Narratives of the future

Navigating uncertainty in adopting sustainable farming practices and payment schemes

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Narratives of the future – Navigating uncertainty in adopting sustainable farming practices and payment schemes

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Abstract

This thesis explores the adoption of sustainable farming practices among large-scale land users in South Africa's Albany thicket biome, a region facing significant environmental challenges. The need for farming practices that mitigate climate change by sequestering carbon and restoring soil health – known as carbon farming – is crucial. However, the success of these sustainable practices depends on the decision-making of local land users, which is shaped by uncertainties such as economic pressures, climate variability, and the evolving political landscape in South Africa. In navigating these uncertainties, future narratives can provide valuable direction for decision-making. This study applies Vignoli et al.'s (2020) narrative framework to examine the future narratives of land users in the thicket biome. Through semi-structured interviews with twelve participants, these narratives were analysed to understand how they guide complex decision-making. The research identifies three future narratives: 'keep the fight and innovate the business', 'leave the fight but keep the farm', and 'the future of the family farm (probably) ends with me'. Experiences, constraints, expectations, and aspirations shape these narratives. Additionally, the study's findings show that environmental factors significantly impact future narratives and thus the adoption of carbon farming practices, highlighting the need for policies that align with farmers' realities. This thesis contributes to understanding how integrating ecological awareness with economic and social factors can drive sustainable agriculture.

Keywords: Narrative Framework, sustainable farming, carbon farming, carbon market, uncertainty, land user decision-making, Albany thicket biome.

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Abbreviations

ANC	African National Congress
CEO	Chief Executive Officer
CPD	Carbon Project Developer
NMU	Nelson Mandela University
SLU	Swedish University of Agricultural Sciences

1. Introduction

1.1 Problem formulation

Given the urgency of a fast-approaching global climate crisis, the question of how humans utilise the earth's resources and deal with the steady rise of greenhouse gas emissions in the atmosphere has never been more critical. Agricultural land use is particularly significant as it can greatly contribute to carbon emissions (Lamb et al. 2021); however, if adapted properly, it also has the potential to store carbon, thereby mitigating climate change (Lal et al. 2015). Carbon farming refers to agricultural practices specifically designed to reduce carbon emissions and improve soil health (Shockley & Snell 2021). As an economic incentive for farmers to adopt those practices, the sequestered carbon can be quantified and sold as carbon credits on the free market to companies seeking to offset their emissions. While political and economic discourse often presents carbon farming as a win-win-win scenario – benefiting companies that offset their emissions through the purchase of carbon credits, providing farmers with additional income, and reducing the concentration of carbon that has already been emitted in the atmosphere – the local adoption rates do not reflect the anticipated success (Buck & Palumbo-Compton 2022; Barbato & Strong 2023). Despite extensive research on climate-adaptive decision-making, the behavioural aspects, especially in the farming context, often rest on untested assumptions (Findlater et al. 2019). One reason is, that the dominant way to understand land users' decisions is often through economic models, which assume that land users make choices only based on economic rationality. However, economic explanations for decision-making often fall short because they do not account for the fact that people's decisions can be inconsistent with rational economic analysis (Findlater et al. 2019). Instead, research increasingly recognises that land users face uncertain futures due to climatic and agroecological changes where economic prospects do not offer sufficient guidance for action (Glover 2018; Findlater et al. 2019). Therefore, exploring the broad set of strategies land users employ to navigate this uncertainty is crucial for understanding individual decision-making processes and the adoption of carbon farming practices.

1.2 Case description

South Africa ranks among the most attractive host countries for carbon credit projects, thanks to favourable investment conditions and significant mitigation potential (Jung 2006). I chose to focus on a very specific area in South Africa that demonstrates the carbon market and investor-implementor dynamics very well: The Albany thicket biome in the Eastern Cape Province. The area's semi-arid valleys face significant environmental challenges, such as severe droughts and degraded landscapes (Lechmere-Oertel et al. 2005; Clarke et al. 2012). At the same time, it is home to the succulent shrub *Portulacaria afra*, locally known as spekboom, which holds promising potential for generating carbon credits through its ability to sequester CO_2 in the soil, making it very interesting for international investors (Marais et al. 2009; Curran et al. 2012). Within that area, I chose to focus on large-scale land users due to the significant amount of land they control. In South Africa, large-scale (commercial) farmers oversee 86% of all available farmland (National Treasury 2021). This extensive land concentration means their agricultural practices significantly impact the country's agriculture and emissions. Moreover, this concentration of land is particularly attractive for carbon project developers (CPDs) who are interested in large, degraded areas for scalable implementation of spekboom planting projects (United Nations 2019).

Historically, the large-scale land users who own these degraded land areas are primarily engaged in commercial livestock farming (Lechmere-Oertel et al. 2005; Statistics South Africa 2023). However, nowadays, due to economic, political, and environmental pressures the Eastern Cape's land use has significantly shifted from predominantly livestock farming to game farming, which includes live sales, breeding, hunting, and eco-tourism, or a mix of the two farming types (Von Solms & Van der Merwe 2020). Additionally, land users are increasingly exploring further (not necessarily economically driven) land use options to diversify income, support restoration efforts, or enhance personal enjoyment (Reed & Kleynhans 2009; Abrams & Bliss 2013).

To summarise, large-scale land users in the Albany thicket biome area control significant portions of land, much of which is in a degraded state, and have the opportunity to adopt the carbon farming practice of spekboom planting. Therefore, whether carbon farming will significantly alter the Eastern Cape landscapes and bring the promised economic and socio-ecological benefits largely depends on the decisions of these local land users.

1.3 Research aim and questions

This thesis aims to unravel the decision-making process of large-scale land users in the Eastern Cape's thicket biome regarding the adoption of carbon farming

practices and participation in carbon farming payment schemes amidst growing uncertainty. Using the narratives framework introduced by Vignoli et al. (2020), which suggests that individuals, in this case, land users, also referred to as farmers or land managers, navigate decision-making in uncertain conditions by relying on narratives of the future, the study seeks to understand why land users may or may not be willing to adopt spekboom planting as an approach to sustainable farming practices and participate in the carbon market. Consequently, the research is structured around three specific inquiries:

(i) What narratives of the future do land users construct, and what factors influence these narratives?

(ii) How do these narratives influence the adoption of sustainable farming practices, including spekboom planting?

(iii) How do narratives of the future influence the decision to participate in carbon payment schemes?

The thesis is organized into several sections: First, a background chapter outlines research on farmers' adoption of sustainable practices, as well as the role of narratives and the future in decision-making under uncertainty. It then examines the carbon farming context in the Eastern Cape, by outlining the practices, the socio-political context, the environmental requisitions as well as current literature. Secondly, the narrative framework by Vignoli et al. (2020) is thoroughly explained, along with its application in agricultural decision-making. The third section details my methodology for data collection and analysis, as well as a section where I reflect on the process and my role in it. The results section then presents the future narratives identified among land users, categorized based on how they are constructed. The discussion focuses on the role these narratives play in shaping carbon farming adoption decisions and attitudes towards the carbon market. Finally, the conclusion summarizes the key findings and provides recommendations for future research and policy.

2. Background

2.1 Farmers' adoption of sustainable practices

The adoption of a new practice by farmers can be understood as the modification of their land use or management approaches (Kragt et al. 2017). In the context of sustainable farming, extensive literature has explored how farmers adopt these practices (Pannell et al. 2006; Knowler & Bradshaw 2007) and found several factors influence it besides the obvious financial incentive (Morgan et al. 2015). Following Kragt et al. (2017), the most prominent factors influencing adoption found in research can be clustered into five categories: Firstly, the characteristics of the practices in question play a role (Pannell et al. 2006). Secondly, the characteristics of the farm and the land are significant (Prokopy et al. 2008; Ma et al. 2012). Thirdly, the characteristics of the land user are crucial; these include socio-demographic factors such as age, education, capital, and access to information (Prokopy et al. 2008; Feliciano et al. 2014; Buck & Palumbo-Compton 2022) as well as psychological drivers and barriers which Zebrowski et al. (2023:2) refer to as "non-logistical influences", encompassing farmers' values, motivations, worldview, mental model, and narratives, but also environmental attitudes and climate change awareness (Prokopy et al. 2008; Clarke et al. 2012).

Morgan et al. (2015), who explored drivers and barriers to adopting low-emission agricultural practices identified four segments of Australian farmers: those apathetic and denying climate change, those uncommitted with neutral values, those believing in climate change with high ecocentric values, and those focused on financial benefits while being indifferent to environmental values. That study's use of latent profile analysis to distinguish farmer groups based on attitudinal factors, rather than traditional socioeconomic or land-use factors, is particularly relevant to this thesis.

Fourthly, the social and cultural context, including the influence of social networks and peers, is highly relevant. Burton (2004:195) has extensively studied the concept of the "good farmer" and how this social identity affects farming practices and the adoption of innovations. Additionally, Fischer et al. (2019b) provide insights into dairy farmers' perspectives on antibiotic use, highlighting the importance of social and cultural factors in decision-making. Glover et al. (2016)

discuss the adoption problem in African agriculture, emphasising the importance of considering social aspects in the adoption of agricultural technologies. Those sociological and anthropological perspectives are crucial because they shift the focus from purely economic explanations to a more nuanced and grounded understanding of the social and cultural dimensions of farmer's adoption decisions.

Lastly, if the adoption takes place in an incentivized management program, the design of the program itself is a factor influencing the adoption (Kragt et al. 2017). Interestingly, non-monetary drivers can be more influential than financial incentives in that context (Torabi et al. 2016). Highly complex programs and stringent, inflexible rules can deter participation, and landholders are unlikely to participate if they cannot easily access detailed information about the program (Kragt et al. 2017). Moreover, Page and Belotti (2015) found in their study on farmers' willingness to participate in payment for ecosystem service programs, that especially in carbon sequestration programs, political uncertainty was the most cited deterrent to participation.

2.2 Decision-making under uncertainty: The role of narratives and the future

Farming is inherently susceptible to uncertainty, which stems from various sources, including weather variability, market fluctuations, and changes in government policies (Milestad et al. 2012; Glover 2018). Farmers must navigate in this uncertain environment, where the consequences of their decisions are often unpredictable, to ensure their farming enterprise's survival (Glover 2018).

By combining cognitive and affective experiences, narratives help individuals construct the meaning of everyday events and their causal implications (Bruner 1991). In agriculture, narrative framing sets the focus on how a farmer's story and motivation impact their decision-making (Zebrowski et al. 2023). Prior research has examined the impact of farmer narratives on decision-making, including studies on farmers' aspirations (Dilley et al. 2021) and climate change perceptions, for which Houser (2018:40) for example identified the prevalent narrative of "inevitable 'natural cycles'" among Iowa farmers. Other studies looked closer at the influence of narratives on farming practices like regenerative agriculture (Kenny & Castilla-Rho 2022) or the use of chemicals, for instance, narratives including the "war on nature" (2011:285) metaphor have historically justified actions such as pesticide use and large-scale agricultural practices. The following studies offer further interesting examples of the diverse ways narratives shape farmers' identities and decision-making processes amidst various uncertainties.

Zebrowski et al. (2023) found that narratives play a significant role in farmers' decisions to transition to organic production, with the primary narratives being

environmentalism, economic factors, religiosity, and farm-family legacy, with the latter being the most prevalent, particularly resonating with midsize farmers.

O'Callaghan and Warburton (2017) examine the narratives of ageing Australian farmers, revealing how the prospect of retirement and the potential loss of the family farm impacts their self-identity and cultural image. They found that narratives help farmers validate their identities amidst social, economic, and climate uncertainties.

McMillan Lequieu's (2015:39) study on German-heritage farmers in Wisconsin shows that they use "patrimonial narratives" to blend cultural heritage with contemporary agricultural demands, ensuring the continuity of traditional values while adapting to modern economic realities. The narratives provided cognitive and emotional support, guiding farmers' decision-making.

Through all the studies, it is evident that farmers use narratives to navigate and find a sense of security while facing uncertain futures. To fully understand how these narratives help farmers cope with and plan for the future, it is essential to examine how individuals perceive and relate to time, introducing the concept of time perspective. The concept examines how individuals' temporal outlook influences actions, emotions, and motivations, significantly impacting decision-making and goal-setting (Zimbardo & Boyd 1999). Time perspective is also interesting in the farming context, with research suggesting its rising importance amidst climate change. Morgan et al. (2015) found that future orientation influences decision-making, with future-oriented farmers more likely to adopt low-emission agricultural practices. Reversely, Shariatzadeh and Bijani (2022) found farmers with a past- and present perspective to focus on earning immediate benefits instead of emphasizing future benefits. In their study area, this time perspective led to less effective adaptation to climate change, particularly in terms of water scarcity management and limited long-term strategies. But even among those forward-looking farmers, different strategies emerge to respond to current challenges. Shucksmith and Herrmann (2002) examined how British farmers' future-oriented strategies vary in response to declining incomes and evolving policies. They categorize farmers into six main groups with diverging future behaviours. While some will likely exit farming, others plan to expand, or even seek new opportunities. Interestingly, one group that emerged – the hobby farmers – farm for intrinsic reasons rather than financial gain, and plan to continue farming regardless of returns.

After having established those narratives as well as a future-oriented perspective influence decision-making, the question remains, how do narratives *of* the future impact decision-making?

2.3 Carbon farming in South Africa's Eastern Cape

2.3.1 Practices and criticism

Carbon farming aims to combat climate change by encouraging land managers to adopt practices that sequester carbon in soils or vegetation or reduce emissions (Kragt et al. 2017). Practices include planting trees, restoring native vegetation, adopting no-till cropping, and reducing methane emissions from livestock. These practices can be incentivized through payments from voluntary carbon markets (Barbato & Strong 2023). In the Eastern Cape's Albany thicket biome, the most prominent carbon farming practice is restoring native vegetation through the planting of spekboom, which is not just effective for carbon sequestration (Mills & Cowling 2006), but also highly adaptive to dry climates, potentially withstanding projected increased temperatures, droughts, and fires (Kerley et al. 1995; Vlok et al. 2003). Significant spekboom planting projects were the *Subtropical Thicket Restoration Programme*, which planted 300 50×50 m plots of spekboom across the Eastern and Western Cape provinces between 2008 and 2009 and the *Kuzuko Thicket Restoration Project* launched in 2022, the first large-scale restoration funded by carbon credits, aiming to restore over 5000 hectares with spekboom (Mills et al. 2015; C4 EcoSolutions 2021). Since then, the private sector has recognized the economic potential of restoration alongside its environmental benefits, attracting numerous investment companies, with different concepts of carbon farming payment schemes (Alesbury 2024; AfriCarbon n.d.; ClimatePartner n.d.). Most companies currently plant spekboom cuttings on their acquired land, propagating them in nurseries until they are ready for the large-scale restoration projects. However, in the future, the companies may increasingly seek collaboration with local farmers. Figure 1 below shows a spekboom cutting in front of a nursery filled with similar cuttings, illustrating the initial stages of the restoration process.

Figure 1. Photo of a spekboom cutting in front of the nursery, taken by the author, 12.03.2024

However, with more interest in the investments, voices of criticism have also emerged. In terms of academic critique, this has included questioning the usefulness and efficiency of carbon uptake in these projects (Lal et al. 2015), the risk that projects that focus specifically on carbon sideline other values such as biodiversity and livelihoods (Fischer et al. 2019a), and the concentration of benefits of investments to powerful international actors, with limited benefits (or even negative outcomes) for local farmers (Bachram 2004). For local implementers, uncertainty exists about carbon credit pricing and payment due to the market's volatile and still developing nature (Shockley & Snell 2021). Additionally, Barbato and Strong (2023) found that farmers perceive soil carbon offset programs as complex and unreliable, raising concerns about the effectiveness of these initiatives in enhancing climate mitigation.

2.3.2 The socio-political context

The implementers attractive to the carbon market are the large-scale land users. In the Eastern Cape, this group consists of predominantly white farmers (Department of Rural Development and Land Reform 2018) who operate in family farming systems that are constituted by succession in terms both of the legal transfer of property and the gradual transition of management roles, typically within families, with significant gender biases favouring male heirs (Kritzinger & Vorster 2002). Looking at the Eastern Cape households engaged in agriculture, large-scale commercial farmers make up only a small fraction of landowners in terms of their

number, at the same time however, they hold a substantial amount of the region's land (Department of Rural Development and Land Reform 2018; Statistics South Africa 2023). This disparity is rooted in historical injustices and oppression established during colonialism and apartheid, which consolidated land under white settlers and directed infrastructure and economic policy to support these, leading to enduring socio-economic inequalities that still are very visible today (Shackleton & Luckert 2015)[1]. Despite still controlling significant resources and having economic dominance in rural areas, white large-scale farmers have faced declining political and economic support since the end of Apartheid in 1994. In 1996, the deregulation of agricultural marketing reduced subsidies and farm support while leading to a more open and globally sensitive agricultural sector (Genis 2012). The situation is further complicated by a growing dissatisfaction with South Africa's ruling party the ANC (African National Congress), which has been in power for over 30 years.[2]

2.3.3 The environmental context

Especially in the semi-arid valleys of the Eastern Cape, farmers are grappling with increased temperatures and prolonged droughts (Archer et al. 2022). In addition to immediate effects, climate change is driving lasting transformations. Recent data shows significant alterations in rainfall patterns and volumes in the Eastern Cape, resulting in water scarcity challenges (Apraku et al. 2023). Furthermore, vast areas in the Eastern Cape experience large-scale land degradation, with moderate to severe states of degradation in specific thicket locations resembling savannah-like vegetation (Lechmere-Oertel et al. 2005). These conditions make the region particularly suitable for large-scale planting of spekboom, as it is indigenous to the area and one of the few species that can thrive in such degraded environments, while also facilitating the growth of additional plant species. Degraded land prevents water infiltration and increases soil erosion and can be caused by natural processes as well as by human-induced activities, such as overgrazing or burning (Olsson et al. 2019). For farmers, the degraded land makes it economically unfeasible to maintain healthy grazing conditions for livestock, leading to unsustainable exploitation of natural fodder resources and potential reductions in agricultural productivity (Kerley et al. 1995).

[1] Today, efforts at land reform and restitution aim to address these injustices by redistributing land to black South Africans, improving access, and supporting agricultural development, however with mixed success (Andrew 2020). While this is not the study's focus it should still be kept in mind when researching land use in that specific socio-geographical context.

[2] During the writing of this thesis, the ANC lost its parliamentary majority in a historic election and now has to govern in coalition with other parties, including the Democratic Alliance (Chothia et al. 2024).

2.3.4 Research on carbon farming in the Eastern Cape

Existing research has extensively explored the potential for spekboom planting in restoring the thicket area, highlighting investor opportunities (Marais et al. 2009; Curran et al. 2012) and emphasizing the ecological restoration effects from a natural science perspective (Mills & Cowling 2006; Galuszynski et al. 2023). However, there is a notable scarcity of social science research, particularly qualitative investigations, on its practical implications for large-scale land users, with some notable exceptions. Clarke et al. (2012) found farmers being open to new approaches, including the potential adoption of spekboom planting, to help them adapt to the uncertainties posed by climate change. Additionally, Curran et al. (2012) found that including human and social factors in planning restoration projects with spekboom in the Eastern Cape makes them more effective, by understanding individual land managers' attitudes and behaviours, building relationships between managers and implementers, and efficiently allocating resources. This previous research supports how crucial it is to acknowledge that intervening in land use practices for restoration or climate change mitigation is closely tied to the complex socio-cultural dynamics within social-ecological systems. While these studies contribute valuable insights within the same geographical focus, they have not included a look at the narratives, these land users construct for their future, leaving room for additional investigation and understanding of the land users' perceptions and motivations to change land use and adapt carbon farming.

In summary, farmers' adoption of sustainable farming practices is influenced by various factors beyond financial incentives. In decision-making under uncertainty, narratives guide farmers, with future-oriented narratives adding a forward-looking dimension and providing cognitive and emotional support. Despite extensive literature on both topics in isolation, the integration of future narratives in agricultural decision-making remains underexplored, highlighting a gap that this study aims to address. This study focuses on carbon farming in the Eastern Cape due to its significant potential for carbon sequestration through spekboom planting and the region's unique socio-political and environmental context. Moreover, while there is substantial research on the ecological and economic aspects of spekboom planting, there is a notable gap in understanding the qualitative dimensions of carbon farming in the Eastern Cape. By addressing both the gap in integrating future narratives into agricultural decision-making and the gap in qualitative research on carbon farming in the Eastern Cape, this study aims to provide a comprehensive understanding of land users' adoption of carbon farming practices in that specific area.

3. Theoretical Framework

3.1 The narrative framework

Vignoli et al. (2020) propose a theoretical framework, the narrative framework, that integrates the concepts of structural constraints, expectations, imaginaries, and narratives to analyse decision-making processes in the context of uncertainty. Although the framework is initially applied to fertility decisions, I believe it can be effectively adapted to the agricultural context, as land users also face the challenge of making significant long-term decisions amidst uncertainty with unknown outcomes (Glover 2018). Vignoli et al. (2020:1) propose that the adoption intentions can be assessed by examining individuals' "narratives of the future", constituted by the aforementioned concepts, structural constraints, expectations, imaginaries, and narratives. See a visualization of the process in Figure 2. In practice, the boundaries between the concepts can often be blurred, as each mutually influences the others (Vignoli et al. 2020). However, for analytical clarity, I will delineate these components as distinct concepts in the following sections.

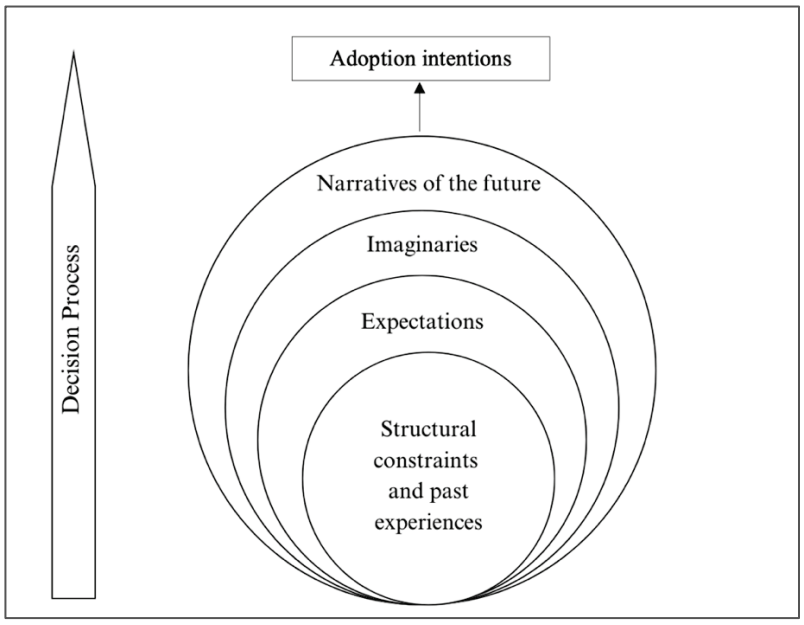

Figure 2: Adoption decision-making process under conditions of uncertainty. Adapted from Vignoli et al. (2020).

3.2 The framework's components

3.2.1 Structural constraints and past experiences

Structural constraints are the foundational elements of the framework and refer to the broader social, economic, cultural, and institutional factors that limit individuals' choices and opportunities (Vignoli et al. 2020). They provide the foundation on which expectations, imaginaries, and narratives develop and operate and may vary in scale, ranging from micro-level factors to macro-level conditions.

To illustrate structural constraints in relationship to expectations, imaginaries, and narratives within agriculture; economic constraints such as fluctuations in meat prices can impact individuals' expectations about farmers' financial stability and ability to sustain their agricultural activities (Assouto et al. 2020). Similarly, cultural norms and societal expectations within farming communities (being a 'good farmer') can shape the imaginaries of land users regarding their agricultural practices (Burton 2004). Structural constraints also influence the narratives constructed by land users about their future. For example, Dilley et al. (2021) showed that farmers' aspirational narratives are shaped by their personal circumstances, networks of relations, and the material and cultural resources available to them.

Structural constraints are also closely connected to past experiences, which shape individuals' decision-making processes and their responses to various situations and challenges (Vignoli et al. 2020). Vignoli et al. (2020) give the

example of second-generation migrants who may deliberately draw upon traditional values from their homeland to shape their own identity, even if it goes against the prevailing cultural norms in their current environment.

3.2.2 Expectations

While past trajectories are crucial, an individual's action cannot solely be explained by the past; perceptions of the future equally influence actors' decisions (Beckert 2016). These perceptions of the future, called expectations, link various outcomes to different possible decisions, shaping actors' choices beyond existing structures and past experiences (Beckert 2016). Expectations are essentially belief systems about future events or actions, reflecting what individuals expect to happen based on their current circumstances, regardless of how much influence they have over the outcome (Bazzani 2023). They serve as guides in decision-making and significantly influence the choices people make, irrespective of their accuracy, logic, or feasibility (Vignoli et al. 2020). In social science, much attention has been placed on examining past experiences in understanding expectations. However, other disciplines like economics highlight the significant role of future expectations, particularly in shaping investment and consumption behaviours, emphasizing potential gains or utility (Bazzani 2023).

An example of how expectations affect decision-making as described by Vignoli et al. (2020), transferred to the agricultural context, would be a scenario where a land user would like to expand their agricultural operations to increase income and guarantee the farm's survival. This aspiration is not pursued due to the expectation of being unable to secure a loan to finance the expansion with limited financial resources. This example illustrates how expectations shape the available options for action and influence the decision-making process. While important for decision-making, expectations do not guarantee specific future results, as the future holds possibilities beyond what can be expected (Beckert & Bronk 2018). This emphasizes the importance of imagination (Bazzani 2023).

3.2.3 Imaginaries

Through imagination, which Beckert and Bronk (2018:4) define as "the ability to conceive and visualize new futures", individuals can generate ideas or visions of the future that may not be directly derived from the present circumstances (Vignoli et al. 2020). These imaginaries serve as guiding frameworks for selecting alternative actions in situations where past regularities and known constraints fail to deduce the future, offering an anchor to navigate uncertainties (Bazzani 2023). For instance, a vision of a deep-rooted cultural reverence for ancestral lands may motivate land users to persist in their practices despite economic challenges. Research on imaginaries has primarily focused on youths and migrants (Sime et al.

2020), personal life plans (Macrae et al. 2017) and sustainability transitions (Milkoreit 2017) but could be as promising in the agricultural context. When it comes to decision-making, imagining future scenarios allows people to aspire for better outcomes, break routines, and envision alternatives to reality, thus encouraging proactive behaviour (Bazzani 2023). While imaginaries are important for shaping how individuals think and act, these imaginative scenarios need to be incorporated into a larger storyline or narrative about the future to have a meaningful impact on decision-making (Vignoli et al. 2020).

3.2.4 Narratives

Narratives bridge the gap between imaginaries and present actions (Bazzani 2023). They are the stories individuals construct to make sense of their lives, drawing on their expectations and imaginaries to guide their decisions and actions limited by structural constraints (Vignoli et al. 2020). Thus, in the narrative framework, narratives are the overarching concept that integrates structural constraints, expectations, and imaginaries into coherent storylines about the future (Vignoli et al. 2020). By assigning roles to actors and objects, narratives illustrate how the future might unfold, providing a guiding image of potential innovations and outcomes (Beckert & Bronk 2018). Furthermore, narratives motivate individuals by helping them assign meaning to their actions and navigate uncertainty through the integration of existing information and known causal mechanisms (ibid.).

Beckert (2016) illustrates the power of narratives with an example in an economic context by suggesting that people's confidence in the future worth of money is constructed through the narratives they use to interpret monetary situations and their everyday experiences with money. By framing money within certain narratives, individuals collectively assign value to it.

Transferring and applying the narrative framework to the farming context to understand adoption decisions is promising for several reasons. Firstly, the narrative framework was specifically designed to comprehend decision-making under uncertainty. Given the complex and unpredictable nature of farming, where farmers frequently face uncertainties related to weather, market conditions, and environmental changes, this framework proves appropriate. Secondly, by considering both personal circumstances and broader systemic influences, the framework reveals how these factors interact to inform adoption decisions offering a thorough and nuanced analysis of the decision-making processes. Lastly, Vignoli et al. (2020) broadened the understanding of decision-making beyond mere economic considerations, which is essential in the farming context. This broader perspective ensures that the adoption of carbon farming is not solely discussed in economic terms, but also incorporates social and cultural factors.

4. Methodology

In this chapter, I will present the methodology employed in this thesis. I begin with the epistemology and research design applied, followed by an overview of the data collection process. I will then describe how I critically examined my role and the research process itself. This approach aims to identify and mitigate potential shortcomings and biases, thereby having the possibility to enhance the reliability of the study. Connecting to this, I will elaborate on my intention to trustworthiness in this study. Finally, I will elucidate the data analysis process.

4.1 Epistemology and research design

The worldview I bring to this study aligns with Sutton's (2004) concept of 'artefactual constructivism', emphasizing how our interactions with the physical environment shape our values and perceptions of nature. I agree with the constructivist view that individuals (e.g. land users) construct subjective meanings influenced by social and cultural contexts (Creswell & Creswell 2018) and that land use and management are subjective experiences influenced by individuals' positions in social structures, rather than objective truths (Mohammadi et al. 2021). At the same time, I recognize the ongoing debate between constructivists and realists regarding society's connection to nature. Constructivists see nature as socially constructed ("A fish is only a fish if it is socially classified as one", Tester (1991:46)), while realists emphasize its material aspects (Joubert & Davidson 2010). While recognising the value and relevance of both constructivism and realism, I support the critique of both perspectives for their anthropocentrism and reductionistic tendencies (ibid.). Therefore, I instead advocate for an approach that jointly considers both constructed perceptions and material realities. For instance, in the context of climate change, 'artefactual constructivism' understands that farmers in semi-arid regions construct subjective meanings of environmental shifts, influenced by cultural beliefs and social interactions while facing material impacts like water scarcity, necessitating adaptive agricultural strategies.

To explore this dualistic dynamic at the individual level and comprehensively grasp land user epistemologies, I utilize a phenomenological approach in my research. This involves treating land use as a phenomenon that takes form in front of a mental background, i.e. lived experiences, emotions, and perceptions of local

agents (Mohammadi et al. 2021). Thus, I aim to gain insight into how land users interpret and interact with their environment (Creswell & Creswell 2018). The design of the study was intentionally set to capture the individual's perceptions as closely as possible. Additionally, the adaptability of interviews permits the research design to be flexible and responsive to the data as it emerges, ensuring that the study can explore and adapt to unforeseen dynamics that arise during the data collection process (Creswell & Creswell 2018).

4.2 Qualitative data collection

4.2.1 Selection of study site and participants

In collaboration with a colleague from the Swedish University of Agricultural Sciences, we gathered data for our respective studies in the same geographical area. The study site was chosen based on our local supervisor's prior research experience and contacts in the region, as well as its proximity to Nelson Mandela University in Gqeberha, which facilitated field trips. Figure 3 depicts the geographical area where the interviewees' farmlands are situated, across three municipalities within the Sarah Baartman District of the Eastern Cape. Ecologically, this is a semi-arid region, and all farms are located in areas with similar vegetation profiles, enhancing comparability in terms of ecological prerequisites for farming. Given the study's focus on carbon farming, particularly spekboom planting, interviewee properties needed to exhibit potential for the growth of this indigenous plant, further refining the selection criteria for interviewees.

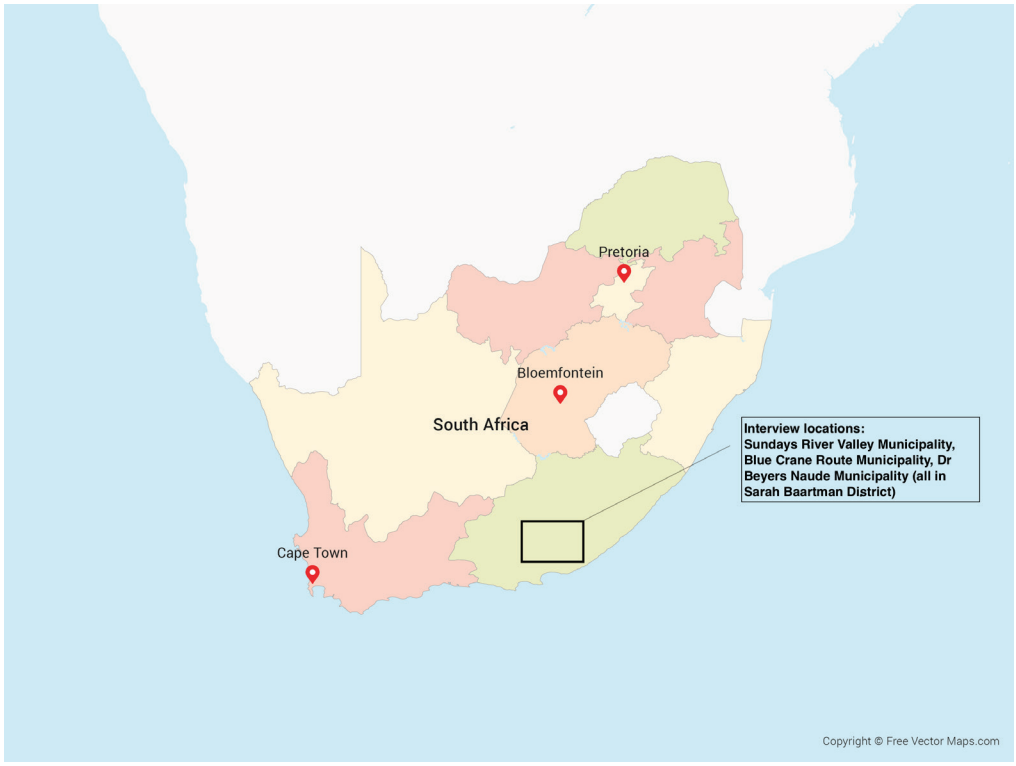

Figure 3: Map illustrating interview locations, downloaded from FreeVectorMaps, accessed on 12.05.2024, edited by the author.

Within this area, the participants were selected based on being land users actively engaged in (commercial) land use management, ensuring relevance to the research focus (Creswell & Creswell 2018). To facilitate this process, my colleague and I employed a snowball sampling technique, in which one contact person leads to the next (Robson & McCartan 2016). Initially, our local supervisor connected us with a key contact, who in turn recommended additional interview partners. While this approach expanded the pool of interviewees who might not have participated otherwise, it also poses a risk of bias if relying solely on one person's network (Robson & McCartan 2016). It is important to reiterate that the aim of this qualitative thesis is not to seek generalization but to grasp the interviewees' realities. Therefore, if the researcher is aware of the risk of capturing quite homogenous perspectives and draws conclusions with this in mind, snowball sampling does not compromise the results and subsequent discussion. Notably, except for one woman, all our interview respondents were white men aged between 40 and 90, with a bias towards those in the older half of the span. They have all passed through higher education and manage their farms, sometimes along with additional business operations, providing them with above-average wealth for South African standards. The high degree of homogeneity in the sample offers an opportunity to gain a deeper understanding of land use within this specific demographic group that has historically held a significant portion of land in this region in South Africa.

The table below provides an overview of the interviewees, showing that the pool consists of two livestock farmers (F1, F2), one farming couple specializing in forage crops (F3, F4), three game farmers (F5-F7), and three non-permanent farmers (F8-F10). Additionally, two land users (LM1, LM2), who are not farmers but work as carbon project developers, were interviewed and will be referred to as land managers. Although all interviewees are considered land users, the distinction in labelling is important: unlike the farmers, the two land managers do not invest in the land themselves but manage land owned by international investors. This gives them access to specific resources and knowledge that the farmers may not have. This situation may influence their perspective on land use in connection with the carbon market, potentially introducing bias. They are also the only ones without a hereditary connection to the area and are thus considered 'outsiders' by the farming communities.

Table 1. Detailed overview of interview participants.

Abbreviation used in the study	Sex	Age	Land Use Type	Size of land (ha)	Date of Inter-view	Place of Inter-view
Farmer						
F1	M	50-60	Livestock farming	4,000	12/03/24	On farm
F2	M	50-60	Livestock farming	6,000	13/03/24	On farm
F3 (married to F4)	F	50-60	Forage crops, irrigation scheme	700	13/03/24	On farm
F4 (married to F3)	M	50-60	Forage crops, irrigation scheme	700	13/03/24	On farm
F5	M	80-90	Game farming, international hunting tourism	9,000	18/03/24	On farm
F6	M	40-50	Game farming, international hunting tourism	8,000	18/03/24	On farm
F7	M	50-60	Game farming, international hunting tourism, event venue, restaurant	10,000	19/03/24	On farm
F8	M	50-60	Non-permanent farming	547	19/03/24	On farm
F9	M	40-50	Non-permanent farming	500	03/04/24	Café in Gqeberha
F10	M	40-50	Non-permanent farming	1,700	10/04/24	Office in Gqeberha
Land Manager						
LM1	M	50-60	Employed by CPD	7,300	04/03/24	Café in Gqeberha
LM2	M	50-60	Employed by CPD	1,200	14/03/24	On farm

4.2.2 Semi-structured interviews

To address the research questions, my colleague and I employed eleven in-depth, open-ended, semi-structured interviews, lasting between one to two hours. All were held individually, only one turned in a group interview consisting of a married farming couple. The semi-structured interview format, with its open-ended questions, provided both the structure needed to cover the research questions and the flexibility to explore emerging topics in greater depth (Creswell & Creswell 2018).

Before the interviews, a semi-structured interview guide was created (see Appendix). The guide included open-ended questions loosely grouped into themes such as 'current land management practices', 'the family farm connection and past experiences', 'changes and challenges in farming nowadays and going forward', as well as their 'perception of sustainable practices such as carbon farming, and initiatives stemming from the carbon market'. Although the questions were initially arranged in a specific order, this structure was followed freely. Interviewees often jumped between topics or elaborated more on certain questions than others. A strong focus was set on a future-oriented time perspective, with the last question in every interview being, "If there is one thing realistic or not that you could wish for in the future, what would that be?" This question was asked to gain insight into the interviewees' aspirations, hopes, and visions they hold for their future, providing a deeper understanding of their motivations and potential drivers for adopting new practices. The interviews were audio-recorded, under the condition the participants' consent was given at all times (Creswell & Creswell 2018).

Conducting the interviews together with my colleague allowed us to alternately ask questions and take notes, ensuring that the conversation was well-facilitated and that no important thoughts, observations, or follow-up questions were missed. Collaborating also allowed us to offer each other constructive feedback, thus enhancing our interview techniques, and refining our questions (Robson & McCartan 2016).

To ensure no nuance is lost, field notes in the form of a diary complemented the whole process, capturing the restraints of each conversation and the emergent themes that spontaneously arose, thereby enriching the data with lived realities and personal reflections (Creswell & Creswell 2018). These field notes were, for example, taken during observational experiences such as when farmers guided us around their land or when the land managers showcased their nurseries for spekboom planting. In addition to verbal exchanges, gestures, and body language were observed, notable for example when a game farmer proudly displayed their trophies or demonstrated the intricacies of their meat processing facilities. These observations provided valuable insights into the interviewees' perspectives and emotional connections to their work, allowing for a deeper understanding of their practices and motivations.

4.2.3 Reflexivity and my role as a researcher

As a German researcher conducting interviews with white South African farmers, some of whom shared European or even German ancestry, I acknowledge that my own background may have influenced the dynamics of the interviews (Creswell & Creswell, 2018). In qualitative research, the intimate atmosphere between interviewer and interviewee can lead to the disclosure of sensitive topics such as racism and prejudice, which individuals might not otherwise express (Kulnik et al. 2020). Due to our shared ethnic background, some interviewees may have felt more comfortable expressing discriminatory views, causing discomfort for me as the researcher. Despite recognizing significant differences between my personal values and certain statements made by the interviewees, I consciously refrained from engaging in discussion or commentary.

Furthermore, I am mindful of how my background and experiences may also influence my interpretations and biases during the study as well as the data analysis. My preconceptions may incline me toward certain themes or positions, affecting how I perceive and analyse data. Therefore, I make a conscious effort to remain open-minded, present contradictory findings, and explicitly state my philosophical standpoint when conducting research (Robson & McCartan 2016).

4.2.4 Reflexivity on the process in the field

To ensure reflexivity, I find it equally important to disclose and reflect on the process of data collection in the field. Securing an ethical permit issued by the Nelson Mandela University (NMU) Research Ethics Committee: Human was a foundational step in our research process and aimed to ensure my colleague and I preserved the dignity, rights, safety, and welfare of our research participants (Nelson Mandela University n.d.). We maintained transparency with our interviewees regarding our intentions and research interests, recognizing that past research endeavours in that area had occasionally caused scepticism and resistance within the farming community toward such projects. Additionally, we provided all interviewees with our contact information, allowing for open communication and further questions. This approach also turned out to be useful for data-collection purposes, as evidenced by one farmer who reached out to us after an interview with further remarks.

Before and during the fieldwork, my colleague and I conducted several interviews with experts, including a NMU university professor specializing in botany and spekboom, a research associate from NMU, who is also an independent consultant on terrestrial ecosystems, and the CEOs of a specialized carbon project execution organization based in South Africa. These interviews were solely intended to inform our fieldwork and were not included in the data analysis. While these interviews provided valuable insights and enriched the contextual understanding of our fieldwork, most of the interviewees presented planting

spekboom very favourably, lacking voices of criticism in the preparation for the fieldwork.

Lastly, our key contact joined my colleague and me for three of the interviews that he facilitated in the first place, which led to interruptions and questions answered by him rather than the interviewed farmer. Due to his association with a carbon project developer, some land users were reluctant to openly critique the concept. In these instances, my colleague and I made sure to steer the conversation back to the interviewee, creating an environment that encouraged open discussion. However, we interpreted these interviews with the understanding that some farmers may have self-censored because of this person's presence.

4.2.5 Validity and reliability

To ensure the validity and reliability of my study, I implemented the following strategies. In addition to reflecting on my role and biases throughout the research process as elaborated previously, I thoroughly documented my research process, as recommended by Creswell and Creswell (2018). I provide detailed descriptions of my methodology, including how I conducted interviews, selected participants, and analysed data. This transparency allows readers to assess the rigour of my study. Furthermore, I utilized peer debriefing to enhance the validity of my study (Creswell & Creswell 2018). This involved working closely with my colleague, who also studied the case, to review and discuss the data and our findings. Through our collaboration, I ensured that the narrative I presented would resonate with individuals beyond myself.

4.2.6 Data analysis

For data analysis, I employed thematic analysis following the approach described by Robson and McCartan (2016:461). Initially, I transcribed the interviews using automatic speech recognition software and labelled the data according to thematic codes using an open-source text tagging tool. Following Robson and McCartan's (2016) guidelines, I coded all parts of the data that represented something of potential interest. These codes were either predetermined based on the theoretical framework or emerged inductively from the data. The first set of codes was based on predetermined themes derived from the theoretical framework, specifically the narrative framework components: structural constraints, expectations, imaginaries, and narratives. Examples of these codes included 'culture and community', 'economic challenges,' and 'personal future'. As I progressed with the data analysis, I continuously reviewed the data, allowing new codes to emerge inductively. This iterative process involved cycling between raw data, coded extracts, and ongoing analysis, enabling additional codes to be identified (Robson & McCartan 2016). Examples of these new codes included 'environmental

challenges', 'climate (change) expectations', and 'farming in the future'. The codes were grouped under the new theme of 'environmental factors'. The final themes became the core of the data analysis, and the findings are presented in the following results section. A remnant category was used to collect all codes that did not fit into any of the identified themes.

5. Results

In this chapter, I present the results based on the analysis and informed by the narrative framework, which includes the elements of structural constraints and past experiences, expectations, and imaginaries. Additionally, my analysis revealed an important new theme: environmental factors. To structure the results accordingly, I have divided the chapter into three sections. First, I categorize the findings according to the elements of the original narrative framework, examining factors in both traditional agricultural settings and the emerging carbon market. Second, I connect the theme of environmental factors with the components of the narrative framework, demonstrating how these factors enhance our understanding of the framework in the agricultural setting. Finally, the 'narratives of the future' that emerged from the earlier findings are presented, showing how both the original framework elements and the environmental factors come together in greater storylines. My findings are supported by direct quotes that have been refined for readability by removing filler words.

5.1 The narrative framework

5.1.1 Structural constraints

The interviews revealed three key structural constraints, including economic pressures, missing political and institutional support, and family legacy. I will elaborate on these constraints in this order.

Farmers face significant economic constraints due to their weak bargaining position in the market, where powerful retail companies and fibre trading entities dictate prices, squeezing farming profit margins. These economic pressures undermine the viability of farming operations, even forcing farmers to reconsider their agricultural activities. Market structures demand that farmers invest increasing amounts of capital to secure the survival of their farms, covering costs such as predator management and farm labour wages. This financial burden compels farmers to focus on what is economically feasible, limiting their choices. As Farmer 2 states:

I'm not farming with goats because I want to farm with goats. I'm farming with goats because I have to make a living.

Farmers with sufficient capital can diversify their operations, such as through irrigation schemes in case they have sufficient access to water or through transitioning to game farming.

In the carbon market, similar capital investment constraints exist, but farmers also face additional regulatory complexities unique to this market. These complexities primarily manifest as constrained access to information, even though farmers are eager to learn more about the carbon market:

I would like to understand the whole spekboom farming business a bit better and also get proper info on how carbon offsets - how it really can benefit the environment because I don't have that knowledge. (F9)

The interviews also revealed a power imbalance within the carbon market as farmers feel left out of the conversation *(*"*They don't talk to us*", "*It's not the market where the farmers play*", F2). The suspicion toward big foreign investors and the anonymity of credit buyers highlights a lack of transparency and the dominance of larger, more powerful entities in the carbon market. These entities hold "*their cards close to their chest*" (F10), which limits farmers' bargaining power and market access. Farmers question who the real beneficiaries of this market are with some believing it is the big foreign investors rather than themselves. There is also uncertainty about the process, with some farmers thinking that a farm needs to be registered on the stock exchange to sell carbon credits, which theirs are not. Adding to the confusion, sources of information about carbon credits were varied and sometimes unreliable. Farmers often heard about the carbon market from third parties, referred to vaguely as 'someone', or even from friends who made light of the situation, as illustrated by Farmer 1:

I've got my friend in Texas who says, 'How many carbon credits do you want? I'll print them out for you now'.

Beyond the economy, the political climate in South Africa imposes perceived structural constraints on land users. Many farmers feel let down by the government, citing a lack of institutional support and frustration over the absence of farming subsidies their grandfathers received. During the Apartheid era, white farmers benefited from substantial support and lower labour costs due to the exploitation of black workers. Today's white farmers often feel unfairly treated, focusing on the support black farmers now receive as part of efforts to address past injustices.

Farmers cited deteriorating infrastructure, including roads, schools, and electricity, as an example of this lack of support. Frequent power cuts, that severely impact farming operations are attributed to corruption within the state-owned

energy provider Eskom. Hence, most farmers have started installing solar panels on their farms to reduce their reliance on Eskom.

Lastly, family legacy and tradition were identified as structural constraints by embedding deep-rooted cultural norms and expectations that dictate life choices for the farmers, as Farmer 1 explains with the example of his education:

> *Look, my grandfather also went to the big agricultural college in [nearby city]. He was there, my dad was there, I was there and my son was there.*

The tradition of commercial farming in South Africa dates back to the 19th century when European farmers (mainly of Dutch origin) first settled in the Eastern Cape, with farms being passed down through generations, reinforcing cultural norms and expectations. The traditions impose inherited responsibilities and create pressure to conform, possibly limiting personal aspirations, as Farmer 2 emphasized:

> *I've got a big responsibility being living here on the farm that's kind of handed down from generation to generation. […] The last thing I want to do is something stupid and lose the property.*

Farmers often mention their sons, fathers and grandfathers when discussing inheritance, with patrilineality historically playing a significant role. However, this is evolving, with daughters now included in family trusts. Still, many male farmers feel a responsibility to uphold the family legacy. This family heritage can shape their identities, manifesting in a deep connection to farming and evoking strong emotions. Farmer 8 noted, "*Because it's in our genes. We want to farm. We need to farm*". The legacy aspect is also mentioned among game farmers "*Hunting is a thing that sort of sits within our blood*" (F5). This feeling of getting something from the generation before and handing it over to the next generation can be a driver to keep the farming business in traditional ways: "*We always had goats, we never gonna get rid of them*" (F1).

5.1.2 Past experiences

During the interviews, several past experiences were mentioned that can be connected to future decision-making. Firstly, farmers frequently mention having gone through the "*boom-crash*" (F5) economy, referring to cycles of highly profitable opportunities followed by steep financial downturns. Examples include investments in wildlife such as ostriches and sable antelopes, and the "*mohair boom*" (F6), a period of rapid growth and high demand for mohair, which is a type of wool made from the hair of Angora goats. When the boom turns into a bust, financial difficulties can prompt a shift in agricultural practices. For instance, Farmer 6 decided to start with international hunting tourism after losing prior invested money in such a crash. This "*jumping onto the bandwagon*" (F1) sentiment

was also used when discussing potential participation in the carbon market. It helps to explain farmers' hesitancy to participate in the carbon market, as many still vividly remember their experiences with past boom-and-crash cycles, and selling credits is viewed as jumping onto the bandwagon all over again.

Farmers also recall past experiences with the carbon market, such as being approached by researchers from South African Rhodes University about spekboom planting. However, these initiatives were driven by ecological interests such as planting techniques rather than financial incentives. In more recent times, carbon credit companies, such as AfriCarbon have reached out to farmers, mostly through giving presentations in their farming associations. Moreover, leading figures of AfriCarbon have personally built trust within the farming community by becoming members of farming associations. This demonstrates that forming personal social relationships within the farming community is crucial for convincing farmers to participate in carbon credit schemes. In fact, a couple of farmers mentioned this hesitation to trust 'outsiders', referring to people working for CPDs, as the reason not to participate in the carbon market (e.g. F1). The two interviewed land managers employed by CPDs have come to understand this and are both making efforts to network with their farming neighbours.

However, trust is incredibly fragile and appears to have eroded in the case of AfriCarbon, as they allegedly completed their *Kuzuko Thicket Restoration Project*[3] and now seem to have departed from the area. Such actions are sowing seeds of distrust among some farmers, as expressed by Farmer 1:

> *And then two weeks, two years later they're [the CPD contractors] missing; they're gone. So that makes the people scared as well.*

This shows how (negative) past experience can influence decision-making in the future.

5.1.3 Expectations

Navigating the structural constraints and building on past experiences, farmers expected the future to be even more competitive and a constant struggle for survival. Farmer 2 openly stated:

> *I'm not going to say this to my neighbours, but we're definitely in competition. Remember, the best one's going to survive.*

Despite a sense of camaraderie within the community, fostered by longstanding neighbourly relationships and mutual assistance, when it comes to surviving

[3] The Kuzuko Thicket Restoration Project launched in 2022 was the first large-scale restoration funded by carbon credits, aiming to restore over 5000 hectares of degraded land in the Eastern Cape with spekboom (C4 EcoSolutions 2021).

through expansion, farmers have purchased each other's land (F2, F5). To sustain his livelihood amidst declining profits from goat farming, Farmer 2 adopted a strategy of expansion, dramatically increasing his farm size from 3,000 to 10,000 hectares. This aligns with the perceived only way to survive with livestock farming in the region, "*to grow bigger*" (F2), meaning you must acquire additional land to enlarge your farming grounds. This trend is expected to result in the farming sector being run by "*mega commercial farmers*" (F10) who acquire more land, thereby displacing smaller farmers. Farmer 2 sums this up: "*In 10, 15 years there going to be less and less of us*". With us, he refers to livestock farmers. Other interviewees voiced similar expectations about a trend continuing into the future, saying if those farming with livestock stay in agriculture, they will turn into subsistence farmers or convert to game farming which is an industry expected to grow in the future. Additionally, many farmers foresee an ongoing depopulation of the area as smaller farmers[4] are pushed out.

Regarding the carbon market, farmers expected persistent uncertainty through the market's volatility. They worry that long-term contracts (mostly 30 to 40 years) could prevent them from benefiting from future market price increases. Farmer 7 raised the question:

> *What happens if carbon goes to $400 and the farm is still getting the equivalent of $10? What happens if the dollar collapses? […] 40 years, in today's changing environment is a massively long period for anybody to commit to. So, they may make money now, but inflation, etc., you may not make a living there in 10 years' time.*

Additionally, the farmers expected that significant initial investment is needed to participate for example to cover the labour costs when starting to plant spekboom large-scale. None mentioned that CPDs could cover these initial costs, despite land managers indicating that they do. This suggests a knowledge gap, with farmers forming their expectations based on their current understanding of how they think the market works, which in turn influences their decisions to participate or not. Ultimately, farmers believe that the financial reimbursement from carbon farming will be insufficient to sustain their operations.

> *But the amount of money they're paying us isn't sustainable really. It's just too little. I'm not 100% sure how this works, but someone said it could be like 30 years before you get your money. (F2)*

Land users also expected a grim social and political future for South Africa, primarily driven by concerns over crime and security. They connected these issues with fragile social equality, high unemployment rates, and lack of education. Many farmers held the current government responsible for addressing these problems, and

[4] It is important to note that when these farmers refer to 'smaller farmers', they are speaking about other white, previously privileged farmers, not the black smallholders who numerically dominate South Africa.

repeated disappointments with the ANC have led them to question the political will to make meaningful changes.

> *It definitely change a hell of a lot and going forward with unemployment rates in South Africa and there's no political will to try and get not only crime, violent crime, all crime whether it's corruption, whatever it may be. There's no political will to really try and change that. […] In fact, it will just get worse.* (F9)

The majority of the farmers expressed wishes to see crime better contained. Yet, the epicentre of crime is perceived to be in the bigger cities, hence the land users feel a relative sense of security on their land, which can be a reason to keep the farm.

5.1.4 Imaginaries

When asked about a preferable future, farmers envisioned fulfilment and joy derived from a lifelong dedication to farming and a peaceful retirement. This reflects the desire for a stable, rewarding career that allows them to end their working years with a sense of accomplishment and contentment. This can be derived from providing either for one's children, "*It's nice for me as an old man to know I supply my children with something*" (F8), or for the country's food security, "*If you take the farmers away, there won't be food*" (F4). There is an intrinsic passion for farming apparent in the interviews which goes beyond financial considerations and extends to a deep-rooted connection with the land, as Farmer 1 remarked:

> *That's my way of life. You're not gonna get very rich out of it, but at least it's a way of life.*

For many farmers, leaving their farms is inconceivable. As Farmer 5 expressed, "*I love it here. I won't go. I hope I die right here.*" When speaking about their future, most of the farmers want to spend it in peace on their land. Even those who currently do not live on their farms imagine spending their last years out of the city and on their farms. Similarly, the land managers are already determined to dedicate their careers to building up the spekboom farms literally until the end: "*It's really to restore as much as possible land before I fall over one day*" (LM1).

5.2 Environmental factors

5.2.1 Experiencing droughts and getting constrained by nature

The analysis of the interviews reveals significant environmental constraints and experiences that influence farmers' decisions and practices. Farmers have observed substantial changes in rainfall patterns, with the rain's distribution shifting,

resulting in severe water shortages and altered farming practices. Additionally, an increased severity in extreme weather events such as droughts ("*We were running away from the drought.*" F7) and floods ("*We had a river running through the farm, broke its banks and washed everything away.*" F5) was repeatedly mentioned. Especially the droughts are so impactful that all farmers can recall significant droughts, such as the one spanning 2016 to 2022. Furthermore, rising temperatures have made the environment hotter and more challenging for farming. Farmer 4 displayed a photograph of a thermometer reading 52.2 degrees Celsius, which he took a couple of weeks before the interview, demonstrating the increasing severity of temperatures. Due to droughts and water scarcity heavily impacting livestock health and the availability of fodder, some farmers, like the farming couple who decided to sell their livestock, opted to change their farming practices to avoid the high costs of purchasing external fodder. Even game farmers are not spared from the financial impacts of droughts, as they must also provide feed for the wild animals if they do not find food themselves.

Lastly, soil erosion and land degradation, exacerbated by the lack of vegetation during droughts, are major concerns, leading farmers to implement measures like planting erosion-controlling plants and constructing dams to restore land.

5.2.2 Expecting worsening environmental futures and promising carbon farming effects

For the future many land users expressed a similar desire: "*I wish for 30 years of very good rains*." (F1) While hoping for a reversing trend, most are expecting a harsher environment in the future. Farmer 5 explains "*There's more droughts going to come. And that's the reality of it.*" The land users offered varying explanations for this perceived trend. Those with a background in ecology, including Land Manager 2, who has experience in climate activism, directly linked it to climate change. Additionally, some farmers explicitly mentioned CO_2 emissions as a factor driving global warming, thus acknowledging the anthropocentric influence. None expressed climate change denial. Yet, Farmer 9 emphasized that he is not a "*flat-earther*" and hence did not want to be seen as irrational or a "*conspiracy theorist*", but he like other farmers held doubt about whether climate change is manmade at all or rather just cyclic and unavoidable.

For the future, a lot of farmers see their only option to be adaptable and question traditional farming practices, Farmer 3:

> *[…] because the seasons have changed, the temperatures have changed, the water levels have changed, we must adapt.*

Concerning carbon farming, the land users expect spekboom planting to improve land conditions, based on past experiences with spekboom. Improved land

condition will in turn improve the carrying capacity of the land, allowing it to support more livestock and healthier vegetation. There is also an expectation that these practices will contribute to long-term conservation goals, creating a more sustainable and resilient agricultural environment. However, none of the interviewed farmers currently participate in commercial carbon farming, highlighting a gap between recognizing the need for land improvement and actual participation. Many farmers are interested in carbon farming but want to see others do it first. Some farmers like Farmer 6 tentatively collaborate with a CPD by providing spekboom cuttings, believing it will enhance the soil. However, for practical reasons such as the need for fencing, which disrupts the roaming environment his hunting tourism clients look for, he does not plan on commercially planting spekboom on his land. He also explains:

> *I cannot sit and watch those things grow every day and do nothing else. I have to see people. I meet different people all over the world every week. I love what I do.* (F6)

Other farmers also prefer active land use, fearing that a carbon contract would make them more passive. This indicates a preference for active management over passive restoration. Farmer 8 expressed reluctance due to negative past experiences with a CPD, influenced more by personal history than future expectations. Further reasons not to engage in carbon farming were mentioned, including uncertainties about establishing baseline measurements and potential threats such as fire that could jeopardize the investment.

5.2.3 A nature-centred imaginary

When imagining an ideal future, land users express an environmental vision which departs from current expectations. They envision a healthy and beautiful land with a stable climate and more predictable rainfall patterns, allowing for better water management and reduced drought impact. In this future, their land can support their farming operations and contribute to a balanced ecosystem. Yet, ‘healthy land’ means different things to different land users. Some see it as an opportunity for positive financial outcomes, believing that restoring the land to its ‘original’ status will allow them to increase stocking rates and grow their business. Others focus on the environmental benefits and the satisfaction of leaving the land in better condition for future generations. For Farmer 8, who does not farm full-time, improving the land is driven by aesthetics and the desire for a pleasing environment around their homes. Additionally, among some land users – especially the land managers – a passion for restoration and the hope of leaving the land in better condition, was even prioritized over financial gain.

> *So, for me, the restoration work is primary. […] It's not as if I'm in it for the money or anything because we get paid okay, but I could have done better in other kind of lines if I wanted to.* (LM2)

All land users hoped that the widespread adoption of sustainable practices would lead to significant improvements in soil health, effectively combating land degradation and helping them survive dry periods. Hence, farmers agreed that a good farmer must "*farm as sustainably as possible*" (F2). This involves practices such as planting cover crops and trees, building dams to prevent soil erosion, or implementing water-saving irrigation systems. Additionally, all of the livestock farmers have adapted their grazing systems and are more or less familiar with the concept of holistic or regenerative grazing, a strategy where livestock are moved between pastures to prevent overgrazing, allowing vegetation time to recover. This aligns with the shared narrative among the land users that historically overgrazing has resulted in severe land degradation and soil erosion. While no one blames their ancestors for this situation, they agreed that degradation stems from a lack of knowledge about sustainable grazing practices in previous generations, a situation that has changed in modern times ("*everything has gotten more scientific.*" F6). This change is realized through changing contents in agricultural college education, or through specific training programs. For example, Farmer 2 attended a course to improve his grazing management and noticed a marked difference in the condition of his land compared to his neighbours who did not attend the course.

5.3 Narratives of the future

5.3.1 We keep the fight and innovate the business - The adaptive farmers (F1, F3 & F4, F6, LM1, LM2)

This narrative reflects land users' resilience, adaptability, and proactive approach to their future, emphasizing their determination to overcome challenges and persist despite economic, environmental, and political obstacles. Innovation is central, as these land users continually evolve their practices and adopt new technologies. For instance, the farming couple exemplifies progress by being the first in the area to implement a rotational irrigation method. Their aim is economic survival and growth, making strategic decisions for long-term financial stability and prosperity. Another example of such strategic planning is Land Manager 1, who developed and pitched a business proposal that secured ten million dollars from an international investor to plant spekboom for generating carbon credits, ensuring a sustainable and profitable model for the next 30 years.

Healthy land is seen as a means to improve stocking rates and expand the business. A crucial aspect of this future narrative is ensuring that growth and

success pass on to the next generation, securing the survival of the family farm. For instance, instead of selling, the farming couple and their son are considering investing in new ventures to generate additional income, showing a strong commitment to keeping the farm within the family. A forward-thinking vision drives those land users' continuous improvement and innovation, integrating diverse skills in business management, marketing, and agriculture to navigate the complexities of modern farming. As Farmer 1 explains:

> *But there's a lot of modernization that's coming. With the laptops and the communication and information sharing now. It's so easy [switching] over to this digital media.*

5.3.2 We leave the fight but keep the farm - The holiday farmers (F8, F9, F10)

This narrative was used by one specific group, the holiday farmers – a term used by the land users themselves – whom I labelled 'non-permanent' prior in this thesis since they do not farm or live on the farm full-time. These farmers combine their passion for farming with financial security derived from outside of agriculture income streams. They typically own land and a farm not primarily for economic but for recreational purposes, using it as a weekend or holiday destination. This recreational focus is evident from the size of most holiday farms. While one of the holiday farmers inherited a farm spanning 1,700 hectares, the other two manage farms for recreational purposes 'only' around 500 hectares in size, which is, according to them, way too small to sustain a farming business.[5]

The holiday farmers mentioned a strong connection to farming, often stemming from their upbringing on a farm or their connections to a farming family. Thus, all three have either returned to their family farms after leaving or opted to purchase new land with a farm to reconnect with a past farming tradition. The farm in its role as "*holiday house*" (F10) serves as a sanctuary, cherished for its connection to nature and its ability to relieve stress. As expressed by Farmer 10:

> *It's the place where you go to relieve your stress. It's the place where you go to just not get depressed and handle the stresses of life, I think. Also, for your children and your family it's like medicine for the soul.*

Holiday farming aligns with the increasing academization of farmers. All three holiday farmers have pursued higher education and hold university degrees in various fields. This educational background has led them to pursue careers outside of farming, for example, in mechanical engineering (F9). Due to their employment in bigger cities, all holiday farmers reside closer to urban areas.

[5] It is important to note that the average farm size per individual landowner in the Eastern Cape is 7 hectares, nationwide even just 6 hectares (Department of Rural Development and Land Reform 2018).

Although their farms are not intended to be viable as commercial ventures ("*It's like a sponge, it just sucks up money*" F9), the farmers still prefer to use the land productively to some extent, such as by keeping livestock, but for different reasons. For example, Farmer 10 decided to raise cattle on his land again, not for commercial purposes, but because "*it gives me a reason to go back*".

5.3.3 The family farm's future (possibly) ends with me – The uncertain legacy farmers (F2, F5, F7)

This narrative reflects a profound sense of uncertainty and concern among farmers about the continuity of their farms. This sentiment is intertwined with parents' varying desires for their children's involvement in agriculture. While some farmers following other narratives are eager to pass down their farming legacy ("*It [the farm] will stay in our family.*" F1), the farmers of this group are reluctant due to the overwhelming uncertainties in the industry. Farmer 7 encapsulated this reluctance:

> *I have shied away from encouraging my children to get involved in anything agricultural in this country because I think the uncertainties are just too many and too huge. So my children are both professionally qualified and effectively I don't think they will ever be involved in agriculture.*

For some farmers, the situation is more nuanced. They would like to see their children take over the farm but prefer to leave the choice to them and even encourage their children to pursue careers outside of farming. When asked if he would like his children to take over the farm, Farmer 2 responded:

> *That would be great. But I think that's because people feel a son must farm. I don't feel like that. Even if this farm has a manager one day, that's also fine. They don't have to farm. […] I enjoy farming, that's cool. But if they don't enjoy it, then they must do what they enjoy.*

This statement highlights a potential compromise: hiring an external farm manager. While this keeps the farm productive without involving the next generation in daily activities, it could also signal the end of traditional family farming. The personal, hands-on legacy might be replaced by a corporate structure, diluting the familial connection and heritage that have historically defined these farms.

It is important to note that these sentiments are shared not only by the 'uncertain legacy farmers' but also by some holiday farmers. This overlap emphasizes that narrative categories are not fixed, and aspects of different narratives can intersect. For instance, both groups expressed doubts about whether the next generation will remain in South Africa, as some family members have already emigrated. Both groups pointed to the unstable political situation in South Africa as a source of uncertainty, highlighting the upcoming elections (which were still in the future at the time of the interview) and their potential impact on the country's future stability.

Farmer 8, who fits both the holiday farmer and 'uncertain legacy farmer' narratives, captured this sentiment:

> *Luckily, my one son, his wife, and three children, has got [sic] French passports. They stayed there for 13 years. So, if it collapses completely in this country, then they can go there.*

6. Discussion and conclusions

6.1 Future narratives: Differentiating land users' perspectives

Applying the narratives framework facilitated the identification of three distinct future narratives among the land users: 'We keep the fight and innovate the business', 'We leave the fight but keep the farm', and 'The family farm's future (possibly) ends with me'. The framework also revealed how these narratives are constructed. The findings connect to the wider agricultural research discourse, which has looked at narratives and future orientation in farmers' decision-making.

The 'keep the fight' narrative highlights a land user type often observed in agricultural research, characterized by adaptability and innovation to overcome economic, environmental, and political challenges, while ensuring long-term farm viability. Similar to Morgan et al.'s (2015) findings on future-oriented farmers, the farmers in my analysis group, as well as those identified by the authors, demonstrate a forward-thinking approach. However, Morgan et al. (2015) noted that these farmers are mainly driven by financial gains and often display little concern for climate change and sustainability. In contrast, my study found that especially land managers integrate financial investment with environmental objectives. Additionally, the desire to secure the survival and prosperity of the family farm for the next generation is evident with this narrative and aligns with findings from Zebrowski et al. (2023), where the farm-family legacy was a prevalent narrative driving farmers to adapt their production methods. This parallel, along with McMillan Lequieu's (2015) study on German heritage farmers, who follow narratives to balance cultural priorities with the evolving realities of modern agricultural production, underscores the importance of family legacy in shaping farming decisions.

The 'We leave the fight but keep the farm' narrative supports decisions that are less influenced by long-term agricultural viability and more by personal enjoyment and lifestyle choices. This approach to farming for intrinsic reasons rather than financial gain is also observed in rural landscape research, highlighting how land use can shift from productivity to recreation (Reed & Kleynhans 2009; Abrams &

Bliss 2013). Consequently, literature often refers to these farmers as holiday, hobby, or amenity farmers. The characteristics of such farmers are by no means homogeneous. Shucksmith and Herrmann (2002) found hobby farmers to typically have no farming background and do not identify as farmers, whereas my data suggests those farmers often have strong personal ties to farming, either through upbringing or wider family connections. Furthermore, although the farms are not meant for investment and expansion, the interviewed farmers of that narrative group still stressed how important it is for them to maintain some productive farm activities.

'The family farm's future (possibly) ends with me' narrative is upheld by land users who worry about the future of their farms and do not believe passing them on to the next generation is viable. In research, a narrative of 'dropping out' not for oneself but the next generation is less explored. However, O'Callaghan and Warburton's (2017) study found that Australian farmers also grapple with the potential end of their family farms, which affects their social and personal identities. Narratives helped those farmers to make sense of their situations and maintain their identities amidst changing conditions. In my study, the narratives of the future not only support farmers' identities but also provide a strong motivation for their current actions. Those actions, however, tend to focus more on a present-time perspective, with immediate rewards rather than long-term investments which could have negative effects on the environment (Shariatzadeh & Bijani 2022).

Acknowledging the different narratives helps distinguish individual land users within a group that is often perceived as homogeneous. This differentiation was crucial in revealing the diverse responses to similar contexts. Instead of assuming that all farmers would respond similarly to the same external factors, the analysis highlighted how personal experiences, expectations, and hopes shape differentiated future narratives which in turn influence individual decision-making. To illustrate that, while some farmers were eager to pass on their agricultural legacy, others were less strict about family heritage. This shift could change the traditional inheritance patterns in the white farming community (Kritzinger & Vorster 2002), opening up opportunities for new arrangements, such as more women becoming the main farm operators or the integration of professional farm managers within a corporate structure. Understanding these distinct narratives helps in accurately addressing the varied needs and challenges faced by different groups within the farming community.

6.2 Revisiting the narrative framework: Integrating environmental factors

The narrative framework proposed by Vignoli et al. (2020) provides a comprehensive approach to understanding how land users construct future narratives through the interplay of structural constraints, expectations, and imaginaries. However, originally developed in the context of fertility decisions, this framework needs expansion to be applicable to agricultural decision-making. My empirical data suggests incorporating environmental factors in the framework, which play a crucial role in shaping land users' decision-making processes.

Originally, structural constraints were defined as economic, social, and political factors (Vignoli et al. 2020). My data reveals that local environmental conditions, such as water availability, soil quality, and climate variability, are significant factors affecting farmers' decisions. These environmental conditions often act as immediate constraints that dictate the feasibility of certain agricultural practices, especially livestock grazing. Similarly, expectations in the original framework refer to anticipations of future outcomes based on past experiences and current trends (Vignoli et al. 2020). My findings show that environmental variability heavily shapes farmers' expectations. Recurring extreme weather events but also climate change awareness have led farmers to expect worsening conditions in the future. And lastly, imaginaries in the narrative framework are the visions or aspirations for the future, influenced by cultural, social, and personal values (Vignoli et al. 2020). My data indicates that these aspirations are to a large degree shaped by environmental considerations, what I call the nature-centred imaginary in the analysis. This has concrete consequences for the adaptation of new practices, as discussed in the next chapter.

I suggest extending the narrative framework by Vignoli et al. (2020), of structural constraints to encompass also environmental factors, expectations to include environmental uncertainty, and imaginaries to incorporate ecologically prosperous futures. In this expanded model, environmental factors are depicted as an encompassing layer, influencing each component of the framework. By integrating environmental factors, it reveals how farmers' choices are deeply intertwined with their environmental context. Figure 4 is a visual representation of the expanded narrative framework and the decision-making process. Future research could explore more thoroughly the detailed mechanisms through which environmental factors influence farmers' narratives and their practical decisions in the face of uncertainty.

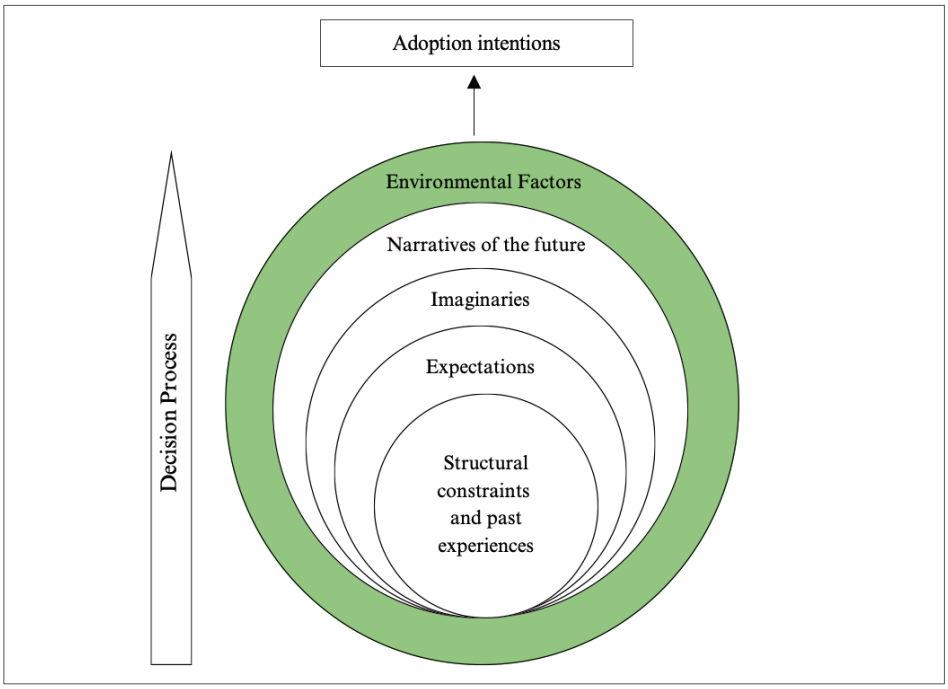

Figure 4. Adapted Narrative Framework by Vignoli et al. 2020 by the component of Environmental Factors.

6.3 Integrating environmental factors: The adoption of sustainable practices and spekboom planting

Applying the narrative framework, revealed that land users construct different future narratives that guide their farming decisions under uncertainty. However, only when expanding the framework by environmental factors, we understand better why farmers from all three groups were positive about spekboom planting and have already adopted other sustainable practices to different degrees and in their respective farming practices. Examples include building dams, practicing rotational grazing for livestock farmers, implementing conservation management and culling for wildlife farmers, planting trees and cover plants, and attending courses on sustainable practices. Expanding the narrative framework demonstrates that adopting new practices goes beyond just financial, political, and social considerations. This is not to say, that those are not important considerations, as shown by Kragt et al. (2017). In fact, the narratives shared within social networks and among peers significantly impact the decision to adopt sustainable practices. Several land users emphasized the importance of farming associations and described waiting until their peers adopt new practices before they act. This reflects Burton's (2004:195) concept of the "good farmer", where social identity and peers shape farming practices and the adoption of innovations. Most land users had a clear picture of a good farmer as someone who can sustain their farm, both

ecologically and financially. Interestingly, for one farmer, the concept of a good farmer was tied to aesthetics and how a farm should look. Additionally, culture played a critical role, particularly for those in the 'keep the fight' narrative group. This aligns with Fischer et al. (2019b), showing that farming decisions are not made in a vacuum, but in a social context influenced by social norms and peer behaviours. Further, similar to Page and Belotti (2015) who found political instability to be a significant barrier to adoption, a lack of trust in and support of the government and its institutions was repeatedly mentioned in the interviews as a reason to hinder the adoption of sustainable practices.

However, expanding the framework showed that farmers' choices are, in addition to being influenced by financial, political, and social considerations, also influenced by the physical realities they encounter, and their expectations of a worsening environmental future, which influences their long-term decision-making, and their strong imaginative future in which the land is healthy, and rainfall increases again.

Farmers' willingness to engage in spekboom planting, as revealed in the findings, is primarily driven by the belief that this activity improves land conditions. This belief is rooted in a nature-centred imaginary, with the vision of a healthy, sustainable land. Prokopy et al. (2008) found that overall, environmental awareness generally has a positive effect on the adoption of sustainable practices among farmers. Similarly, in my study, farmers' awareness of spekboom's potential for land restoration and their experiences with its growth significantly influenced their favourable view of the practice and even encouraged them to consider its adoption. Since only the interviewed land managers have planted spekboom yet, incorporating environmental factors also helps explain the adoption of other sustainable strategies in response to climate change and environmental degradation, like rotational grazing or dam building.

The farmers expect to achieve ecological benefits, such as improved soil health, which they believe will subsequently lead to economic benefits. In light of climate change and environmental degradation, the environmental aspect serves as a stronger motivator than the financial gains. This aligns with some prior adoption literature, which found that the perception of environmental benefits often drives adoption more strongly than financial incentives (Torabi et al. 2016; Kragt et al. 2017).

Considering environmental factors reveals their influence on future narratives, which, in turn, impact lived realities. To give a simplified example: the farmer experiences droughts, expects them to worsen in the future, and integrates more dams to capture more rainwater, linking environmental challenges, future expectations, and adoption decisions. This environmental lens reveals how land users' expectations and aspirations are intertwined with the physical realities they encounter, driving them toward sustainable practices. Clarke et al. (2012) found

similar tendencies with commercial livestock and game farmers who are open to new approaches like carbon farming with spekboom, driven by their perception of climate variability and their need to cope with severe drought conditions.

Even though the three narrative groups have different future scenarios envisioned for themselves, an overall desire for land improvement was apparent among all three. By acknowledging the significance of environmental factors within the construction of future narratives, we recognize that land users are simultaneously constrained and motivated by environmental realities and the desire for a healthy land often transcends mere economic gain. This holistic view captures the complexity of agricultural decision-making.

6.4 Participating in carbon payment schemes

Despite the positive perception of spekboom planting as a practice to improve soil health, participation in the carbon market or paid carbon schemes varied among the interviewed land users, driven by their differing narratives of the future.

Barbato and Strong (2023) found in their study, that predominantly those farmers who are already practising on-farm activities that could be integrated into a carbon payment scheme are interested in participating. I found that some farmers are also willing to participate, even if it requires adopting an entirely new on-farm activity. My study suggests that their openness to participation was rather driven by their aspirations for the future, than their existing farming practices, highlighting that their interest is shaped by the narratives they envision for themselves. Overall, the adaptive and the holiday farmers expressed more interest in participating in schemes. For the adaptive farmer, it represents a business opportunity, but only if it proves to pay enough and can remove further uncertainties in the future. The holiday farmers are not as dependent on the income from the market – they would still like to see their investments covered – but are more motivated by the prospect of regenerating the land. This fits with the expected environmental co-benefits from participation (Torabi et al. 2016). Uncertain legacy farmers do not view carbon farming as viable due to its future-oriented returns. They are hesitant to invest in carbon farming by selling parts of their land meaning potential income losses at the present. This present-time perspective can be limiting, as highlighted by Shariatzadeh and Bijani (2022). While understandable from a personal perspective, it poses environmental challenges where short-term benefits like immediate income and resources are weighed against long-term sustainability.

However, all the land users regardless of their narrative could mention reasons that most likely prevent them from future involvement in contracted carbon credit schemes, all related to uncertainty. The analysis reveals that the carbon market introduces significant layers of complexity for land users, raising as of yet

unresolved questions like ‘How does it work?’, ‘Who benefits?’, and ‘What if the speculations fail in the future?’. Thus, its structures do not support a clear course of action but rather add to the overall uncertainty in farming. Kragt et al. (2017) found that to overcome the uncertainty associated with the carbon market, farmers found information and personal contact to be helpful. My findings support this, both land managers and farmers confirmed that personal exchanges helped remove the initial scepticism. However, for these interactions to be effective, they need to be long-term and establish trust, which has not always been the case in the past. Additionally, a consistent lack of information – or what Buck and Palumbo-Compton (2022) identify as an educational barrier – was not only evident in my research but has also been repeatedly identified in prior studies as a significant obstacle for farmers (Feliciano et al. 2014; Kragt et al. 2017). However, simply providing more information does often not prove to be the best solution. Social science, especially communication science, critiques the notion that more information naturally leads to changes in attitude or behaviour (Owens & Driffill 2008; Simis et al. 2016). In fact, Ma and Coppock (2012) found that farmers with more knowledge about carbon sequestration were actually more sceptical. According to that study, this scepticism may stem from farmers relying on their own definitions and understanding of carbon sequestration, which may not always align with factual knowledge. I could also assume that with more knowledge, farmers have realized all the uncertainties and inequalities in where the money goes in the carbon market, which makes them more sceptical. In my study, land users demonstrated varied levels of knowledge and held differing assumptions about the carbon market. Nevertheless, there were discrepancies between all land user’s accounts of carbon farming contracts and the actual practices described by land managers employed by CPDs, indicating that there is a lack of knowledge about how the market works amongst the studied farmers.

Considering the uncertainty and knowledge gap prevailing in the study area, it appears that CPD planners have not adequately addressed existing uncertainties in terms of information. Furthermore, in the Eastern Cape province, many of these planners are also engaged in ecological research. This dual role can blur the lines between research and project implementation, leading to a focus on the natural science benefits of spekboom planting rather than the socio-economic realities faced by farmers. For instance, farmers worry that planting spekboom will prevent them from actively working on the planted piece of land. While the interviewed land managers, and likely other CPD planners, view this as beneficial (“*You don’t have to work your ass off*.” LM1), farmers see it as a restriction on their on-farm activities. This mismatch arises because project implementers prioritize ecological benefits, such as carbon sequestration, without fully considering the practical and economic implications for the farmers.

While there is substantial research praising spekboom for ecosystem regrowth from a natural science perspective (Mills & Cowling 2006; Galuszynski et al. 2023) social science research, especially phenomenological investigations on its practical implications for farmers is scarce (notable exceptions are Clarke et al. (2012) and Curran et al. (2012)). This gap indicates that while spekboom planting is theoretically beneficial for the environment, the farmers, and the local communities, it does not always fit into the practical realities of farmers in that area, failing to deliver the expected ecological success. This situation underscores the need for a more integrated approach that considers both ecological effectiveness and practical applicability in the farmers' real-world context.

6.5 Conclusions

The findings of this discussion contribute directly to the thesis's goal of better understanding adoption decisions among large-scale land users in the Eastern Cape's thicket region, with the idea that this knowledge can provide a clearer picture of the ground in which the carbon market hopes to plant its seed. I did so by suggesting a theoretical framework that considers future perspectives as a critical guidance point in deciding under uncertainty. To reiterate, the research aim was constituted of three research questions. The first one was about the different narratives and how they are constructed. This thesis identified three narratives among land users, which reflect diverse responses to similar challenges shaped by individual experiences, structural constraints, and visions of the future.

The second research question explored how these narratives influence the adoption of sustainable practices. It revealed that decisions are shaped not only by financial, political, and social factors but also by environmental awareness and shared experiences, with factors like physical realities and expectations of worsening conditions playing a key role.

The last question addressed the role of the carbon market and incentivized carbon payment schemes. The intention to participate in the carbon market varied among land users due to differing future narratives. While some land users were motivated by financial and environmental goals, others were deterred by the uncertainty and long-term nature of carbon farming. The uncertainty surrounding carbon markets, and the lack of clear information add layers of complexity, making farmers hesitant to commit. Additionally, the focus on natural science by planners often overlooks the socio-economic realities of farming, creating a disconnect between ecological benefits and practical applicability. This leaves room for future research as well as policymaking.

7. Recommendations for future research and policy

Future research could build on my study to explore the social science perspective of carbon farming, understanding lived realities in the context of ecological changes. The narrative framework initially developed for fertility decisions, has shown its versatility in agricultural contexts and provided a good starting point but could be applied to more contexts. By adapting the framework to various environmental and socio-economic scenarios, researchers can further uncover how different narratives shape decisions across diverse farming practices and regions such as crop farmers or livestock farmers in grassland areas (rather than thicket). Furthermore, longitudinal studies are essential to understanding how adoption decisions evolve, considering how environmental changes and socio-economic factors keep changing. Lastly, examining the dynamics of how the carbon market evolves for farming, including how benefits and risks are distributed along value chains could provide a critical perspective on its implementation and impacts.

In terms of policy, it is important that policymakers in agrarian and environmental sectors understand carbon market dynamics so that they can help create a policy environment that reduces uncertainties for farmers and facilitates the possibility for farmers to make informed choices about if or how to participate in different emerging carbon farming initiatives. By addressing these concerns, policymaking can ensure that projects genuinely benefit both the environment and the farmers. Additionally, sustainable practices like planting spekboom must be balanced with productive land uses, balancing ecological goals with day-to-day farming activities. Active involvement of farmers in planning and decision-making processes is crucial for designing schemes that are both ecologically effective and practically applicable. This involvement could be realized through education and training aligning farmers' perceptions with CPD project goals, but it must be coupled with long-term support and monitoring to offer ongoing assistance and allow for necessary adjustments.

References

Abrams, J. & Bliss, J.C. (2013). Amenity Landownership, Land Use Change, and the Re-Creation of "Working Landscapes". *Society & Natural Resources*, 26 (7), 845–859. https://doi.org/10.1080/08941920.2012.719587

AfriCarbon (n.d.). *Restoring degraded thicket and generating carbon credits.* https://africarbon.co.za/ [2024-07-25]

Alesbury, J. (2024). Hive Ecosystems expands land restoration project with the acquisition of a fourth farm. Hive Energy. [Blog post] 28 February. https://www.hiveenergy.co.uk/2024/02/28/hive-ecosystems-expands-land-restoration-project-with-the-acquisition-of-a-fourth-farm/ [2024-07-25]

Andrew, N. (2020). South Africa's Land Ownership System as a Barrier to Social Transformation. Land Conflict and the Forced Displacement of Black Farm Dweller Families. *Revue internationale des études du développement*, 243 (3), 233–261. https://doi.org/10.3917/ried.243.0233

Apraku, A., Gyampoh, B.A., Morton, J.F. & Karikari, A.B. (2023). Water security in rural Eastern Cape, SA: Interrogating the impacts of politics and climate change. *Scientific African*, 19, e01493. https://doi.org/10.1016/j.sciaf.2022.e01493

Archer, E., du Toit, J., Engelbrecht, C., Hoffman, M.T., Landman, W., Malherbe, J. & Stern, M. (2022). The 2015-19 multi year drought in the Eastern Cape, South Africa: it's evolution and impacts on agriculture. *Journal of Arid Environments*, 196, 104630. https://doi.org/10.1016/j.jaridenv.2021.104630

Assouto, A.B., Houensou, D.A. & Semedo, G. (2020). Price risk and farmers' decisions: A case study from Benin. *Scientific African*, 8, e00311. https://doi.org/10.1016/j.sciaf.2020.e00311

Bachram, H. (2004). Climate fraud and carbon colonialism: the new trade in greenhouse gases. *Capitalism Nature Socialism*, 15 (4), 5–20. https://doi.org/10.1080/1045575042000287299

Barbato, C.T. & Strong, A.L. (2023). Farmer perspectives on carbon markets incentivizing agricultural soil carbon sequestration. *npj Climate Action*, 2 (1), 1–9. https://doi.org/10.1038/s44168-023-00055-4

Bazzani, G. (2023). Futures in Action: Expectations, Imaginaries and Narratives of the Future. *Sociology*, 57 (2), 382–397. https://doi.org/10.1177/00380385221138010

Beckert, J. (2016). *Imagined futures: fictional expectations and capitalist dynamics*. Harvard University Press.

Beckert, J. & Bronk, R. (2018). *Uncertain Futures: Imaginaries, Narratives, and Calculation in the Economy*. Oxford University Press.

Bruner, J. (1991). The Narrative Construction of Reality. *Critical Inquiry*, 18 (1), 1–21. https://doi.org/10.1086/448619

Buck, H.J. & Palumbo-Compton, A. (2022). Soil carbon sequestration as a climate strategy: what do farmers think? *Biogeochemistry*, 161 (1), 59–70. https://doi.org/10.1007/s10533-022-00948-2

Burton, R.J.F. (2004). Seeing Through the 'Good Farmer's' Eyes: Towards Developing an Understanding of the Social Symbolic Value of

'Productivist' Behaviour. *Sociologia Ruralis*, 44 (2), 195–215. https://doi.org/10.1111/j.1467-9523.2004.00270.x
C4 EcoSolutions (2021). *Kuzuko Lodge Private Game Reserve Thicket Restoration Project*. (CCB Standards). Climate, Community & Biodiversity Alliance. https://c4es.co.za/wp-content/uploads/2023/03/Kuzuko-CCB-PDD_ReforestAction_31-March-2023.pdf [2024-03-17]
Chothia, F., Nesta Kupemba, D. & Plett-Usher, B. (2024). ANC and DA agree on South Africa unity government. *BBC News*. https://www.bbc.com/news/articles/c8007w4vqveo [2024-07-18]
Clarke, C.L., Shackleton, S.E. & Powell, M. (2012). Climate change perceptions, drought responses and views on carbon farming amongst commercial livestock and game farmers in the semiarid Great Fish River Valley, Eastern Cape province, South Africa. *African Journal of Range & Forage Science*, 29 (1), 13–23. https://doi.org/10.2989/10220119.2012.687041
ClimatePartner (n.d.). *Spekboom Reforestation, South Africa*. ClimatePartner. https://www.climatepartner.com/sites/default/files/content/images/impact/ClimatePartner-Impact-Spekboom%20Brochure%20short.pdf [2024-07-25]
Creswell, J.W. & Creswell, J.D. (2018). *Research design: qualitative, quantitative, and mixed methods approaches*. Fifth edition. SAGE.
Curran, P., Smedley, D., Thompson, P. & Knight, A.T. (2012). Mapping Restoration Opportunity for Collaborating with Land Managers in a Carbon Credit-Funded Restoration Program in the Makana Municipality, Eastern Cape, South Africa. *Restoration Ecology*, 20 (1), 56–64. https://doi.org/10.1111/j.1526-100X.2010.00746.x
Department of Rural Development and Land Reform (2018). *Land Audit Report November 2017*. Department of Rural Development and Land Reform. https://www.gov.za/sites/default/files/gcis_document/201802/landauditreport13feb2018.pdf [2024-08-05]
Dilley, L., Mausch, K., Crossland, M. & Harris, D. (2021). What's the Story on Agriculture? Using Narratives to Understand Farming Households' Aspirations in Meru, Kenya. *The European Journal of Development Research*, 33 (4), 1091–1114. https://doi.org/10.1057/s41287-021-00361-9
Feliciano, D., Hunter, C., Slee, B. & Smith, P. (2014). Climate change mitigation options in the rural land use sector: Stakeholders' perspectives on barriers, enablers and the role of policy in North East Scotland. *Environmental Science & Policy*, 44, 26–38. https://doi.org/10.1016/j.envsci.2014.07.010
Findlater, K.M., Satterfield, T. & Kandlikar, M. (2019). Farmers' Risk-Based Decision Making Under Pervasive Uncertainty: Cognitive Thresholds and Hazy Hedging. *Risk Analysis*, 39 (8), 1755–1770. https://doi.org/10.1111/risa.13290
Fischer, K., Giertta, F. & Hajdu, F. (2019a). Carbon-binding biomass or a diversity of useful trees? (Counter)topographies of carbon forestry in Uganda. *Environment and Planning E: Nature and Space*, 2 (1), 178–199. https://doi.org/10.1177/2514848618823598
Fischer, K., Sjöström, K., Stiernström, A. & Emanuelson, U. (2019b). Dairy farmers' perspectives on antibiotic use: A qualitative study. *Journal of Dairy Science*, 102 (3), 2724–2737. https://doi.org/10.3168/jds.2018-15015
Galuszynski, N.C., Forbes, R.E., Rishworth, G.M. & Potts, A.J. (2023). Restoring South African subtropical succulent thicket using Portulacaria afra: exploring the rooting window hypothesis. *PeerJ*, 11, e15538. https://doi.org/10.7717/peerj.15538
Genis, A. (2012). *The changing nature of large-scale commercial farming & implications for agrarian reform: Evidence from Limpopo, Western Cape and Northern Cape*. (Working Paper, 24). PLAAS, University of the

Western Cape. https://repository.uwc.ac.za:443/xmlui/handle/10566/570 [2024-02-22]
Glover, D. (2018). Farming as a performance: a conceptual and methodological contribution to the ecology of practices. *Journal of Political Ecology*, 25 (1). https://doi.org/10.2458/v25i1.22390
Glover, D., Sumberg, J. & Andersson, J.A. (2016). The Adoption Problem; or Why We Still Understand so Little about Technological Change in African Agriculture. *Outlook on Agriculture*, 45 (1), 3–6. https://doi.org/10.5367/oa.2016.0235
Houser, M. (2018). Who Framed Climate Change? Identifying the How and Why of Iowa Corn Farmers' Framing of Climate Change. *Sociologia Ruralis*, 58 (1), 40–62. https://doi.org/10.1111/soru.12136
Joubert, B. & Davidson, D.J. (2010). Mediating constructivism, nature and dissonant land use values: The case of northwest Saskatchewan Métis. *Human Ecology Review*, 17 (1), 1–10
Jung, M. (2006). Host country attractiveness for CDM non-sink projects. *Energy Policy*, 34 (15), 2173–2184. https://doi.org/10.1016/j.enpol.2005.03.014
Kenny, D.C. & Castilla-Rho, J. (2022). What Prevents the Adoption of Regenerative Agriculture and What Can We Do about It? Lessons and Narratives from a Participatory Modelling Exercise in Australia. *Land*, 11 (9), 1383. https://doi.org/10.3390/land11091383
Kerley, G.I.H., Knight, M.H. & de Kock, M. (1995). Desertification of subtropical thicket in the Eastern Cape, South Africa: Are there alternatives? *Environmental Monitoring and Assessment*, 37 (1), 211–230. https://doi.org/10.1007/BF00546890
Knowler, D. & Bradshaw, B. (2007). Farmers' adoption of conservation agriculture: A review and synthesis of recent research. Food Policy, 32 (1), 25–48. https://doi.org/10.1016/j.foodpol.2006.01.003
Kragt, M.E., Dumbrell, N.P. & Blackmore, L. (2017). Motivations and barriers for Western Australian broad-acre farmers to adopt carbon farming. *Environmental Science & Policy*, 73, 115–123. https://doi.org/10.1016/j.envsci.2017.04.009
Kritzinger, A. & Vorster, J. (2002). The Conceptualization of Farm Family Business: Deciduous Fruit Farming in South Africa. *Sociologia Ruralis*, 37, 114–133. https://doi.org/10.1111/1467-9523.00039
Kulnik, S.T., Egbunike, J. & Francois, J. (2020). When Values Get in the Way of Conversations: Reflections on Dealing With Discriminatory Remarks and Behaviors in Qualitative Interviewing. *International Journal of Qualitative Methods*, 19, 1609406920965409. https://doi.org/10.1177/1609406920965409
Lal, R., Negassa, W. & Lorenz, K. (2015). Carbon sequestration in soil. *Current Opinion in Environmental Sustainability*, 15, 79–86. https://doi.org/10.1016/j.cosust.2015.09.002
Lamb, W.F., Wiedmann, T., Pongratz, J., Andrew, R., Crippa, M., Olivier, J.G.J., Wiedenhofer, D., Mattioli, G., Khourdajie, A.A., House, J., Pachauri, S., Figueroa, M., Saheb, Y., Slade, R., Hubacek, K., Sun, L., Ribeiro, S.K., Khennas, S., Can, S. de la R. du, Chapungu, L., Davis, S.J., Bashmakov, I., Dai, H., Dhakal, S., Tan, X., Geng, Y., Gu, B. & Minx, J. (2021). A review of trends and drivers of greenhouse gas emissions by sector from 1990 to 2018. *Environmental Research Letters*, 16 (7), 073005. https://doi.org/10.1088/1748-9326/abee4e
Lechmere-Oertel, R.G., Kerley, G.I.H. & Cowling, R.M. (2005). Patterns and implications of transformation in semi-arid succulent thicket, South Africa. *Journal of Arid Environments*, 62 (3), 459–474. https://doi.org/10.1016/j.jaridenv.2004.11.016

Ma, Z. & Coppock, D.L. (2012). Perceptions of Utah ranchers toward carbon sequestration: Policy implications for US rangelands. *Journal of Environmental Management*, 111, 78–86. https://doi.org/10.1016/j.jenvman.2012.06.016
Macrae, C.N., Mitchell, J.P., Golubickis, M., Ho, N.S.P., Sherlock, R., Parlongo, R., Simpson, O.C.M. & Christian, B.M. (2017). Saving for your future self: The role of imaginary experiences. *Self and Identity*, 16 (4), 384–398. https://doi.org/10.1080/15298868.2016.1264465
Marais, C., Powell, M. & Mills, A. (2009). Establishing the platform for a carbon sequestration market in South Africa: The Working for Woodlands Subtropical Thicket Restoration Programme.
McMillan Lequieu, A. (2015). Keeping the Farm in the Family Name: Patrimonial Narratives and Negotiations among German-Heritage Farmers. *Rural Sociology*, 80 (1), 39–59. https://doi.org/10.1111/ruso.12046
Milestad, R., Dedieu, B., Darnhofer, I. & Bellon, S. (2012). Farms and farmers facing change: The adaptive approach. In: Darnhofer, I., Gibbon, D., & Dedieu, B. (eds) *Farming Systems Research into the 21st Century: The New Dynamic*. Springer Netherlands. 365–385. https://doi.org/10.1007/978-94-007-4503-2_16
Milkoreit, M. (2017). Imaginary politics: Climate change and making the future. Kapuscinski, A.R., Locke, K., & Iles, A. (eds) (Kapuscinski, A. R., Locke, K., & Iles, A., eds) *Elementa: Science of the Anthropocene*, 5, 62. https://doi.org/10.1525/elementa.249
Mills, A.J. & Cowling, R.M. (2006). Rate of Carbon Sequestration at Two Thicket Restoration Sites in the Eastern Cape, South Africa. *Restoration Ecology*, 14 (1), 38–49. https://doi.org/10.1111/j.1526-100X.2006.00103.x
Mills, A.J., Vyver, M.V. der, Gordon, I.J., Patwardhan, A., Marais, C., Blignaut, J., Sigwela, A. & Kgope, B. (2015). Prescribing Innovation within a Large-Scale Restoration Programme in Degraded Subtropical Thicket in South Africa. *Forests*, 6 (11), 4328–4348. https://doi.org/10.3390/f6114328
Mohammadi, Z., Ahmadvand, M., Sharifzadeh, M. & Shahbazi, I. (2021). The lived-experience of land-use among Northern Iranian farmers in land risk areas: A phenomenology study. *Land Use Policy*, 108, 105534. https://doi.org/10.1016/j.landusepol.2021.105534
Morgan, M.I., Hine, D.W., Bhullar, N. & Loi, N.M. (2015). Landholder adoption of low emission agricultural practices: A profiling approach. *Journal of Environmental Psychology*, 41, 35–44. https://doi.org/10.1016/j.jenvp.2014.11.004
National Treasury (2021). *Provincial Budgets and Expenditure Review: 2015/16 – 2022/23 Chapter 9 - Agriculture Land Reform and Rural Development*. (Provincial Budgets and Expenditure Review). Department: National Treasury. https://www.treasury.gov.za/publications/igfr/2021/prov/Chapter%209%20-%20Agriculture%20Land%20Reform%20and%20Rural%20Development.pdf [2024-09-07]
Nelson Mandela University (n.d.). *Research Ethics Committee: Human (REC-H) - Office of Research Development*. https://rd.mandela.ac.za/Research-Ethics/Research-Ethics-Committee-Human-(REC-H) [2024-07-25]
O'Callaghan, Z. & Warburton, J. (2017). No one to fill my shoes: narrative practices of three ageing Australian male farmers. *Ageing & Society*, 37 (3), 441–461. https://doi.org/10.1017/S0144686X1500118X
Olsson, L., Barbosa, H., Bhadwal, S., Cowie, A., Delusca, K., Flores-Renteria, D., Hermans, K., Jobbagy, E., Kurz, W., Li, D., Sonwa, D.J. & Stringer, L. (2019). Land Degradation. In: *Climate Change and Land: an IPCC special*

report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. Intergovernmental Panel on Climate Change (IPCC). 1.
Owens, S. & Driffill, L. (2008). How to change attitudes and behaviours in the context of energy. Energy Policy, 36 (12), 4412–4418. https://doi.org/10.1016/j.enpol.2008.09.031
Page, G. & Bellotti, B. (2015). Farmers value on-farm ecosystem services as important, but what are the impediments to participation in PES schemes? *The Science of the Total Environment*, 515–516, 12–19. https://doi.org/10.1016/j.scitotenv.2015.02.029
Pannell, D.J., Marshall, G.R., Barr, N., Curtis, A., Vanclay, F. & Wilkinson, R. (2006). Understanding and promoting adoption of conservation practices by rural landholders. Australian Journal of Experimental Agriculture, 46 (11), 1407–1424. https://doi.org/10.1071/EA05037
Prokopy, L.S., Floress, K., Klotthor-Weinkauf, D. & Baumgart-Getz, A. (2008). Determinants of agricultural best management practice adoption: Evidence from the literature. *Journal of Soil and Water Conservation*, 63 (5), 300–311. https://doi.org/10.2489/jswc.63.5.300
Reed, L.L. & Kleynhans, T.E. (2009). Agricultural land purchases for alternative uses—evidence from two farming areas in the Western Cape province, South Africa. *Agrekon*, 48 (3), 332–351. https://doi.org/10.1080/03031853.2009.9523830
Robson, C. & McCartan, K. (2016). *Real world research: a resource for users of social research methods in applied settings*. Fourth Edition. Wiley.
Shackleton, S. & Luckert, M. (2015). Changing Livelihoods and Landscapes in the Rural Eastern Cape, South Africa: Past Influences and Future Trajectories. *Land*, 4 (4), 1060–1089. https://doi.org/10.3390/land4041060
Shariatzadeh, M. & Bijani, M. (2022). Towards farmers' adaptation to climate change: The effect of time perspective. *Journal of Cleaner Production*, 348, 131284. https://doi.org/10.1016/j.jclepro.2022.131284
Shockley, J. & Snell, W. (2021). Carbon Markets 101. *Economic and Policy Update*, 21 (4). https://agecon.ca.uky.edu/carbon-markets-101 [2024-03-16]
Shucksmith, M. & Herrmann, V. (2002). Future Changes in British Agriculture: Projecting Divergent Farm Household Behaviour. *Journal of Agricultural Economics*, 53 (1), 37–50. https://doi.org/10.1111/j.1477-9552.2002.tb00004.x
Sime, D., Moskal, M. & Tyrrell, N. (2020). Going Back, Staying Put, Moving On: Brexit and the Future Imaginaries of Central and Eastern European Young People in Britain. *Central and Eastern European Migration Review*, 9 (1), 85–100. https://doi.org/10.17467/ceemr.2020.03
Simis, M.J., Madden, H., Cacciatore, M.A. & Yeo, S.K. (2016). The lure of rationality: Why does the deficit model persist in science communication? Public Understanding of Science, 25 (4), 400–414. https://doi.org/10.1177/0963662516629749
Statistics South Africa (2023). Eastern Cape home to over 7.2 million people. *Statistics South Africa*. [Press Statement]. https://www.statssa.gov.za/?p=16760 [2024-06-20]
Sutton, P.W. (2004). *Nature, Environment and Society*. Macmillan Education UK. https://doi.org/10.1007/978-0-230-21244-2
Tester, K. (1991). *Animals and society: the humanity of animal rights*. 1. ed. Routledge.
Torabi, N., Mata, L., Gordon, A., Garrard, G., Wescott, W., Dettmann, P. & Bekessy, S. (2016). The money or the trees: What drives landholders'

participation in biodiverse carbon plantings? *Global Ecology and Conservation*, 7, 1–11. https://doi.org/10.1016/j.gecco.2016.03.008
United Nations (2019). *Big potential benefits from restoring spekboom thicket ecosystems in South Africa*. https://www.unep.org/news-and-stories/story/big-potential-benefits-restoring-spekboom-thicket-ecosystems-south-africa [2024-07-17]
Vignoli, D., Bazzani, G., Guetto, R., Minello, A. & Pirani, E. (2020). Uncertainty and Narratives of the Future: A Theoretical Framework for Contemporary Fertility. In: Schoen, R. (ed.) *Analyzing Contemporary Fertility*. Springer International Publishing. 25–47. https://doi.org/10.1007/978-3-030-48519-1_3
Vlok, J.H.J., Euston-Brown, D.I.W. & Cowling, R.M. (2003). Acocks' Valley Bushveld 50 years on: new perspectives on the delimitation, characterisation and origin of subtropical thicket vegetation. *South African Journal of Botany*, 69 (1), 27–51. https://doi.org/10.1016/S0254-6299(15)30358-6
Von Solms, W. & Van der Merwe, P. (2020). Farm size and its impact on land use: The case of the South African private wildlife industry. *Open Agriculture*, 5 (1), 844–856. https://doi.org/10.1515/opag-2020-0081
Zebrowski, W., Farmer, J., Bruce, A., Giroux, S., Dickinson, S., Chen, X., O'Donnell, M. & Benjamin, T. (2023). Use of narratives to communicate organics with commodity grain farmers. *Renewable Agriculture and Food Systems*, 38, e39. https://doi.org/10.1017/S174217052300025X
Zimbardo, P. & Boyd, J. (1999). Putting Time in Perspective: A Valid, Reliable Individual-Differences Metric. *Journal of Personality and Social Psychology*, 77, 1271–1288. https://doi.org/10.1037/0022-3514.77.6.1271

Popular science summary

This thesis explores how large-scale farmers in South Africa's Albany thicket biome can help fight climate change through carbon farming. Carbon farming involves planting certain crops, like the *spekboom* shrub, that capture and store carbon from the atmosphere. This practice can reduce greenhouse gases and improve soil health, making it a promising solution to climate change.

However, even though carbon farming is promoted as beneficial for both the environment and farmers, many local farmers have been slow to adopt it. To understand why, I interviewed twelve farmers and land managers. I used a narrative approach to understand their stories and perspectives on the future.

The research identified three main stories among the farmers. The first group, 'we keep the fight and innovate the business', focuses on adapting and finding new ways to make their farms successful. The second group, 'we leave the fight but keep the farm', is more interested in enjoying their land without worrying too much about making money. The third group, 'the family farm's future (probably) ends with me', is uncertain about the future and doesn't plan to pass the farm on to the next generation.

These stories are shaped by the farmers' past experiences, current challenges, and hopes for the future. Farmers who are optimistic about creating a healthier, more sustainable future for their land are more likely to adopt carbon farming practices like planting spekboom. Those who are focused on immediate financial concerns or are unsure about the future are less likely to participate.

The study highlights the need for policies that support farmers' real-life situations and challenges. By understanding the stories and motivations of farmers, policymakers and carbon project developers can better encourage sustainable farming practices. This research contributes to the broader conversation on how to address climate change by emphasizing the importance of considering environmental, economic, and social factors in promoting sustainable agriculture.

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Appendix

Disclaimer: This interview guide was developed before conducting the interviews to provide a structured framework for the interviews. Given its prior development, the guide contains a wide-ranging set of questions, although not all were used in each interview. While the main sections of the guide remained consistent, the order and number of questions varied according to the flow of each interview and the responses of the interviewees. The structure was thus followed loosely to allow for a more natural and comprehensive dialogue. During the interviews, both my colleague and I focused on different aspects of the guide. My primary focus was on exploring the future perspectives of the interviewees.

Interview Guide

Provide general information: we are master students from SLU, explain aim of the study, data security, consent sheet, any questions welcome, no right or wrong answers, the interview will be recorded on our phone, transcribed and anonymised, all the information is in the information sheet, any questions before the start?

START RECORDING

Land Management Practices

- To start, can you tell me a bit about your farm? What is your daily business? Who currently lives and works here at the farm?? Who takes over which task?
- What are your goals for managing your farm?
- What are the biggest challenges in managing your farm?
- Can you describe what in your opinion makes a "good farmer"? Do other farmers share your view on that?

History and land use change

- Could you provide a brief history of your farm?
- Did you grow up on this farm, and has it been in your family for a long time?
- Have you always used your land this way, or have you changed your land use practices?

- Can you describe some significant changes in land use practices over the years?
- In your opinion, what are the reasons behind these changes? Which factors influenced you in deciding to change your farming practices?
- Do you think that any of these changes were caused by climate change or specific land use practices?
- What were the consequences of these changes to your farming operations? Were they positive, or rather negative?

Future

- How do you plan to adapt your farming practices to stay economically viable in the coming years?
- Where do you see your farming operations in the next 10, 20, 30 years?
- What do you think is going to change? Why?
- Does climate change play a role in this?
- In an ideal scenario, what would you like your farming operations to look like?
- Would you say that you generally look positively or more sceptical towards the future?
- After you retire, do you think that your farm will stay in the family?

Relationships:

- Where do you get help or assistance when managing the farm? Are you part of any professional organization/association related to your farm?
- What, if any, changes do you see taking place in your community?

Changes and restoration efforts

- How has the wider economic and policy landscape in South Africa changed over the time that you have been a farmer?
- How have these changes impacted your farming practices?
- Do you feel supported by the government?
- Are there any government policies or initiatives that you believe have positively or negatively influenced your farm?
- In your opinion, what improvements or changes would you like to see in government policies related to agriculture?

Environmental Changes:

- What, if any, changes do you see taking place in the surrounding landscape/ on the land?
- What concerns do you have about the natural resources or environment in your landscape?
- How do you see the role of farming in relation to nature and the land?

Restoration [*Here we were interested in carbon farming practices, but we used a term used by the farmers to reduce complexity*]:

- How do you generally feel about landscape restoration efforts?
- Do you see any possible benefits or negative consequences with it?
- Are you currently employing any or would you be open to starting landscape restoration efforts on your land?
- Have you discussed this topic with fellow farmers or with your neighbours/ fellow farmers?
- Have any people from the outside approached you to discuss landscape restoration or to conduct research on your land?
- In that context, how do you think about Carbon Farming?

Carbon Market/ Carbon Credit Projects

- In recent years, the international market for carbon credits has grown significantly. Are you aware of this?
- Are you involved in a carbon credit program (how did you hear about it) and what motivated your participation?
- What are the advantages you associate with program participation?
- What are the disadvantages you associate with program participation?
- Did you talk with your neighbours/ fellow farmers in the community about the program? If yes,
  - How was the response from your community/ your neighbours/ fellow farmers to your farm's participation?
  - If not, what do you think they would say?
- How do you think the program could change your community?
- How do you think the program could change the landscape where you farm?
- What do you think could a growing carbon market mean for South Africa in general?
- How do you view the broader influence of such initiatives/programs for agriculture and the environment? Benefits, drawbacks

Last Question: If there is one thing realistic or not that you could wish for in the future, what would that be?

Ending the interview: Do you have any further thoughts, remarks, or questions? Thanking for the time, if wished a presentation of the results, if anything comes up they can reach us at our email addresses.

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