application in the discussion in Chapter four.

O’Brien’s (2018) three spheres is a framework to better understand the current condition and identify where intervention would be most successful. This could be intervention at a local, regional or nation level. O’Brien (2018) suggests that, although pathways are important for progressing to a low carbon society, they often disregard how such deliberate social transformations happens. The complexity of the social interactions between different actors and what influences those actors is overlooked in favour of technical progress. This thesis argues, as highlighted in the literature review, that this same criticism has led to the failure of many triple-win projects and why O’Brien’s work is appropriate in answering Research Question 2.

In response, O’Brien (2018) presents a heuristic framework for understanding the breadth and depth of what is required for transformations. The three spheres are (1) *practical*, (2) *political* and (3) *personal*, and all three must be recognised and understood if the goal of a low-carbon society is to be achieved. To do this, O’Brien (2018) first makes the distinction between technical and adaptive challenges.

Technical versus adaptive challenges

There has been focus on literature about incremental versus transformative change, or reformist versus radical change (Pelling, 2011; Nalau & Handmer, 2015), but both ultimately describe the rate or quality of change. Heifetz, Grashow and Linsky (2009) make a different distinction: *technical* versus *adaptive* (not to be confused with ‘adapting’ to climate change). These categories contextualise the type of problem that is being addressed, and this distinction is a crucial point in O’Brien’s (2008) argument. Technical problems are those solved by technical innovations. But technical innovations often lead to personal trade-offs and undervalues the role of people to make change. Adaptive challenges “recognize[s] the importance of mind-sets, especially the beliefs, values, and worldviews that influence how problems and solutions are perceived, approached and addressed” (O’Brien, 2018, p. 154). If climate change is viewed as an adaptive challenge, the personal and political elements become critical to the success of practical strategies and the challenge involves a deeper social transformation.

Three spheres of transformation

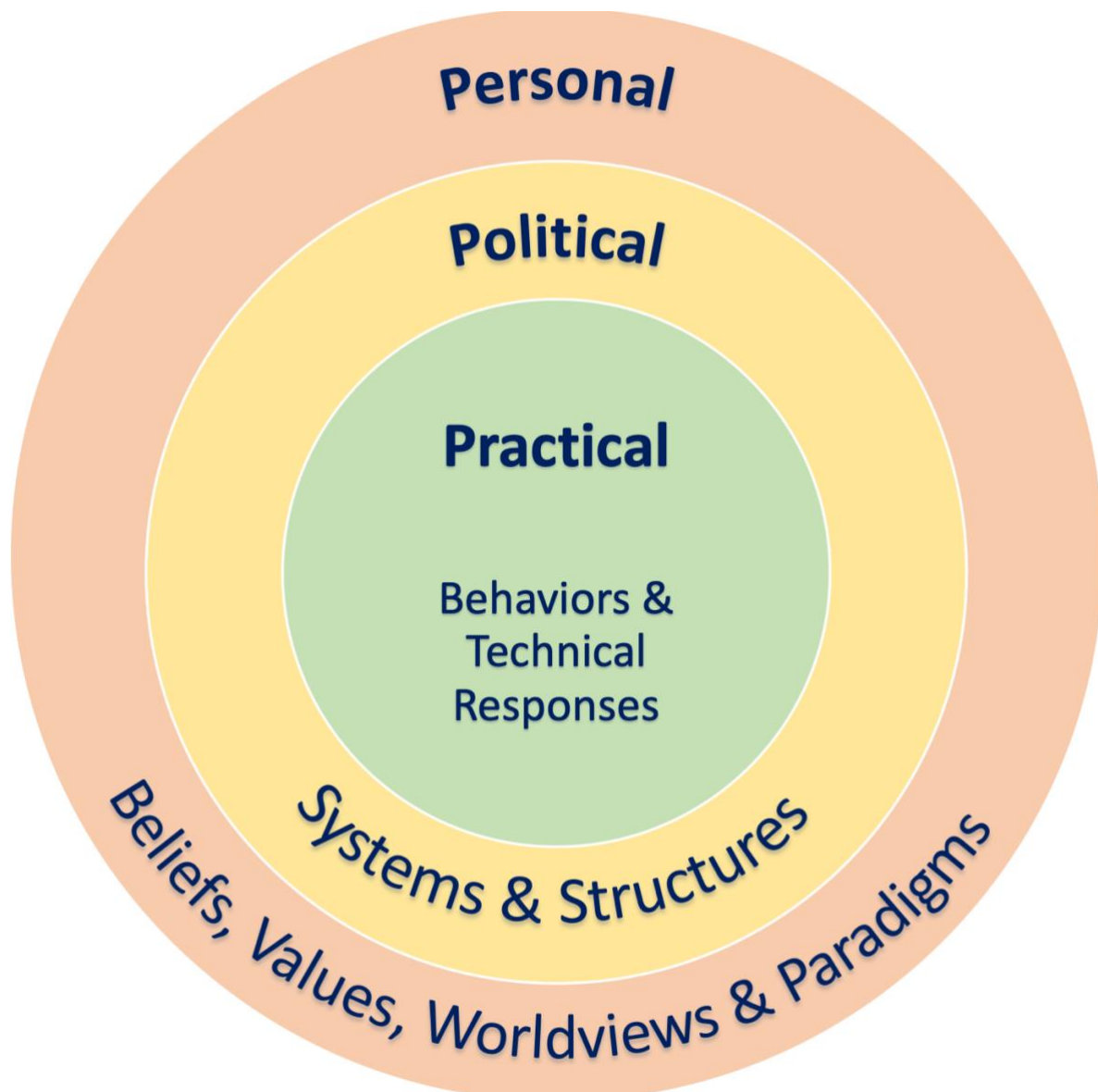


Figure 1: The three spheres showing the dynamic relationships between the practical, political and personal dimensions of transformation (adapted from O'Brien, 2018, p. 155).

Figure 1 shows the three spheres of transformation adapted from O'Brien (2018, p. 155). The relative size of the spheres in the model corresponds to the potential leverage that an intervention in each can have.

At the centre of the circle is the **practical sphere** which has been the focus of most climate change triple-win policies and actions” (O'Brien, 2018). It includes specific actions and strategies that directly fund a chosen outcome. Success in this sphere is easily tracked by macro-indicators, and transformations there can occasionally trigger transformations in the outer spheres. Such transformations are however difficult to implement at a large scale due to

barriers in the outer spheres. In the model, the practical sphere is located in the innermost position as it contains the most measurable outcomes (O'Brien, 2018).

The middle circle is the **political sphere** (O'Brien, 2018). It represents the systems and structures. Systems are the relationships between the many parts of a larger whole, and structures are the regulations, governments, institutions, and norms that influence how systems are designed, ordered and supervised. O'Brien references Wilhite (2016) who showed how the capitalist growth-focused systems of wealthy nations (political sphere) are linked to the daily actions of stakeholders (in the practical sphere) arguing that such systems are not conducive to low-carbon objectives. To emphasise this point, O'Brien refers to Brand (2016, p. 505) who said that it is "deeply inscribed socio-economic, political, cultural, and subjective social relations as well as societal nature relations that need to be transformed" which means that it is in the political sphere where structural inequalities and norms are challenged. In the model, the political sphere is located in the middle as it is the medium between which beliefs and worldviews influence outcomes via systems and structures.

Finally, the **personal sphere** represents beliefs, values, worldviews and paradigms (O'Brien, 2018). *Beliefs* affect how a situation is perceived, what action should be taken and what the outcome will be. *Values* frame what is considered desirable and important. *Worldviews* describe how an individual look at the world, how they think it operates and what their role is. *Paradigms* are the set of rules or assumptions an individual uses or assumes as true. Such definitions are based on different understandings of causation or social consciousness which in turn "influence[s] and inform[s] whether, where and how boundaries are drawn between 'us' and 'other,' who or what is included or excluded (or allowed or prohibited) and who or what is considered to have power in any given relationship" (O'Brien, 2018, p. 156). The personal sphere will inform the political sphere as beliefs, values, worldviews and paradigms enforce social norms, authenticate certain forms of governance, and define what is collectively achievable and they can be influenced by historical events.

Therefore, the implications of the personal sphere often manifest in both the political and practical spheres. Although beliefs, values, worldviews and paradigms of individuals are difficult to change, it can happen over lifetimes or across generations or, in rare cases, through profound 'life changing' events. Such changes usually cause individuals to explore alternatives resulting in more inclusive and less conservative beliefs, values, worldviews and paradigms, which are necessary for problems such as climate change. Unfortunately, it is possible via manipulation, for such changes to make individuals more intolerant or fear-based. Collective beliefs, values, worldviews and paradigms can also reinforce themselves as they influence politics, choices and actions which in turn may influence pre-existing beliefs, values, worldviews and paradigms. In the model, the personal sphere is located as the outermost because it has a pervasive impact on the other spheres (O'Brien, 2018).

The personal sphere must not however be described as culture. Culture is present across all three spheres in various forms e.g. consumer culture (Arnould & Thompson, 2015). Furthermore, given the interconnectedness of the three spheres, it is improbable that the threat

of climate change will be solved by technical solutions alone and that social transition is necessary.

The next section shows how, by overlaying the three spheres across Meadow's (1999) *twelve points of leverage*, the three spheres can give an indication of where intervention would be most successful.

Meadows (1999) presented twelve leverage points for systems change, as listed in Figure 3. Although this work is now somewhat dated, Abson, Fischer, Leventon, Newig, Schomerus, Vilsmaier, von Wehrden, Abernethy, Ives, Jager and Lang (2017) affirmed is a suitable framework for conceptualising transformations. Meadows (1999) asserts that (1) parameters such as regulations and (2) buffers such as, in the case of climate change, forests are the least significant leverage points, yet these receive a substantial amount of attention in climate policy interventions. Intriguingly these are the two points that align with the practical sphere. Numerous points with higher leverage exist in the political sphere, most notably the strength of positive or negative feedback loops and the rules of the system. The power to change the rules is significant and thus political action is crucial for transformation.

However, the points with the most leverage are in the personal sphere. They are, in ascending order of leverage, the goals of the system (e.g. growth), the paradigm from which the system arises (e.g. climate change "isn't real") and the power transcend such paradigms. Simply put, an intervention that could push people to transcend their personal - perhaps not climate - conscious - paradigms would have the best chance of successfully tackling climate change. Meadows (1999) stresses that the latter needs to be flexible as the goal may change and requires for openness, humility and courage to achieve success although this can be difficult when the dealing with issues as imposing and complex as climate change.

To summarise this Content Analysis tool, when climate change is viewed as adaptive problem, interventions at the political and particularly personal spheres are more likely to succeed than purely practical interventions. However, political and particularly personal interventions are more difficult to accomplish. This framework will be used to frame the discussion in Chapter four.

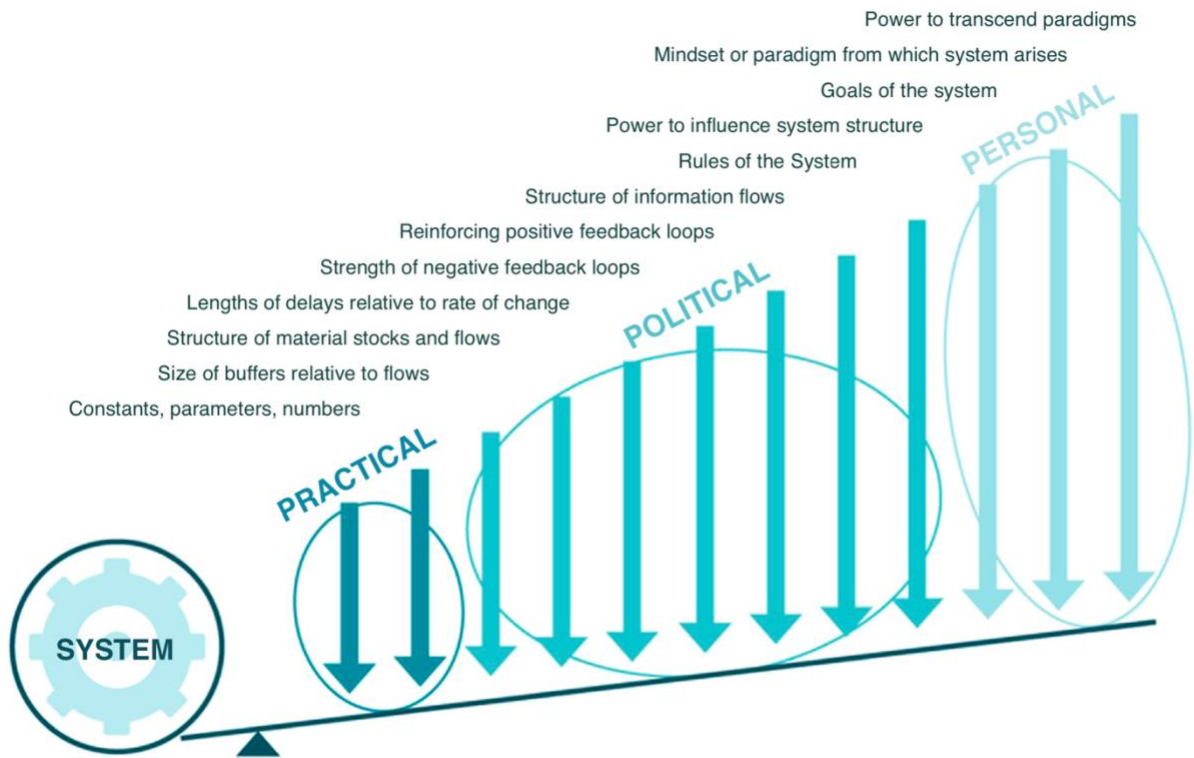


Figure 2: Leverage points for systems change based on Meadows (1999) and their relationship to three spheres of transformation (O'Brien, 2018, p 158).

The Resulting Theoretical Framework

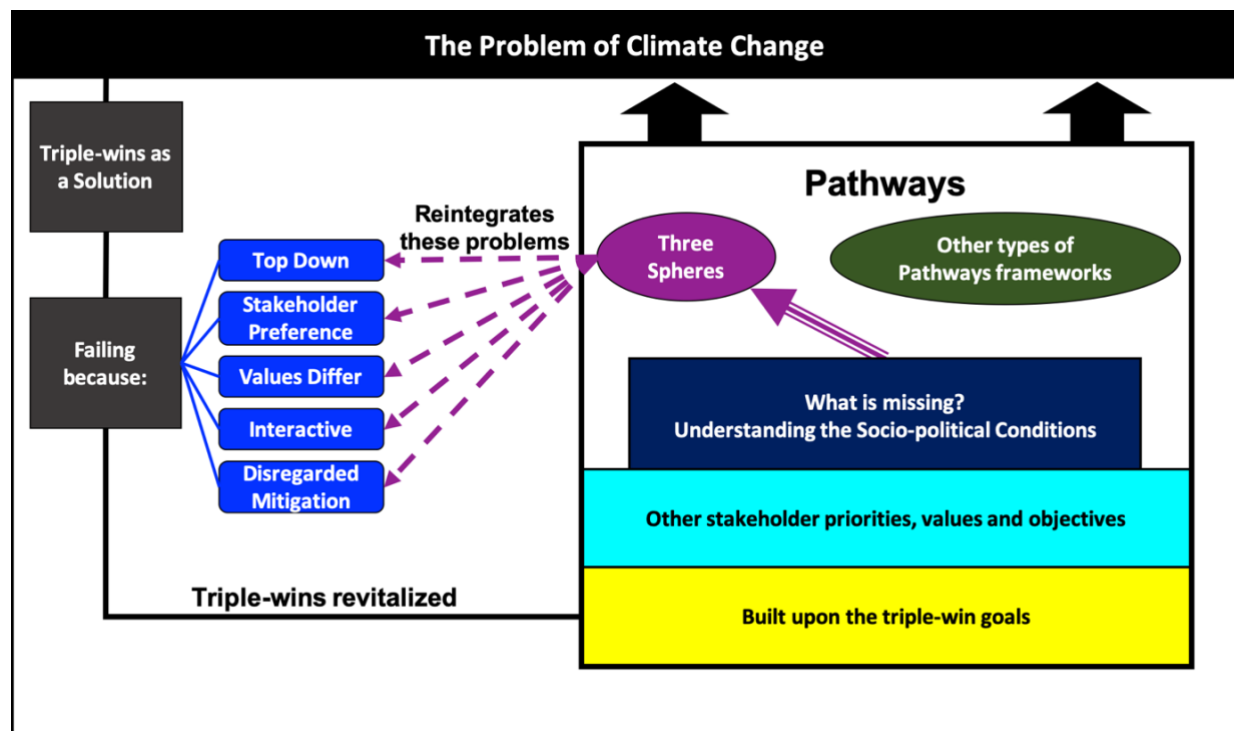


Figure 3: The Theoretical Framework of this Thesis constructed from Literature

Figure 3 shows the theoretical framework constructed for this thesis. Beginning in the top left-hand corner, it shows how traditional triple-wins have been used as an attempted solution to climate change, but they have largely failed due to the top down approach, the uniqueness of stakeholder preferences and values, and often disregard for climate change mitigation. Instead of abandoning triple-win objectives and research, triple-wins have been revitalised and are being used as the building blocks of the emerging conceptual theory of pathways. Pathways are a broader approach thereby including as goals many of the issues that traditional triple-wins missed, including other stakeholder values and priorities. Pathways also have a myriad of frameworks at their disposal to better understand inherent problems and to achieve sustainable development. What is missing is empirical evidence of the functionality of revitalised triple-wins in their new pathways form. This thesis aims to show how, in their new home, with the aid of a Content Analysis tool found in pathways literature, triple-wins have a better chance of success.

3 Methodology

Research Approach

This thesis aims, in part, to ascertain what factors the farmers take into account when making decisions, and more acutely, why they prioritise certain factors over others. Therefore this thesis is, in effect, this social research, meaning it is qualitative research. Bryman (2012, pp.19-39) states that social research is influenced by the values of the researcher, and practical, theoretical, epistemological and ontological considerations.

The values of the researcher massively influenced the research approach of this thesis. The research areas of climate change and agriculture in South Africa was borne out the researcher's belief in and sense of urgency around tackling climate change and the confidence that South Africa, although it has great potential, requires guidance to achieve its potential. The choice of research method and data collection technique was influenced by the researchers very sociable nature and strength in allowing conversation to flow easily. The way the data was interpreted was based on the researcher's belief that climate change can only be successfully countered in a collaborative effort.

This thesis will utilize interpretivism, as described by Bryman (2012, p. 28). This epistemological choice is straightforward as the thesis questions prevailing thought on *triple-wins* and aims to draw new conclusions from empirical data.

With regards to the ontological considerations, this thesis is grounded in social constructivism which emphasises "the relevance of the construction in the perception of things and knowledge around them" (Flick, 2018, p. 36). The farmers views on climate change and other beliefs are, as social constructionism and this thesis contends, based on the perception of things such as rainfall patterns. The ontological concept is important to research as the assumptions within them are the scaffold that fortifies the link from evidence to conclusion. Indeed, without such assumptions, it would be difficult to draw solid conclusions from large amounts of empirical evidence (Bryman, 2012, p. 21).

Practical considerations naturally influenced the research approach. Financial resources were the key consideration given the significant distance that needed to be covered, but they allowed for the interviews to go ahead. Access to participants once on location was also important. After a conversation with a farmer, who turned out to be Interviewee A, the researcher was confident that interviews were possible. Had such financial resources and access not been made available, the researcher would have chosen a different research approach as, for example, quantitative methods would not have been sufficient to ascertain the underlining beliefs of the farmers.

Research Design

There are numerous research designs in qualitative research and it is important that the most appropriate. The main option is grounded theory developed by Glaser and Strauss (1967). Other popular options are ethnomethodology, discourses analysis, ethnography and narrative studies (Flick, 2018, pp. 57-59), each with their own characteristics. Ethnomethodology, as founded by Garfinkel (1967) may be appropriate for this study at how people drive meaning in the daily activities. A case study (Creswell, 2014) may be even more appropriate as we are considering the case of a specific group of farmers. However, this thesis contends that the most suitable design is phenomenological research (Creswell, 2014). This design is built in philosophy and psychology and describes the experience of individuals in the wake of a phenomenon which, in this case, is climate change. It aims at uncovering the essence of how the individuals handle the phenomenon and the most common research design is conducting interviews. In this vein, the data was collected via semi-structured interviews conducted by the researcher as a core feature of the research process is to ascertain the interviewees perspectives, worldviews, beliefs and priorities.

The participants for the interviews were found via the process of snowball sampling (Bryman, 2012, p. 424), which began with contacting participant one, conducting the interview, and contacting his neighbours and farmers he knew in the area. This process was repeated with each new farmer interviewed. This thesis argues that, in line with (Bryman, 2012, p. 424) review the snowball sampling could be described as opportunist sampling given the difficulty in finding willing participants in such a remote location. Other avenues such as the national and regional farmers' associations, the land owners' union and cold-calling farmers found online yielded no willing participants. Thus, the offer from a farmer to contact his neighbours was received and accepted with relief. Time in the area was also a barrier as many farmers were only able to make time weeks or even months later. The two participants of the questionnaire for example stated categorically that a questionnaire was the only way they would participate as they could do when they found a free moment and without intrusion. The limitations of snowball sampling are addressed in the Limitations section. The sampling process led to 10 farmers being interviewed.

Data Collection Method

Bryman (2012, p. 471) states, when seeking interviewees' own perspectives and points of view, semi or unstructured interviews are more appropriate. Indeed, in such a format, 'rambling' (Bryman, 2012, p. 470) is encouraged as it gives insight to what the interviewee sees as important. The interviewees were allowed to take the conversation wherever they chose with the occasional probe to more thoroughly discuss a topic and some questions taken from the interview guide where needed to ensure a broad range of discussion points.

The interview guide consisted of a set of questions covering the topics being researched and could be utilised when natural pauses in conversation occurred as per the suggestion of Bryman

(2012, p. 471). The interview guide was prepared in stages: (1) the topics of the interview were highlighted based on the work done in the theoretical section; (2) then questions for each topic were formulated; (3) these were then reviewed to ensure they were in line with the research aims and objectives; (4) the wording of each question was thoroughly scrutinised to ensure they would not be leading the interviewees; (5) and finally the questions were phrased in clearest language possible, as English is not the first language of many participants. The interview guide prepared for this thesis is in the Appendices. During the interview, the questions from the guide, as well as any other questions that became necessary as long as they did not lead the interviewee, could be delivered as one nine types (Kvale, 1996), namely: introducing questions, follow-up questions, probing questions, specifying questions, direct questions, indirect questions, structuring questions to bring about a new topic, allowing silence to prompt a further response on the same point, and interpreting questions.

The interviews were all approached with flexibility in mind in terms of how the discussion played out, the variety of the topics and indeed, the participants. On one occasion, a focus group had been assembled as a complementary method collection form however three of the four participants cancelled just prior to the discussion due to unforeseen weather circumstances on their farms, meaning the final participant was interviewed one-on-one as the others had been and additive to the dataset.

Given the distance, telephone interviews were a feasible low-cost option however, few potential participants were willing to have open conversations on phone if a face-to-face meeting were possible, and telephone interviews have certain limitations (Bryman, 2012, p. 488). Telephone interviews are not ideal for lengthy discussions, as the desired interviews were, as it is easier interviewee to terminate the interview compared to one conducted in person. Furthermore, body language, which may be an important element of can be a participant's reaction to a question, cannot be observed. Body language subtly communicates discomfort, enthusiasm, confusion etc. Finally, the cellular coverage and phonelines in are region of South Africa are notoriously unreliable often due to the proximity to the Lesotho border.

Most interviews were conducted in the head office of Sandstone Estates, a farm located on the Caledon River in the heart of the Conquered Territory. The remainder of interviews were conducted on the farms of the farmer in question. All the interviews were conducted in a quiet one-on-one environment. Each interview began with a brief period of casual conversation in an effort to make the interviewee relaxed and comfortable (Longhurst, 2003, p. 147). The interviewees consented to the interviews being recorded as they were made aware that the responses would be anonymised. The interviewer then clearly stated the purpose of the doing this research but in such a way so as to not lead the interview to a conclusion or indeed imply a worldview. For example, it would have been problematic to state that "this thesis is to how help the discussion on how best solve climate change", although in a broad sense it is, as not all participants may believe in anthropogenic climate change. Thus, each interviewee was presented with the following statement: "The purpose of this thesis is to clearly understand the challenges and priorities of stakeholders of a region. The region in question is the area of the Free State Province, South Africa that borders Lesotho and the stakeholders in question are

landowners.” This highlights the importance of the interviewee to the research without directly indicating what topics are being chosen and why so as to acquire the most natural reaction to each question.

The first direct questions were straightforward in order to create a ‘factsheet’ (Bryman, 2012, p. 473) including name, age and experience in farming, size of farming. This fact sheet was added to later on points such as source of income and types of produce, the results of which are in Table 1. This information was useful for contextualizing interviewee’s answers. All the interviews were recorded and transcribed. This allows a more detailed analysis of what was said, it allows repeated analysis, it helps counter accusations that an analysis might have biases and it allows the data to be reevaluated in the light of new theoretical ideas or analytic strategies (Bryman, 2012, p. 482). The transcription process was one of the most time-consuming elements of the thesis, but necessary.

Direct quotations from the interviews are used in the results and discussion sections. It should be noted that interviewees occasionally repeat themselves and have verbal ‘tics’ such as a word to fill a silence when thinking about their next point (Bryman, 2012, p. 485). For the purposes of clarity and length, some of these verbal irregularities have been edited out of quotations but this thesis emphasises that such alterations will not paraphrase or change the meaning of what was being said in any way.

Site and Case Selection

The choice of the site where the field research was conducted was motivated by the complex historical context of the region. The land had been occupied by a variety of groups in recent history which manifests in complex issues over land ownership and a ‘us’ and ‘them’ mentality. These regional issues compete for the time and attention of the stakeholders with daily challenges contrasting with global troubles such as climate change which offers a unique case for research.

The case of the large-scale farmers was motivated by not finding similar cases in existing research. Most similar research focuses on smallholder farmers. The researcher argues that, while both types of cases are important, the ramifications of the large-scale farmer cases have great potential to influence positive action over a larger area.

The researcher has experience relevant to this field of research having grown up on a farm in South Africa. This experience was exceptionally useful to the research process as the researcher: was able to understand local contextual references and phrases, made the interviewees feel comfortable as if they were talking to a peer rather than an outsider and thus solicit more honest responses, and had no difficulty traveling to and navigating the very rural area to conduct the interviews. However, the researcher was careful to not let these experiences encourage the analysis and outcomes to lean toward certain themes or activity look for information to show any stakeholders in a more favourable light as that would compromise the accuracy and validity of this thesis. Indeed, this was not a case of ‘Backyard’ research, as

described by Glesne & Peshkin (1992) as the researcher grew up in a different region of South Africa.

Validity

The validity of the findings was ensured by the use of three strategies as suggested by Creswell (2014): triangulation, member checking and reflection of bias thick description. Triangulation was used both in the three types of data sources and the different sources of data within these types. For example, all kinds of farmers were interviewed as long as they met the criteria of owning the land and the land was within the Conquered Territory and, for the historical context, the works from authors from each group were reviewed.

Data Analysis

The data analysis phase began during the interviews. The researcher immediately began making notes and formulating an idea of the narrative that was being discussed. As each interview was conducted, these ideas were strengthened and sharpened without any formal analysis being performed. This process was repeated during the transcription process as elements that may have not received focus during an earlier interview were uncovered by linking to elements that had been realised in later interviews.

The field notes, results from questionnaires, final transcriptions and historical source material was consolidated and additional notes were added. The researcher reflected on the variance in tone. For example, the interviewees' tone varied greatly whilst describing similar concepts. The next step was to 'winnow' the data which is a process of highlighting relevant information and disregarding surplus information (Guest, MacQueen, & Namey, 2012). The interviews were bracketed into 'chunks' (Creswell, 2014) and coded by theme. The codes were based on what the interviewees emphasised or brought up. They were not predetermined and thus interpreted inductively. As the interviews were semi-structured, all the relevant topics had been covered however the interviewee's perspective was the most important and thus the codes must reflect that. These themes were revised, combined and discarded where necessary until seven core themes had been outlined, although, as will be apparent in the results section there are significant overlaps in terms of motivations and reactions. This codification process was done by hand as, although laborious, the researcher considered software unnecessary for this sample size. The results of this process are presented in the next chapter.

Limitations

Valid criticisms of snowball sampling are the community bias, non-random and anchoring (Morgan, 2008, p. 816). However this thesis contends that community bias is irrelevant as the beliefs and worldviews of the community are being investigated, and anchoring is also irrelevant as the aim is not to actually propose interventions for this region. Projects wishing to form actual interventions would need to have a much larger sample to accurately represent

the views of population. Non-random sampling was unavoidable as the farmers each had to be specifically sort on the criteria that made then appropriate for the study therefore a limitation of this study is that the interviewer had little control over sampling method.

3 Context, Results and Discussion

First, this chapter will describe two important historical elements to give context to the distinctive situation in this region. These historical narratives are important as they present additional factors for the farmers to consider. Secondly, this chapter will describe the results of the interviews with the farmers. Finally, this chapter presents the discussion, including an application of the Content Analysis tool on the results, the outcomes of which will be used to answer the primary research question, highlight this thesis' contribution to literature and implication on future research.

Historical Context

Conquered Territory

The focal region of this thesis is a region of land referred to by locals as “the conquered territory” (Coplan, 2001, p. 81). It lies in the eastern part of the Free State Province in South Africa which borders the country of Lesotho along the Caledon River. There is a complex historical narrative as to why that river is considered the national border involving numerous actors, including the Boers, the British Empire and the many tribes that lived in the region.

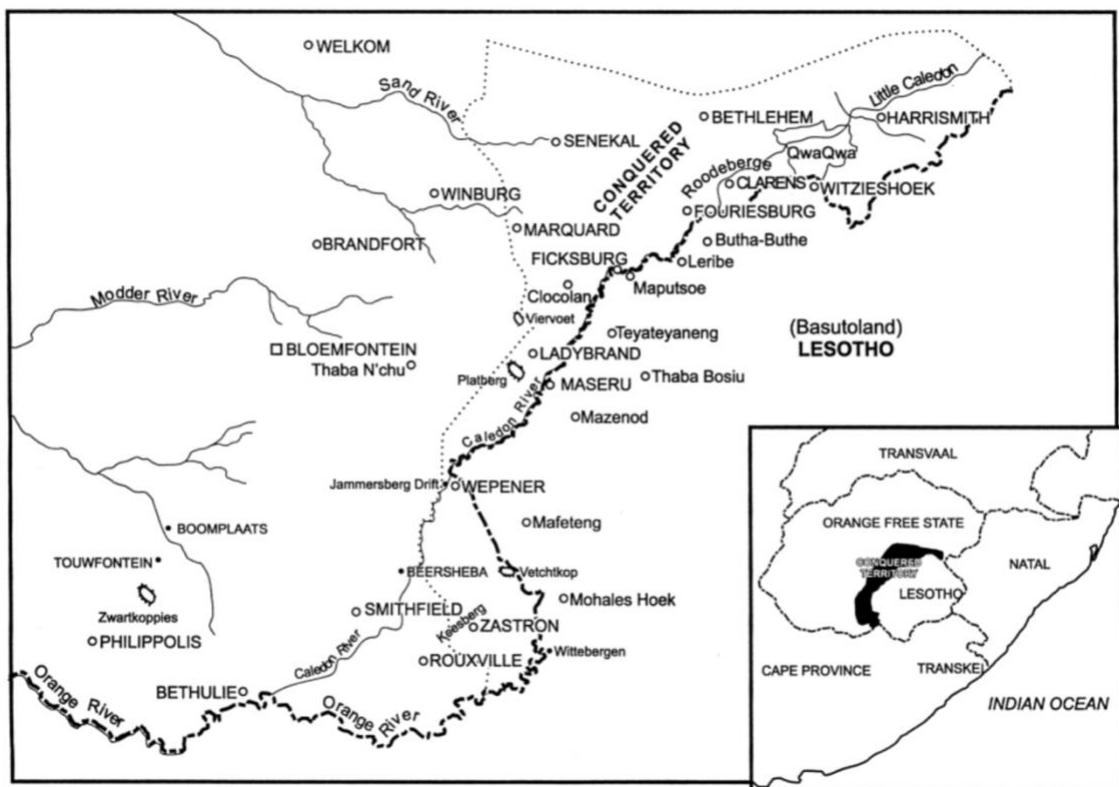


Figure 4: Showing the Free State and Lesotho and "The Conquered Territory" (Coplan, 2001, p. 84).

The Dutch had a significant presence in South Africa built upon the establishment of the Dutch Cape Colony in 1652. However by 1806, the Cape had been occupied by the British (Etherington, 2014). In the years that followed, the Cape citizens of Dutch descent became dissatisfied with British rule and sought to expand beyond those borders, and began what is today known as Great Trek (1835 to 1846), with the migrant Dutch Colony coming to be known as the “Voortrekkers” (Etherington, 2014). Some spread out across the Transvaal and Natal (see figure 3). Others found the lands north of the Orange River to be fertile and relatively sparsely populated, as the inhabitants had suffered heavy losses to the chief Mzilikazi during Mfecane (1815 to 1840), a period of extensive warfare among indigenous ethnic communities (Beck, 2000). The Voortrekkers defeated Mzilikazi, established settlements and began farming there, henceforth being known as the “Boers,” which means the farmers in Afrikaans (Beck, 2000).

Prior to the Boers settling north of the Orange River, Mfecane had caused many smaller Sotho tribes in the area to flee to the Maloti Mountains. Moshoeshe, the king of a small Basotho tribe, brought together many of these scattered tribes to form the Basotho Kingdom in 1822. Moshoeshe’s followers grew as those destabilised by Mfecane sought refuge (Beck, 2000) although not all of the tribes in the area, such as the Rolong and the Tlokoa, accepted him as leader. By 1848, his nation had 80 000 people. Much of the land that Moshoeshe oversaw was mountainous but the most fertile land was that on either side of the Caledon River (see figure 3).

The Boers too found this land to be the best for farming and, for a brief time, the Boers and the Basotho operated peacefully in this area. But tensions soon began to grow over who owned the land. To avoid war, Moshoeshe outlined a segment of land to the west of the Caledon River which the Boers could rent, but either due to misunderstanding the offer or due to obstinance, the Boers occupied that land and refused to pay rent (Coplan, 2001).

Moshoeshe knew it was his most fertile land but he also wished to avoid war. He sought the assistance of the British, the most powerful force in Southern Africa at the time, by signing a treaty in 1843 with the British Governor of the Cape, which established boundaries of the Basotho Kingdom including that fertile land near west of the Caledon river (Beck, 2000, p. 71). Moshoeshe could rule here on condition that he returned escaped criminals to the Cape and promoted peace and order. This greatly angered the Boers, who had originally left the Cape to escape British rule, and they flatly refused to submit to the rule of a non-white leader. Some Boers chose to move north of the Vaal River whilst others stayed to resist British and African rule, leading to ongoing unrest. In an attempt to bring stability to the area, the new Cape Colony governor declared the entire area as the Orange River Sovereignty in 1848, the Eastern border of which was the ‘Warden Line,’ well into Moshoeshe’s territory. Moshoeshe only agreed to this with the expectation of protection from the British. Unfortunately, it cut off too much fertile land and Moshoeshe’s followers did not recognise the line. The British attempted to enforce it but were defeated by Moshoeshe’s force in 1851, a battle during which Moshoeshe purposefully did not enact absolute defeat to avoid a full retaliation from the British. The

British did react, however, so Moshoeshoe agreed a temporary alliance with the Boers who had moved north of the Vaal (Coplan, 2001).

The new Cape Governor ordered Moshoeshoe to pay a fine for not recognising the Warden Line, which he refused to do, and so more British troops were deployed in 1854 - but again Moshoeshoe was victorious. This led the British to decide that the Orange River Sovereignty was too costly to maintain so, after convening with the Boers, agreed to withdraw and the land became the independent Boer state called the Orange Free State with the Warden Line as the eastern border. The Basotho were not consulted. (Etherington, 2014)

In 1854, the Basotho began taking livestock from Boer farms which angered the Boers, but the Basotho argued that it was still their land. Moshoeshoe was wary that the British would side with the Boers if it came to all-out war. As members of both sides believed they had the right to the land, tensions rose until in February 1858 when the Orange Free State declared war on the Basotho Kingdom. The Boers were the first to advance aided by the Tlokoa, but they suffered heavy losses and had to retreat. Again Moshoeshoe showed restraint in victory as did not want to risk bringing the British back to the region. He signed an armistice with Boers in June of 1958, but not all of Moshoeshoe's followers agreed with his judiciousness (Coplan, 2001).

In the years that followed the Orange Free State recuperated and grew in strength. They imported heavier artillery from the Cape, while the British had stopped the sale of weapons in African tribes, limiting the Basotho's weapon supplies. Realising this shift in power, Moshoeshoe applied to the British for protection, which they declined, and the Boers declared war again in 1865 with the aim of reaffirming the Warden Line. Moshoeshoe had to retreat and signed a new peace treaty in 1866 (Coplan, 2001).

The Orange Free State government then began allocating land to farmers in the reaffirmed territory. Still many of the Basotho believed that the land was theirs to use grazing and took stock from the Boers. This prompted another war in 1867, where the Boers forced the Basotho far back. Moshoeshoe faced losing the entire kingdom and so once again appealed to the British for help. The British agreed, as their objectives for South Africa had changed with the discovery of diamonds in Orange River in 1867. (Etherington, 2014)

The Basotho Kingdom was annexed in 1868 and became the British protectorate of Basotholand. The Orange Free State ceased their military effort so as not be at war with the British. In 1869, the borders of modern-day Lesotho were drawn up in a Convention between the British and the Boers. This gave much of the 'Conquered Territory' to the Orange Free State and new border became the Caledon River, meaning the Basotho's lost much of their fertile land. However, the Kingdom had survived in a time when many tribal kingdoms fell (Coplan, 2001).

Basotholand was partially ruled by the British from 1869 to 1880 when increasing British control lead to the Basotho Gun War. Once this war was resolved, Basotholand was established

as a British colony in 1884. Finally, in 1966 Basotholand became the independent country of Lesotho. In the present day, the land to the west of the Caledon River is known colloquially as the Conquered Territory, referencing the many times it changed hands. Since 1867, excursions across the border by Basotho individuals to steal and graze cattle have persisted (Beck, 2000).

Land Redistribution

The Land Reform movement began with the aim of promoting equality in a racially unequal South Africa after the country became a democracy. It involves three parts: restitution, land tenure reform and land redistribution, with the latter being the most significant. Lahiff and Li (2012). Originally the government would buy land from a willing seller redistributed. In 2006, the African National Congress (ANC), the ruling party since 1994, stated they would start to be expropriate the land from unwilling sellers but they would compensate. Lahiff and Li (2012). In 2013, a new political party called the Economic Freedom Fighters (EFF) began gaining popular support calling for land expropriation without compensation based on the argument that the land was seized by white people without just compensation to indigenous people during colonial times (Mbetse, 2015). In 2017, in part due to this political competition, the ANC stated their intention amend Section 25 of the Constitution which concerns property rights to implement land expropriation without compensation (Kepe & Hall, 2018). This drew parallel to the drastic land expropriation that occurred in Zimbabwe which had had significant detrimental influence on the Zimbabwean economy (Moyo, 2018).

A draft of the proposed amendment was approved by parliament in late 2018 and the final version is still under review, although it is unclear how long this will take. (Reuters, 2019) Foreign commentators have said that land reform causes uncertainty it that lessens foreign investment in South Africa (Vecchiatto, 2019; The Economist, 2019). Kepe and Hall (2018) suggested that expropriation without compensation is as unjust as the colonial errors that are trying to be solved. As of writing, the government has not begun seizing land at a national scale. This thesis does not dispute a clear moral and social responsibility to create greater equality in South Africa. It purely wishes to outline the major historical and political influencing aspects of the case been investigated.

Data Collection Results

This section aims to answer the sub-research question. Through codification, the results of the interviews with the 10 farmers in the Conquered Territory have revealed seven themes, which are the main factors considered in decision-making, namely: Economics, Climate Adaptation, Security, New Knowledge, the Community, the State, and Climate Mitigation. These are presented in order of significance based on the amount of emphasis the farmers collectively placed on each and to what degree the farmers were in agreement. The farmers names have been removed and replaced with pseudonyms to preserve anonymity. This was done during the codification process so a record of who said what was maintained throughout. This is reflected in the findings and will be useful in linking actions and choices to beliefs and worldviews during the discussion section.

First though, it is important to present the answers to the eight framing questions which serve as an important reference during the discussion.

Table 1: Showing basic facts about farmers for Reference

Name	Grew up on a farm?	When did you begin farming?	From the area?	Do you live on your farm?	Sole source of income?	Size of Farm	How the farm was acquired?	Types of Produce
Adam	Yes	1996	No	Part time	No	60 km ²	Purchased over time. Expanded.	Crops & Livestock
Bert	No	1992	No	Yes	Yes but not always	14 km ²	Purchased over time. Expanded.	Crops & Livestock
Carl	Yes	1970	Yes	Yes	Yes	25 km ²	Inherited. Expanded.	Crops, Fruit & Livestock
Dirk	No	1989	No	Yes	No	1 km ²	Single Purchase	Fruit.
Eric	Yes	1973	Yes	Part Time	No	25 km ²	Purchased over time. Expanded.	Vegetables, Crops, Fruit, & Livestock.
Fred	Yes	1957	Yes	Yes	Yes	15 km ²	Inherited. Expanded.	Vegetables, Crops & Livestock.
Greg	Yes	2009	Yes	Part time	No	28 km ²	Inherited. Expanded.	Crops and Livestock.
Hugo	Yes	2012	Yes	Yes	No	20 km ²	Inherited. Expanded.	Crops, Fruit, Vegetables & Livestock.
Jeff	Yes	1990	Yes	Yes	No	24 km ²	Inherited.	Crops & Livestock.
Kyle	Yes	1999	Yes	Yes	No	7.53 km ²	Inherited. Expanded.	Crops, Fruit & Livestock.

1. Economics

Economics was the primary factor considered by all farmers. Every decision has a financial implication that needs to be taken into account, and this was farmers vehemently asserted by all ten farmers vehemently asserting that their profit margins have been shrinking and that they are having to react.

Table 2: Showing the Interview Results for the Economics Factor

Why Factor is Important	Reactions	Supported by
Profit margins declining	Expansion to utilise economies of scale	A, B, C, E, F, G, H, J & K
Input costs increasing	Using crops and livestock in combination	A, B, C, E, F, G, H, J & K
Sale prices not corresponding with inflation	Storage Facilities to wait for better pricing	A, E, F, & G
Open market gives opportunities and exposure.	Modifying plants schedules to suit market demand	D, E, F, G & K
	Farming more intensively	D, G, & H
	Diversifying produce	E & F
	Vertically integrating parts of the supply chain	E
	Organic polymers	H

The point that was emphasised is that farms are getting bigger as farmers leave and the land is absorbed by their neighbours. Although, this also corresponds with an increase in yield from the lands absorbed. This more corporate trend in farming was summarised by Greg who said, “Farming is a corporate thing. The old way of living on a farm and the **lifestyle** - those days are gone. Only the biggest and business-wise farming enterprises will survive. You must take the maximum of what nature can give you. A big yield can make up for bad pricing”.

These reactions highlight how access to capital is crucial in being able to react. As Fred put it, “It’s a question of finance, the more you had the more you were able to do.” Indeed, Adam, Eric and Greg, who have reacted best to the financial pressures and profited, have really taken advantages of economies of scale as they now have the three biggest farms. Furthermore, they are also the three farmers who do not live on their farms full time which underscores how they are treating it as a business and not a lifestyle.

2. Climate Change Adaptation

The factor that influences the farmers almost as much as economics is climate adaption. All of the farmers have noticed that the climate is changing, and they are having to react.

Table 3: Showing the Interview Results for the Adaption Factor

Why Factor is Important	Reactions	Supported by
Seasons shifting later in the year	Planting much later in the year	A, B, E, F, G & H,
Raining later in the year	Crops and livestock can be used in combination	A, B, C, E, F, G, H, J & K
Raining more intensely	Inorganic fertilizers tailored the lands requirements	A, B, C, D, E, F, G, J & K
Raining less overall so ground water is lessening e.g. 'Green Drought'	Organic polymer acids	H
Higher Temperatures	No-till farming	A, J & K
	Cover Crops e.g. sunflowers add nitrogen to the soil	A, E, G, H, J & K
	Crop rotation depending on timing and amount of rain	A, B, C and G
	Converting land back to pastures	A
	Planting less densely	C
	Irrigation	D
	Fallowing the land	A, E & G
	Machinery that plants faster	D & J

Curiously, in spite of these assertions that ground water is depleting, Carl, Fred, Jeff and Kyle all have rainfall data from their farm dating as far back to 1908 and it does not show conclusively that there has been less rain, or indeed that it has been raining later.

In the long term, Adam, Dirk and Burt expressed concern that, although they have been able to adapt thus far, there are limits on how much more than can do. If the drought continues and ground water is depleted even more, they would have to stop farming entirely. As Adam put it, "We're adapting to a change in circumstances, we're not saying it's good." Carl contents this melancholy view stating that, "[t]o me, the bible, that's my agricultural handbook" and went on to explain that the bible said as long as there is summer and winter, the land will be able to provide.

3. Security

The security concerns in this region are clearly exceptionally bad and thus a big factor in farmers decisions. Hugo stated that theft in the area is at its highest for 150 years, since the end of last Basotho war.

Table 4: Showing the Interview Results for the Security Factor

Why Factor is Important	Reactions	Supported by
Crime rate is extremely high	Small investment in additional security	F
Farmers concerned about personal safety	Medium investment in additional security	B, C, G & K
Negatively impacts profitable business practises	Large investment in additional security	A
Low arrest and conviction rate cause distrust in the police	Moving livestock into enclosure every evening	B & H
Farmers cannot apprehend criminals themselves and hand them over to the police for risk of being accused of physical abuse	No additional security due to strong relationship with the local community	H
Other farmers have departed due to safety concerns	Often following land immediately on the border as its too difficult to protect	A
	No additional security due to distance from the border	E
	No additional security due to religious beliefs	A

Three suggestions as to why the crime rate in the area was so high were made. Firstly, as both South Africa and Lesotho have huge numbers of people living in poverty, they steal out of desperation as acknowledged by Adam. Secondly and uniquely to this region, the border provides protection for stolen goods. Adam, Fred, Greg and Hugo elaborated at length on occasions when perpetrators from Lesotho would move stolen assets across the border from where it cannot be retrieved and where assets were stolen domestically but then sold across the border, thereby ending any trail for investigation. Finally, Fred explained that due to complicated history of land occupation in the region, the people of Lesotho have felt for many years that the conquered territory should still belongs to them and thus they don't view many actions as crimes. It is simply accessing what already theirs. Fred solemnly surmised that "[t]here is a lot of bad blood between both sides.". This is reflected in the contextualising section.

When the farmers were asked about this final reason, they responded in one of two ways. The farmers who inherited their farms and whose families had farmed the longest, including Fred, believe that the land was won fairly and thus theft for this reason is not justified. The ones that had purchased their farms recently believe that as they had bought their farms legally, the theft was not justify.

As shown in Table 4, Hugo considers his source of protection is his good relationship with the local community. He explained, “we benefit each other so is in their interest that this farm is protected and they know that.”. Curiously, Adam stated a similar relationship with his staff but is the biggest investor in security. Hugo warned that having a bad relationship with staff leads to crimes using insider knowledge. Greg stated crime was one of the reasons he does not live on his farm but Hugo contends only farmers who don’t enjoy the lifestyle don’t live on their farms. Bert said crime was negatively impacting his enjoyment of the lifestyle.

4. New Innovations

Although the utilisation of new technology has been frequently in this section, this segment underlines the farmers attitudes towards new technology for its own sake, as it did emerge somewhat strong factor. Carl and Greg explained how fast things change and Carl said that, “[i]f you don’t go with the times, you going to stay behind.”. The farmers all appeared very open to new technology. To underscore this enthusiasm, one of the main functions of the Farmers Association is to bring new ideas to the area, particularly those that increased yield or cut costs. Greg also argued that South African farmers have always been proactive in searching for better ways operate because they are under the most pressure to survive. According to him, John Deere test all new equipment in South Africa first, both because of the tough conditions but also because of the willingness and interest from the farmers.

Table 5: Showing the Interview Results for the Economics Factor

Why Factor is Important	Reactions	Supported by
New technology can help farmers increase yields	Precision Farming	J & G
New technology can help farmers adapt to climate change	New seed varieties that provide higher yields and are more drought tolerant.	D, G & K
New technology allows better trading on the open market	Employing staff to seek more efficient technology	D
	Traveling to gain new perspectives and learn new methods	A, G & H
	Not investing in new technology due to lack of support infrastructure	A

Greg believes that the information is available digitally and some farmers don't know how to access it. Kyle and Adam said that older farmers are also struggling with new online commodity trading mechanisms. This point is supported by Fred who says he struggles to keep up to date.

Bert and Adam did mention that local knowledge is still very important, specifically things farmers can only learn by doing. In connecting with this, Hugo somewhat heatedly said that donor-led projects from overseas with new ideas rarely work. When probed, he elaborated that, "the technology should to suit the farm as the farm cannot be changed to suit the technology. Local knowledge is important and new ideas are the future but it's about how they are brought together. More often than not, donor-led projects from overseas want to swoop in with some new Norwegian idea and 'save' us. They expect it to work instantaneously. But it takes time. Things are different here. Better we travel to see the new ideas because we know the conditions." Such a statement draws clear parallels with the theoretical framework of this thesis.

When advocating in favour of travel, Greg said, "If you are just on the farm all the time, your spectrum is very narrow. Your worldview. You don't have a wider view of things." This could be a reason as to why he believes in anthropogenic climate change.

5. The Community

The results of this theme were not tabulated as it was less apparent as to what actions farmers having been taking and what those actions are a response to.

When asked about the community, all farmers asked for clarification on which community the question was referring to. They divide the community into (1) farmers and their families who are mostly white, (2) the low-income communities who are mostly black, and (3) the Basotho.

When discussing the low-income communities, all farmers only referred to their farm's labour force and their families. This could mean that the farmers do not have many relationships with low-income groups outside beyond what's necessary. Alternatively, it could mean that they view that as a full encapsulation of the community. The latter is possible as, for example, Kyle has a village on his farm, Adam has a village and a primary school, and Jeff has a village, a school and a clinic. All of the farmers described their relationship with their labour force as mutually beneficial. Adam in particular elaborated on how many people working on the farm were born on the farm so the relationship has been able to build up across generations. Adam also explained that they try not mechanising certain activities unless there is no alternative, to maintain jobs. Indeed, some cases hand labour is still more effective than machinery.

Similarly, Hugo has a strong relationship with his labour force community. He speaks Sesotho, mother tongue of most of the people who live in the area, but not typically spoken by white people. He referenced his low staff turnover as a positive sign for the good relationships, a

sentiment echoed by Carl, Jeff, Adam and Kyle. Jeff detailed the community investment programs that he and the eleven other farmers he farms with have been investing in. He stated is confidence that job creation and education improve crime in the area. He also speaks Sesotho. Eric's numerous business ventures have reached such a scale that he attracts labour from across the border. He is the only farmer interviewed who has even a working relationship with the Basotho. Perhaps as the region develops, other farms could start building mutually beneficial relationships, and begin breaking down the long-standing social barriers.

These positive relationships were not the case for all farmers relationships. Greg said he has an acceptable relationship with community but as he lives away from his farm, he struggles to build it further. Carl was hesitant in responding to the question about the community. He described his relationship in the surrounding villages as good but he sounded unconvinced and refused to elaborate when probed. This indicates that his relationship with the village community is not as good as some of the other farmers. Bert made a point of saying that not all of the farmers in the area get on well. He referenced many disputes between neighbours. He suggested that farmers who rent their land do not care as much about development of the area as landowners. Building on this, Carl, Hugo and Kyle all answered the question about their relationship with fellow farmers rather narrowly, with responses such as "I get on well with one or two guys".

Fred, by far the oldest farmer interviewed, recalled the years immediately following apartheid area. Apparently, a farmer's union and a labour union met regularly to resolve disputes but the meetings were plagued with arguments and poor behaviour so the endeavour was abandoned. He highlighted how difficult it was to align priorities as the black labours were aggrieved about the events of apartheid and the white farmers felt their role in society was under threat.

Adam did highlight how he has struggled to find source managerial staff in the region. The educational system is not sufficient and even those from the area who somehow do gain the requisite skills normally seek to ply their trade in urban areas. "There's a community brain drain" as Adam noted.

Overall, the results presented in this segment imply although positive steps have been taken, this remains a fairly separated society with interactions often only happening where necessary.

6. The State

The results of this theme were not tabulated as the farmers are not reacting in any way to the state. However, that in itself is an important observation.

Generally, The State, as in the central government of South Africa, is not a big factor in the decisions of the farmers interviewed. Their opinions on the current government range from displeased to disinterested.

The subject that came up the most was land redistribution, as mentioned in the historical context. The farmers opinions on it were mixed. Adam, Carl, Eric, Greg and Jeff believe that it's just rhetoric to for the ANC to appease voters. In contrast, Dirk, Bert, Fred, Hugo and Kyle said there were worried but not enough to cease farming, with Bert voicing his frustration about how difficult it was for new young white people to being farming. Indeed, Dirk is worried enough to lobby for a nearby forest to be cultivated into farm land and given as part of the redistribution rather than his own farm be taken. Adam mentioned that part of the reason some farmers in the area had left was due to their concerns over land redistribution. Greg did acknowledge there was a need to rectify the past, but he, Adam, and Hugo are convinced land redistribution is not the way to do it. Greg and Jeff view the uncertainty around land redistribution as an opportunity for farm expansion.

None of the farmers receive any kind of support from the post-apartheid government. Adam, Carl and Fred said they used to get public veterinary and technical services. Adam also said the government once offered his farm a significant grant to support a tourism venture. He went ahead assuming it would be paid but they reneged on the deal, causing huge financial problems for Adam and completely eroding his faith in the state. Adam did grant that there are advantages to an inattentive government as the farmers enjoy complete operation freedom. Eric and Jeff contend that they are not inattentive but rather detrimental as corruption is hampering infrastructure and utility upkeep. They described how the 'junk' credit rating that South Africa received in 2017 impacted input costs and commodities prices.

All the farmers were asked if they think the government could have a role. Most believed it was nearly impossible, with Adam lamenting that even if he wanted to sponsor staff members to receive training, there are no public agricultural colleges left where he or she could attend. Only Greg was optimistic. He believes it is possible for the government to play a role and necessary that they do to maintain elements of the economy and agricultural sector that can only happen at a national level.

7. Climate Change Mitigation

Similarly to The State, this section is not tabulated as there is an evident lack of reaction to the challenge of mitigation of climate change. Unfortunately, the factor of least concerned amongst the farmers interviewed is the mitigation. This appears to be for two reasons.

The first is that not all the farmers believe climate change is caused by human activity. Carl believes that the bible is the best guide on how to farm and that it says the climate cannot be affects by humans due to their insignificance in comparison to god. Jeff explained how he is certain that the climate was changing but it was because an American shadow government was using technology, such as The High Frequency Active Auroral Research Program (HAARP), to influence the weather. He assured the interviewer that chemicals were being sprayed from commercial airlines that caused droughts and food shortages thereby increasing commodities revenue in the USA. He also believes that global warming is a lie created by Al Gore in order

to tax people on carbon. Two of Jeff's farming methods, no-till farming, can be seen as minor mitigation activity, as it increases carbon sequestration but his motivation for this was adaption. Hugo is sure that thermal activity from the earth's core is the primary cause of climate change. He did say he wished he did not use diesel anymore but only because it was expensive. Eric and Fred agree that climate change is certainly happening but are unsure as to why.

The second reason is that, although Adam, Bert, Dirk, Greg and Kyle all stated categorically that they believe climate change is caused by human activity, they are limited by financial pressures. They all noted the South Africa consumer was unwilling to pay more for more ecologically grown produce. Dirk is more worried about land redistribution to the extent that he would advocate for the removal of a forest which shows how low mitigation is on the priorities list. Greg thinks this could change. He provided the anecdote that until recently, cattle in the area were fed on supplemented feed for size. That feed contained harmful bacteria so the cattle required antibiotics. But now consumer preference has shifted so even the most price conscious consumer demands antibiotic free meat. Adam and Kyle are probably doing the most as both have embraced sustainable agricultural practices wherever possible and they believe it is the future of farming. But, as both explained, in current conditions it's not financial sustainable and organic food production is insufficient for global demands.

Discussion

Apparent from the results is that a single consultation with a group of local stakeholders provides a decent level of understanding of their priorities. Even at this degree of understanding, it is clear that some highly prioritized factors fall outside of the triple-win temple which supports the argument of Atela et al. (2015), Hurlbert & Gupta, (2015) and Sova et al. (2015). Furthermore, it is in line with the findings of Wood et al. (2016) that climate change mitigation is the least prioritized by local stakeholders, the common root for which was lack of local belief in anthropogenic climate change.

All of the factors raised do not necessarily present challenges in their own right. For example, just because some farmers struggled to access new information online does not mean the internet should be removed. This is the kind of critique of the farmers' priorities that Hurlbert and Gupta (2015) recommend. But, given the lack emphasis on, for example, climate change mitigation, the problems within the factors raised are what is leading to local stakeholders to make trade-offs. Consequently they all present challenges where intervention is required.

Firstly, do the factors raise either technical or adaptive challenges? The answer to this depends on the objective of the investigation. The main aim of this thesis looks at the implications of deeper socio-political understanding and its impact on intervention design. Therefore, technical solutions would be inappropriate. There are certainly technical solutions to many of problems referred to. But such solutions implemented in isolation have unintended consequences. This is why O'Brien's (2018) emphasised that sustainable development needs to be viewed as an adaptive challenge.

Thus, seven challenges in the adaptive sense have been established such that the three spheres can be used. Presented next is a map of where the seven challenges fall in within the three spheres, followed by individual justifications as to why.

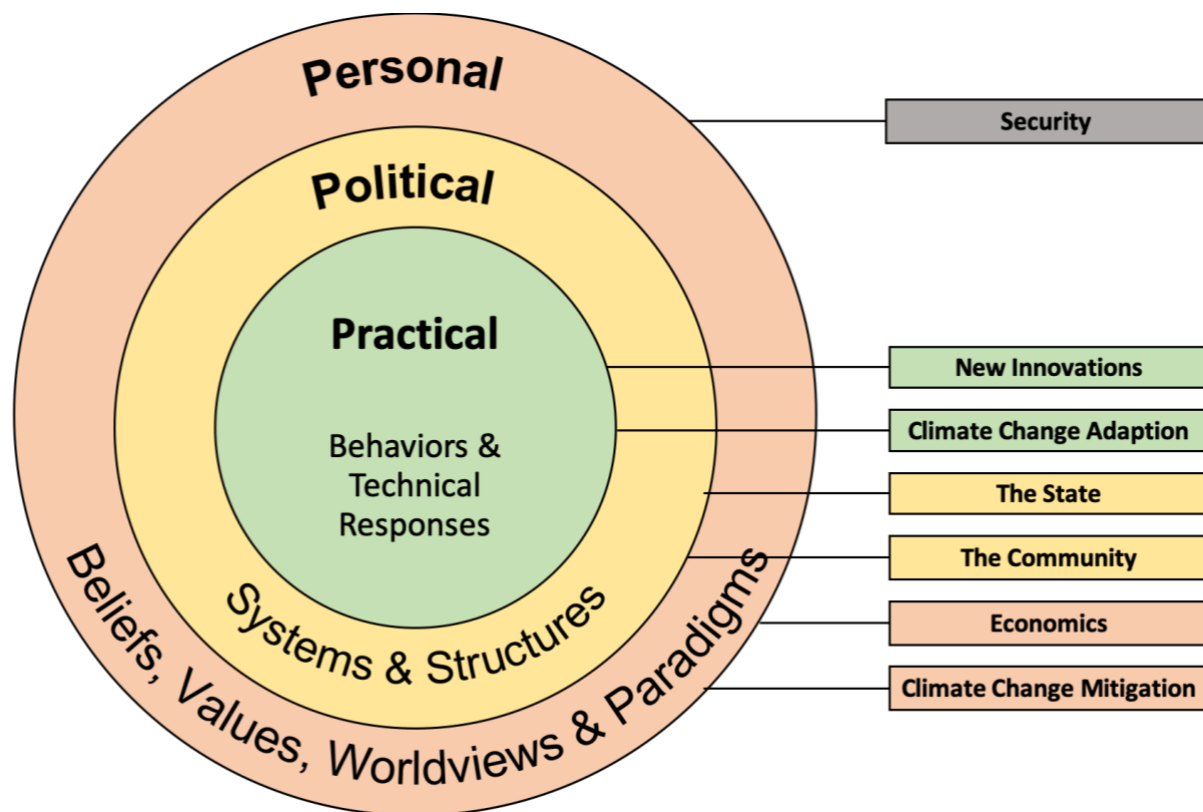


Figure 5: Where the Seven Factors fit into the Three Spheres (adapted from O'Brien, 2018)

New Innovations

The farmers certainly did not have any personal reservations towards new innovations. As long as the functionality was proven, the farmers were open to both testing and implementing new ideas. There are also no structural restrictions as although the open market can put financial pressure on the farmers, it does all the import and use of most new technology. This rules out personal and political spheres as areas that require intervention and that intervention in the practical sphere is more suitable. This is reinforced due to a fundamental part of the practical spheres being technical responses. The intervention needs to add new innovations that suit the priorities of the farmers and the triple-win goals. It is beyond the scope of this thesis to state if such innovations exist but this shows how technical innovations are helpful in resolving adaptive challenges and how difficult countering climate change is as **innovators are under huge pressure to provide helpful tools.**

Climate Change Adaptation

Adaptation to climate change is a core goal of the triple-win and the farmers actions in this regard have been extensive and fairly effective. Arguably therefore, no intervention is required. But the farmers highlighted how every year it gets more difficult, and there are therefore **limits to what they can do**. Furthermore, the ability to react is dependent on their **access to credit** and, particularly for the older farmers, **information**. This is in line with the findings of Nhemachena & Hassan (2007), as links to problems the New Technology and Economics factors again emphasise the interconnected nature of tackling these challenges. An appropriate intervention would be facilitating access to credit and information on innovations that push the limits of how the farmers can adapt. This mirrors the conclusion of the previous paragraph on **the pressure on innovators** and how technical innovations can be useful in solving adaptive challenges.

The State

Perhaps obviously, intervention by the state would happen in the political sphere. It could be argued that resolving the Land Redistribution dispute would require personal sphere intervention but many of the farmers indicated that the ANC do not truly want to redistribute the land as they believe it would be economical detrimental, as was the case in Zimbabwe. Therefore, if Land Redistribution is purely rhetoric to gain votes, political sphere intervention would be sufficient. It also could be argued that the farmers have completely lost belief in the government and so personal sphere intervention is required to restore this belief. However, this thesis contends that, based on how many farmers said the state could have a role beneficial and that once did, this belief could be restored after the many practical benefits that would come from a successful political intervention. Here, arguments in favour of personal interventions highlight the complicated nature of designing interventions and indicate why so many triple-win projects failed.

Therefore, the question of intervention is a question not so much of 'where' but rather of 'how,' as the scale of the challenge is significant. The systems and structures across two national governments would need to drastically change to stop hindering the farmers. Indeed, the allegations of **corruption and its consequences**, as expressed by many of the farmers, is in agreement with the research of Tanner et al. (2014), and the need for complete governmental transformation is supported by Stringer et al. (2017). Fully answering this question of how to intervene politically at such a scale is beyond the scope of this thesis, although the sheer scale does support the findings in the literature that **broader transitional pathways are a better approach** to tackling sustainable development than triple-wins.

The Community

Where to intervene in the community is perhaps the most complicated to decipher because it does not stand out as hindering the triple-win goals as clearly as they others. Indeed, it is the one where O'Brien's (2018) framework is perhaps the least appropriate, considering the other works Ellis and Tschakert (2018) referenced address the plight of the community more directly e.g. 'poverty eradication and reducing inequalities' (Roy et al. 2018); 'community resilience' (Fazey et al. 2018); 'social justice' (Patterson et al. 2018). This paper does not have the scope to utilise all of those works as Content Analysis tools, so an application of the three spheres must be attempted on all seven factors to properly answer the research question.

The problem highlighted in **the community was the isolation of various social groups**, emphasized by how the farmers saw their own community and the low-income communities as separate and by how rarely those groups interacted. While this problem may not directly impact the farmers efforts to achieve the triple-win goals, it would be nonsensical to disregard priorities of another group of local stakeholders when the foremost criticism of traditional triple-wins, and the basis of this thesis to some degree, is that the priorities of local stakeholders have been disregarded (Atela et al. 2015; Hurlbert & Gupta, 2015; Sova et al. 2015). Indeed, the importance of community-wide engagement and multi-stakeholder partnership has already been reviewed in the literature e.g. Dyer et al. (2014).

The problem may be practical, caused distances between the farms, villages and towns, but the farmers stated they maintain relationships with others in their group over such distances so this cannot be the cause. The cause could be racism, which if so, would require a personal sphere intervention. Indeed, the Afrikaners' global reputation of being racist persists to the present day as a legacy of Apartheid (Wilson, 2011). although in contrast to that stereotype, most of the farmers claimed to have strong relationships with their labour force. It is, of course, unlikely that a farmer would admit to having poor relationships and that a very racist paradigm, in reference to Meadows (1999) leverage points, could be laid aside for that many individuals of another race to allow for a positive working environment. Indeed, Adam and Jeff provided the interviewer with evidence of social development they are investing in. Hence it can be concluded that the farmers believe in the value of the development of the community.

There is a huge cultural disparity between the groups but O'Brien (2018) noted that culture is present across all three spheres and this paper maintains that intervention should not erode local cultures and, nevertheless, it would not be effective.

As personal and practical interventions have been ruled out, only the political sphere remains, which is fitting in this instance. After all politically segregated and symmetrically racist structures that prevailed over South Africa for so long, and the isolation overserved in the interviews with these farmers is likely as legacy of this. Such historical spatial legacies are common occurrences in South Africa (Noble & Wright, 2013; Wilson, 2011). If this is indeed the case then unfortunately, as is the case with the State, **the scale and difficulty of intervening in a way that erodes centuries have betterment between social groups is significant**, and its well outside the scope of the thesis to hypothesise how this could be done.

Economics

This factor does link to the triple-win goal of economic development but is not exactly inline as with climate change adaptation and mitigation. From the interviews it is possible to conclude that the farmers worldview of the Traditional Economic Paradigm (Stevens, 2011) (see table 6), given the emphasis they placed on financial returns. This observation supports the discoveries of Tanner et al. (2014) that the priorities of local stakeholder are often short term. If this is acceptable then no intervention in this factor is required. However, in recent years, climatologists have warned that a global temperature increase beyond the 1.5 °C threshold, previously thought to be 2 °C, will have a catastrophic impact environment and on society (Kharin, Flato, Zhang, Gillett & Anderson, 2018; Arnell, Lowe, Lloyd-Hughes & Osborn, 2018). The main purpose of O'Brien (2018), heavily referenced in this thesis, was to explore ways to better achieve the 1.5 °C threshold objective. Research indicates that a society based on Traditional Economic Paradigm will be insufficient to curb rising temperatures as, despite of process in decoupling emissions and economic growth, decoupling is not happening fast enough and absolute decoupling from resource consumption is impossible (Hickel & Kallis, G., 2019). Therefore alternatives are required. Once such alternative is Green Growth (Fay, 2012; Lorek & Spangenberg, 2014; Mundaca, Neij, Markandya, Hennicke & Yan, 2016). Apparent from Table 6 is that shifting the farmers to adopting a Green Growth Paradigm **and place the environment as their foremost priority**, would require a **high-level personal intervention**, specifically Meadows (1999) leverage points: changing personal paradigms or transcending them. Certainly it seems from the order of the factors, regardless of the progress made elsewhere, the farmers would make environmentally unfriendly choices if they were profitable. This links to the personal sphere intervention required for climate change mitigation. Hickel and Kallis (2019) suggest the Green Growth Paradigm will also be insufficient to achieve the temperatures objectives and continues growth needs to be **abandoned entirely in favour of more radical change**. That is requires more research. In the context of this thesis, if more radical change is required then the intervention at the personal level of the farmers will also need to be more radical, increasing its difficulty.

Table 6: Comparing Traditional Economic versus Green Growth Paradigms (Adapted from Stevens, 2011)

	Traditional Economic Paradigm	Green Growth Paradigm
Economic-environment links	Environmental protection viewed as detracting from economic growth	Environmental protection viewed as a driver of economic growth
Planning perspective	Short- to medium-term perspective	Long-term perspective
Scope of environmental responsibility	Government agencies and private sector units responsible for environmental management	All government agencies, corporate departments and wider society

Environmental policy interventions	Improvements to existing modalities of consumption and production	Changes to patterns of economic activity to reduce environmental pressures
Economic indicators	Measure rate and level of economic growth, e.g. GDP, productivity	Measure qualitative aspects of growth or well-being including environmental quality
Environmental indicators	Measure resource use and output of pollutants	Measure linkages between economic activity and output of environmental goods and services

Climate Change Mitigation

Perhaps most crucially, successful intervention on the mitigation of climate change would unquestionably have to occur in the personal sphere. The farmers have to believe that climate change is caused by human activity or they will not attempt to mitigate it. In reference to Meadows' (1999) leverage points, intervention would have to happen at the two highest points: either at the paradigm that determines what they chose to believe, or perhaps preferably, encouraging them to transcend that paradigm – to lay it aside on this issue and act for the benefit of the globe. An apt example of this is provided in the interview with Carl who stated that his rejection of the anthropogenic climate change consensus was due to his strong religious values. This paper does not comment on the validity or virtuousness of those values, only that they need to be transcended.

The farmers that already do believe that climate change is caused by human activity indicated that currently climate change mitigation activities were not financially sustainable. This could be approached in the personal or in practical sphere. At a personal level, intervention at the 'goals of the system' (Meadows, 1999), as discussed in Economics would address this to some degree. At a practical level, new innovations - specifically practises that mitigated climate change whilst being possible - would also help address this. Once again, the links across the factors and indeed across spheres shows the interconnectedness and difficulty of tackling climate change.

Security

Security on these farms clearly presents a huge problem and a problem that is outside of the triple-win objectives. There is a strong argument that investing in economic development in the region will reduce crime and indeed, many of the farmers noted that having a mutually beneficial relationship with the community does add protection, but only domestically. The main problem is the Lesotho border, as is indicated by Eric's farm which has little crime and is furthers from the border. It is impossible to say exactly what motivates **crime from across the border** with the most probable causes being the dire economic situation in Lesotho, the

historical context of land ownership both regionally and nationally, as discussed above supported by Fred's testimony, and safety that the border provides if stolen produce can be taken that far. If the three spheres are applied here, it indicates that intervention would be across all the spheres. Personal intervention may require convincing the Basotho offenders of the farmers' value and their rights, as per the current system of property rights, to farm that land peacefully. Political and practical intervention is required to enforce the border. Although acknowledging this is a good first step, it also serves to further underline the monumental challenge facing the area as such interventions would be exceptionally difficult. Given the history of the region, it would not be outlandish to suggest that to appease the greatest number of people, the border may need to be moved again. However it is achieved, the goal is **to restore stability to the area so that triple-win objectives can be achieved.**

Outcomes

To summarize, as farmers are already open to new innovations, what is required is for innovators to provide them. Similarly, the farmers are motivated to adapt to the changing climate. However there is a limit to how much they can do and is dependent on the availability of knowledge and credit. They can, of course, be provided with both but innovators are again under pressure to provide, in this case, more climate change adaptation innovations. The apparent corruption and lack of state support in South Africa is hindering the farmers to do achieve their goals both within and externally of the triple-win template. To rectify this would require sizeable and long-term political change. The region is divided into isolated communities, arguably due to the legacy of apartheid. To erode this legacy is both a substantial and difficult challenge.

Financial objectives appear as the primary motivation for farmers to fulfil the role of providing food for society. However, if they are to do so, they arguably need to put the environment ahead of financial gains and find a way to farm around this. This is a difficult prospect for any group and, even if achieved, may not be enough to curb rising temperatures.

Furthermore, in order to commit to using mitigation practises, the farmers need to unanimously believe in climate change, which means they need to change their worldview. Any such change is challenging to accomplish. Finally, the security concerns in the region are so grave that the application of the Content Analysis tool indicates there needs to be significant and striking interventions across all three spheres to create an environment where triple-win goals can be achieved.

This highlights how difficult the 'how' aspect of interventions within the pathways approach would be. More importantly, it also shows **the significant extent** to which understanding the priorities of the farmers can indicate **where** interventions would have the best chance of success, in effect, answering the primary research question. Understanding the farmers' priorities was sufficient to identify challenges, both within and externally of the triple-win template and give a starting point of where resolutions can be found.

Completing the theoretical framework

This conclusion around the usefulness of local stakeholder priorities is in agreement with the majority of the literature that has criticised traditional triple-wins. Furthermore, the identification of challenges that are outside of the triple-wins and the successful use of the Content Analysis tool, derived from pathways literature, emphasises that the new home of triple-wins within pathways is appropriate. As outlined in the theoretical framework, the combination of triple-win objectives, empirical evidence of other challenges and a pathways framework were able to begin addressing the issues that had previously caused triple-wins to fail. Therefore, this thesis has successfully contributed to filling the gap in the literature that it had identified.

4 Conclusion

The aim of this thesis was to explore to what extent understanding the priorities a group of local stakeholders can indicate where interventions would have the best chance of success. This aim was inspired by a gap found in literature where scholars had suggested that the failing triple-win (Nunan, 2017) approach may still have part to play in the emerging pathways literature (Ellis & Tschakert, 2018), but there was no empirical evidence of this. This thesis therefore provided such evidence. To achieve this, the researcher conducted in-depth semi-structured interviews with a group of large-scale farmers from the Eastern Free State in South Africa to gain an understanding of their priorities. A Content Analysis tool, specifically O'Brien's (2018) three spheres, was then applied to the results of the interviews. This process showed that understanding the priorities of local stakeholders provides a strong indication of where interventions would have the greatest chance of success. This, in turn, is evidence that the triple-win objectives can be used as the foundation for sustainable development research, within the broader pathways concept.

Finding where interventions would have the best chance of success is the first step in designing revitalized triple-win projects that avoid the failures of their predecessors. Inadvertently, this thesis also shows that the next step of that design process - "how" to intervene - is an exceptionally large and difficult task.

Several questions remain to be resolved, in particular; do different groups of local stakeholders have different priorities? If so, this would only add more complexity to the already monumental task of accomplishing revitalised triple-win projects. Further studies are required to establish this.

The results of this thesis cannot be generalised as each stakeholder group will have different priorities. Indeed, the case of these farmers was chosen, in part, due to the unique historical background of the area which has an influence on stakeholder priorities. What can be generalised is that local stakeholder priorities play a huge part in future triple-win project design. Furthermore the novel approach used in this thesis can certainly be repeated across various sectors by interviewing new groups of stakeholders.

These findings can contribute substantially to the rising body of literature that suggests the transitional pathways (e.g. Ellis & Tschakert, 2018; Shafiei, Davidsdottir, Leaver, Stefansson & Asgeirsson 2015; García-Arias, Vázquez-González, Sineiro-García & Pérez-Fra 2015; Mundaca et al. 2016), at least in the socio-technical sense (Rosenbloom, 2017), and are a promising approach for society to develop sustainably.

Additionally, as many fundamental challenges that are outside the triple-wins have been identified, the findings reinforce the recommendation to find pathways frameworks that place more emphasis on other challenges. Many such frameworks already exist, some of which were

identified in the literature. (e.g. Patterson et al. 2018; Roy et al. 2018; Harris, Chu & Ziervogel, 2017; Fazey et al. 2018).

This also inadvertently supports the suggestion that society may need to shift its approach to economic growth, indicating that at least a Green Growth alternative (e.g. Fay, 2012; Lorek & Spangenberg, 2014; Mundaca et al. 2016) or something more radical is required (Hickel & Kallis, G., 2019).

Finally, and perhaps most importantly, this study reinforces the argument by O'Brien (2008) that if climate change is viewed purely as a technical problem, it will undervalue the role of human beings to make change. To end where this thesis began, "Sustainable development requires human ingenuity. People are the most important resource." - Dan Shechtman.

References

- Abah, R. C. & Petja, B. M. (2016). 'Assessment of potential impacts of climate change on agricultural development in the Lower Benue River Basin', *Environmental Monitoring and Assessment*, 188(12). Available at: <http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=cm-edm&AN=27873107&site=eds-live&scope=site> (Accessed: 8 January 2019).
- Abson, D.J., Fischer, J., Leventon, J., Newig, J., Schomerus, T., Vilsmaier, U., von Wehrden, H., Abernethy, P., Ives, C.D., Jager, N. W. & Lang, D. J. (2017). Leverage points for sustainability transformation. *Ambio*, 46(1), pp.30-39.
- Antwi-Agyei, P., Dougill, A. & Stringer, L. (2017). Assessing coherence between sector policies and climate compatible development: Opportunities for triple wins. *Sustainability*, 9(11), p.2130.
- Arnell, N.W., Lowe, J.A., Lloyd-Hughes, B. & Osborn, T.J. (2018). The impacts avoided with a 1.5 C climate target: a global and regional assessment. *Climatic change*, 147(1-2), pp.61-76.)
- Arnould, E.J. & Thompson, C.J. (2015). Introduction: consumer culture theory: ten years gone (and beyond). In *Consumer Culture Theory* (pp. 1-21). Emerald Group Publishing Limited.
- Atela, J., Quinn, C., Minang, P. & Duguma, L. (2015). Implementing REDD+ in the context of integrated conservation and development projects. *Land Use Policy*, 48, 329–340.
- Beck, R.B. (2000). *The History of South Africa*. Greenwood Publishing Group.
- Boisier, J.P., de Noblet-Ducoudré, N. & Ciais, P. (2014). 'Historical land-use-induced evapotranspiration changes estimated from present-day observations and reconstructed land-cover maps'. *Hydrol. Earth Syst. Sci.* 18, 3571–3590. <http://dx.doi.org/10.5194/hess-18-3571-2014>.
- Bonfiglio, A., Arzeni, A. & Bodini, A. (2017). 'Assessing eco-efficiency of arable farms in rural areas', *Agricultural Systems*, 151, pp. 114–125. doi: 10.1016/j.agsy.2016.11.008.
- Boyd, E., May, P., Chang, M. & Veiga, F. C. (2007). Exploring socioeconomic impacts of forest based mitigation projects. *Environmental Science and Policy*, 10(5), 419–433
- Brand, U. (2016). How to get out of the multiple crisis? Contours of a critical theory of social-ecological transformation. *Environmental Values*, 25(5), pp.503-525.

Brook, B.W., Ellis, E.C., Perring, M.P., Mackay, A.W. & Blomqvist, L. (2013). 'Does the terrestrial biosphere have planetary tipping points?', *Trends Ecol. Evol.* 28, 396–401. <http://dx.doi.org/10.1016/j.tree.2013.01.0>

Browne, S. (2017). 'Sustainable development Goals and UN goal-setting'. Abingdon, Oxon: Routledge 2017 (Global institutions series). Available at: <http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com.ludwig.lub.lu.se/login.aspx?direct=true&db=catt01310a&AN=lovisa.004997913&site=eds-live&scope=site> (Accessed: 7 January 2019).

Bryman, A. (2012). *Social research Methods*, Oxford University Press, Oxford

Calvin, K., Pachauri, S., De Cian, E. & Mouratiadou, I. (2016). The effect of African growth on future global energy, emissions, and regional development. *Climatic Change*, 136(1), pp.109-125.

Conceição, P., Levine, S., Lipton, M. & Warren-Rodríguez, A. (2016). Toward a food secure future: Ensuring food security for sustainable human development in Sub-Saharan Africa. *Food Policy*, 60, pp.1-9.

Cook, J., Nuccitelli, D., Green, S.A., Richardson, M., Winkler, B., Painting, R., Way, R., Jacobs, P. and Skuce, A. (2013). Quantifying the consensus on anthropogenic global warming in the scientific literature. *Environmental research letters*, 8(2), p.024024.

Creswell, J. W. (2014). 'Research Design: Qualitative, Quantitative, and Mixed Methods Approaches'. Thousand Oaks, California: SAGE Publications.

David B. Coplan, A river runs through it: The meaning of the Lesotho-free state border, *African Affairs*, Volume 100, Issue 398, 1 January 2001, Pages 81–116, <https://doi.org/10.1093/afraf/100.398.81>

Denton, F., Wilbanks, T.J., Abeysinghe, A.C., Burton, I., Gao, Q., Lemos, M.C., Masui, T., O'Brien, K.L. & Warner, K. (2014). Climate-resilient pathways: adaptation, mitigation, and sustainable development. In: Field, C.B., Barros, V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., Girma, B., Kissel, E.S., Levy, A.N., MacCracken, S., Mastrandrea, P.R., White, L.L. (Eds.), E534, R. (Tran.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel of Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1101–1131.

Di Vita, G., Pilato, M., Pecorino, B., Brun, F. & D'Amico, M. (2017). 'A Review of the Role of Vegetal Ecosystems in CO₂ Capture'. *Sustainability* 2017, 9, 1840.

Duku, C., Zwart, S.J, van Bussel, L. G. J. & Hein, L. (2018). ‘Quantifying trade-offs between future yield levels, food availability and forest and woodland conservation in Benin’, *Science of the Total Environment*, 610–611, pp. 1581–1589. doi: 10.1016/j.scitotenv.2017.06.115.

Dyer, J. C., Stringer, L. C., Dougill, A. J., Leventon, J., Nshimbi, M., Chama, F., Kafwifwi, A., Muledi, J. I., Kaumbu, J. M. K. & Falcao, M. (2014). ‘Assessing participatory practices in community-based natural resource management: Experiences in community engagement from Southern Africa’. *J. Environ. Manag.* 2014, 137, 137–145.

Ellis, N.R. & Tschakert, P. (2018). Triple-wins as pathways to transformation? A critical review. *Geoforum*.

England, M. I., Stringer, L. C., Dougill, A. J. & Afionis, S. (2018). ‘How do sectoral policies support climate compatible development? An empirical analysis focusing on Southern Africa’. *Environmental Science and Policy*, 79, 9–15. <https://doi.org/10.1016/j.envsci.2017.10.009>

Eriksen, S.H., Nightingale, A.J. & Eakin, H. (2015). Reframing adaptation: the political nature of climate change adaptation. *Glob. Environ. Chang.* 35, 523–533. <https://doi.org/10.1016/J.GLOENVCHA.2015.09.014>.

Esham, M. & Garforth, C. (2012). Agricultural adaptation to climate change: insights from a farming community in Sri Lanka. *Mitig Adapt Strateg Glob Chang.* doi:10.1007/s11027-012-9374-6

Etherington, N. (2014). *The Great Treks: the transformation of southern Africa 1815-1854*. Routledge.

Favretto, N., Dougill, A.J., Stringer, L. C., Afionis, S. & Quinn, C. H. (2018). ‘Links between Climate Change Mitigation, Adaptation and Development in Land Policy and Ecosystem Restoration Projects: Lessons from South Africa’, *Sustainability*, Vol 10, Iss 3, doi: 10.3390/su10030779

Fay, M. (2012). *Inclusive green growth: the pathway to sustainable development*. World Bank Publications.

Fazey, I., Carmen, E., Chapin, F.S., Ross, H., Rao-Williams, J., Lyon, C., Connon, I.L.C., Searle, B.A. & Knox, K. (2018). Community resilience for a 1.5°C world. *Curr. Opin. Environ. Sustain.* 31, 30–40. <https://doi.org/10.1016/j.cosust.2017.12.006>.

Flick, U., 2018. *An introduction to qualitative research*. Sage Publications Limited.

Flöser, G. & von Storch, H. (1999). ‘Anthropogenic climate change’. Berlin : Springer, cop. 1999 (GKSS School of Environmental Research). Available at: <http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=cat01310a&AN=lovisa.001398801&site=eds-live&scope=site> (Accessed: 7 January 2019).

García-Arias, A.I., Vázquez-González, I., Sineiro-García, F. & Pérez-Fra, M. (2015). Farm diversification strategies in northwestern Spain: Factors affecting transitional pathways. *Land Use Policy*, 49, pp.413-425.

Garfinkel, H. (1967). *Studies in ethnomethodology*.

Gbetibouo, G., Hassan, R. & Ringler, C. (2010). Modelling farmers' adaptation strategies for climate change and variability: the case of the Limpopo Basin, South Africa, *Agrekon: Agricultural Economics Research*. *Pol Pract South Afr* 49(2):217–234

Glaser, B. G. & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine.

Glesne, C. & Peshkin, A. (1992). *Becoming qualitative researchers: An introduction*. White Plains, CA: Wadsworth.

Glesne, C., & Peshkin, A. (1992). *Becoming qualitative researchers*. White Plains, NY.

Guest, G., MacQueen, K. M. & Namey, E. E. (2012). *Applied thematic analysis*. Thousand Oaks, CA: Sage

Haider, L.J., Boonstra, W.J., Peterson, G.D., Schlüter, M., 2018. Traps and sustainable development in rural areas: a review. *World Dev.* 101, 311–321. <https://doi.org/10.1016/j.worlddev.2017.05.038>.

Hansen, O. (2017). 'Deforestation Caused by Illegal Avocado Farming: A Case Study on the Effectiveness of Mexico's Payment for Ecosystem Services Program', *University of Miami Inter-American Law Review*, no. Issue 1, Available at: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=eds_hol&AN=edshol.hein.journals.unmialr49.7&site=eds-live&scope=site (Accessed: 7 January 2019).

Harris, L.M., Chu, E.K. & Ziervogel, G. (2017). Negotiated resilience. *Resilience* 1–19. <https://doi.org/10.1080/21693293.2017.1353196>.

Heifetz, R. A., Grashow, A. & Linsky, M. (2009). *The Practice of Adaptive Leadership: Tools and Tactics for Changing Your Organization and the World*. Harvard Business Press; 2009.

Hickel, J. & Kallis, G. (2019). Is Green Growth Possible?. *New Political Economy*, pp.1-18.

Houghton, R.A., House, J.I., Pongratz, J., van der Werf, G.R., DeFries, R.S., Hansen, M.C., Le Quéré, C. & Ramankutty, N. (2012). 'Carbon emissions from land use and land-cover change'. *Biogeosciences* 9, 5125–5142. <http://dx.doi.org/10.5194/bg-9-5125-2012>.

- Hurlbert, M. & Gupta, J. (2015). The split ladder of participation. *Environmental Science and Policy*, 50, 100–113.
- Jindal, R., Swallow, B. & Kerr, J. (2008). Forestry-based carbon sequestration projects in Africa. *Natural Resources Forum*, 32(2), 116–130.
- Kansiime, M. K., van Asten, P. & Sneyers, K. (2018). 'Farm diversity and resource use efficiency: Targeting agricultural policy interventions in East Africa farming systems', *NJAS - Wageningen Journal of Life Sciences*, 85, pp. 32–41. doi: 10.1016/j.njas.2017.12.001.
- Kattel, R. & Mazzucato, M. (2018). 'Mission-oriented innovation policy and dynamic capabilities in the public sector', *Industrial & Corporate Change*, 27(5), pp. 787–801. doi: 10.1093/icc/dty032.
- Kennedy, P. (2008). *A guide to econometrics*. Oxford: Blackwell, 2008. Available at: <http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=cat01310a&AN=lovisa.001778695&site=eds-live&scope=site> (Accessed: 10 January 2019).
- Keohane, R.O. & Victor, D.G. (2016). Cooperation and discord in global climate policy. *Nature Climate Change*, 6(6), p.570.
- Kepe, T. & Hall, R. (2018). Land redistribution in South Africa: Towards decolonisation or recolonisation?. *Politikon*, 45(1), pp.128-137.
- Kharin, V.V., Flato, G.M., Zhang, X., Gillett, N.P., Zwiers, F. & Anderson, K.J. (2018). Risks from climate extremes change differently from 1.5 C to 2.0 C depending on rarity. *Earth's Future*, 6(5), pp.704-715.
- Kovacic, Z. & Viteri Salazar, O. (2017). 'The lose-lose predicament of deforestation through subsistence farming: Unpacking agricultural expansion in the Ecuadorian Amazon', *Journal of Rural Studies*, 105–114. doi: 10.1016/j.jrurstud.2017.02.002.
- Kvale, S. (1996). *InterViews: An Introduction to Qualitative Research Interviewing*. Thousand Oaks, CA: Sage.
- Lahiff, E. & Li, G. (2012). Land redistribution in South Africa: A critical review. World Bank
- Leventon, J., Dyer, J.C. & Van Alstine, J.D. (2015). The private sector in climate governance: opportunities for climate compatible development through multilevel industry-government engagement. *Journal of Cleaner Production*, 102, pp.316-323.
- Longhurst, R. (2003). Semi-structured interviews and focus groups. *Key methods in geography*, 3, pp.143-156.

Lorek, S. & Spangenberg, J.H. (2014). Sustainable consumption within a sustainable economy—beyond green growth and green economies. *Journal of cleaner production*, 63, pp.33-44.

Maxwell, J. A. (2005). *Qualitative research design: An interactive approach* (2nd Ed.). Thousand Oaks, CA: SAGE Publications.

Maxwell, S. (2017). 'Mainstreaming Climate Compatible Development'. Climate Development Knowledge Network (CDKN), London

Mbete, S. (2015). The Economic Freedom Fighters-South Africa's turn towards populism?. *Journal of African elections*, 14(1), pp.35-59.

Meadows, D. (1999). *Leverage points. Places to Intervene in a System*.

Mitchell, T. & Maxwell, S. (2010). 'Defining Climate Compatible Development', CDKN ODI Policy Brief, November 2010/A. Available at: https://cdkn.org/resource/defining-climate-compatible-development-3/?loclang=en_gb

Monast, J. (2016). 'From Top-down to Bottom-up Climate Policy: New Challenges in Carbon Market Design', *San Diego J. of Climate & Energy Law*, Available at: [http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=eds_hol&AN=edshol.hein.\).s.sdjclimel8.7&site=eds-live&scope=site](http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=eds_hol&AN=edshol.hein.).s.sdjclimel8.7&site=eds-live&scope=site) (Accessed: 9 January 2019).

Morgan, D. L. (2008). *The SAGE Encyclopedia of Qualitative Research Methods*. SAGE Publications, Inc. pp. 816–817.

Moyo, S. (2018). The political economy of land redistribution in the 1990s. In *Land reform in Zimbabwe: Constraints and prospects* (pp. 73-82). Routledge.

Mundaca, L., Neij, L., Markandya, A., Hennicke, P. & Yan, J. (2016). *Towards a Green Energy Economy? Assessing policy choices, strategies and transitional pathways*.

Nalau, J. & Handmer J. (2015). When is transformation a viable policy alternative? *Environ Sci Policy* 2015, 54:349-356.

Newbold, T., Hudson, L.N., Arnell, A.P., Contu, S., Palma, A.D., Ferrier, S., Hill, S.L.L., Hoskins, A.J., Lysenko, I., Phillips, H.R.P., Burton, V.J., Chng, C.W.T., Emerson, S., Gao, D., Pask-Hale, G., Hutton, J., Jung, M., Sanchez-Ortiz, K., Simmons, B.I., Whitmee, S., Zhang, H., Scharlemann, J.P.W. & Purvis, A. (2016). 'Has land use pushed terrestrial biodiversity beyond the planetary boundary? A global assessment'. *Science* 353, 288–291. <http://dx.doi.org/10.1126/science.aaf2201>.

Nhemachena, C. & Hassan, R. (2007). *Micro-level analysis of farmers adaption to climate change in Southern Africa*. Intl Food Policy Res Inst.

Noble, M. & Wright, G. (2013). Using indicators of multiple deprivation to demonstrate the spatial legacy of apartheid in South Africa. *Social Indicators Research*, 112(1), pp.187-201.

O'Brien, K.L. & Leichenko, R.M. (2000). Double exposure: assessing the impacts of climate change within the context of economic globalization. *Glob. Environ. Change* 10, 221e232.

O'Brien, K. (2018). Is the 1.5°C target possible? Exploring the three spheres of transformation. *Curr. Opin. Environ. Sustain.* 31, 153–160. <https://doi.org/10.1016/j.cosust.2018.04.010>.

Obersteiner, M., Walsh, B., Frank, S., Havlík, P., Cantele, M., Liu, J., Palazzo, A., Herrero, M., Lu, Y., Mosnier, A., Valin, H., Riahi, K., Kraxner, F., Fritz, S. & van Vuuren, D. (2016). 'Assessing the land resource–food price nexus of the Sustainable Development Goals'. *Sci. Adv.* 2, e1501499. <http://dx.doi.org/10.1126/sciadv.1501499>.

Olsson, L., Opondo, M., Tschakert, P., Agrawal, A., Eriksen, S.H., Ma, S., Perch, L.N., Zakieldeen, S.A. (2014). Livelihoods and poverty. In: Field, C.B., Barros, V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y. O., Genova, R.C., Girma, B., Kissel, E.S., Levy, A.N., MacCracken, S., Mastrandrea, P. R., White, L.L. (Eds.), E1421, R. (Tran.), *Climate Change 2014: Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 793–832. <https://doi.org/10.1017/CBO9781107415379.018>.

Oreskes, N. (2007). The scientific consensus on climate change: How do we know we're not wrong?. *Climate change: What it means for us, our children, and our grandchildren*, pp.65-99.

Patterson, J.J., Thaler, T., Hoffmann, M., Hughes, S., Oels, A., Chu, E., Mert, A., Huitema, D., Burch, S. & Jordan, A. (2018). Political feasibility of 1.5°C societal transformations: the role of social justice. *Curr. Opin. Environ. Sustain.* 31, 1–9. <https://doi.org/10.1016/j.cosust.2017.11.002>.

Pelling, M. (2011). *Adaptation to Climate Change: From Resilience to Transformation*. Routledge

Perera, C. & Hewege, C. (2018). 'Climate change risk perceptions among green conscious young consumers: Implications for green commodity marketing', *Journal of Consumer Marketing*, 35(7), pp. 754–766. doi: 10.1108/JCM-01-2018-2537.

Reuters (2019). Presidential panel submits long-delayed report on South African.... [online] Available at: <https://www.reuters.com/article/us-safrica-land/presidential-panel-submits-long-delayed-report-on-south-african-land-reform-idUSKCN1TC290> [Accessed 11 Jun. 2019].

Riddell, D., 2013. BRING ON THE R/EVOLUTION: Integral Theory and the Challenges of Social Transformation and Sustainability. *Journal of Integral Theory & Practice*, 8.

Robinson, C. (2008). 'Climate change policy: challenging the activist', London : Institute of Economic Affairs, 2008 (IEA readings: 62). Available at: <http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=cat01310a&AN=lovisa.001793375&site=eds-live&scope=site> (Accessed: 9 January 2019).

Robinson, M., Shine, T. (2018). Achieving a climate justice pathway to 1.5°C. *Nat. Climate Chang.* 8, 564–569. <https://doi.org/10.1038/s41558-018-0189-7>.

Robinson, M., Shine, T. (2018). Achieving a climate justice pathway to 1.5°C. *Nat. Climate Change.* 8, 564–569. <https://doi.org/10.1038/s41558-018-0189-7>.

Rockström, J., Gaffney, O., Rogelj, J., Meinshausen, M., Nakicenovic, N., Schellnhuber, H.J., 2017. A roadmap for rapid decarbonization. *Science* (80-.) 355, 1269–1271.

Rosenbloom, D. (2017). Pathways: an emerging concept for the theory and governance of low-carbon transitions. *Glob. Environ. Chang.* 43, 37–50. <https://doi.org/10.1016/j.gloenvcha.2016.12.011>.

Roy, J., Tschakert, P., Waisman, H., Abdul Halim, S., Antwi-Agyei, P., Dasgupta, P., Hayward, B., Kanninen, M., Liverman, D., Okereke, C., Pinho, P.F., Riahi, K. & Suarez Rodriguez, A.G. (2018). Sustainable development, poverty eradication and reducing inequalities. In: Masson-Delmotte, V, Zhai, P., Pörtner, H.O., Roberts, D., Skea, J., Shukla, P.R., Pirani, A., Moufouma-Okia, W., Péan, C., Pidcock, R., Connors, S., Matthews, R.B.R., Chen, Y., Zhou, X., Gomis, M.I., Lonnoy, E., Maycock, T., Tignor, M., Water eld, T. (Eds.), *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, in press.

Safrina. (2014). 'The Logging Ban Policy in Addressing Deforestation: A Comparison between Thailand and Indonesia', *Indonesian Journal of International Law*, (Issue 2), p. 222. Available at: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=eds_hol&AN=edshol.hein.journals.indjil12.24&site=eds-live&scope=site (Accessed: 9 January 2019).

Schleich, J., Schwirplies, C. & Ziegler, A. (2018). 'Do perceptions of international climate policy stimulate or discourage voluntary climate protection activities? A study of German and US households', *Climate Policy* (Earthscan), 18(5), pp. 568–580. doi: 10.1080/14693062.2017.1409189.

Shafiei, E., Davidsdottir, B., Leaver, J., Stefansson, H. & Asgeirsson, E.I. (2015). Comparative analysis of hydrogen, biofuels and electricity transitional pathways to sustainable transport in a renewable-based energy system. *Energy*, 83, pp.614-627.

Sharma, M. (2007). Personal to planetary transformation. *Kosmos*, pp.31-5.

Sietz, D., Boschütz, M. & Klein, R. (2011). Mainstreaming climate adaptation into development assistance: rationale institutional barriers and opportunities in Mozambique. *Environ Sci Pol* 14(4):493–502

Sova, C., Vervoort, J., Thornton, T., Helfgott, A., Matthews, D. & Chaudhury, A. (2015). Exploring farmer preference shaping in international agricultural climate change adaptation regimes. *Environmental Science and Policy*, 54, 463–474.

Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., Carpenter, S.R., Vries, W.d., Wit, C.A.d., Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B. & Sörlin, S. (2015). Planetary boundaries: guiding human development on a changing planet. *Science* 347, 1259855. <http://dx.doi.org/10.1126/science.1259855>.

Stevens, C. (2011). Agriculture and Green Growth. Report to the OECD, Paris, France.

Stringer, L. C., Sallu, S. M., Dougill, A. J., Wood, B. & Ficklin, L. (2017). ‘Reconsidering climate compatible development as a new development landscape in Southern Africa’. In *Making Climate Compatible Development Happen*, 1st ed.; Routledge: London, UK, 2017; pp. 22–43. ISBN 9781138657021.

Stringer, L.C., Dougill, A.J., Mkwambisi, D.D., Dyer, J.C., Kalaba, F.K. & Mngoli, M. (2012). Challenges and opportunities for carbon management in Malawi and Zambia. *Carbon Manag.* 3, 159–173.

Suckall, N., Stringer, L. C. & Tompkins, E. L. (2015). ‘Presenting Triple-Wins? Assessing Projects That Deliver Adaptation, Mitigation and Development Co-benefits in Rural Sub-Saharan Africa’, *Ambio*, (1). Available at: <http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com.ludwig.lub.lu.se/login.aspx?direct=true&db=edsjsr&AN=edsjsr.24670723&site=eds-live&scope=site> (Accessed: 7 January 2019).

Suckall, N., Stringer, L. C. & Tompkins, E. L. (2015). ‘Presenting triple-wins? Assessing the framings of projects that deliver adaptation, mitigation and Development in rural sub-Saharan Africa’. *Ambio* 44, 31–41.

Tanner, T., Mensah, A., Lawson, E.T., Gordon, C., Godfrey-Wood, R. & Cannon, T. (2014). Political economy of climate compatible development: artisanal fisheries and climate. Change in Ghana. IDS Working Paper No 446.

The Economist. (2019). Land reform will continue to be one of South Africa's biggest problems. [online] Available at: <https://www.economist.com/special-report/2019/04/25/land-reform-will-continue-to-be-one-of-south-africas-biggest-problems> [Accessed 7 May 2019].

Thornton, T.F., Comberti, C. (2017). Synergies and trade-offs between adaptation, mitigation and development. *Clim. Change* 1–14. <https://doi.org/10.1007/s10584-013-0884-3>.

Tompkins, E. L., Mensah, A., King, L., Long, T. K., Lawson, E., Hutton, C., Hoang, V., Gordon, C., Fish, M., Dyer, J. & Bood, N. (2013). 'An investigation of the evidence of benefits from climate compatible development'. Working Paper. Centre for Climate Change Economics and Policy (Retrieved from [http](http://www.ccccep.ac.uk/))

Tumusiime, D. M., Byakagaba, P. & Tweheyo, M. (2018). 'Policy and Institutional Drivers of Deforestation', *Environmental Policy and Law*, (Issue 2), Available at: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=eds_hol&AN=edshol.hein.journals.envpola48.30&site=eds-live&scope=site (Accessed: 9 January 2019).

Vecchiato, P. (2019). South Africa's Land-Expropriation Debate: The State of Play. [online] *Bloomberg.com*. Available at: <https://www.bloomberg.com/news/articles/2019-03-11/south-africa-s-land-expropriation-debate-the-state-of-play> [Accessed 25 Apr. 2019].

Viola, E. (2013). 'Transformations in Brazilian Deforestation and Climate Policy since 2005', *Theoretical Inquiries in Law*, (Issue 1), p. 109. Available at: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=eds_hol&AN=edshol.hein.journals.thinla14.10&site=eds-live&scope=site (Accessed: 9 January 2019).

Wilhite, H. (2016). *The political economy of low carbon transformation: breaking the habits of capitalism*. Routledge.

Wilson, F., 2011. Historical roots of inequality in South Africa. *Economic History of Developing Regions*, 26(1), pp.1-15.

Wood, B.T., Dougill, A.J., Quinn, C.H. & Stringer, L.C. (2016). Exploring power and procedural justice within climate compatible development project design: whose priorities are being considered?. *The Journal of Environment & Development*, 25(4), pp.363-395.

Wood, B. T., Stringer, L. C., Quinn, C.H. & Dougill, A.J. (2017). 'Investigating climate compatible development outcomes and their implications for distributive justice: Evidence from Malawi'. *Environ. Manag.* 60, 436–453.

Appendices

Appendix 1 Types of Transformative Pathways

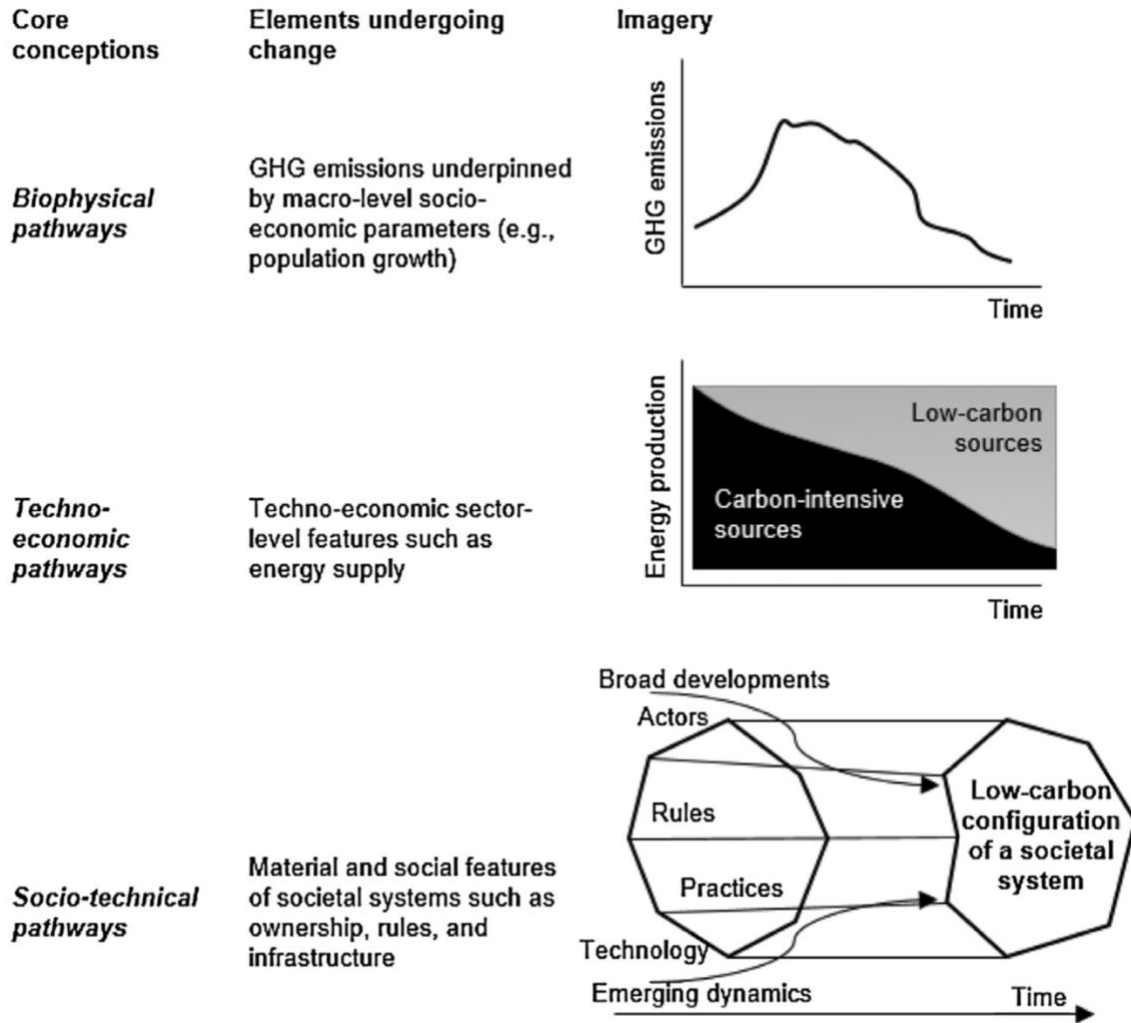


Figure 6: The multi-dimensionality of pathways (Rosenbloom, 2017, p 44)

Appendix 2 Interview Guide

Base Questions

1. When did you begin your farming operation?
 2. Did you grow up on a farm?
 3. Are you from this area?
 4. Do you live in the farm?
 5. How large is your farm?
 6. Did you buy the farm or perhaps inherited it?
 7. What's your main produce?
 8. Is farming your sole source of income?
-
1. Do you have a relationship with the local community?
 2. What was the biggest change you encountered during your time as a farmer?
 3. What technical innovation had the biggest impact?
 4. Have you found that it's more difficult over time to maintain a livelihood from farming?
 5. Have you observed changes in the size of farms in your surrounding area?
 6. Do you believe the government should have a role in the farming sector?
 7. Have you ever received any form of government support?
 8. What do you think about 'land redistribution' in South Africa?
 9. What do you think about the local police force?
 10. Do you feel the rule of law is upheld?
 11. Do you have additional security?
 12. Do you think that human activity has had an impact on the environment?
 13. Have you seen a change in climate since you first started farming?
 14. What do you think of sustainable agriculture?
 15. Are you under any pressure from consumers to move toward that practice?
 16. Has annual rainfall be consistence since you began farming?
 17. Do you know anyone (neighbours, family, friends) who's given up farming? Why exactly did they do it?