STEWARDSHIP AND COLLABORATION IN MULTIFUNCTIONAL LANDSCAPES: A TRANSDISCIPLINARY ENQUIRY

A thesis submitted in fulfilment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

of

RHODES UNIVERSITY

By

JESSICA JANE COCKBURN

March 2018

Grahamstown

ABSTRACT

Social-ecological sustainability challenges, from the local to the global level, are of increasing concern. Stewardship has been proposed as a means of dealing with these challenges, but how can it be achieved in practice? In South Africa, the concept is put into practice by practitioners working with local stewards to facilitate more sustainable and equitable management of ecosystem services across landscapes. This landscape approach requires collaboration between multiple stakeholders, as social-ecological processes function beyond the boundaries of individual farms or villages.

The aim of this research was to investigate the practice of stewardship and collaboration in multifunctional landscapes in South Africa through a transdisciplinary enquiry. This was achieved using a methodological framework based on critical complexity, transdisciplinarity, and critical realism. This framework was applied through an inductive, mixed methods research design which involved stewardship practitioners, stewards, and other stakeholders in the research.

Practitioners' understandings of the stewardship concept vary, yet they coalesce around the idea of responsible use and care of nature. Accordingly, the primary role of stewards is to interact with nature responsibly and carefully, balancing the use of ecosystem services for their own benefit with broader social-ecological interests and needs. Although the biodiversity stewardship tool dominates stewardship practice in South Africa, more integrated social-ecological initiatives are also emerging, often hand-in-hand with this approach.

Practitioners working in these initiatives face multiple interacting and mutually reinforcing enablers and barriers that facilitate or hinder collaboration for stewardship. Individual and social-relational enablers are pivotal to long-term sustainability of initiatives, whilst deep-seated inequalities and mistrust are significant barriers to collaboration. Despite such challenges, practitioners are succeeding in fostering collaboration by operating as hubs in the landscape. They are actively building new relationships and networks among diverse stakeholders to address shared sustainability challenges. This results in a patchwork of collaborative stewardship activity across the landscape, suggesting that stewardship and collaboration are fundamentally relational processes and that pluralistic approaches to sustainability are needed in multifunctional landscapes. Moreover, by re-focusing stewardship on stewards, practitioners are finding innovative ways to enable farmers to appreciate and practice stewardship, addressing the conflict between agriculture and conservation.

Drawing on these findings, a critical realist analysis revealed underlying generative mechanisms that help to explain the challenges encountered in collaborative efforts toward stewardship. These mechanisms included, amongst others: individual stewards' values, societal constraints on the ability of stewards to express care, conflict between agriculture and conservation due to dominant agricultural approaches and neoliberal economic policies, and the divided and unequal nature of South African society.

Operationalising transdisciplinary research enabled meaningful engagement with practitioner partners, allowing for novel insights and unexpected findings to emerge from practice-based knowledge. Putting transdisciplinarity into practice revealed the dynamic and multi-faceted role that researchers can play in transdisciplinary research, highlighting the importance of relational knowledge and competencies. Existing support systems and incentives within universities need to be re-configured to enable postgraduate students to conduct engaged science in service of society.

INTETHO ESHWANKATHELWEYO

Kuyanda ukuxhalatyiswa yimiceli mngeni yobudlewlane obuhlala buhleli bezentlalo nendalo, ekuhlaleni nakwihlabathi. Kuphakanyiswe umbono wobugosa-bumeli (ubuphathi bendalo, *stewardship)* ukuze kuhlangatyezwane nale miceli mngeni, kodwa iza kwenziwa njani le nto? EMzantsi Afrika le ngcamango iye yabekwa entsebenzweni ngabo banezakhono no bugcisa besebenza namagosa-bameli asekuhlaleni, benceda ekulawulweni ngendlela ehlala iheli nelinganayo iinkonzo zobudlelwane nendalo kuyo yonke imihlaba. Le ndlela yokusebenzisa le mihlaba ifuna intsebenziswano phakathi kwabo bonke ababandakanyekayo, njengoko ubudlelwane bentlalo nendalo busebenza ngaphaya kwemida yomfama ngamnye okanye iilali.

Injongo yoluhlolisiso ibikukuphanda ngoqheliselo lobugosa-bumeli nentsebenziswano yeemihlaba esebenza ngendlela ezininzi eMzantsi Afrika kubuzwa kumasebe olwazi ohlukeneyo olwazi*(transdisciplinarity)*. Oku kwathi kwaphunyezwa ngenkqubo ehlola izinto ezahlukahlukeneyo kwimigangatho eyahlukeneyo, isekelwe kwingcamango enzulu kunoko kubonakala kuqondakalayo, kumasebe olwazi ohlukeneyo, nakulwazi lwesayensi nentlalo. Le nkqubo yenziwa kusetyenziswa inkqubo yokuqokelela ulwazi luze luhlalutywe, iintlobo ezahlukeneyo zokwenza uhlolisiso, ezazibandakandakanya abanezakhono zobugosa-bumeli, amagosa-bameli nabanye ababandakanyekileyo kolu hlolisiso.

Ingcamango zabanezakhono zobubugosa-bumeli ziyohluka, kanti iingcamango zinye ngokuphathelele ukusetyenziswa nokukhathelela indalo yemvelo. Phofu ke, indima esisiseko yamagosa-bameli kukuphembelelana ngokufanelekileyo nangenkathalo nendalo, bethelekisa ukusebenzisa iinkonzo zobudlelwane nendalo ukuze zincede bona, kunye nomdla neemfuno eziphangaleleyo zobudlelwane bendalo nentlalo. Nakubeni isixhobo Sobugosa-Bumeli Bendalo Eyahlukeneyo Yezityalo Nezilwanyana *(Biodiversity Stewardship)* isesona sitshotsha phambili kuqheliselo lobugosa-bumeli eMzantsi Afrika, zikhona nezinye izixhobo ezivelayo eziqukwayo kwiphulo lobudlelwane bendalo nentlalo, ezisoloko zisebenza kakuhle neli lokuqala.

Abanezakhono nabasebenza kula maphulo bajamelene neendidi zokuphembelelana, iingxaki ezahlukeneyo, izisombululo nezithinteli ezinceda okanye zonakalise intebenziswano yobugosa-bumeli. Isisombululo ngasinye nezo zayanyaniswa nentlalo zibaluleke gqitha kumaphulo azakuhlala ehleli, nakubeni ukungalingani okuzinze nzulu nokungathembani iyimiqobo ebelulekileyo kwintsebenziswano. Nangona ikhona le micelimngeni, abanezakhono bayaphumelela ekukhuliseni intsebenziswano ngokuthi basebenze kwiindawo ezithile kwimihlaba. Bakha unxulumano olutsha noqhagamishelwano nababandakanyekileyo ngokwahluka kwabo ukuze kusingathwe nemiceli mngeni yokugcina ubudlelwane bendalo nentlalo buhlale buhleli. Oku kuye kwaphumela kwintsebenziswano yobugosa-bumeli ethe yakho pha na pha kule mihlaba, nto leyo ebonisa ukuba ubugosa-bumeli nentsebenziswano ngokusisiseko yinkqubo enxulumeneyo, kwaye iindlela ezininzi zokwenza ubudlelwane bendalo nentlalo buhlale buhleli ziyimfuneko kwimihlaba ekwenziwa izinto ezininzi kuyo. Ngapha koko, ngokuthi kuphindwe kunikelwe ingqalelo kubugosa-bumeli isiya kumagosa bameli, abanezakhono bafumana iindlela ezintsha zokunceda amafama axabise aze aqhelisele ubugosa-bumeli, ngolu hlobo kusingathwa ingxabano phakathi kwezolimo nolondolozo lwendalo.

Xa sifunda koku, ukucamngca nzulu ngako kutyhile enye indlela eye yanceda ekucaciseni imiceli mngeni ekuhlangatyezwane nayo kwimigudu yentsebenziswano yobugosa-bumeli. Ezi ndlela zibandakanya, phakathi kwezinye: indlela aziphatha ngayo amagosa-bameli, iingcinezelo yabahlali ekubeni amagosa-bameli abonakalise inkathalo, ukungavisisani phakathi kwezolimo nolondolozo lwendalo ngenxa yendlela ezongamelayo nezisetyenziswayo zolimo, nemigaqo-nkqubo yezoqoqosho elawulwa bucala, nokwahlukana, ukungalingani kwabantu baseMzantsi Afrika.

Ukusebenzisa uhlolisiso lwamasebe olwazi ohlukeneyo kubangele ukufuthelana okunentsingiselo namaqabane abo banezakhono, oku kuvulele iingcamango ezinzulu nokufumana izinto ebezingalindelekanga kulwazi olusekelwe kuqheliselo. Ukubeka ulwazi lwamasebe ahlukeneyo entsebenzweni kutyhile iindima ezahlukeneyo okanye ezininzi ezidlalwa ngabahlolisisi kuhlolisiso lolwazi lwamasebe ohlukeneyo, kubalaseliswa ukubaluleka

kolwazi olunxulunyaniswayo nozimiselo. Iinkqubo zenkxaso nezinye izinto ezincedayo ezikhoyo kwiyunivesiti kufuneka ziphinde zakhiwe ukuze zincede abafundi abenza uhlolisiso balwenze benomfutho wesayensi enceda abahlali.

OPSOMMING

Uitdagings in sosio-ekologiese volhoubaarheid, vanaf die plaaslike tot die globale vlak, is toenemend kommerwekkend. Rentmeesterskap is voorgestel as 'n manier om hierdie uitdagings te hanteer, maar hoe kan dit in die praktyk uitgevoer word? In Suid-Afrika, word hierdie konsep toegepas deur praktisyns wat met plaaslike rentmeesters werk om 'n meer volhoubare en regverdige bestuur van ekosistemiese-dienste oor landskappe heen te bewerkstellig. Hierdie landskapsbenadering verg samewerking tussen verskeie belanghebbendes, aangesien sosio-ekologiese prosesse verder funksioneer as die grense van individuele plase en dorpies.

Die doel van hierdie navorsing is om die toepassing van rentmeesterskap en die samewerking in multi-funksionele landskappe in Suid-Afrika te ondersoek deur 'n trans-dissiplinêre ondersoek. Dit is behaal deur 'n metodologiese raamwerk, gebaseer op kritiese kompleksiteit, trans-dissiplinariteit en kritiese realisme. Hierdie raamwerk is toegepas deur 'n induktiewe, gemengde metode navorsingsontwerp wat rentmeester praktisyns, rentmeesters en ander belanghebbendes by die navorsing betrek het.

Praktisyns se begrip van die rentmeester konsep verskil, maar kom tog byeen rondom die idee van die verantwoordelike gebruik en sorg van die natuur. Gevolglik is die primêre rol van rentmeesters om versigtig en verantwoordelik met die natuur om te gaan en die gebruik van ekosistemiese dienste vir eie gewin te balanseer met wyer sosio-ekologiese belange en behoeftes. Alhoewel die biodiversiteit rentmeesterskapsinstrument die rentmeester bedryf in Suid-Afrika domineer, kom meer geïntegreerde sosio-ekologiese inisiatiewe na vore, dikwels hand aan hand met hierdie benadering.

Praktisyns wat met hierdie inisiatiewe werk, word gekonfronteer met vele interaktiewe en wedersydse ondersteunende bemagtigers en versperrings wat samewerking vir rentmeesterskap gaan verhinder of gaan fasiliteer. Individuele en sosiaal-verwante bemagtigers is sentraal tot die langtermyn volhoubaarheid van inisiatiewe, terwyl diepgewortelde ongelykhede en wantroue beduidende hindernisse is tot samewerking. Ten spyte van hierdie uitdagings, slaag praktisyns daarin om samewerking te bevorder deur as middelpunte in die landskap te funksioneer. Hulle is aktief besig om nuwe verhoudings en netwerke te skep onder diverse belanghebbendes om die gemeenskaplike volhoubaarheidsuitdagings aan te spreek. Die gevolg hiervan is 'n lappieskombers van samewerkende rentmeesterskapsaktiwiteite regoor die landskap, wat suggereer dat rentmeesterskap en samewerking fundamenteel verwante prosesse is en dat veelvoudige benaderings tot volhoubaarheid nodig is in multi-funksionele landskappe. Verder, deur rentmeesterskap te herfokus op rentmeesters, vind praktisyns innoverende maniere wat boere toelaat om rentmeesterskap te beoefen en te waardeer, wat die konflik tussen landbou en bewaring aanspreek.

Deur te kyk na hierdie bevindings, het 'n krities-realistiese analise gewys dat daar onderliggende generatiewe meganismes is wat help om die uitdagings wat teëgekom is in samewerkingspogings vir rentmeesterskap te verduidelik. Hierdie meganismes het onder andere ingesluit: individuele rentmeester waardes, sosiale beperkings op die vermoë van rentmeesters om sorg te wys, konflik tussen landbou en bewaring as gevolg van dominante landboumetodes en neo-liberale ekonomiese beleid, sowel as die ongelyke, verdeelde aard van die Suid-Afrikaanse samelewing.

Om transdissiplinêre navorsing operasioneel te maak, het betekenisvolle betrokkenheid met praktiserende vennote tot gevolg gehad, wat interessante insig en onverwagse bevindings laat blyk het uit praktyk-gebaseerde kennis. Deur trandissiplinariteit toe te pas, is die dinamiese en veelvoudige rol wat navorsers kan speel in transdissiplinêre navorsing onthul, wat die belangrikheid van verwante kennis en vaardighede beklemtoon. Bestaande ondersteuningstelsels en aansporings binne universiteite moet herstruktureer word om nagraadse studente toe te laat om betrokke wetenskaplike navorsing in diens van die samelewing te doen.

Table of contents

List of figures

List of tables

List of boxes

Glossary of terms

Term	Definition and sources adopted for this thesis
biodiversity stewardship	"An approach to securing land in biodiversity priority areas through entering into agreements with private or communal landowners, led by conservation authorities. Different types of biodiversity stewardship agreement confer different benefits on landowners and require different levels of restriction on land use. In all cases the landowner retains title to the land, and the primary responsibility for management remains with the landowner, with technical advice and assistance provided by the conservation authority." (SANBI, 2016: 11)
collaboration	"The pooling of appreciations and/or tangible resources, e.g., information, money, labor, etc., by two or more stakeholders, to solve a set of problems which neither can solve individually." (Gray, 1985: 912)
critical complexity	Critical complexity is a perspective on research in complex SES which foregrounds the normative or value-based nature of framing practices (Audouin et al., 2013).
critical realism	A comprehensive philosophy of science which provides a detailed account of ontology and epistemology, recognising that the world is real. According to critical realism, ontology (i.e. what is real, the nature of reality) is not reducible to epistemology (i.e. our knowledge of reality) and human knowledge therefore captures only a small part of a deeper and vaster reality. Critical realism seeks to go beyond the positivist/constructivist paradigm wars (Fletcher, 2016).
ecosystem services	"the capacity of natural processes and components to provide goods and services that satisfy human needs, directly or indirectly." (de Groot et al., 2002: 394)
epistemology	Epistemology is concerned with the nature of knowledge and how it can be acquired (Snape & Spencer, 2013).
framing	"the different ways of understanding or representing a social, technological or natural system and its relevant environment. Among other aspects, this includes the ways system elements are bounded, characterized and prioritized, and meanings and normative values attached to each." (Leach et al., 2010: xiii)
governance	"Political and institutional relationships including those of power and knowledge." (Leach et al., 2010: xiii)
interdisciplinarity	Research that cuts across disciplines, beyond the addition of results from different disciplines (multidisciplinary research), but does not extend beyond the practices of academic researchers (Castán Broto et al., 2009).
landscape	Landscapes are place-based social-ecological systems that emerge from the interactions between people, through their values and institutions, with land-based ecosystems and the natural resources they produce (Minang et al., 2014a; Robinson et al., 2017).
landscape approach	"A conceptual framework whereby stakeholders in a landscape aim to reconcile competing social, economic and environmental objectives. It seeks to move away from the often-unsustainable sectoral approach to land management. A landscape approach aims to ensure the realisation of local level needs and action (i.e. the interests of different stakeholders within the landscape), while also considering goals and outcomes important to stakeholders outside the landscape, such as national governments or the international community." (Denier et al., 2015: 10)
level	"The units of analysis that are located at the same position on a scale. Many conceptual scales contain levels that are ordered hierarchically, but not all levels are linked to one another in a hierarchical system." (Gibson et al., 2000: 218)
multifunctional landscape	"Sustainable multifunctional landscapes are landscapes created and managed to integrate human production and landscape use into the ecological fabric of a landscape maintaining critical ecosystem function, service flows and biodiversity retention." (O'Farrell & Anderson, 2010: 59)
natural resource management	A collective process of sustainable use, conservation, and protection of renewable natural resources (including for example forests, grazing land, wildlife, fisheries, river catchments, irrigation systems etc.) by diverse actors (including governments, farmers, business, communities, and NGOs) so that improvements in the condition of natural resources can be achieved (Kumar, 2005; Lockwood et al., 2010).
normative	"Relating to norms, standards, priorities, values and meanings as embodied in contrasting ways in different institutional interests or social perspectives" (Leach et al., 2010: xiii)

ontology	Ontology is concerned with the nature of the social world and what can be known about it (Snape & Spencer, 2013).
pathways	"The particular directions in which interacting social, technological and environmental systems co-evolve over time." (Leach et al., 2010: xiii)
practice-based knowledge	"Multiple forms of knowledge and learning emanating from on-the-ground action and problem solving." (Weber et al., 2014: 1075)
reflexivity	"A collaborative process of acknowledgement, critical deliberation and mutual learning on values, assumptions and understandings that enables the generation of 'new meanings, new heuristics, and new stakeholder identities' (Lenoble & Maesschalck, 2010: 199)...the role of such reflexive processes is to encourage processes of critical assessment and social learning on the background values and assumptions guiding research, and on the socio-institutional structures supporting particular norms and practices." (Popa et al., 2015: 47)
retroduction	A mode of inference which moves "from a description and analysis of concrete phenomena to reconstruct the basic conditions for these phenomena to be what they are". In retroduction one asks: "What qualities must exist for something to be possible?" (Danermark et al., 2005: 80)
scale	"The spatial, temporal, quantitative, or analytical dimensions used to measure and study any phenomenon." (Gibson et al., 2000: 218)
social-ecological systems (complex)	An integrated perspective of humans-in-nature (Berkes & Folke, 1998) which posits that human systems are embedded in, and entirely dependent, on the biosphere (Folke et al., 2016). SES are complex adaptive systems, and are characterised by nonlinear feedbacks, dynamic interactions, individual and spatial heterogeneity, and operate over varying time scales (Levin et al., 2012).
social justice	Social justice is both a process and a goal (Bell, 2016) and it is achieved when people have equal access to goods, opportunities, and institutions needed to develop their capabilities for human functioning and when people have both the power and the resources necessary to decide how they will use their capabilities (Donaldson & Daughtery, 2011).
social learning	"A change in understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks." (Reed et al., 2010: 6)
steward, competent steward	In this research I define a steward as anyone who uses, manages, or owns natural resources. However, I recognise that not everyone who uses, manages, or owns natural resources is necessarily a competent steward. Thus, the goal of stewardship initiatives is to facilitate stewardship practice by enabling stewards to become competent. I adopt this description of a 'competent steward' from Welchman (2012: 299): "to be a competent steward, one must possess and act from dispositions such as loyalty, temperance, diligence, justice and integrity, as well as intellectual virtues or technical skills such as prudence and practical rationality."
stewardship (environmental)	"The responsible management of human activity affecting the natural environment to ensure the conservation and preservation of natural resources and values for the sake of future generations of human and other life on the planet, together with the acceptance of significant answerability for one's conduct to society." (Welchman, 2012: 303)
sustainability	"A normatively explicit form of the general term, referring to the capability of maintaining over indefinite periods of time specified qualities of human well-being, social equity and environmental integrity." (Leach et al., 2010: xiii)
sustainability science	Science that seeks to understand the fundamental character of interactions between nature and society. Such an understanding must encompass the interaction of global processes with the ecological and social characteristics of particular places and sectors, as well as society's capacity to guide those interactions along more sustainable trajectories (Kates et al., 2001).
transdisciplinary research	"a reflexive research approach that addresses societal problems by means of interdisciplinary collaboration as well as the collaboration between researchers and extra-scientific actors; its aim is to enable mutual learning processes between science and society; integration is the main cognitive challenge of the research process." (Jahn et al., 2012: 4)
values	Trans-situational goals and principles that guide human behaviour. Values serve as standards for evaluating whether actions, events, and people are desirable or undesirable (Manfredo et al., 2017).

List of acronyms

C.A.P.E.	Cape Action for People and the Environment
CPR	Common pool resources
CR	Critical realism*
IHE	Institute of higher education
ILA, LA	(Integrated) landscape approach*
NGO	Non-governmental organisation
NPAES	National Protected Area Expansion Strategy
NRM	Natural resource management*
SANBI	South African National Biodiversity Institute
SES	Social-ecological system(s)*
SKEP	Succulent Karoo Ecosystem Programme
STEP	Succulent Thicket Ecosystem Programme
TD	transdisciplinary/ity
UNESCO	United Nations Educational, Scientific and Cultural Organization

*Terms defined in the glossary of terms.

Acknowledgements

The PhD research experience can at times feel lonely and individualistic and the degree is eventually awarded to me as an individual. However, in reality it is an entirely collective and relational endeavour. Many, many people have contributed in a variety of ways to this process. I would like to thank you all, from the bottom of my heart, for your contribution towards my PhD research. Despite this work having my name on it, it is ours.

I begin by acknowledging my supervisors: Georgina Cundill, Mathieu Rouget and Sheona Shackleton. From the very start, my plan was to pick the best people to work with to set myself up for success: it's all about the supervisors! I relied on a combination of gut feel, reputations, CVs, publication records and research interests to identify potential supervisors. I also wanted to work with people who were more than just excellent academics, who prioritise their families, care for the world, and who live by values and principles which I shared. You three are all that and more—thank you for agreeing to supervise my PhD (Sheona – thank you for joining in half-way and catching up so quickly!). Thank you all for your unwavering belief in me and my research, your excellent academic guidance, your critical yet caring approach to research supervision, and above all for being beautiful humans whom I am proud to consider role models and mentors for life.

I also had excellent additional academic support and encouragement through discussions, workshops, and exchanges from numerous colleagues and critical friends. Thank you to Alta De Vos, Joanna Carlos Bezerra, Deo Kujirakwinja, Chenai Murata, Ashish George, Shannon Heard-Hoare, Eureta Rosenberg, Heila Lotz-Sisitka, Jane Burt, Helen Fox, Vanessa Masterson, Tally Palmer, Chris De Wet, Matthew Weaver, Margaret Wolff, Athina Copteros, My Sellberg, Nina Rivers, Sherran Clarence, and John van Breda. I would also like to acknowledge the support and inspiration I received through participating in the activities of the Rhodes University Transdisciplinary Research Group, the Rhodes University Centre for Postgraduate Studies, and the Southern African Programme on Ecosystem Change and Society.

I knew from the start that meaningful relationships with stewardship practitioners engaged in the day-to-day challenges of facilitating stewardship would be pivotal in my research. Writing another long list of names doesn't quite do justice to the important ways in which the practitioner partners I have worked with have helped to shape my research. However, I want you all to know that I have distinct memories of a-ha moments and critical insights from conversations with each and every one of you. Thank you for the time you took to participate in my research – some more and some less, but everyone appreciated. Thank you to: Thekla Teunis, Steve Germishuizen, Gilbert Plant, Bheka Memela, Cobus Theron, Lyle Ground, Wiam Haddad, Piet Prinsloo, Gareth Boothway, Nikara Mahadeo, Dale Wright, Candice Stevens, Daniel Marnewick, Philippa Huntley, Inge Kotze, Nkazi Mafa, Sam Mnguni, Angus Burns, Jan Coetzee, Shelly Fuller, Mireille Lewarne, Natasha Wilson, Sinegugu Zukulu, Sissie Matela, Natalie Hayward, Kerry Purnell, Andrew Purnell, Japie Buckle, Chris Jurisch, and Francis Steyn. A very special thank you to the practitioner partners who agreed to participate in my work as a case study. Thank you for sharing your knowledge, for welcoming me to your project for a site visit, and for participating in our 'Learning for Landscapes' workshop: David Lindley, Sue Viljoen, Vaughan Koopman, Samantha Schroder, Nicky McLeod, Joyce Loza, Ayanda Cele, Jean-Pierre le Roux, and Ian Little. Thank you to Catherine Andersson, Dieter van den Broeck, and Daniel van Diepen for helping me to facilitate the workshop.

The relationship I have developed with the Living Lands team over the last three years has been super-special. Thank you for making me part of the team (and a special thank you for giving me a Living Lands jacket!☺). Thank you for the highs and lows, the laughs and cries, the deep dialogues and light chats, the embodiments

and meditations, the knowledge exchanges, the wine and cooking, and the learning journey we've been on together. I look forward to its continuation! Thank you to Matt Sephton, Catherine Andersson, Liz Metcalfe (a Living Lander at heart ☺), Dieter van den Broeck, Maura Talbot, Kris Marais, Marijn Zwinkels, Justin Gird, Steve Berry, Julia Glenday, Ancia Cornelius, Thelani Grant, Liezl le Roux, Tiahnah-Leigh Gobel, Jocelynn Jacobs, Larissa Koch, and Zarra de Laat. Special thanks to Liz, Ancia, and Dieter for reading early drafts of parts of my thesis.

Another important group of people without whom this research would not have been possible are the research participants. In the interest of research ethics, I can unfortunately not name and thank them here in person. I would like to extend my sincerest thank you to the 95 people who participated in the country-wide survey on stewardship practice, the 68 people who participated in interviews in my research for the Langkloof case study, and the numerous key informants who gave of their time and knowledge whilst I visited the six cases for my multi-case study in Verlorenvlei, Groot Marico, Enkangala (Mgundeni), Umzimvubu (Matatiele), the Baviaanskloof and the Langkloof, and the KZN Midlands. A special thank you to the Langkloof farmers: I have a soft spot for farmers and enjoyed getting to know you and your beautiful landscape.

I would like to thank the Department of Environmental Science at Rhodes University for hosting me during this research. Thank you for being an excellent Head of Department, Sheona. Thank you to Zukile Madlebe, Kathy Cassidy, Monde Ntshudu, and Bulelwa Dyan for helping me with admin, logistics, events, and keeping our academic home in shape. Thanks to the staff and postgrads for making DES home and for encouragement and support. Thank you to the various office mates in Room 9 who have come and gone—it's been good to be on this PhD journey together. A special mention to Ashish George, Dylan Weyer, Nanamhla Gwedla, Bhuko Gusha, and Mwazvita Sachikonye for mutual support and encouragement. I would also like to thank members of the Land Use Planning and Management research group at the University of KwaZulu-Natal for support: Chantal Janks, Jorge Renteria, Rashieda Davids, Phili Manqele, and Precious Nciliba. Thank you to Babalwa Resha, Sanele Ntshingana, Ilse De Korte, Monde Ntshudu and Nanamhla Gwedla for assistance with translating my thesis abstract. Thank you to Mindy Stanford for massage therapy, to Danika Pearson for dance classes, and to Jen Hilman for online yoga support: you helped me to keep my body and soul healthy through this demanding process! Special thanks for Lucrecia Adriaan at Academic Admin for processing my thesis.

PART I: SETTING THE SCENE

Chapter 1 | General introduction

"Hope has never trickled down, it has always sprung up" (Naomi Klein)
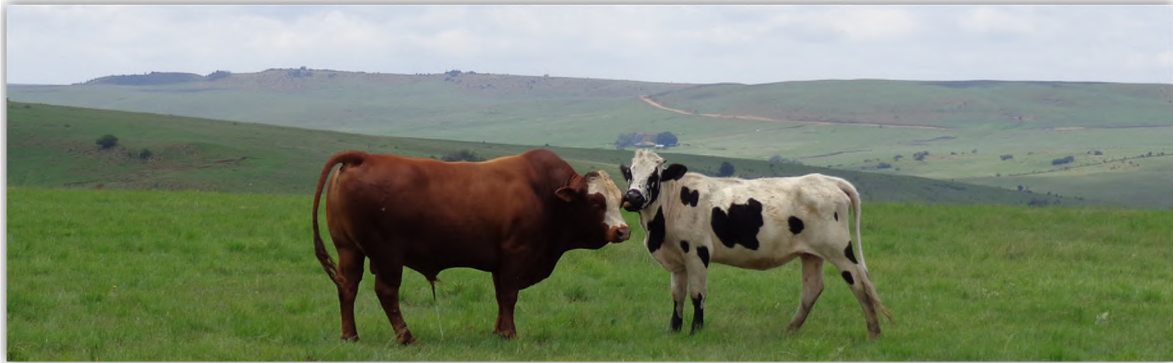
Meet 'the bull of collaboration' (left). He was given to a community of emerging black farmers by their white neighbours, to support them in improving the genetics of their cattle herd. This will enable them to manage the grasslands and biodiversity through improved stewardship practices. The bull symbolises improved collaboration between black and white farmers in the region. It also illustrates that sustainable farming and good stewardship can go hand in hand.

In the last 200 years, there has been a marked shift in the relationship between humans and nature. Humans have become a global geophysical force, and the human imprint on the global environment is so large that earth systems scientists propose recognising the beginning of a new geological epoch, which they call the 'Anthropocene' (Crutzen, 2002). In the last fifty years, a time which has been labelled 'the great acceleration' (McNeill & Engelke, 2016), a number of earth system indicators such as population, real GDP (Gross Domestic Production), and water use have seen rapid growth, indicating that we live in a time of rapid global change (Figure 1.1) (Steffen et al., 2015).

Whilst earth system scientists have been monitoring the biophysical health of the earth, suggesting that we are exceeding a number of biophysical 'planetary boundaries' which keep the earth system functioning in a way that makes it habitable for humans (Rockstrom et al., 2009), social scientists have identified serious concerns about societal health and well-being (Raworth, 2012; ISSC and UNESCO, 2013; ISSC IDS and UNESCO, 2016). These include human deprivations such as hunger, illiteracy, poverty, and voicelessness, which interact with one another, resulting in inequalities, from the local to the global level (Raworth, 2012).

The Sustainable Development Goals (SDGs) announced in 2015 are the official global response, led by the United Nations, to dealing with the intertwined challenges of ecological degradation and social deprivation (Sachs, 2012; Griggs et al., 2013). Sustainable development is defined as "*development that meets the needs of the present while safeguarding Earth's life-support system, on which the welfare of current and future generations depends*" (Griggs et al., 2013: 306). The SDGs emphasise that global ecological and social challenges are inexorably linked and that it is necessary to work towards positive, interlinked social-ecological outcomes from the local to the global level, to address these challenges.

Another response to global social-ecological sustainability challenges has emerged in increasing calls for stewardship. The growing allure of stewardship as a response to these challenges has been expressed through numerous influential publications in which researchers call for 'ecosystem stewardship' (Chapin et

al., 2009c), 'biosphere stewardship' (Folke et al., 2016), 'earth stewardship' (Chapin et al., 2011a), 'planetary stewardship' (Power & Chapin, 2009), and 'planetary stewardship in the Anthropocene' (Steffen et al., 2011). All such calls have at their centre an appeal for people to take responsibility for the care of nature and for the unsustainable trajectory we currently find ourselves on.
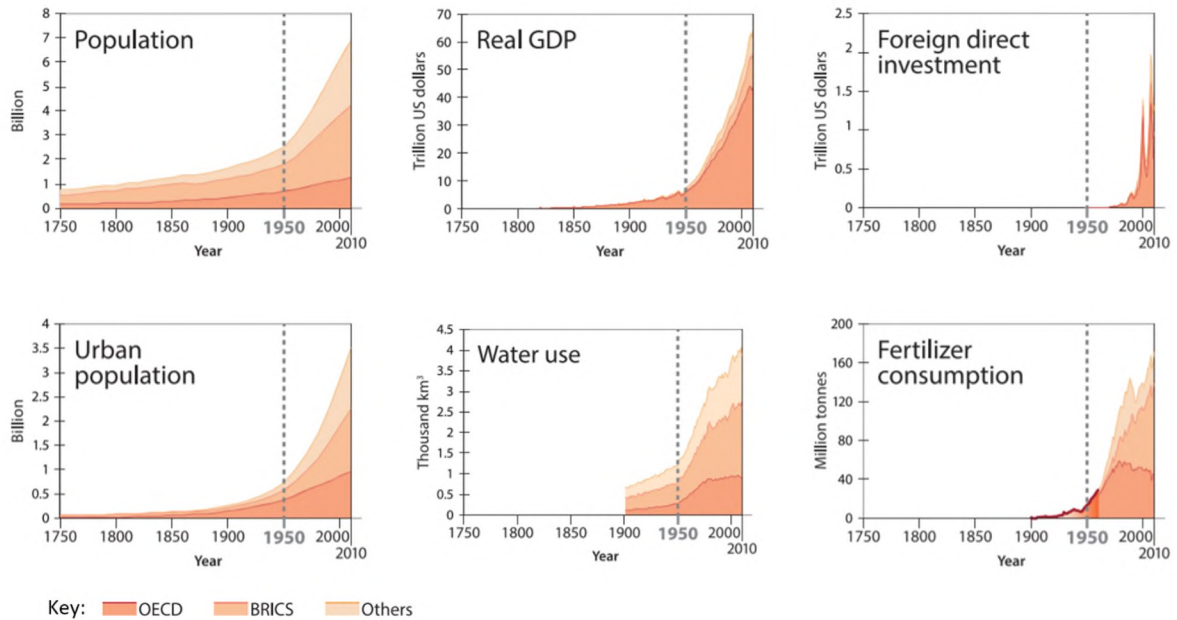
Figure 1.1: 'The great acceleration' of humanity's impact on the earth: Selected earth system indicators illustrating the increasing rates of change in human activity since the beginning of the Industrial Revolution, with notable increases in the last 50 years (OECD=Organisation for Economic Co-operation and Development (high income economies, BRICS=Brazil, Russia, India, China and South Africa (emerging economies) (Steffen et al., 2015: 84).

Although global policy processes such as the SDGs play an important role in creating enabling conditions for stewardship of the global earth system, we also need to ask ourselves how these global calls for stewardship can be put into practice at the most local level. For example, how stewardship can be put into practice in rural landscapes across the world and how farmers and local natural resource users can be supported to become better stewards of the ecosystems upon which they depend for their livelihoods. Local stewards and practitioners are already working together to address these challenges (Worrell & Appleby, 2000; Barendse et al., 2016) and much can be learnt from their practice-based knowledge (Weber et al., 2014).

Investigating how social-ecological stewardship can be achieved in practice requires contextualised, place-based research (Carpenter et al., 2012; Norström et al., 2017). Landscapes are examples of social-ecological systems (SES) and offer an appropriate level of analysis for investigating stewardship in practice (Angelstam et al., 2013b; Plieninger et al., 2015; Martín-López et al., 2017). Landscapes are multifunctional, heterogenous regions which bring together the 'many multiples' (such as stakeholders and ecosystem services) which characterise SES, posing management and governance challenges (Poteete, 2012; Lescourret et al., 2015; Fischer et al., 2017). Furthermore, since many ecological processes in landscapes operate at levels beyond the individual farm or village, landscapes need to be managed and governed at appropriate

levels (Everard, 2011; Vejre et al., 2012). To bring about stewardship in landscapes in a way that accounts for the multiple functions they perform for a variety of stakeholders, collaboration among the multiple people who live in, work in, rely on, utilise, manage, and govern the landscape is needed (O'Farrell & Anderson, 2010; Angelstam et al., 2013a; Minang et al., 2014a). Collaboration, then, becomes a key concern in the pursuit of stewardship in practice.

If stewardship and collaboration are core concerns in a transition toward sustainability, then in simpler terms there are two things people need to learn to do better: to care and to share. We need to become better at caring for ourselves, each other, and the planet; and better at sharing the benefits of nature more fairly amongst one another. In this research, I investigated how the notion of 'stewardship', which is fundamentally about caring, can be put into practice in multifunctional landscapes through 'collaboration', which is fundamentally about sharing.

1.1. Researching stewardship and collaboration in South Africa

South Africa has been called 'a world in one country' (Bond, 2002; Carruthers, 2007), since the global social-ecological sustainability challenges described above, in particular the concerns about rapid natural resource degradation and rising socio-economic inequality, are experienced acutely in South Africa. Moreover, the concept of stewardship is embedded in legislation, policy, and practice (Blackmore, 2015; Barendse et al., 2016). Accordingly, South Africa is a particularly suitable location to explore the challenges of stewardship practice and collaboration.

South Africa has rich biodiversity and a wealth of natural resources (Cadman et al., 2010); however, unsustainable use or destruction of these resources is a growing concern (Wynberg, 2002; Department of Environmental Affairs, 2012). Unsustainable resource use in agriculture is of particular concern (Scotcher, 2009), both in intensive cropping systems (van der Laan et al., 2017), and on extensive rangelands (Hoffman & Todd, 2000). Agricultural activities play an important role in addressing food security and provide much-needed employment in rural areas (Department of Agriculture, 2008; Musvoto et al., 2015). Rural landscapes are the site of commercial agricultural production and of subsistence livelihoods for many millions of people, whilst also providing a suite of non-agricultural ecosystem services that benefit society both within the landscape and beyond. However, unequal distribution of rights and access to land and water means that these landscapes are also the site of high levels of socio-economic inequality (Bond, 2002; Hall, 2009; van Koppen & Schreiner, 2014).

Much of the decision-making around natural resource use in rural landscapes lies in the hands of local land owners and land users across private and communal land tenure contexts. As argued above, bringing about stewardship in multifunctional landscapes requires collaboration among diverse stakeholders and this extends to the South African context as well (O'Farrell & Anderson, 2010). Hence, working towards

collaborative, sustainable and equitable use of natural resources through stewardship in rural landscapes is a priority for South Africa.

1.2. Research aims and objectives

The aim of this research was to investigate the practice of stewardship and collaboration in multifunctional landscapes through a transdisciplinary enquiry. This aim emerged both from theory and practice and was explored in the context of multifunctional landscapes in South Africa (Figure 1.2).

I pursued this aim by addressing three objectives. Each objective was divided into specific research questions which guided the research in individual thesis chapters. The objectives of the research were to:

1. Characterise stewardship practice in South Africa:
    a. What are the meanings and practice of stewardship in South Africa and how do these relate to theory? (Chapter 5)
2. Investigate how practitioners are building collaboration for stewardship in South Africa:
    a. What can be learnt about fostering collaboration for stewardship in the contested, multifunctional landscape of the Langkloof? (Chapter 6)
    b. How are practitioners overcoming the challenges of building collaboration for stewardship in diverse multifunctional landscapes across South Africa? (Chapter 7)
    c. What underlying causal mechanisms explain the empirical observations about stewardship practice and collaboration? (Chapter 8)
3. Pursue and reflect on the application of a transdisciplinary approach to PhD research:
    a. What lessons can be learnt from operationalising a transdisciplinary approach to PhD research on stewardship and collaboration? (Chapter 9)
    b. What ethical challenges are encountered by PhD students applying transdisciplinary research? (Book chapter in press, Appendix 1)

1.3. Research approach and positioning

A transdisciplinary (TD) approach was used to guide the overall research approach to enable an on-going conversation between theory and practice (Chapter 4) (Figure 1.2). I operationalised the principles of TD research by partnering with practitioners seeking to bring about stewardship in practice at the local level. The first step in this TD process was to co-develop the research aim with practitioner partners, whilst at the same time drawing on questions of interest from stewardship theory to inform the aim and research questions. Therefore, not only did the overall research aim (Section 1.2) emerge from both theory and practice, but the research findings also have relevance to both stewardship theory and practice (Figure 1.2).
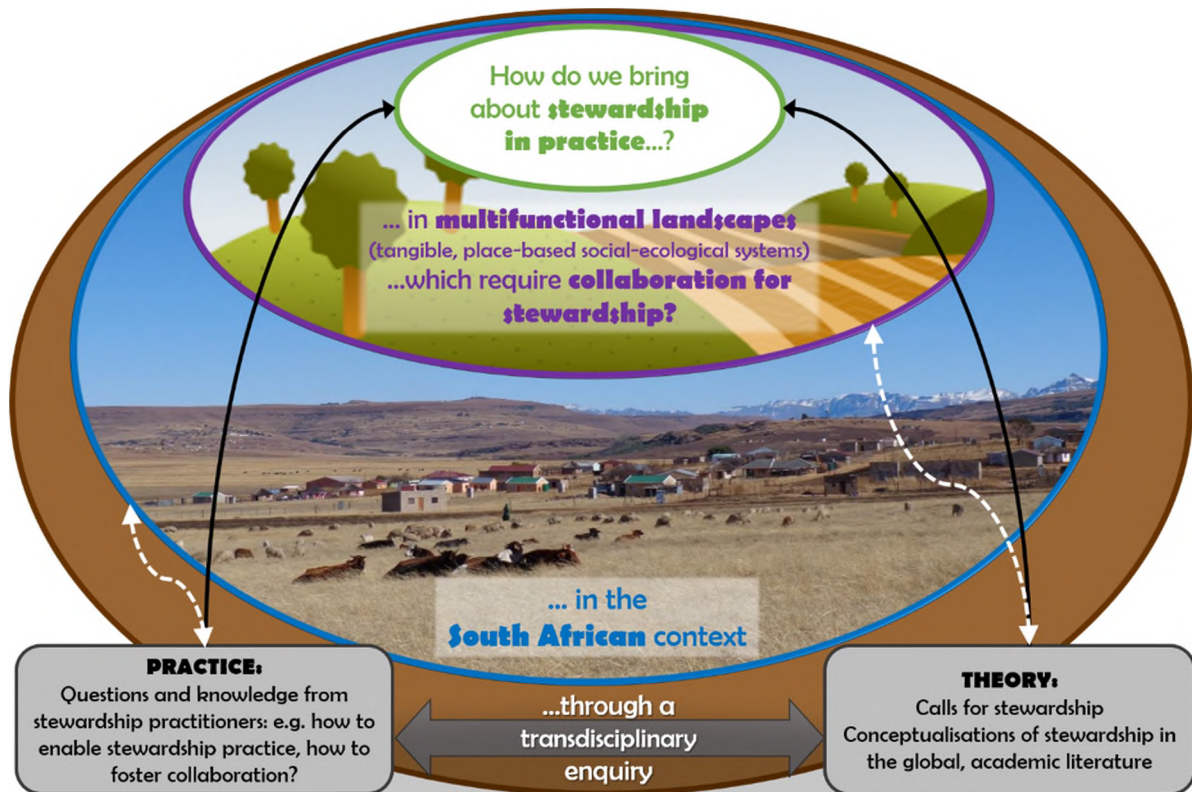
Figure 1.2: Overview of the PhD research highlighting the primary aim of the research, the contextual and place-based approach, and the commitment to transdisciplinarity.

The research was guided by a commitment to contextual (Leach et al., 2010), situated (Cote & Nightingale, 2011), and place-based social-ecological research (Carpenter et al., 2012) (Figure 1.2). I employed critical realism (Bhaskar, 2016) as an 'underlabourer' to support the transdisciplinary enquiry process in a philosophically coherent manner (Chapter 4). I integrated critical realism with critical complexity (Audouin et al., 2013) and transdisciplinarity (Jahn et al., 2012) to develop a guiding philosophical and methodological framework (Chapter 4). To implement this guiding framework, I worked closely with stewardship practitioners or facilitators at the local level to conduct grounded research which recognised the value of practice-based knowledge (Weber et al., 2014). I focused specifically on 'facilitated' stewardship, rather than emergent or self-organised stewardship, recognising the potential value of learning with and from a 'community of practice' of stewardship practitioners that is emerging in South Africa (Barendse et al., 2016).

Reflexivity emerged as a key principle and practice from my methodological framework (Chapter 4, Section 4.2.4). A critical practice in conducting reflexive research is to expose one's position and framings as a researcher (Leach et al., 2010; Audouin et al., 2013). For this research, I positioned myself in the field of sustainability science (Kates et al., 2001) and framed my research through the concept of social-ecological systems (Chapter 3, Section 3.2.2). Sustainability science is a normative science, as it seeks to conduct research in support of global commitments towards sustainable development. My hope (or position) is that

my research can contribute to addressing the local-to-global sustainability challenges we face by improving our understanding of how we can bring about stewardship in practice in multifunctional landscapes. However, I recognise that the specifics of social-ecological outcomes vary widely and are determined by fundamentally political processes. Moving towards social-ecological sustainability globally requires recognition of diverse, context-specific pathways which are negotiated and deliberated among diverse stakeholders (Leach et al., 2010).

Since I consider myself an active participant in, rather than a passive observer of, the social-ecological systems I am studying (Audouin et al., 2013), I specifically chose to write this thesis using the first person with active voice.

1.4. Thesis structure

This thesis is divided into three parts (Table 1.1). In **PART I**, I set the scene for the research. In **PART II**, I present three empirical chapters about stewardship practice and collaboration. In **PART III**, I draw the research together through an explanatory synthesis of the empirical findings, reflect on the experience of applying a TD research approach, and conclude with reflections and recommendations.

PART I of the thesis begins with **Chapter 1** (this chapter). Here I set the scene for the research, outline the background and rationale, give a brief overview of the overall research, and outline the research aim, objectives, and thesis structure.

In **Chapter 2** I describe the study area, introducing the South African context for this study. I first introduce the broad historical and socio-economic context. I then describe rural, multifunctional landscapes and agriculture, the context in which I situate this research on stewardship practice. I then go on to introduce how the concept of stewardship is implemented in the South African context.

In **Chapter 3**, I introduce the theoretical context of the study. I introduce the concepts of stewardship, multifunctional landscapes and collaboration. I make the case for investigating the practice of stewardship in multifunctional landscapes, showing how this necessitates a focus on collaboration. Then, I briefly introduce the literature on collaboration relevant to stewardship and multifunctional landscapes, highlighting the strengths and limitations of this existing literature. I then propose the pathways approach as a 'waymark' to guide research on collaboration for stewardship in multifunctional landscapes to address limitations identified.

I introduce the overall research approach and methodological framework in **Chapter 4.** I argue for a transdisciplinary approach embedded in a philosophical framework guided by critical realism and critical complexity. From this philosophical and methodological framework, I draw out four principles to guide research design and methods in the study. I then give an outline of the research design and methods for the study as a whole and discuss the ethical considerations.

Table 1.1: Thesis structure

Part:	Thesis chapters:
PART I: SETTING THE SCENE	Chapter 1: General introduction
	Chapter 2: The South African context
	Chapter 3: Theoretical overview: Towards stewardship in multifunctional landscapes
	Chapter 4: Research approach and methodology
PART II: INSIGHTS FROM THE FIELD EMPIRICAL CHAPTERS	Chapter 5: The meanings and practice of stewardship in South Africa
	Chapter 6: Patchworks of collaborations in multifunctional landscapes: Lessons from the Langkloof
	Chapter 7: Hubs of collaboration for stewardship: Lessons from six cases across South Africa
PART III: SYNTHESIS, REFLECTIONS & RECOMMENDATIONS	Chapter 8: Explanatory synthesis: Investigating underlying causal mechanisms of the practice of stewardship and collaboration in multifunctional landscapes
	Chapter 9: Lessons learnt from operationalising a transdisciplinary approach to PhD research on stewardship in practice
	Chapter 10: Conclusion and ways forward
	APPENDIX 1: Ethics in transdisciplinary research: Reflections on the implications of Science with Society (Book chapter)

Chapter 5 is the beginning of **PART II**, which is a set of three core empirical chapters. In this chapter, I report on a country-wide survey on the practice of stewardship in South Africa. The survey findings provide insights into the diverse ways in which stewardship is put into practice in South Africa, and on how stewardship practitioners understand the concept of stewardship. This chapter sets the scene for the next two empirical chapters, which take a case study approach. The data collected in this chapter were used to select the case studies for Chapters 6 and 7.

In **Chapter 6**, I present an in-depth case study of collaboration in the Langkloof region of South Africa. This case study was based on a 3-year, transdisciplinary research partnership with a local NGO, Living Lands. They are facilitating collaboration for stewardship in the greater Langkloof region. Practitioners face a variety of challenges in facilitating collaboration among diverse stakeholders in the region. The case provides valuable insight into the realities of bringing diverse stakeholders together to collaborate in complex, contested landscapes.

In **Chapter 7**, the final empirical chapter, I present a multiple-case study. Through a transdisciplinary knowledge co-production process, I brought together six cases of landscape-level stewardship initiatives from diverse contexts across South Africa. These cases give valuable insights into how practitioners overcome barriers and enhance enablers to build collaboration for stewardship in multifunctional landscapes. From these cases, I present practical lessons on how practitioners are working with local stewards to bring about social-ecological stewardship in a collaborative manner across the landscape.

PART III of the thesis begins with **Chapter 8**, which is an explanatory synthesis. In this chapter I draw together the empirical findings in a synthesis and present an integrated picture of stewardship practice and collaboration in South Africa. I then use an analytical heuristic tool from critical realism to investigate underlying causal mechanisms which explain the empirical findings from Chapters 5, 6, and 7. Doing this

allows me to move from context-specific lessons learnt in the survey and case study chapters to broader tendencies and patterns. In this analysis, I also identify avenues for further interdisciplinary research on stewardship practice and collaboration.

In **Chapter 9** I shift to a stronger personal tone in writing and analysis. I share the story of my 'TD PhD Journey', with the intention of drawing out lessons about operationalising a TD research approach in individual PhD research. First, I present a narrative about my personal experience leading up to and during the PhD. I then reflect on these experiences, drawing out lessons and recommendations which I hope will be of benefit to other postgraduate students, supervisors, and research institutions to support engaged, transdisciplinary research at postgraduate level.

In **Chapter 10**, I draw the thesis to a close and consider ways forward. I briefly outline the key contributions of the research on stewardship practice (Objective 1), collaboration (Objective 2), and transdisciplinary research (Objective 3). I then reflect on the strengths, weaknesses, and significance of the research and close with recommendations for policy and practice.

During the PhD I had an opportunity to contribute a chapter to an edited book. The proposed title of the book is: *Handbook of ethics in critical research: Stories from the field* (the book is in press as at December 2017). In this book chapter, one of my supervisors and I reflected on the ethical challenges of transdisciplinary research which I faced in the early part of my PhD. We share these experiences as a case study of engaged research in sustainability science. We then propose recommendations for institutes of higher education seeking to support ethical practice in engaged research. The book chapter is included in **Appendix 1** (Cockburn & Cundill, In Press).

I have structured the thesis chapters as papers (in preparation for submission to academic journals). Therefore, there is some possibility of repetition across the introductions, and possibly the methods, of empirical chapters.

Chapter 2 | The South African context

"Everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures..." (Constitution of the Republic of South Africa, 1996)

This is a site on the edge of the city of Johannesburg which is in the process of being declared as a new protected area. Local stewardship practitioners and activists have been working to protect the natural environment from industrial pollution and expanding residential development. They have been applying South African environmental law and biodiversity stewardship policies, for the sake of people and nature.

2.1. The national context: South Africa at a glance

Although South Africa is classed as an upper middle income country by the OECD (2014) due to extreme inequality between rich and poor, many parts of the country are more similar to the contexts of developing countries. This led former South African President Mbeki to coin the term 'Two worlds: Two economies' to describe South Africa (Mbeki, 2004). According to the World Bank South Africa suffers unacceptably high socio-economic inequalities, with a Gini coefficient of .69, among the highest in the world (The World Bank, 2014). These inequalities are primarily due to the legacy of colonialism and the Apartheid regime which was in power in South Africa for a period from 1948 to 1994 (Besada, 2007). In the post-Apartheid period the country suffers significant challenges including high levels of poverty, unemployment, HIV-AIDS, unequal access to education, gender inequality, crime, corruption, eroding democratic governance, and poor service delivery (Butler, 2009; Kotze & Taylor, 2010; Bornman et al., 2013). Although overall poverty has been reducing since the end of Apartheid, recent reports indicate that poverty has increased since 2011, and that 55.5% of South Africans live in poverty (Statistics South Africa, 2017). Poverty is worst in rural areas, where 81.3% of people live in poverty (Statistics South Africa, 2017).

2.1.1 Social cohesion and race relations

Despite Apartheid having come to an end with the country's first democratic elections in 1994, racial tensions are still a serious concern (Seekings, 2008) and race and identity politics influence race relations (Ansell, 2004). Racism affects all sectors of society in South Africa (Seekings, 2008) although there is evidence that race-based discrimination may be declining (IRR, 2017). Race and identity politics also plays a role in the context of agriculture and conservation, which may have implications for stewardship and collaboration. For example, according to Kepe (2009) there is a reluctance within the conservation sector to deal with race issues. This could exacerbate tensions between biodiversity conservation, human rights, and development

and make it difficult to achieve integrated sustainable development outcomes. The race issues in conservation are a result of the colonial and Apartheid history of conservation in South Africa (Carruthers, 2007; Kepe, 2009), which I will discussed further in Section 3.3.2. In recognition of the fractured nature of South African society (Rhoodie & Liebenberg, 1994; Bond, 2001), the South African government has prioritised nation-building and social cohesion as key objectives in the National Development Plan (NDP) (Government of South Africa, 2012).

2.1.2 Concerns about corruption and eroding governance

One of the challenges which South Africa's post-Apartheid government faces is shortages in human capacity, coupled with ever-increasing corruption in the civil service (Kotze & Taylor, 2010). In models developed for collaborative approaches to stewardship in the Global North (e.g. landscape approaches or adaptive co-management), literature often describes partnerships and collaboration between resource users or farmers and the state as a key enabler. However, shortages of funding, poor capacity for high quality facilitation, and a lack of consistent and reliable technical and knowledge support, have been described as a concern for achieving collaboration and effective natural resource management in South Africa (Engel & Salomon, 2002; Cundill & Fabricius, 2010; Von Hase et al., 2010).

Frustrations with service delivery in the public sector have become highly visible due to violent protests at the municipal level across South Africa, and there is evidence of growing mistrust in local government (Kotze & Taylor, 2010). Poor governance and lack of government oversight and implementation of laws and policies is also a concern for stewardship and natural resource management. For example, as long ago as 2009, Shackleton (2009: 92) made an appeal to the South African government, saying *the time has come for the real custodian of natural resource management to stand up*". He points out that government responsibility for management of natural resources and biodiversity outside of protectionist models, i.e. in rural landscapes across the country where the poor rely heavily on natural resources, is fragmented and weakly implemented. There is also recognition that agricultural extension services, which the state is mandated to provide, are in decline (Ngomane et al., 2002). Extension services face significant challenges in responding to the changing context of agriculture in South Africa (Ngomane et al., 2002; Worth, 2006). In response, non-governmental organisations (NGOs), and agricultural industry bodies, are playing an increasing role in assisting farmers to access information (Eweg, 2005; Kotze & Rose, 2015; Lyne et al., 2017). Similarly, frustrations about poor governance and management in the water sector have also been identified (Clifford-Holmes, 2015; South African Water Caucus, 2017; Weaver et al., 2017), and skills shortages are a major barrier to implementing policy and legislation in the water sector (Quinn, 2012). Lack of trust amongst local people (including farmers) in the government compounds these issues (Mulkerrins, 2015).

2.2. The landscape context: land and agriculture

2.2.1 Land tenure and land reform

The question of land tenure and unjust distribution of land is a socio-political issue in South Africa which is relevant to stewardship practice and collaboration in rural landscapes. It is an emotive, political, and contested issue at all levels. Historical policies have resulted in a dualistic agricultural sector with large, privately-owned commercial farms at one extreme (owned and managed by 'landowners') and a subsistence-oriented smallholder sector with communal land tenure at the other (managed by 'land users') (Binswanger & Deininger, 1993; Africa Research Institute, 2013). Although the new democratic government elected in 1994, and successive governments since then, have committed to a proactive process of land reform and redistribution, and have put in place policies in this regard, the progress of land reform has been slow (Ntsebeza & Hall, 2007; Hall & Kepe, 2017). This lack of progress in redistribution of access not only to land, but also to water resources, means that white commercial farmers are still the majority landholders in most parts of the country. This creates contestation and power imbalances and entrenches existing socio-economic inequalities in rural communities. Where land has been transferred to black farmers, they often still do not receive title deeds, but rather have 'caretaker' arrangements or long-term leases (many of which have lapsed) (Hall & Kepe, 2017). This is a result of shifting land reform policies. The original intention of the land reform process was to restore land title to black people, however this has shifted over the years, and the state now owns large areas of land which are leased or contracted out to black farmers (Hall & Kepe, 2017).

This duality in land tenure, and the way in which the land reform process has manifested, translates into specific identities and labels for landowners and land users. For example, since most large-scale farming is still conducted by white farmers, the term 'farmer' is often associated with commercial white farmers, excluding black people. Black people farming or utilising land under communal land tenure are often called 'small-scale farmers', 'subsistence farmers', 'resource users' or 'communities'. A third type of farmer identity label is that of 'emerging farmers'. This is a label used to identify black (or coloured, or indian, i.e. non-white) farmers who have recently started farming, usually as beneficiaries of land reform processes. In this study, I use the term 'steward' in a generic sense to refer to anyone who utilises land-based resources for agricultural activities in a rural landscape, be they a commercial farmer, a farmer in a communal land use context, or an emerging farmer. I also use the word 'farmer' to refer to anyone (from any race group, in any of the three situations) who is involved in primary agricultural activities such as crop or fruit farming, plantation forestry, raising livestock, growing vegetables, etc. I recognise that particularly in communal areas, many people are farmers, but also use a variety of other natural resources such as water, fuelwood, medicinal plants, and wild fruit and vegetables (Shackleton et al., 2001). The term 'resource users' may be a more suitable label for people who interact with natural resources in multiple different ways, beyond just farming the land. However, my focus here is on farmers (of all types) as the primary stewards of rural landscapes.

2.2.2 Agriculture as an important land use in rural landscapes

The concept of multifunctional landscapes incorporates a wide range of land uses; however, in this research the focus is rural landscapes in which the key economic land use is agricultural production. Agriculture plays a significant role in the life of many South Africans and in the economy, and there is growing recognition of the important role agriculture plays in South Africa's emerging green economy (Musvoto et al., 2015). According to the most recent country-wide census survey, 20% of South African households are classified as agricultural households, and most of these are found in the rural provinces of KwaZulu-Natal (25%), Eastern Cape (21%) and Limpopo (16%) (Statistics South Africa, 2013). Agriculture contributes 2.2% to national GDP, and contributes 5.2% to employment (Statistics South Africa, 2013). The most important agricultural sector is livestock farming, but cereal production also plays a significant role, with maize being the most important cultivated crop, followed by sugarcane, wheat, hay and soya beans (Department of Agriculture Forestry and Fisheries, 2014). Besides these key sectors, South Africa supports a diversity of cropping and livestock systems, with intensive cultivated crop production in winter and summer rainfall regions, cattle ranching in the savannah and grassland biomes, and sheep and goat farming in the more arid parts of the country (Department of Agriculture Forestry and Fisheries, 2014; Kotze & Rose, 2015) (Figure 2.1).
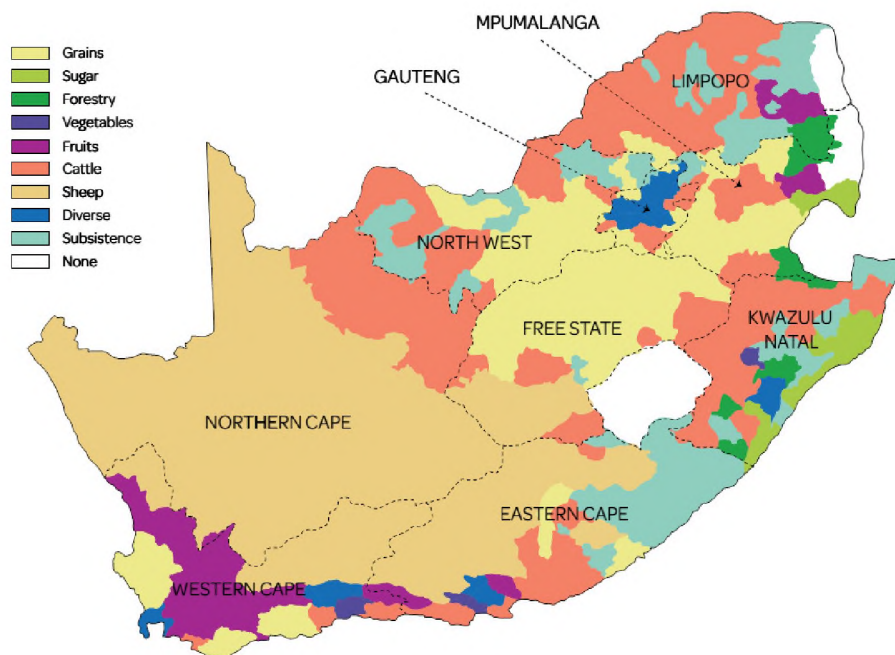
Figure 2.1: Agricultural regions of South Africa. (Source: FAO, adapted by Saheeda Chowdry, Africa Research Institute (2013))

South African agriculture has a dualist nature, as mentioned above. Privately owned commercial farming operations which were historically white-owned, play a significant role in domestic food production and exports, and South Africa is said to be 'food self-sufficient', although it has recently begun importing key food items including meat and wheat (Kotze & Rose, 2015). Commercial farming operations are highly mechanised, often importing cutting-edge international technology and employing private extension

consultants in order to be able to compete on global markets and keep up with rising input costs and tightening economic margins (Scotcher, 2009). Agricultural industry bodies, according to commodity or sector (e.g. the sugar industry, the wool industry), along with formal organised agriculture bodies (nationally co-ordinated by AgriSA) provide important technical, knowledge, political lobbying, and policy support to the commercial farming sector.

In contrast, the rural communal areas comprised of former homelands or 'Bantustans', is where the majority of South Africa's rural population resides (labelled as 'subsistence' on the map in Figure 2.1). These areas are characterised by high levels of poverty (Neves & du Toit, 2013). Former homelands are areas that were set aside by the Apartheid government for black groups and were historically governed by a traditional system of chiefs and headmen (Ainslie, 1999). Traditional leaders still hold authority in most communal areas, although they are expected to work together with democratically-elected local municipal representatives in a system of co-operative governance (Bank & Minkley, 2005).

Landscapes in communal areas are often more 'multifunctional' than many commercial farming landscapes which are usually characterised by large-scale monocropping. People in communal areas engage in a diversity of land-based activities for their livelihoods, including arable farming, livestock husbandry, and consumption and trade of natural resources (Shackleton & Shackleton, 2011). However, cash in the form of government social grants, and to a decreasing extent remittances, has begun to play a bigger role in food security in rural areas than natural resource use and farming (Bank & Minkley, 2005; Baiphethi & Jacobs, 2009). A trend of deagrarianisation, which is the abandonment of farming as a livelihood and results in field abandonment, has long been identified in many parts of the country (Bryceson, 1996), though this is most apparent in the Eastern Cape (Shackleton et al., 2013). This trend, coupled with high and increasing rates of unemployment, means that livelihoods of the rural poor in South Africa are precarious (Bank & Minkley, 2005; Neves & du Toit, 2013). Nonetheless, natural resource use still plays a significant role in rural livelihoods, particularly in the form of 'safety nets' (Shackleton & Shackleton, 2011; Shackleton & Luckert, 2015). Where agriculture is still being practiced in communal areas, declining productivity is putting pressure on natural resources, as more marginal areas are cultivated, and there is an urgent need for skills development and extension services in this sector to improve productivity through sustainable practices (Baiphethi & Jacobs, 2009). Direct reliance on ecosystem services is highest in poor rural areas in the historic homelands (Hamann et al., 2015), highlighting the need for sustainable resource management in rural landscapes.

Some of the key challenges facing the agricultural sector in South Africa are variable weather conditions, land reform conflicts and uncertainties, capacity shortages in extension support, a loss of expertise, and decreasing local investment in research and development (Kotze & Rose, 2015). Another significant challenge is that agriculture is not only dependent on functioning ecosystems, but is one of the most significant threats to ecosystem integrity in South Africa (Kotze & Rose, 2015) and worldwide (Foley et al., 2005). Agriculture has a large impact on biodiversity loss and land transformation, and poor agricultural practices and

unregulated expansion are on-going threats to biodiversity and ecosystem function (Scotcher, 2009). However, a report by WWF-South Africa recently stated that the majority *"of South Africa's land lies in the hands of farmers* (on private and communal land). *They are the true custodians of our resource base and ecosystems"* (Kotze & Rose, 2015: 28). It is therefore crucial to work with farmers in agricultural landscapes to bring about better stewardship.

2.3. The stewardship context: biodiversity conservation and landscape-level initiatives

2.3.1 Biodiversity and natural resources

South Africa is the third most biologically diverse country in the world, containing between 250 000 and 1 000 000 species, many of which are endemic (World Conservation Monitoring Centre, 1992; Mittermeier et al., 2004). It has three global biodiversity hotspots. These are areas which are biologically rich but threatened, namely the Maputaland-Pondoland-Albany hotspot, the Cape Floristic Region and the Succulent Karoo. South Africa is considered a leader in conservation policy, research and implementation (Balmford, 2003). Yet, it is still experiencing high rates of biodiversity losses and degradation of natural resources, and novel approaches to biodiversity conservation are needed (Wynberg, 2002).

This conservation imperative is a particular challenge considering South Africa's history. Since the turn to democracy in 1994, South Africa has had to deal with significant trade-offs required to balance development and conservation needs. This has resulted in profound paradigm shifts in conservation from a traditional protectionist approach, towards one in which the sustainable use of biodiversity is recognised as important, along with the need to involve communities in conservation (Wynberg, 2002). Multifunctional landscapes offer a conceptual and practical space in which to explore such trade-offs (Cadman et al., 2010), however countering the negative perceptions of conservation and its association with the social injustices of the past makes this a challenging task (Kepe, 2009).

2.3.2 Historical social injustices in the name of conservation

The historical injustices associated with biodiversity conservation in South Africa must be acknowledged and taken into account when seeking to understand stewardship practice in South Africa (Wynberg, 2002; Kepe et al., 2004). Communities across South Africa were displaced in order to proclaim nature reserves and national parks (Kepe et al., 2004; Carruthers, 2007; Masuku Van Damme & Meskell, 2009; Cundill et al., 2013), and although land restitution processes are underway to address these injustices, progress is slow (Fabricius & de Wet, 2002; Cundill et al., 2013). As a colleague pointed out to me, *"We must remember that for a long time, many black people felt that white people cared more about nature than about them."* (Anonymous, pers. comm) Such feelings pose obvious challenges to collaborative approaches to stewardship.

As mentioned above, questions around social justice, equity, and power imbalances are gaining prominence in social-ecological systems research. South Africa, 'a world in one country' (Bond, 2002) provides an important opportunity to conduct contextual, situated research to contribute to addressing these important

questions. Furthermore, the challenges of facilitating collaborative stewardship in multifunctional landscapes in South Africa, with its socio-economic challenges and contested natural resource and conservation history, can contribute new insights to current theory which is often dominated by findings from the Global North with comparatively less contentious situations.

2.4. Stewardship research, policy, and practice

In taking a broad understanding of stewardship as 'responsible use and care of natural resources' (Chapter 3, Section 3.2.1), it becomes apparent that research, policy, and practice of stewardship in South Africa stretches across various sectors. These might for example include environmental governance and management, biodiversity conservation, agriculture, rural development and land reform, and water or catchment management (Section 2.4.1). The research, policy, and practice of stewardship in South Africa is however dominated by the biodiversity stewardship tool and the conservation sector (Barendse et al., 2016). A literature search reveals almost no published research on stewardship 'in general' (i.e. generic use of the term not associated with biodiversity stewardship).

There is a growing body of research on biodiversity stewardship in South Africa and the term 'biodiversity stewardship' is often used interchangeably with 'private land conservation'. Initially research was focused on conservation planning and policy processes (Gallo et al., 2009; Pasquini et al., 2009; Von Hase et al., 2010). More recently, however, there is also research emerging on social aspects of biodiversity stewardship. This includes work on incentives and the potential of biodiversity stewardship to contribute to development (Rawat, 2017), on the motivations of landowners participating in biodiversity stewardship (Selinske et al., 2015) and on the influence of social and personal factors on the implementation of large-scale biodiversity stewardship initiatives (Potts, 2016). I now go on to introduce the government sectors, legislation, and policy relevant to stewardship practice in South Africa. I then introduce the national biodiversity stewardship tool. This is followed by an overview of other forms of landscape-level stewardship practice, and then a brief discussion of the role played by NGOs in stewardship practice in South Africa.

2.4.1 Sectors and policies relevant to stewardship

Since the biodiversity stewardship tool is dominant in South African stewardship practice, the biodiversity legislation is important (NEM:BA, and NEM:PA, Box 2.1). However, various other pieces of legislation and policy related to land use, agriculture, rural development, and water are also relevant (Box 2.1 and Box 2.2). These include the water, agriculture, and spatial planning sectors. The SANBI publication *'Biodiversity for Development: South Africa's landscape approach to conserving biodiversity and promoting ecosystem resilience'* provides a useful overview of the relevant biodiversity and environmental management legislation and policy tools (Cadman et al., 2010). However, it focuses on biodiversity conservation and falls short in not recognising the importance of other key legislation of relevance to an integrated approach to sustainable

multifunctional landscapes (Box 2.1). This may well also be reflected in practice, where the different sectors in a landscape operate in isolation from one another, as has been found elsewhere (Dobbs & Pretty, 2004).

Box 2.1: Legislation and policy relevant to stewardship practice in South Africa

The following acts of legislation are relevant in considering stewardship in multifunctional landscapes:
- National Environmental Management: Biodiversity Act No. 10 of 2004 (NEM:BA)

- National Environmental Management: Protected Areas Act No. 57 of 2003 (NEM:PA)

- National Protected Area Expansion Strategy for South Africa 2008 (NPAES)

- Conservation of Agricultural Resources Act No. 43 of 1983 (CARA)

- Spatial Planning and Land Use Management Act No.16 of 2013 (SPLUMA)

- National Water Act No. 36 of 1998 (NWA): The national government is the ultimate steward of water resources in SA, as it has "Public trusteeship of nation's water resources... acknowledging the National Government's overall responsibility for and authority over the nation's water resources and their use".

Please note: this is not an exhaustive list. It is meant to illustrate that stewardship in multifunctional landscapes is institutionally complex and requires collaboration and co-operative governance across a variety of sectors which may represent different interests and priorities.

2.4.2 Biodiversity stewardship

The national biodiversity stewardship tool in South Africa is driven by legislation, specifically the National Environmental Management Protected Areas Act, NEMBA:PA Act No. 57 of 2003. Biodiversity stewardship is an important tool in the National Protected Areas Expansion Strategy (NPAES), by which South Africa aims to reach its commitments to the Aichi Biodiversity Targets of the Convention of Biological Diversity (Department of Environmental Affairs, 2010; Government of South Africa, 2015). The South African National Biodiversity Institute (SANBI) and the national Department of Environmental Affairs are responsible for oversight of the NPAES and biodiversity stewardship. Stewardship practice for biodiversity conservation in South Africa has thus been institutionalised through the biodiversity stewardship tool, and its associated policies and legislation. Biodiversity stewardship is implemented at the provincial level primarily by conservation agencies or NGOs (Section 2.4.4).

Biodiversity stewardship is defined as:

> *An approach to securing land in biodiversity priority areas through entering into agreements with private or communal landowners, led by conservation authorities. Different types of biodiversity stewardship agreement confer different benefits on landowners and require different levels of restriction on land use. In all cases the landowner retains title to the land, and the primary responsibility for management remains with the landowner, with technical advice and assistance provided by the conservation authority.* (SANBI, 2016: 11).

Biodiversity stewardship seeks to contribute to various broader goals including conservation of a representative sample of biodiversity; involving landowners as custodians of biodiversity; contributing to the

rural economy; investing in ecological infrastructure; contributing to climate change adaptation and mitigation; and supporting sustainable development (SANBI, 2016) (Figure 2.2).

TYPE OF AGREEMENT	LEGAL MECHANISM	
Nature Reserve*	National Environmental Management: Protected Areas Act (Act 57 of 2003)	• Suitable for sites with highest biodiversity importance • Binding on property: declaration of Nature Reserve, and a title deed restriction • Binding on landowner: contract with landowner usually for 30 – 99 years/in perpetuity • Is considered to be part of South Africa's protected area estate, and contributes to meeting protected area targets
Protected Environment	National Environmental Management: Protected Areas Act (Act 57 of 2003)	• Suitable for declaration over multiple properties • Less restrictive land use than Nature Reserve • Binding on property: declaration of Nature Reserve, and a title deed restriction • Binding on landowner: contract with landowner usually for 30 – 99 years/in perpetuity • Is considered to be part of South Africa's protected area estate, and contributes to meeting protected area targets
Biodiversity Management Agreement	National Environmental Management: Biodiversity Act (Act 10 of 2004)	• Less restrictive than protected area declaration • Must have a Biodiversity Management Plan (in terms of Biodiversity Act) on all/part of the property • Binding on landowner: contract with landowner for a minimum of 5 years or longer, in 5 year increments
Biodiversity Agreement	Contract law	• Less restrictive than protected area declaration • Binding on landowner: contract with landowner for a minimum of 5 years or longer
Biodiversity Partnership Area	Informal agreement	• Non-binding partnership, may include a Memorandum of Understanding

Increasing biodiversity importance

Increasing support from conservation authority

Increasing landowner commitment to conservation

* Or National Park

Figure 2.2: The hierarchy of biodiversity stewardship agreements in South Africa, showing increasing biodiversity importance of the site, support from conservation authorities, and landowner commitment moving up the diagram (SANBI, 2015a).

Biodiversity stewardship is implemented on private land and in communal areas (Section 2.2.1) and there is also a biodiversity stewardship initiative that seeks to work with land reform beneficiaries (SANBI, 2009), i.e. all three 'types' of farmers in South Africa can participate in biodiversity stewardship (Section 2.2.1). Farmers who commit to participating in the biodiversity stewardship are expected to manage land and biodiversity according to guidelines set up by conservation authorities in an agreed-upon management plan for each farm. The conservation authority provides support for implementation of the plan and monitors farmers' performance on an annual basis. Furthermore, the legislation makes provision for tax rebates for landowners who sign up for higher levels of biodiversity stewardship, offering potential financial incentives (Rawat, 2017), though these have only recently put into practice, and lack of capacity for the implementation of tax incentives at the municipal level is a concern. Preferential access to state-funded teams who clear invasive alien plants (e.g. Working for Water (van Wilgen & Wannenburgh, 2016)) is sometimes arranged as an incentive for farmers who have signed biodiversity stewardship agreements.

There are five different types of biodiversity stewardship agreement that landowners and the state can enter into, which range from more to less strict, depending on the priority of the biodiversity on the site, and the willingness of the landowner to commit their land to conservation (Figure 2.2) (SANBI, 2015b). The level of priority and commitment are matched accordingly with support from conservation agencies (Figure 2.2). Various legal mechanisms underpin these agreements, and they range from Nature Reserves at the highest

level, to Biodiversity Partnership Areas at the lowest level (Figure 2.2). Only the top two levels contribute to South Africa meeting its protected area targets (SANBI, 2016), and therefore resources (human and financial) are usually prioritised for sites on which this level of agreement is likely to be secured.

The 'Protected Environment' level of biodiversity stewardship is an agreement which can be used across multiple properties and requires groups of farmers across a landscape to enter into an agreement with conservation authorities. It is therefore a form of landscape-level stewardship which can enable management of landscapes for multifunctionality (Chapter 3, Section 3.3.2, and refer to Cases 1, 2, 3 and 4 in Chapter 7, Section 7.2.3).

2.4.3 Landscape-level stewardship initiatives in South Africa beyond biodiversity stewardship

Besides formal contractual biodiversity stewardship initiatives (for example 'Protected Environments') there are also other, less formal, approaches to implementing stewardship at landscape-level in South Africa (Box 2.2). These initiatives include Bioregional Conservation Programmes, Biosphere Reserves, conservancies, catchment management institutions, and LandCare projects (Box 2.2). These are implemented by different government departments, and therefore have slightly different objectives. Although the conservation sector is a dominant player in stewardship practice in South Africa, taking a landscape approach means that multiple sectors, government departments, and policy communities are potentially relevant to stewardship (Box 2.1).

2.4.4 The role of NGOs in stewardship practice in South Africa

A key characteristic of stewardship practice in South Africa is the important role played by NGOs in implementing stewardship. Barendse et al. (2016) identified this trend in a variety of stewardship initiatives across the country. SANBI also recognises the significant role played by NGOs in supporting implementation of biodiversity stewardship (SANBI, 2015a, 2016). Furthermore, and possibly because of the absence of functional extension services from the state, NGOs are stepping in to provide support to farmers for implementing stewardship through sustainable farming practices (Scotcher, 2009; Kotze & Rose, 2015). NGOs doing this work include small local groups, as well as large national and international organisations. Some of the more prominent NGOs working in stewardship in South Africa include The World Wide Fund for Nature South Africa (WWF-SA), Conservation South Africa (a branch of Conservation International), Living Lands, Wildlands, the Wildlife and Environmental Society of South Africa (WESSA), The Wilderness Foundation, BirdLife South Africa (a branch of BirdLife International), and LIMA Rural Development. Furthermore, as described in Box 2.2, the implementation of Biosphere Reserves relies strongly on local volunteers and NGOs. The ability of NGOs to support stewardship practice depends on funding sources. NGOs often partner with government institutions to access funding from large initiatives such as the Global Environment Facility and

the Critical Ecosystem Partnership Fund which have played a significant role in supporting conservation initiatives in South Africa (Ashwell et al., 2006).

Box 2.2 (Part 1 of 2): Landscape-level stewardship initiatives in South Africa

1. Bioregional conservation programmes

The South African National Biodiversity Institute (SANBI) is responsible for the implementation of bioregional conservation programmes. These are large, landscape-level initiatives which seek to move beyond the usual sectoral fragmentation of conservation and sustainable development initiatives. They encourage collaboration among different sectors such as conservation, agriculture, and land-use planning, though they are primarily focused on biodiversity conservation. The bioregional programmes have a strong focus on mainstreaming biodiversity into production landscapes (Redford et al., 2015), using tools such as biodiversity stewardship to protect sites of high biodiversity value. Through funding received from the Global Environmental Facility (GEF), three pilot bioregional programmes have been established, with varying levels of success: the C.A.P.E., SKEP, and STEP programmes (See 'List of acronyms' for further details). They are intended to provide the basis for conserving globally significant biodiversity, whilst ensuring that people benefit from sustainable natural resource use (Sandwith et al., 2005). The C.A.P.E programme was initiated to protected the endemic biodiversity of the Cape Floristic region (Ashwell et al., 2006). The SKEP programme aims to protect the Succulent Karoo Biome (SKEP, 2003). The STEP programme includes eight of South Africa's nine biomes, though its focus is on protecting the endemic thicket biome of the Eastern Cape (Pierce & Mader, 2006).

2. Biosphere Reserves

Biosphere Reserves are implemented by the Department of Environmental Affairs through the global UNESCO Man and the Biosphere programme. They are based on a landscape approach, taking a socio-ecological approach to land management, explicitly attempting to reconcile environmental protection with sustainable development (NACSA, 2003; Coetzer et al., 2014). Although eight Biosphere Reserves have been established in South Africa (Department of Environmental Affairs, 2015), on-going implementation and maintenance of sites is a challenge. Worldwide, Biosphere Reserves find it difficult to gain recognition and funding for their work, and are heavily reliant on political will and buy-in of local stakeholders, and the same is true in South Africa (Coetzer et al., 2014). In South Africa, Biosphere Reserves are mostly implemented by NGOs, relying heavily on local volunteers (Pool-Stanvliet, 2013). Biosphere Reserves appear to be caught between not getting enough recognition from conservation sector due to the 'lack of teeth' of their conservation agreements, and being perceived as a 'threat to development' by other sectors (Pool-Stanvliet, 2013). However, they hold potential to be 'special places for people and nature'. "Biosphere reserves foster collaborative thinking about the future management of a defined space. They promote decentralisation of decision-making whilst promoting collaboration and co-management practices between all stakeholders" (Pool-Stanvliet, 2013: 4).

3. Conservancies

Conservancies are the oldest form of formalised, voluntary stewardship in South Africa. They can be defined as "Registered voluntary associations, established between like-minded landowners, residents, communities and other users, in a specified area with the shared aim of co-operative management of its natural resources in an environmentally sustainable manner, without necessarily changing the land use on the properties." (Barendse et al., 2016: 4) Conservancies are considered the entry-level to more formalised stewardship using the national biodiversity stewardship tool (Barendse et al., 2016). Conservancies are not governed by formal regulations but are required to register with provincial conservation authorities. They are based on voluntary participation which is formalised through membership, committees, a constitution, and a management plan (Downsborough et al., 2011). They are co-ordinated by the National Association of Conservancies of South Africa (who recently amended their name and added 'and Stewardship South Africa' to the end of it) (NACSA, 2003). Conservancies are particularly well-suited as a landscape-scale stewardship approach, since they provide a flexible platform for multiple landowners to collaborate (Mwango, 2013). Through conservancies, landscape-scale biodiversity and ecosystem services can be managed as common pool resources (Mwango, 2013). I have not selected conservancies as case studies here since they are usually 'self-organised' by local stewards, and my focus is on facilitated stewardship initiatives.

Box 2.2 (Part 2 of 2): Landscape-level stewardship initiatives in South Africa

4. Catchment management institutions

The Department of Water Affairs and Sanitation is responsible for implementation of the National Water Act. According to the act, various institutional platforms must be established for collaborative governance and management of water resources (Quinn, 2012). Catchment Management Forums (CMFs) operate at the local level and are meant to provide a means for local stakeholders, including farmers, to participate in decision-making around water management. These forums should also provide a means for co-ordinated land use management at the catchment level and are thus potential examples of landscape-level stewardship initiatives. However, implementation of the National Water Act has been slow. There are few functional CMFs in the country (Quinn, 2012), and equitable and sustainable water service delivery remains a significant challenge (Weaver et al., 2017). A recent report released by a coalition of civil society organisations in South Africa paints a bleak picture of the Department of Water Affairs and Sanitation. The report draws on public documentation to highlight concerns about the ability of the national department to govern and manage water resources across the country based on failing financial management, lack of skills, and political interference in the running of water management institutions (South African Water Caucus, 2017).

5. Landcare

The South African National LandCare Programme was launched in 1998 by the national Department of Agriculture. The aim of the programme is to promote ecologically sustainable land management. It is primarily focused on communal areas in the previous homelands. Focus areas include development of enabling partnerships, local economic development, community based natural resource management and food security (Peden, 2005). There is some question as to whether the national LandCare Programme is still functional. In the Western Cape, the LandCare programme operates a little differently. It works with all farmers (not just in communal areas), and provides support to farmers for sustainable resource management. This includes, amongst others, farm planning, drainage works, rangeland utilisation works, flood repair works, youth education initiatives, and a range of LandCare and Area-Wide projects with local farming communities (Department of Agriculture: Province of the Western Cape, 2016).

Other landscape-level initiatives in South Africa include World Heritage Sites, Transfrontier Conservation Areas, and Corridor Initiatives. I will not discuss these here, as they do not have a specific focus on stewardship in rural, agricultural landscapes, and usually operate at much larger landscape-levels. Also refer to Barendse et al. (2016) for an overview of stewardship initiatives in South Africa that goes beyond the scope of rural, agricultural landscapes.

2.5. Conclusion

Despite its challenges, South Africa holds a wealth of human and bio-physical diversity, and such diversity is considered a key principle of building resilience (Biggs et al., 2012). The multifunctional landscape context could be considered a microcosm of South African society, and thus brings with it many challenges but also many opportunities for positive change, learning and new ways of doing things. South Africa can be seen as a fragile state (Besada, 2007) and there are rising questions about the government's ability to deliver on its promises (Kotze & Taylor, 2010). PhD research should be viewed as a public good (Frick et al., 2017), particularly in a country facing significant sustainability challenges. Therefore, conducting research that might contribute to facilitating opportunities for people to come together, across historical and racial boundaries, to jointly take ownership of their problems and the solutions, seems an important means of contributing to positive change in this country. This is particularly meaningful considering the national commitments to environmental sustainability and resilience; and nation-building and social cohesion (Government of South Africa, 2012).

Chapter 3 | Theoretical overview: Towards stewardship in multifunctional landscapes

"Landscape: a land made from thoughts of landscape in the creative distance of space-time, when things, without any prints or documents, exist more fiercely than we do: they colonize and watch us, stare at us. Submissive objects of regard, we are their pasture. We are the landscape's landscape." (Carlos Drummond de Andrade)

This is at Mafube, near Matatiele, in the Eastern Cape. This is a multifunctional landscape. In the foreground are cows and sheep, tended by a herder. Behind them are some fields, waiting to be cultivated. Then there are people's homes. Behind the homes are rolling hills with more livestock, fields and homes. And at the very back are the high Drakensberg Mountains: a source of freshwater and inspiration for many people.

3.1. Introduction

If stewardship is considered a significant part of the solution to ecosystem degradation and social inequality and a key to the sustainability of social-ecological systems (SES) (Chapter 1), how can it be achieved in practice? Continued calls for stewardship in the academic literature are unlikely to result in tangible, positive outcomes without the efforts and actions of local people practicing stewardship. However, the links between the theory and practice of stewardship are not well developed (Worrell & Appleby, 2000; Barendse et al., 2016). Research is needed to understand how the ideals of stewardship for sustainability of SES can be realised in practice and I investigate this in the South African context in Chapter 5.

In this chapter, I begin by exploring why stewardship is important in sustainability research generally, before arguing for the importance of a focus on stewardship practice. I go on to make the case for landscapes as a suitable arena for stewardship practice and research. In so doing, I argue that collaboration should be a core concern for scholars and practitioners interested in pursuing stewardship at landscape level. I then propose ways in which research on collaboration can be deepened in pursuit of social-ecological stewardship in multifunctional landscapes.

3.2. Stewardship for sustainable social-ecological systems

3.2.1 What is stewardship?

There is no unified definition or understanding of the concept of stewardship in the sustainability sciences and SES literature. Understanding of the concept in the environmental sense has changed over time. These changes have mirrored changes in understanding of the relationships between humans and nature (Worrell & Appleby, 2000; Berry, 2006; McArthur, 2012) (Refer to Chapter 5, Section 5.1.1). For example, the most recent understandings of stewardship mirror the global sustainability discourse (Worrell & Appleby, 2000; Welchman, 2012). The recent interpretations of the concept indicate a shift towards more integrated and

systemic understandings of the relationships between humans and nature. Previous interpretations of stewardship were based on a more dichotomous relationship of humans either having dominion over nature (Peterson et al., 2010), or being protectors of nature (McArthur, 2012). The most recent interpretations of the concept of stewardship emerge from two different bodies of literature.

'Environmental stewardship' (Welchman, 2012) expresses the classic and most intuitive understanding of the concept (Table 3.1). In response to critiques of the concept Welchman (2012) builds on the older definition of environmental stewardship proposed by Worrell and Appleby (2000) to incorporate two important features in order to align stewardship with changing societal norms and values. These two features are:

1. *"explicit recognition of the irreducible pluralism of the competing 'interests' in question"*; and

2. because stewardship is a role played by someone *"its moral justification is a function of its overall consistency with our common moral norms, including norms of justice, tolerance, and equity in the distribution of social benefits and burdens"* (Welchman, 2012: 303).

This definition is broadly applicable across the various bodies of environmental literature in which the concept is used.

'Ecosystem stewardship' (Table 3.1) is aligned with an SES approach, with resilience thinking, and is framed in the context of rapid global change (Chapin et al., 2009c). According to Chapin (2009c), ecosystem stewardship is an 'action-oriented framework' to bring about better management and governance of complex social-ecological systems. Ecosystem stewardship is a 'resource management paradigm' proposed to guide human interactions with SES (Chapin et al., 2009d) which builds and extends the principles of ecosystem management, rather than a definition, which is what Welchman (2012) provides. Thus, the concept of 'ecosystem stewardship' is a specific application of the broader concept of stewardship and departs quite significantly from other environmental literature on stewardship.

Table 3.1: Definitions of stewardship relevant to social-ecological systems

Term	Definition and literature sources
Environmental stewardship	*"Environmental stewardship is the responsible management of human activity affecting the natural environment to ensure the conservation and preservation of natural resources and values for the sake of future generations of human and other life on the planet, together with the acceptance of significant answerability for one's conduct to society"* (Welchman, 2012: 303). *"The goal of environmental stewardship is to manage human behaviour in order to restore or maintain the integrity of environmental systems and their services to human and other communities of life."* (Welchman, 2015: 130)
Ecosystem stewardship	Ecosystem stewardship is *"a strategy to respond to and shape social-ecological systems under conditions of uncertainty and change to sustain the supply and opportunities for use of ecosystem services to support human well-being"* (Chapin et al., 2009c: 241), or *"the active shaping of pathways of social and ecological change for the benefit of ecosystems and society"* (Chapin & Knapp, 2015)
Social-ecological stewardship	A general term which is starting to appear in the literature but is not yet clearly defined (Chapin et al., 2009d; Carpenter et al., 2012; Rogers et al., 2013). We propose the following working definition: "Social-ecological stewardship is the ethical and responsible interaction of humans with social-ecological systems to sustain the supply of diverse ecosystem services and values for the sake of current and future generations of humans and other life on the planet" or "Environmental stewardship in social-ecological systems".

The term 'social-ecological stewardship' (Table 3.1) is proposed here as a useful 'middle ground' term which recognises the value of a SES framing, whilst also incorporating the moral-ethical core and enduring understanding of the term stewardship offered by environmental stewardship (Welchman, 2012). It is broadly defined as 'environmental stewardship in social-ecological systems', and more specifically as the ethical and responsible interaction of humans with social-ecological systems to sustain the supply of diverse ecosystem services and values for the sake of current and future generations of humans and other life on the planet. For the remainder of the chapter, I will use the term 'stewardship' to imply the working definition of 'social-ecological stewardship' proposed here, unless otherwise specified through a prefix as in 'environmental stewardship' or 'ecosystem stewardship'. Next, I introduce social-ecological systems, one of the key concepts framing my research, within which I interpret the notion of stewardship.

3.2.2 Stewardship in social-ecological systems

There has been a rise in interest in studying human and natural systems in a more integrated way, leading to a proliferation of frameworks in different fields and disciplines (Binder et al., 2013; Kramer et al., 2017). One of these frameworks is the social-ecological systems (SES) framework. It has its origins in ecology and arose out of the development of resilience theory for analysing and managing ecosystems adaptively (Holling, 1973). The concept of social-ecological systems is used to describe an integrated perspective of humans-in-nature (Berkes & Folke, 1998; Folke et al., 2016). Resilience is a key characteristic of SES (Folke, 2006) and is understood as the capacity of a system to absorb disturbance and re-organise while undergoing change, so as to still retain essentially the same function, structure, identity, and feedbacks (Walker et al., 2004). The boundary between the social and the ecological in SES is artificial and arbitrary (Berkes & Folke, 1998). The social refers to diverse facets of the human dimensions of systems including economic, political, technological, and cultural facets. The ecological refers to the biosphere, i.e. the global ecological system. This integrates all living beings, including humans, and the dynamic interactions between all beings with the dynamics of the earth system including the atmosphere, water cycles, and biogeochemical cycles. At its core the concept of social-ecological systems posits that human systems are embedded in, and entirely dependent on, the biosphere (Folke et al., 2016). Levin et al. (2012) argue that SES are complex adaptive systems that are characterised by nonlinear feedbacks, dynamic interactions, individual and spatial heterogeneity and operate over varying time scales. While some authors consequently use the term 'complex social-ecological systems', I will use the term 'social-ecological systems' (SES) in this research, recognising complexity as an inherent characteristic of SES.

The SES perspective seeks to shift policies and practices from a mode of controlling change in systems which were assumed to be stable, to a mode of managing the resilience of dynamic social-ecological systems to respond and adapt to change (Folke, 2006; Chapin et al., 2009a). The concept of social-ecological systems has been used to motivate for global policies and practices in support of sustainability science, policy, and practice that place more emphasis on a biosphere-based approach to development which recognises that

social and economic systems are embedded in, and entirely dependent on, ecological systems (Folke et al., 2016). This is echoed in the global calls for stewardship of the biosphere in support of social-ecological sustainability for current and future generations described above (Chapin et al., 2009c; Chapin et al., 2011a; Steffen et al., 2011).

3.2.3 Why does stewardship matter?

The term 'stewardship' is appealing in that it has an ethical basis and carries with it a moral imperative. By practicing stewardship, humans manage ecosystems out of moral concern (Worrell & Appleby, 2000; Welchman, 2012; Raymond et al., 2013). Therefore, stewardship is considered a means of re-connecting social and ecological systems (Raymond et al., 2013) to shift them onto more desirable trajectories, away from the current extractive and destructive interactions between humans and nature (Chapin et al., 2009c). Thus, it is *"a concept which directs individual and collective action"* (Ridings, 2017: 4). Stewardship is a particular role played by humans (Welchman, 2012) and thus the agency of individual stewards, or stewards acting collectively, is brought into focus (Berkes et al., 2012; Ridings, 2017). The origins and history of the term in western, Christian society has raised concerns about its applicability for a plural society with diverse world views and understandings, and this has led some researchers to question the global suitability of the term (Berry, 2006; Peterson et al., 2010; Attfield, 2014). Yet, its continued use in multiple settings seems to speak for its usefulness, even in secular contexts (Worrell & Appleby, 2000; Attfield, 2014).

The increasing calls for stewardship globally, and the recognition that ecological destruction and rising social inequalities are not abating (Steffen et al., 2011; Leach et al., 2013; ISSC IDS and UNESCO, 2016), indicate that the ideals of stewardship are not being realised in practice. Until now, the literature on stewardship in social-ecological systems and sustainability science has been dominated by conceptual and theoretical discussions. I argue that we now need to move toward empirical experimentation and active learning about the practice of stewardship in social-ecological systems.

The following question thus arises: how does one move from the theory of stewardship to practice, in the context of complex SES and rapid global change? And, in recognition of the interlinked nature of SES: how can stewardship actions and practice lead to positive ecological *and* social outcomes and address concerns about social justice in terms of shared ecosystem services benefits (Welchman, 2012)? To achieve these interlinked outcomes in practice, stewardship needs to follow 'safe and just' pathways to sustainability, taking into account issues of power, politics and contestation around access and management of the costs and benefits of ecosystem services (Raworth, 2012; Leach et al., 2013) (Figure 3.1).

The doughnut model illustrates that navigating pathways towards a 'safe and just space' for humanity must account for both the biophysical limits of the planet, i.e. the environmental ceiling (safe pathways), and the societal limits often linked to concerns of equity and social justice, i.e. the social foundation (just pathways) (Figure 3.1). This model provides an important compass to guide social-ecological stewardship for

sustainability (Raworth, 2017). In the following section, I argue for multifunctional landscapes as suitable sites for investigating stewardship and collaboration using a social-ecological system framing.

3.3. Investigating stewardship practice in multifunctional landscapes

In Chapter 1, I argued that landscapes are the most appropriate level of analysis to better understand stewardship in practice. In this section I further refine this claim, based on three key reasons, each of which will be discussed further below. Firstly, managing landscapes for multifunctionality can lead to more equitable and sustainable benefits. Secondly, landscapes offer the appropriate ecological and institutional level for analysis and action to support social-ecological stewardship in practice. Thirdly, landscapes offer a site to investigate achievement of sustainable and equitable stewardship of ecosystem services by navigating pathways between social and planetary boundaries in a practical, place-based manner. Each of these arguments are elaborated upon in turn below. First, I briefly introduce the concept of landscapes.
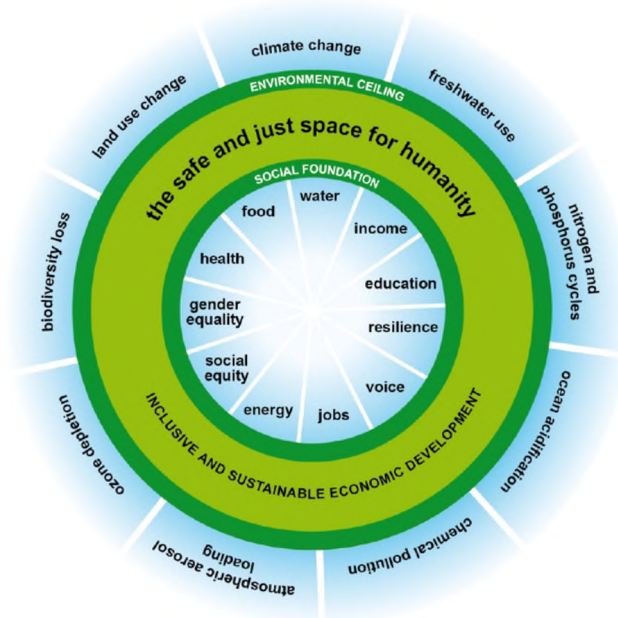
Figure 3.1: 'A safe and just space for humanity to thrive in': the doughnut model illustrates how humanity needs to operate within a safe and just space between the environmental ceiling and the social foundation (Raworth, 2012; 2017).

3.3.1 What are landscapes?

The concept of landscapes has a multitude of definitions and interpretations and has arisen as a spatial focus across a wide range of fields and disciplines (Angelstam et al., 2013a; Sayer et al., 2013; Minang et al., 2014b; Arts et al., 2017; Bieling & Plieninger, 2017). Angelstam et al. (2013b: 131) suggest that the various interpretations of the term 'landscape' can be analysed according to four distinct categories:

1. biophysical interpretations (landscape as a purely natural phenomenon);

2. anthropogenic interpretations (landscape as nature with human artefacts);

3. intangible interpretations (landscape as a cognitive representation of a space, socio-economic interpretations and landscape as socially organised space); and

4. coupled social-ecological interpretation (landscape as a totality including both material natural and cultural dimensions as well as spiritual phenomena).

Whilst recognising that all these are valid understandings of landscapes, in this study I align myself with the fourth category proposed by Angelstam et al. (2013b). Accordingly, I suggest that landscapes are place-based social-ecological systems that emerge from the interactions between people, through their values and institutions, with land-based ecosystems and the natural resources they produce (Minang et al., 2014a; Robinson et al., 2017).

Landscapes generate a flow of ecosystem services which underpin human well-being, including provisoining, regulating, supporting, and cultural ecosystem services (de Groot et al., 2002; MA, 2005). Provisioning ecosystem services include food, water, timber, and fiber; regulating services include climate, flood, pest, disease and waste regulation; supporting services include soil formation and nutrient cycling; and cultural services include recrational, aesthetic, and spiritual benefits derived from the landscape (MA, 2005). A higher diversity of ecosystem services in the landscape is an indicator of higher multifunctionality and often correlates with higher levels of regulating and cultural ecosystem services and lower crop production intensities (Raudsepp-Hearne et al., 2010; Lescourret et al., 2015) (Figure 3.2).

In many rural landscapes, agricultural production is one of the most important human uses of the landscape, for both commercial and subsistence purposes (Robertson & Swinton, 2005; Scherr & McNeely, 2008; Minang et al., 2014b). Landscapes support a variety of agricultural production activities including production of crops and pastures from cultivated fields, and production of livestock, both intensively and extensively in rangelands (Scherr & McNeely, 2008). Agriculture is by far the biggest human use of land, and is estimated to cover approximately 38% of land on earth (Foley et al., 2011). Agricultural production mostly increases provisioning ecosystem services in a landscape (such as food, fibre, and fuel), whilst altering the structure and function of ecosystems, which can result in reduced production of regulating and cultural ecosystem services (Gordon et al., 2010) (Figure 3.2). Yet, functioning, healthy ecosystems and biodiversity are important for the long-term sustainability of agriculture, and agriculture is underpinned by a variety of ecosystem services including pest control, pollination, water provision, and soil formation (Zhang et al., 2007; Power, 2010). Figure 3.2 illustrates that multifunctionality is usually higher in near-natural or natural landscapes (B) than in intensively farmed and simplified agricultural landscapes (A), and that managing for multifunctionality can lead to ecosystem services being produced in more balanced proportions (C).

Therefore, whilst agriculture plays a key role in the production of important resources for human well-being, it also has significant negative environmental impacts. These include degradation of soil and water resources, loss of biodiversity (Foley et al., 2005; Fischer et al., 2006), and human-induced climate change (IPCC, 2014). Consequently, there is a long-standing conflict between agricultural and environmental outcomes in landscapes (Thrupp, 2000; Brussaard et al., 2010). Achieving a balance in the production of a diversity of

ecosystem services in landscapes which include agricultural activities is a challenge (Gordon et al., 2010), and certainly one that will be encountered by efforts in fostering stewardship.

A. Intensively farmed, simplified agricultural landscapes

B. Near-natural landscapes

C. Multifunctional landscapes

Key: Provisioning ecosystem services | Regulating ecosystem services | Supporting ecosystem services | Cultural ecosystem services
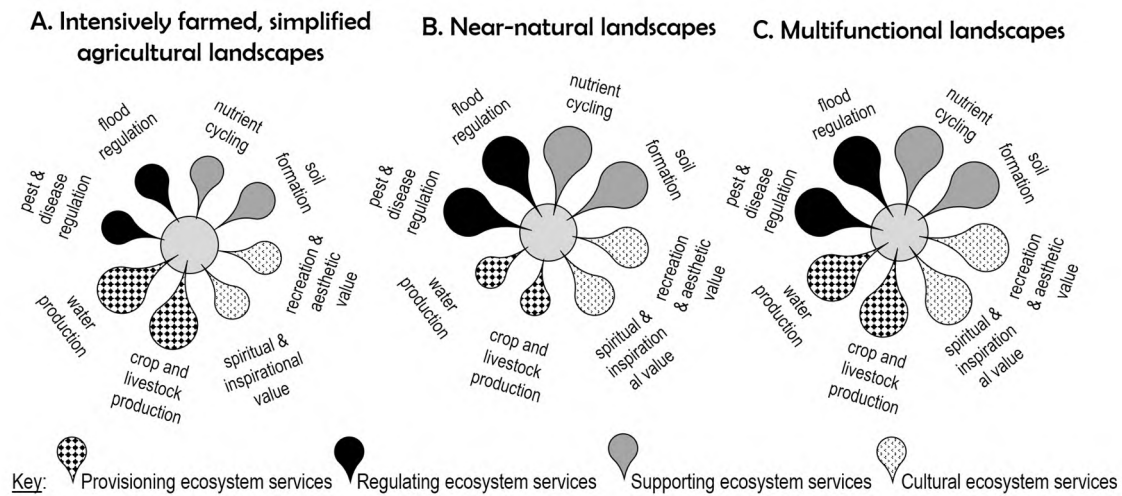
Figure 3.2: Landscapes provide a diversity of ecosystem services, which are utilised in different proportions according to the nature of the landscape (A, B or C) (Modified from Gordon et al. (2010); Raudsepp-Hearne et al. (2010)).

3.3.2 Managing landscapes for multifunctionality can enhance sustainability and equity

All landscapes are inherently multifunctional (Fischer et al., 2017); however, intensive agricultural production has led to monoculture cropping (Clay, 2004), over-simplification of landscape structure and function (Gordon et al., 2010) (Figure 3.2), and a loss of resilience in agricultural landscapes (Power, 2010; Tscharntke et al., 2012). The concept of 'multifunctional landscapes' makes explicit the need to address multiple functions, for example ecological, agricultural, and social functions, expressed as a diversity of ecosystem services in a given landscape (O'Farrell & Anderson, 2010; Minang et al., 2014a; Fischer et al., 2017). Managing or stewarding agricultural landscapes with an emphasis on multifunctionality offers opportunities to identify and optimise synergies among multiple ecosystem services, and can support resilience-based management and stewardship of social-ecological systems (Gordon et al., 2010) (Figure 3.2).

This can be brought about for example through stewardship actions and practices that work towards objectives of biodiversity or agrobiodiversity conservation (Thrupp, 2000; Tscharntke et al., 2012), ecological restoration (Jellinek et al., 2013; van Oudenhoven et al., 2015), and improved farming practices at the field level (for example through implementation of 'Better Management Practices' (BMPs)) (Clay, 2004; Gordon et al., 2010; Power, 2010; van Oudenhoven et al., 2015). Therefore, in order to balance the delivery of ecosystem services and benefits for multiple stakeholders, and to address the conflict between agriculture and other land uses, landscapes need to be explicitly managed for multifunctionality (Fischer et al., 2006; Lescourret et al., 2015). This can lead to enhanced sustainability of the landscape (O'Farrell & Anderson, 2010) and more equitable sharing of benefits (Fischer et al., 2017).

3.3.3 Landscapes offer a suitable level of analysis and action

Approaches are needed to manage ecological processes and production of ecosystem services in landscapes at the appropriate spatial level (Cumming et al., 2006; Prager et al., 2012). These ecological processes include interactions between animal species such as wildlife, pests, and pollinators (Tscharntke et al., 2005) as well as water provision and purification, soil retention, and climate regulation (Zhang et al., 2007). A variety of environmental management challenges also operate at larger levels and include wild fires, flooding, climate change, disease, and invasive species (Flitcroft et al., 2017). The spatial configuration of ecosystems in agricultural landscapes is critical to the supply of many ecosystem services, which requires that farms be managed in a coordinated way at landscape level rather than as individual units (Goldman et al., 2007; Stallman, 2011).

I use the term 'level' to denote landscapes as a piece of land located along a spatial scale (Gibson et al., 2000; Cash et al., 2006). The 'landscape level' is defined as the level along a spatial scale *above the field, farm- and local scale; it can be a catchment, an area of coherent landscape character or a sub-unit of a natural region*" (Prager et al., 2012: 244). The landscape is the primary level at which the actions and decisions of individual farmers, or localised resource-user groups, intersect with those of other resource users, stakeholders, and decision-makers (Frost et al., 2006). It is at this level that individuals interact with collaboratives and with broader institutional structures and processes, i.e. landscapes are the level at which individual stewards interact with the broader social-ecological system. The landscape level therefore offers an opportunity to work beyond the individual farm or village level, by fostering collaboration among multiple stakeholders, to address social-ecological sustainability challenges in an integrated, collaborative manner.

3.3.4 Landscapes offer practical opportunities for navigating social and ecological trade-offs

Landscapes offer an analytical and practical space to explore the integrated challenges of ecological degradation and equitable distribution of the benefits of ecosystem services in practice (Raworth, 2012; Leach et al., 2013). They are complex, place-based systems of many multiples. They produce multiple ecosystem services, function at multiple levels and scales, incorporate multiple issues of interest and concern, are subject to multiple drivers of change, and include multiple stakeholder voices and values (Poteete, 2012; Fischer et al., 2017). Consequently, achieving stewardship across landscapes in a sustainable and equitable manner requires trade-offs between actors (social trade-offs) and different ecosystem services (ecological trade-offs) (Rodríguez et al., 2006; Kremen & Miles, 2012). Therefore, collaboration among multiple stakeholders, locally, and across levels, is necessary to deliberate and negotiate trade-offs (Goldman et al., 2007; Stallman, 2011; Prager et al., 2012; Patterson, 2017), by navigating pathways towards sustainability (Leach et al., 2013).

In summary, initiatives which are putting the concept of stewardship into practice in landscapes can be characterised by three key features, as follows: the initiative

1. works at landscape level (i.e. beyond the individual farm or local village level) (Goldman et al., 2007; Prager et al., 2012);

2. is working towards multifunctionality i.e. towards multiple, integrated social-ecological stewardship outcomes (Raudsepp-Hearne et al., 2010; Torquebiau, 2015); and

3. has an explicit focus on collaboration among multiple stakeholders and stewards are part of a collaborative process (Goldman et al., 2007; Lescourret et al., 2015).

3.4. Collaboration is a necessary focus for stewardship research and practice in landscapes

Since all landscapes are multifunctional and offer a suitable level of analysis and action, understanding how to support collaboration becomes a core concern for researchers interested in understanding stewardship practice (Prager et al., 2012; Lescourret et al., 2015). The topic of collaboration is by no means a new one in the literature on natural resource and landscape management (Margerum & Robinson, 2016a). Worldwide, efforts to devolve control, power, and management responsibility for natural resources to local land users and communities has resulted in a wealth of literature on collaboration and collective action for natural resource management. Moreover, in a variety of contexts with limited government intervention or control, local people have been managing natural resources collectively for a long time (Ostrom, 1990; Fabricius & Koch, 2004). For this study, I use Gray's (1985: 912) definition of collaboration: "*The pooling of appreciations and/or tangible resources, e.g., information, money, labor, etc., by two or more stakeholders, to solve a set of problems which neither can solve individually.*" Collaboration must not be viewed as a panacea to solve all natural resource management problems, as it can come at a cost, and it should not be viewed as an end in itself (Wondolleck & Yaffee, 2000; Koontz & Thomas, 2006). Rather, in this study, collaboration is considered a necessary feature of landscape level stewardship, since it has the potential to *"enhance people's understanding, narrow the range of disagreements, build concurrence about necessary direction, and produce on-the-ground environmental improvements"* (Wondolleck & Yaffee, 2000: xvi). Collaborative processes in support of social-ecological stewardship which focus on dialogue and negotiation among multiple stakeholders offer the opportunity to address concerns about equitable access to the benefits of natural resources or ecosystem services, and sharing the costs of stewardship in landscapes (Wondolleck & Yaffee, 2000; Carr, 2002; Margerum, 2008).

Collaboration is usually a consensus-based approach to management or governance which involves a wide range of stakeholders in an on-going manner (Margerum & Robinson, 2016b; Flitcroft et al., 2017). Collaborative initiatives involve local resource users in a collective process of actively and intentionally taking responsibility and care of natural resources with which they interact, to realise the ideals of stewardship in practice. Positive social and ecological outcomes are likely to be fostered through committed participation by local citizens (Kerr, 2007), and through good quality facilitation of social learning processes among diverse stakeholder groups (Carr, 2002; Buck & Sherr, 2009; Sayer et al., 2013). However, collaboration and learning

do not guarantee such outcomes, and collaboration can be difficult (Wondolleck & Yaffee, 2000; Carr, 2002; Koontz & Thomas, 2006; Margerum & Robinson, 2016a). Collaboration in contested contexts, where there are concerns about equitable access to the benefits of ecosystem services, might in fact not be possible at all, or might lead to conflict as power imbalances and social injustice become apparent (Wollenberg et al., 2001).

The literature on collaboration for natural resource or ecosystem management can be grouped into seven over-arching bodies (Table 3.2).

Table 3.2: Bodies of literature relevant to studying collaboration for stewardship in multifunctional landscapes

Body of literature, key references, links to other literature or antecedents.	Nature of resource	Nature and diversity of collaborating stakeholders	Main limitations relevant to the present study	Further reading and case studies
1. Common Pool Resources (CPR) (Ostrom, 1990; Ostrom & Cox, 2010) **Draws on institutional analysis and game theory. Links to literature on social capital (Ostrom & Ahn, 2003; Pretty & Smith, 2004) and social network analysis (Bodin & Crona, 2009).**	Mostly single-resource focus e.g. fisheries, forests, irrigation systems, at the local resource user level	Local resource users, can include some involvement of support stakeholders	Single resource focus, takes a strongly institutional approach to collaboration, does not sufficiently account for interdependencies among multiple actors and resources. See Campbell et al. (2001), Hinkel et al. (2015), Patterson (2017).	Ostrom (2005); Ostrom and Cox (2010); McGinnis and Ostrom (2014).
2. Community-Based Natural Resource Management (CBNRM) (Fabricius & Koch, 2004; Murphree, 2009; Taylor, 2009; Child & Barnes, 2010). Draws on CPR theory (Ostrom, 1990).	Single or multiple resource focus (depending on context), at the local community level; devolution of power to local communities, often focused on wildlife management.	Local resource users, can include some involvement of support stakeholders or researchers, focus is on decentralising resource management.	Primarily focused on developing country context and subsistence resource use. Often focused on participation rather than collaboration. Significant critiques of efficacy.	Kellert et al. (2000); Campbell and Shackleton (2001); Turner (2004); Torquebiau and Taylor (2009).
3. Collaborative Natural Resource Management (CNRM) (Wondolleck & Yaffee, 2000; Margerum, 2008; Margerum & Robinson, 2016a). Draws on organisational learning; policy and planning, and governance literature (Gray, 1985; Ansell & Gash, 2007). Also called 'collaborative governance'.	Single or multiple resources, usually driven through policy per agricultural sector, at various levels from local to landscape; includes management of forests, watersheds, wild fire, rangelands.	Local resource users and community representatives, industry representatives, government officials, researchers, etc.	Often driven by policy and legislation and with strong institutional/structure approaches, comparatively well-resourced and capacitated initiatives run by government officials in developed countries.	Lubell (2004); Cheng and Mattor (2006); Ferreyra et al. (2008); Church and Prokopy (2017); Cradock-Henry et al. (2017); Flitcroft et al. (2017).

Body of literature, key references, links to other literature or antecedents.	Nature of resource	Nature and diversity of collaborating stakeholders	Main limitations relevant to the present study	Further reading and case studies
4. Various collaborative and participatory approaches to forest management ('collaborative forest approaches') (Wily, 2002; Colfer, 2005; Blomley et al., 2008). **Links to CBNRM, ILA, CM and ACM.**	Multiple resources, implementation focused at local level (some at landscape level); mostly in the tropics e.g. participatory forest management, collaborative governance of tropical landscapes	Local resource users and community representatives, industry representatives, government officials, researchers, etc. Often driven by NGOs, international development organisations.	Appears not be a well-developed, cohesive body of academic literature on collaboration specifically; many of the lessons and case studies published in grey literature, using different terminology and conceptual framings.	Wollenberg et al. (2005); Colfer and Pfund (2012); Buck and Sherr (2009).
5. Co-management (CM) (Berkes, 2009) and Adaptive Co-management (ACM) (Armitage et al., 2007b). Links to literature on CPR, resilience and social-ecological systems, social capital (Putnam, 2001; Ostrom & Ahn, 2003; Pretty & Smith, 2004) and social network analysis (Bodin & Crona, 2009)	Single or multiple resources, implementation focused at local level but emphasis on cross-level collaboration, polycentric governance and learning.	Local resource users, community representatives, industry representatives, government officials, researchers, etc; focus on power-sharing between community and government.	Mostly single resource focus, strong focus on institutional aspects of collaboration, but with recognition of local knowledge, social learning and cross-scale linkages. Literature mostly from developed countries in well-resourced contexts.	Olsson et al. (2004); Armitage (2007); Armitage et al. (2008); Plummer et al. (2012); Bown et al. (2013); Cundill et al. (2013)
6. Integrated Landscape Approaches (ILA) (Sayer et al., 2013; Minang et al., 2014b; Freeman et al., 2015). Some links to landscape restoration and landscape planning literature; draws on its predecessor 'Integrated Natural Resource Management' (INRM) (Campbell & Sayer, 2003)	Multiple resources and sectors, planning at landscape level, action locally focused; usually emphasises multiple ecosystem services; cross-level collaboration beyond the local level.	Emphasises cross-sectoral participation: resource users, support stakeholders, government officials, private partners and investors, researchers etc.	Often focused on participation rather than collaboration, insufficient theoretical rigour and development (policy and practice focus) (Erbaugh & Agrawal, 2017).	Freeman et al. (2015); Reed et al. (2016); Sayer et al. (2013); Milder et al. (2014); Cadman et al. (2010).
7. Collaboration in Complex, Contested Contexts (CCCC) (Poteete, 2012; Palmer et al., 2015; Patterson, 2017). Links to complexity thinking (Cilliers, 2000), and critical institutionalism (Cleaver & de Koning, 2015) literature.	Multiple resources, multiple stakeholders, cross-level focus; focuses on interactions among multiple actors and resources, recognises human agency.	Multiple stakeholders with contested interests, local resource users, support stakeholders, government; recognition of marginalised groups.	A new, emerging field of research, dispersed literature, limited theoretical development and empirical case studies.	Kerr (2007); de Koning (2014); Lubell (2015); Colfer and Pfund (2012); Margerum and Robinson (2016a).

These bodies of literature are: common pool resources (CPR), community-based natural resource management (CBNRM), collaborative natural resource management (CNRM), various collaborative approaches to forest management in the tropics (collaborative forest approaches), co-management and adaptive co-management (CM & ACM), integrated landscape approaches (ILA), and finally, a new emerging field which I label 'collaboration in complex, contested contexts' (CCCC) (Table 3.2).

These bodies of literature differ in a number of ways, primarily by the 'extent of multifunctionality' i.e. the nature of the resource or ecosystem around which stakeholders are collaborating as well as by the 'extent of collaborative complexity', i.e. the nature and diversity of collaborating stakeholders and level of spatial scale at which they are expected to collaborate (Table 3.2, Figure 3.3). There is no obvious body of literature which explicitly looks at collaboration for social-ecological stewardship in landscapes; however, the diagram in Figure 3.3 indicates increasing applicability of these literature bodies to this study (from bottom left towards top right of the diagram), with the ILA and CCCC literature being most aligned and applicable.

In general, the literature at the bottom left of the diagram is older and has a more established body of theoretical and empirical literature, whereas the literature towards the top right is more recent and less established (Figure 3.3). Not only does the literature on ILA and CCCC account better for multifunctionality and complexity of the collaborative context than the older literature, but ILA and CCCC also demonstrate recognition of landscapes as social constructs in which history, culture, and values play an important role in people's interactions with the social-ecological system.
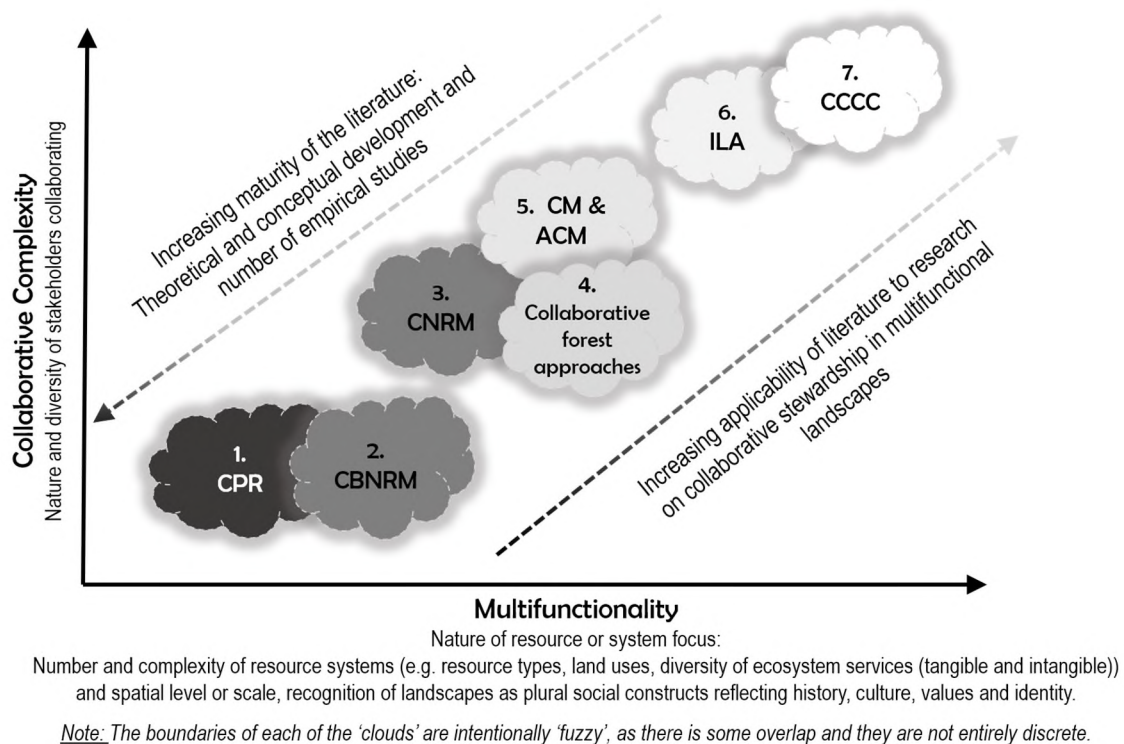
Figure 3.3: Bodies of literature on collaboration in natural resource management of relevance to this study (Refer to Table 3.2 for description of acronyms), arranged according to the level of collaborative complexity and multifunctionality addressed in the literature.

However, both these bodies of literature are relatively recent (although ILA builds on the older integrated natural resource management (Frost et al., 2006)) and as such have yet to develop conceptual and theoretical depth, particularly in how they deal with the nuanced challenges of collaboration among diverse stakeholders in complex SES (Erbaugh & Agrawal, 2017; Patterson, 2017). Furthermore, despite much optimistic academic rhetoric, the ability of ILA to reach the ideals of integrated social and environmental challenges and effectively address the trade-offs between agriculture and other land uses is yet to be proven (Erbaugh & Agrawal, 2017; Reed et al., 2017). The literature on collaborative forest approaches (Table 3.2: '4. Collaborative forest approaches') is not a cohesive, well-defined body of work in the academic literature. Therefore, although it may contribute important lessons on collaboration in complex contexts (as it draws on experiences in complex, multifunctional forest landscapes mostly in the tropics), it appears to lack theoretical development specifically regarding questions of collaboration (Figure 3.3).

3.4.1 Critique of existing research on collaboration and social-ecological systems

Recognition of natural resource management as a complex endeavour involving multiple, diverse stakeholders is not new. For example, as long ago as 1993, Grimble and Quan (1993, cited in Grimble and Wellard (1997)) stated that many natural resource management (NRM) situations are *"characterised by a complex web of interests and tradeoffs between interacting sets of local people, government departments, national and international planners, and professional advisers"*. However, I argue that existing literature on collaboration does not sufficiently account for these complexities. One reason for this may relate to an over-emphasis on organised institutional, governance, and rule-based approaches as popularised by Ostrom's work (for an example of this critique see Campbell et al. (2001)) and a subsequent lack of attention to human agency, social diversity and the social-relational aspects of collaboration for NRM (Cleaver, 2012; Fabinyi et al., 2014; Patterson, 2017).

Nonetheless, the more established bodies of literature, such as CPR, CBNRM, and CNRM do offer a wealth of theories, well-developed concepts, and many empirical studies which provide important insights for collaboration for stewardship in landscapes. The more recent literature on CM and ACM is particularly relevant to my study, as it is framed by the concepts of social-ecological systems and resilience. The focus of this literature is, however, often on single resources and much of the literature is from the Global North and therefore application to contexts of multifunctionality in countries such as South Africa may be limited. Much of the literature on ILAs implies that collaboration across an entire landscape can be facilitated through a single platform. Similarly, collaboration often comes across as a panacea which, if it can be achieved, could solve all the sustainability challenges inherent in complex, multifunctional landscapes. There are nevertheless important lessons for complex collaborative settings in this literature.

Since questions on collaboration in ILA and CCCC literature are still in the early stages of theoretical and conceptual development (Kerr, 2007; Erbaugh & Agrawal, 2017), there is a need for further research on collaboration for stewardship in complex contexts characterised by 'many multiples' (Poteete, 2012;

Patterson, 2017). The literature on ILA and CCCC illuminates some important research opportunities in this regard. Effective implementation of ILAs, and similarly of co-management and adaptive co-management approaches, is dependent on effective institutional and governance arrangements. These need to operate at and/or above the landscape level, and are recognised as possibly the biggest constraint in bringing about sustainable management of landscapes (Sayer et al., 2013; Van Oosten, 2013; Wambugu et al., 2014). Hence, there is a need for research on social-relational processes involved in implementing a landscape approach through collaborative and institutional mechanisms (Freeman et al., 2015).

The potential value of an SES framework to support theoretical development of collaboration in complex, contested systems is recognised. Erbaugh and Agrawal (2017: 2), for example, call for theoretical development of landscape approaches, suggesting that a social-ecological systems framework (Ostrom, 2009) may be useful: "*Social-ecological systems scholars must rise to the task of theoretically and empirically advancing the LA* (landscape approach)... *it is critically important to develop stronger frameworks and use them to evaluate theories and test models through careful scholarship.*"

Although a social-ecological systems approach (Berkes et al., 2008; Ostrom, 2009) and related research on common pool resources (Ostrom, 1990; Ostrom & Cox, 2010) provide an important conceptual framework to begin deepening the theory on collaboration in complex contested systems, it also has shortcomings (Cote & Nightingale, 2011; West et al., 2014; Stone-Jovicich, 2015). Some of these shortcomings include insufficient recognition of the diversity of knowledge types and perspectives of individual actors within the system, and that actors may be temporally, spatially, and institutionally fragmented (Patterson, 2017). Poor recognition of social diversity (Fabinyi et al., 2014), lack of attention to the role of human agency and the interactions between agency and structure (Stone-Jovicich, 2015), and insufficient focus on issues of power and politics (Davidson, 2010; Fabinyi et al., 2014) have also been identified as weaknesses in existing SES research. Furthermore, the SES framework proposed by Ostrom (2009) insufficiently captures the interdependencies in complex, contested contexts where multiple stakeholders interact with multiple resources through multiple activities, which affect multiple resource units and systems i.e. the framework also does not sufficiently represent the dynamic and interactive aspects of resources and actor activities (Poteete, 2012; Hinkel et al., 2015; Patterson, 2017).

Thus, turning to the social sciences, it is necessary to pay attention to the role of human agency, social diversity, and intersubjectivity among actors involved in collaboration through qualitative research, and to interactions among factors that influence collaboration (Fabinyi et al., 2014; Stone-Jovicich, 2015; Patterson, 2017). This can be framed through a complex systems paradigm (Cilliers, 2000; Audouin et al., 2013), recognising that "*collective action cannot be implemented or delivered through conventional management planning and target-setting ...instead what is needed is to focus on building enabling capacities and cross-level interplay from which adaptive and contextually appropriate forms of collective action can emerge*" (Patterson, 2017: 269). In Chapter 4, I draw on complexity thinking, among other concepts, to propose a

philosophical and methodological framework to guide the study. Below I propose a theoretical 'waymark' to strengthen research on collaboration.

3.5. The pathways approach: a theoretical waymark to guide research on collaboration for stewardship in landscapes

Research on collaboration for stewardship in landscapes (i.e. complex, contested contexts) requires deeper research on social-relational and institutional aspects of collaboration. Thus, I now propose a 'waymark' to guide such research efforts. I intentionally suggest a 'waymark', rather than the usual 'research framework' or 'research agenda' which imply a level of inflexibility. I do this in recognition that conducting situated (Cote & Nightingale, 2011), contextual (Leach et al., 2010), and place-based research (Norström et al., 2017) requires flexible research approaches. Theoretical, methodological, and philosophical approaches which are open to unexpected surprises and changes in direction and allow space for action-oriented knowledge co-production with local stakeholders, are necessary (Audouin et al., 2013) (For further discussion on this, refer to Chapter 4, Section 4.2). Here, I argue that research on collaboration can be deepened by drawing on the pathways approach as a theoretical waymark.

In recognition of some of the limitations of researching the social in SES described above, researchers have recently begun to consider the complementarity of the 'SES and resilience approach' (developed by numerous researchers, but strongly driven by the Stockholm Resilience Centre in Sweden) and the 'pathways approach' (developed primarily by researchers at the STEPS Centre in the United Kingdom) (Leach et al., 2012; West et al., 2014). However, the fundamentally different ontological (how we are in the world, or what we constitute as reality) and epistemological (how we know the world, or what constitutes valid knowledge) origins of these two approaches make it difficult to bring them together (West et al., 2014). Resilience thinking has emerged primarily from a positivist or post-positivist orientation, whereas pathways has emerged from a constructivist orientation (West et al., 2014). I propose that adopting critical realism as an underlabourer creates an enabling ontological and epistemological space in which to draw on both these approaches (Refer to Chapter 4, Section 4.2.3, for further discussion on critical realism and the concept of underlabouring), i.e. to bring together the strengths of the SES and resilience approach and the pathways approach.

I agree with Karpouzoglou (2016) that theoretical multiplicity (combination of theories to address complex problems) is needed to advance sustainability research and that it can help to address some of the 'epistemologically grey areas' such as social diversity, power, politics, and equity which I pointed out above. With this in mind, the pathways approach offers promising theory to deepen research on collaboration in social-ecological systems research. For example, Leach et al (2013: 84) propose a conceptual model for sustainability based on the notion of navigating pathways between social and planetary boundaries, or in the 'safe and just operating space for humanity' (Figure 3.1, Figure 3.4). This approach is integrated with an agenda called the 'Three Ds' to support researchers, practitioners, and policy-makers in identifying equitable

and sustainable pathways for development. The 'Three Ds' are: direction (purposefully steering pathways toward transformation needed to stay within a safe operating space), diversity (nurturing more diverse approaches and forms of innovation, fostering diversity within social-ecological systems) and distribution (sharing the 'the safe operating space' between different people, and asking about who gains and who loses) (Leach et al., 2012; Leach et al., 2013). This approach can guide efforts to develop pathways towards managing trade-offs between the multiple benefits and their diverse beneficiaries, provided by a variety of ecosystem services in landscapes (Scherr & McNeely, 2008; Raudsepp-Hearne et al., 2010).

The pathways approach can contribute to deepening research and practice on stewardship and collaboration, and I illustrate some such opportunities here by briefly discussing the implications of the Three Ds for collaboration. The first D – 'Direction' is about the goals towards which an initiative is moving, and this should be primarily concerned with keeping pathways within the safe and just operating space. Social-ecological systems and resilience approaches (Section 3.2.2) and most of the existing collaboration literature (Table 3.1) generally work towards the normative goal of resilience and sustainability for a system as a whole (West et al., 2014). However, these goals are invariably context-specific and are likely to be contested (Leach et al., 2010). Therefore, the task of collaborative initiatives is to deliberately negotiate objectives or goals, recognising that there may be more than one way of defining the problem at hand and more than one pathway to sustainability. The pathways approach suggests that multiple alternatives or pathways to sustainability within the safe and just space are necessary, though all should seek to remain within both the planetary and the social boundaries (Figure 3.4).

This brings us to the second D – 'Diversity'. Both the SES and resilience approach and the pathways approach recognise the importance of diversity for resilience and sustainability (West et al., 2014). Yet, existing literature on collaboration (Table 7.3) often emphasises consensus-building as a key process of collaboration (Margerum & Robinson, 2016b). In multifunctional landscapes, with diverse stakeholders, a more pluralistic approach may be better suited (Wollenberg et al., 2005). More than one pathway to sustainability, may mean more than one collaboration in the landscape. This may mean building 'collaborations' (plural), rather than collaboration (singular). Furthermore, the pathways approach calls for adaptive, context-specific approaches to addressing sustainability challenges, working towards a basket of options rather than singular solutions (Leach et al., 2010).

The third D – 'Distribution', has particularly far-reaching implications for collaboration. The notion of distribution speaks to the concerns of equity, inclusion, power imbalances, and politics which are under-researched in social-ecological systems (Davidson, 2010; Stone-Jovicich, 2015). Existing literature often emphasises 'common entry points' (Sayer et al., 2013) or 'shared problems' (Gray, 1985; Wondolleck & Yaffee, 2000); however, in many landscapes, resources are contested and collaboration around a shared interest may not be possible (Colfer, 2005; Patterson, 2017). If we recognise the contested nature of landscapes and the need for trade-offs (Rodríguez et al., 2006), then the challenge of distributing the benefits of multiple ecosystem services means that conflict is more likely than collaboration.
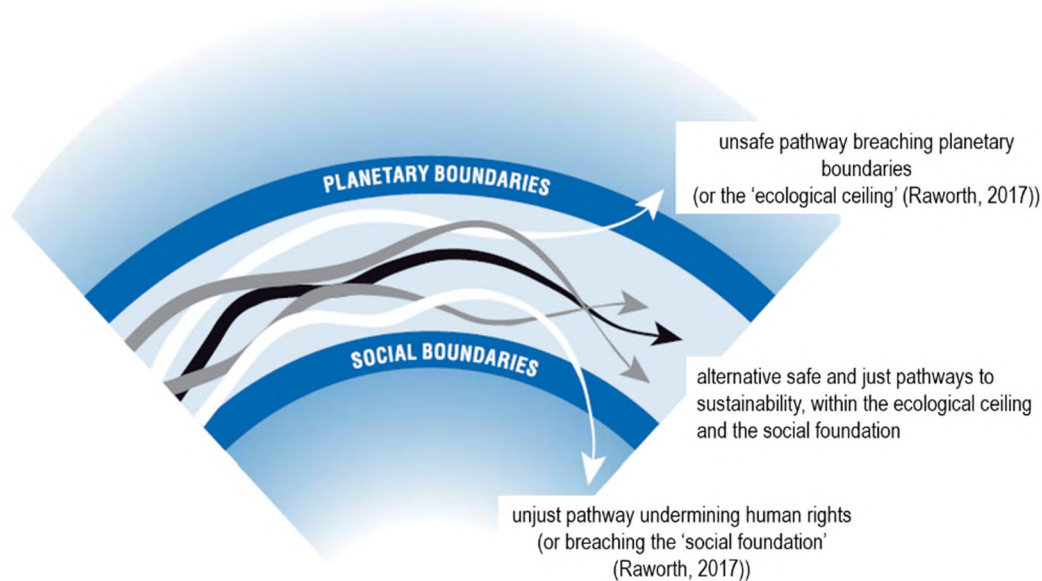
Figure 3.4: Alternative sustainability pathways or possibilities within the safe and just space between planetary and social boundaries (Leach et al., 2013: 87; Raworth, 2017).

Sharing of the 'safe and just space for humanity' is a lofty global goal, but how can the benefits of ecosystem services be shared at the local level? Recognising the need to pay attention to multiple, diverse framings and narratives about sustainability challenges in a landscape (Leach et al., 2010), we have to pause and ask: stewardship for whom? Leach et al (2010: 2) argue that *"we need to recognise the essentially plural and political nature of our quest for pathways to sustainability"*. By the same token, we need to appreciate the essentially plural and political nature of our quest for collaboration for stewardship in multifunctional landscapes.

3.6. Conclusion

The world faces pressing social-ecological challenges, locally and globally, and stewardship has a role to play in addressing these. However, the question of how to achieve social-ecological stewardship in practice remains. I have proposed landscapes as suitable place-based units for investigating how stewardship is achieved in practice. Since all landscapes are multifunctional and are complex and contested contexts, bringing about stewardship in practice requires collaboration among multiple stakeholders. I have synthesised literature on stewardship, multifunctional landscapes, and collaboration to guide research for

stewardship practice. This has revealed that literature on collaboration lacks conceptual development in complex, contested contexts such as multifunctional landscapes. I suggest that to deepen understanding of these contexts further research is needed to investigate social-relational and institutional processes for collaboration. Thus, I have proposed the pathways approach as a theoretical 'waymark' to guide this research.

In the next chapter, I first develop a philosophical and methodological framework drawing on critical complexity, transdisciplinarity, and critical realism to guide my empirical research. I then provide an overview of the research design and methods.

Chapter 4 | Research approach and methodology

"Interdisciplinarians cannot absolve themselves of the responsibility for thinking about what they are doing." (Sarah Cornell, 2010: 127)
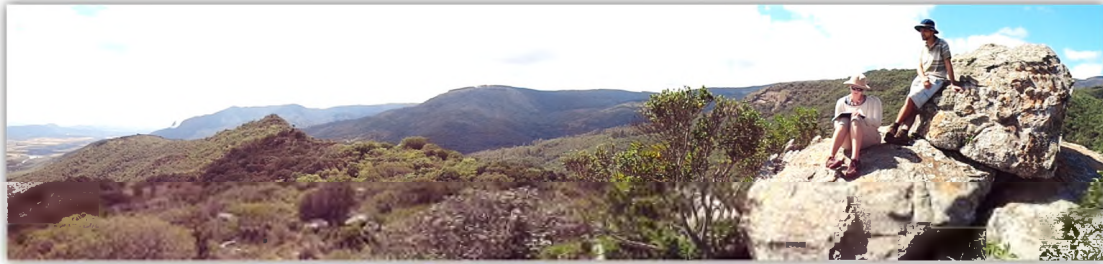
Landscapes as 'Thinkscapes': This photo was taken during one of my scoping visits to a project in Limpopo province early in my PhD. During this trip one of my co-supervisors and I agreed that the term 'thinkscape' would be a useful way to embed reflective practice into my engagements with landscapes during the research. Every opportunity to drive through, walk through, or sit and look over a landscape, could be turned into a 'thinkscape' moment, and an opportunity to reflect.

4.1. Introduction

In this chapter I introduce the overall approach and methodology of my research. The underlying logic is that philosophy informs methodology, which informs research design and methods. The philosophy and methodology also inform the overall approach i.e. the way in which research questions are formulated and developed, the way in which stakeholders are engaged, and the commitments to ethical research practice. The chapter begins with an overview of the philosophical and methodological framework and the three key ideas which inform this, namely critical complexity, transdisciplinary research and critical realism. This is followed by a section on research inference, design and methods, which briefly introduces the methods used in the research (which are explained in more detail in the empirical Chapters 5, 6 and 7), and gives an overview of the overall design of the study. I conclude the chapter with a discussion of ethical considerations for the research.

4.2. Philosophical and methodological framework

Researchers must be clear about the philosophical underpinnings which inform their research approaches (Creswell, 2009; Newing, 2011). This is particularly important when conducting social-ecological systems (SES) research, which is by nature interdisciplinary, and may not obviously conform to a single philosophical paradigm (Evely et al., 2008; Stone-Jovicich, 2015). Moreover, social science research in the fields of environmental science, natural resource management, and conservation has been criticised for a lack of philosophical grounding and reflections on ontology (view or position on reality) and epistemology (view or position on knowledge) (Moon & Blackman, 2014).

In my philosophical and methodological framework, I drew on the perspective of critical complexity (Preiser & Cilliers, 2010; Audouin et al., 2013) as a guide to research on complex social-ecological systems. This perspective emphasises engagement with societal stakeholders. I therefore brought in transdisciplinary (TD) research as a methodological process to guide interdisciplinary, and engaged knowledge co-production with practitioners (Hirsch Hadorn et al., 2007b; Jahn et al., 2012; Lang et al., 2012). To deepen the interdisciplinary

aspects of transdisciplinarity, and to provide an enabling philosophical framework, I employed critical realism as an enabling philosophical meta-theory (Bhaskar, 2010, 2016). I will discuss each of these three components of the philosophical and methodological framework below, arguing for their relevance and value to this study, and showing how they are mutually reinforcing.

4.2.1 Critical complexity: a perspective for social-ecological systems research

In this study I am investigating stewardship practice and collaboration in multifunctional landscapes, which are tangible place-based examples of complex social-ecological systems (SES) (Berkes & Folke, 1998; Angelstam et al., 2013b). Complex SES are open systems, which have emergent properties emerging from dynamic interactions, often resulting in unexpected outcomes (Holling, 2001; Cilliers, 2005). Emergence means that the behaviour of the system is determined by the nature of the interactions between its components, not by the nature of the components themselves, i.e. system behaviour emerges from non-linear interactions in the system. Therefore, it is important to consider the implications of the complex nature of SES when conducting research, particularly for methodology (Walker et al., 2002; Carpenter et al., 2012; van Kerkhoff, 2014). An open system is a system which exchanges energy or information with its environment, and operates at conditions far from equilibrium (Cilliers, 2000). Since the interactions between components are rich, dynamic, and are characterised by feedbacks and non-linear processes, the behaviour of the whole system cannot be predicted from an understanding of its components (Cilliers, 2000). Because complex systems are open and can be very large, to study them, boundaries need to be drawn around a particular part of the system, therefore the complexity of the system must be reduced. This process of 'reducing' the system for purposes of study calls for reflexivity and awareness of the researcher's role, which is what the 'critical complexity' perspective supports (Audouin et al., 2013).

The danger in studying just one part of the system, and isolating It from the rest (as in reductionist modes of research), is that the emergent properties disappear (Stirzaker et al., 2010). Therefore, the challenge is to draw boundaries around a part of the system in ways that simplifies it sufficiently for us to be able to study it, but not to an extent that we make errors in our understanding of the system (Stirzaker et al., 2010; Audouin et al., 2013). Furthermore, the research needs to be accessible to other stakeholders in order for them to use it in decision-making (Roux et al., 2006; Stirzaker et al., 2010). This calls for 'requisite simplicity'. Requisite simplicity is an idea proposed by Holling (2001) to guide research on complex social-ecological systems. He says:

> ...there is a requisite level of simplicity behind the complexity that, if identified, can lead to an understanding that is rigorously developed but can be communicated lucidly. It holds that if you cannot explain or describe the issue of concern using at least a handful of causes, then your understanding is too simple. (Holling, 2001: 391)

Getting to requisite simplicity, so that we can generate knowledge of the system, requires explicit attention to drawing boundaries around a specific part of the system, or 'framing' the study (Stirzaker et al., 2010).

Hence, our knowledge of a system is dependent on framing practices (Audouin et al., 2013). One of the critiques of reductionist science based on assumptions of objectivism, determinism, universalism, and positivism is that framing practices are assumed to be value-free, and the subject–object divide is uncontested (Audouin et al., 2013). This means that the agentic role of the researcher in the knowledge process is ignored, and the potential influence of the researcher on the system of study is not considered. Audouin et al. (2013) suggest that defining boundaries cannot be an entirely objective process, as it involves value-based choices. They therefore suggest that a self-critical, and reflective, approach to framing practices is needed when studying complexity, and they call this perspective 'critical complexity' (Preiser & Cilliers, 2010; Audouin et al., 2013).

Critical complexity is a perspective on research in complex SES which foregrounds the normative or value-based nature of framing practices. It goes beyond the long-standing debate in complexity science between holism and reductionism (Preiser, 2012), calling for a post-reductionist and critical approach to studying complexity (Preiser & Cilliers, 2010). Critical complexity provided a useful perspective for my research as it helped to guide the choices I made in planning, designing, and implementing the research. By adopting this perspective, I recognised three important research practices. Firstly, on-going and critical reflection on framing practices in terms of the knowledge types recognised, i.e. whose knowledge counts (e.g. scientists, practitioners, or local people), and which fields or disciplines are included or excluded (Audouin et al., 2013). Secondly, reflection on framing practices in terms of the scope (or normative context, e.g. research sites and research objectives) of the research is necessary (Audouin et al., 2013). This can be done by asking, for example, what is in and what is out (spatial and temporal scale), or who is in and who is out (stakeholders and other affected people) of the scope of the study. Thirdly, the critical complexity perspective brings with it pointers for an attitude towards research characterised by modesty, humility, and provisionality. This is needed when studying complex SES, since we must recognise that our knowledge is limited, and be open to surprises (Cilliers, 2005; Preiser & Cilliers, 2010; Palmer et al., 2015). Preiser and Cilliers (2010: 271) suggest: "*The lack of complete knowledge does not mean that we should not act, but it does mean that we should do so with modesty.*" Adopting such an attitude should encourage us to take care and responsibility in our actions. Moreover, recognising that our knowledge is always incomplete, and that complex systems are characterised by uncertainty, a commitment to on-going learning (Palmer et al., 2015), or "*a learning orientation*" (van Kerkhoff, 2014: 149), is important.

Since my SES research is focused on stewardship and collaboration in practice, practitioners for whom this research may be relevant, and whose knowledge I recognise as important (Weber et al., 2014), needed to be part of the framing process. This is particularly important since I position myself, and my research, in the field of sustainability science (Kates et al., 2001), which is inherently normative. This means it addresses questions of how social-ecological systems ought to be managed, and how to enhance socio-economic activities and environmental capacities in a balanced way (Wiek et al., 2011). The pathways approach reminds us that

participation and deliberation are key to ensuring equitable sustainability outcomes that address the concerns of stakeholders, and that the details of these need to be articulated in a case-by-case manner (Leach et al., 2012; West et al., 2014). Therefore, including practitioners in the framing process becomes necessary, both in terms of knowledge types, and in defining the scope of the research. While the critical complexity perspective urges engagement with stakeholders in knowledge framing practices, it does not provide methodological processes for such engagements. I therefore turned to the field of transdisciplinary research to support the process of engaging with practitioners in the research.

4.2.2 Transdisciplinary research: a methodological process for engaged research

Transdisciplinary research (Jahn et al., 2012) offers a practical, method-driven means of applying and operationalising a critical complexity perspective in SES research. I take my understanding of transdisciplinarity from its use in sustainability science, which is a body of science that seeks to understand the fundamental character of interactions between nature and society. Such an understanding must encompass the interaction of global processes with the ecological and social characteristics of particular places and sectors, as well as society's capacity to guide those interactions along more sustainable trajectories (Kates et al., 2001). Transdisciplinarity refers to:

> a reflexive research approach that addresses societal problems by means of interdisciplinary collaboration as well as the collaboration between researchers and extra-scientific actors; its aim is to enable mutual learning processes between science and society; integration is the main cognitive challenge of the research process. (Jahn et al., 2012: 4)

Transdisciplinarity has seen a rapid rise in interest and popularity in the sustainability science literature in recent years (Hirsch Hadorn et al., 2007b; Pohl, 2011; Jahn et al., 2012; Lang et al., 2012; Brandt et al., 2013). One of the most widely-cited justifications for TD research is that it is considered one way of bridging the gap between science and society, or science and action, or research and practice, to address societal challenges in a meaningful way, particularly in the Global South (Reyers et al., 2010; Sitas et al., 2014; Swilling, 2014; Cockburn et al., 2016). Involving non-academic stakeholders in knowledge co-production (Schuttenberg & Guth, 2015), is considered a means to reducing or bridging this 'gap', and improving decision-making and management implementation for sustainability (van Kerkhoff, 2014). Knowledge co-production is "an inclusive, iterative approach to creating new information; it is distinguished by its focus on facilitating interactions between stakeholders to develop an integrated or transformational understanding of a sustainability problem" (Schuttenberg & Guth, 2015: 1).

Thus, my intention and assumption in selecting a TD research approach for my research is that it is an effective way of contributing new knowledge towards addressing societal sustainability challenges. The gap between research and implementation in the conservation and environmental management sciences and practices is widely recognised (Knight et al., 2008; Scherr & McNeely, 2008; Rice, 2013). In this study I aimed

to generate new knowledge and bring about change by bridging that gap, or rather, by creating opportunities for meaningful dialogue and knowledge exchange between researchers and practitioners.

The framework proposed by Jahn et al. (2012) and Lang et al. (2012) is a helpful guide for implementing a TD research approach in my PhD (Figure 4.1). This framework is well-suited for my research, as it recognises that there is an interface or gap between societal practice and academic practice. The framework provides specific design principles for TD research, and suggests a phased process of engaging with stakeholders (Jahn et al., 2012; Lang et al., 2012), in my case, stewardship practitioners. These stages are:

1. formation of a common research object;
2. production of new knowledge; and
3. transdisciplinary integration (Figure 4.1).

I used a modified version of this framework which includes an additional 'Stage 0' called 'Prospecting', in recognition of the time it takes to identify and begin building relationships with TD research partners before formal research activities begin (Cockburn et al., 2016) (Chapter 9).

In this study, the *societal problem* (in the words of Jahn et al (2012), Figure 4.1) – one might also call this a 'sustainability problem' – is that of facilitating stewardship practice and collaboration among multiple stakeholders in multifunctional landscapes. I have observed this societal problem through my own work as an environmental practitioner working on stewardship in landscapes over several years (Chapter 9). Moreover, in the six months preceding the official start of my PhD, I undertook a structured process of engagement with stewardship practitioners to co-develop the research objectives for the PhD, i.e. to frame the research together with practitioners (Refer to Chapter 9 and Appendix 2 for details on this process). Thus, the research aim and objectives have emerged from close and on-going engagement with societal actors who are grappling with this particular societal problem, and interactions with practitioners continued throughout the entire research process (Chapter 9, and Appendix 2). The *scientific problems* (Figure 4.1) are those research questions arising from the theory on stewardship, landscapes and collaboration, which I reviewed in the academic literature (Chapter 3). Thus, the study integrated questions arising from practice ('societal practice' in Figure 4.1) and theory ('scientific practice' in Figure 4.1) to inform the research on the practice of stewardship and collaboration.

In a TD research process, these problems are transitioned (rather than 'solved') by *"differentiating and integrating knowledge from various scientific and societal bodies of knowledge"* (Lang et al., 2012: 27). In this research I consider two specific bodies of knowledge (Tengö et al., 2014):

1. practical or practice-based knowledge (Weber et al., 2014) held by stewardship practitioners (also called 'societal actors'), and also in unpublished 'grey' literature emanating from organisations practicing stewardship; and

2. scientific or academic knowledge embedded in academic literature, based on theoretical and empirical research across the social and environmental sciences.

Engagement with societal actors throughout the research process is an important principle of TD research (Hirsch Hadorn et al., 2007a; Lang et al., 2012). This means the research needed to be done in a reflexive manner in order to be responsive to any possible new insights or changes in direction which may have emerged from on-going engagements with societal actors. The societal actors which I focused on in this study were stewardship practitioners or facilitators working in NGOs across South Africa (Refer to case studies in Chapter 6 and 7, and reflections in Chapter 9). Through on-going engagement with these local stewardship practitioners, I sought to explicitly acknowledge and integrate the practice-based knowledge (Weber et al., 2014) of local practitioners, and my academic knowledge as a researcher. The TD research process provided the tools to do this.
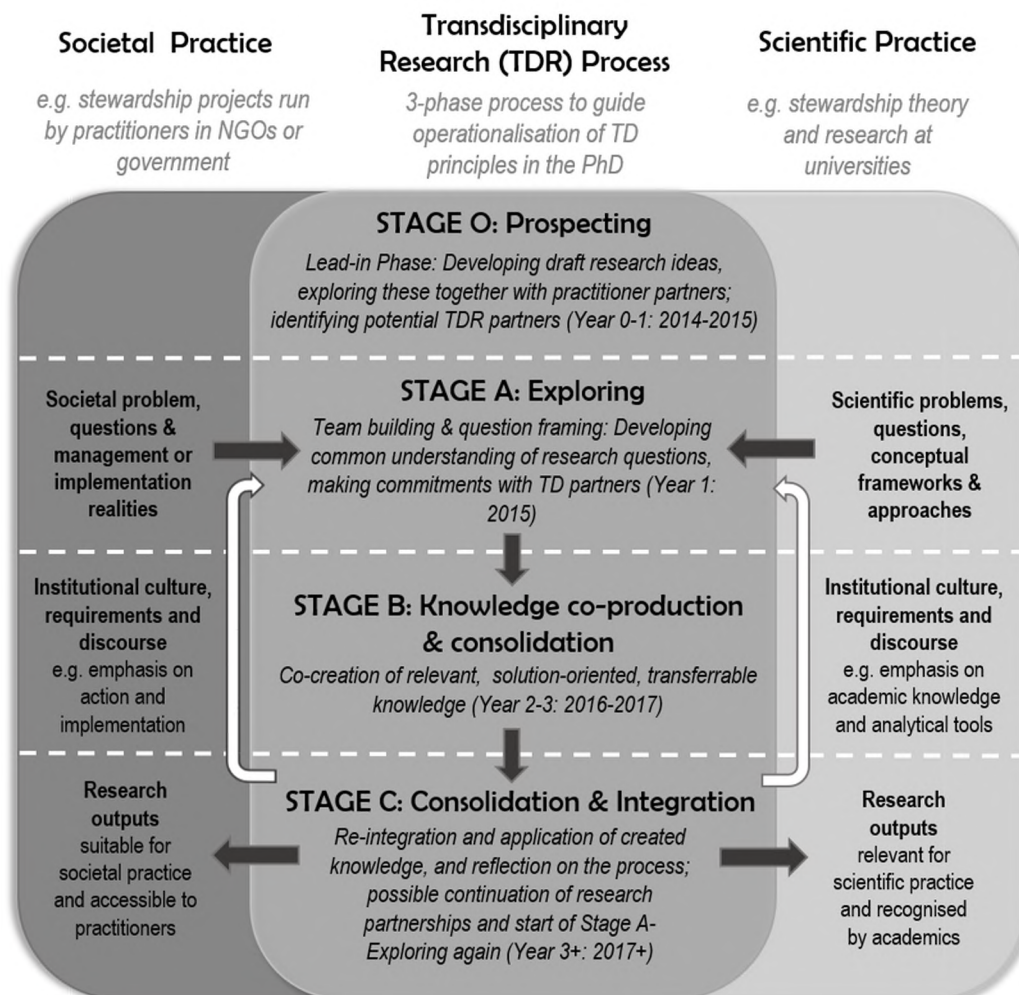
Figure 4.1: A model showing stages of an ideal transdisciplinary research process in the sustainability sciences. Modified from Jahn et al. (2012), Lang et al. (2012), and Cockburn et al. (2016).

Reflecting on on-going learning and adaptation which are emphasised in critical complexity (Rogers et al., 2013), brings me to a critique of the Jahn et al. (2012) model of TD research (Figure 4.1):The linear design of the diagram and the emphasis in Stage 3 on 'research outputs' seems to follow the more conventional technology transfer paradigm of research into practice, which is considered ill-suited to complex SES (van

Kerkhoff, 2014). The model in its current form does not sufficiently emphasise the need for on-going learning and knowledge exchange (feedback), adaptation, and reflection necessary for a complexity approach to research. I advocate for, and sought to implement in this PhD research, a TD research knowledge co-production process informed by a critical complexity perspective, in which emphasis was placed on-going learning, knowledge exchange and adaptive decision-making. This was enabled by my embedding myself within an NGO project team for the research in the Langkloof (Chapter 6), and by developing a 'transdisciplinary epistemic community of practice' (van Breda et al., 2016), i.e. a network of practitioners with an interest in my research, with whom I exchanged ideas and reflections on the research process on an on-going basis. I will reflect further on this in Chapter 9.

Transdisciplinarity is distinct from interdisciplinarity through its focus on engagement with non-academic societal actors (Brandt et al., 2013). I use these two terms in the thesis as follows: 'interdisciplinary' when focusing on the academic aspects of the research (i.e. drawing in an integrated manner on theories, methodologies and literature across social and environmental disciplines), and 'transdisciplinary' when referring to the aspects of the research which went beyond academic interdisciplinary research to work closely with societal actors, i.e. drawing in an integrated manner on academic knowledge and practice-based knowledge.

The TD framework in Figure 4.1 foregrounds the societal engagement characteristics of TD, whilst somewhat obscuring the interdisciplinary nature of the academic aspects of the process. The focus on action-oriented research and stakeholder engagement must not detract from the challenge of integrating across academic disciplines (van Kerkhoff, 2014). It is important to remember that Max-Neef, one of the forerunners of sustainability science TD thinking, called for "*strong transdisciplinarity*" (Max-Neef, 2005: 5), which, in his conceptualisation, meant a fully integrative form of interdisciplinarity. He suggested that "*an integrating synthesis is not achieved through the accumulation of different brains. It must occur inside each of the brains*" (Max-Neef, 2005: 5). Thus, the TD challenge is not only to engage meaningfully with practitioner partners, but also to engage meaningfully across disciplinary boundaries within academia, and to "*be transdisciplinary*" (van Kerkhoff, 2014: 149) within ourselves. In Chapter 8 I seek to demonstrate how using critical realism's laminated totality as an analytical tool, can support this form of "*strong transdisciplinarity*" for which Max-Neef (2005) advocates.

Whilst TD foregrounds interdisciplinary research, and recognises the need for methodological and theoretical pluralism, it does not make explicit the philosophical underpinnings which enable such pluralism. The well-known 'paradigm wars' which have ensued between various research paradigms (e.g. constructivism, interpretivism and positivism) (Mingers, 2004) highlight the fact that there are fundamental differences which underpin methods and theories. Thus, to integrate research across disciplines as TD calls for, an understanding of the epistemological and ontological underpinnings of methods and theories is needed (West et al., 2014). Furthermore, since some of the underlying philosophies of science can be fundamentally

contradictory (Mingers, 2004), conducting inter- or transdisciplinary research requires a philosophical framework which can accommodate a plurality of methods and theoretical perspectives. The philosophy of critical realism is a suitable framework for this (Danermark et al., 2005; Cornell & Parker, 2010), though pragmatism is also widely recognised as an enabling paradigm for interdisciplinary or mixed methods research (Morgan, 2007; Shannon-Baker, 2016). Below, I introduce critical realism as a philosophical metatheory which can guide transdisciplinary research in social-ecological systems. I identify key features through which it contributes novel perspectives on the complex real-world problems I am investigating in this research.

4.2.3 Critical realism: a philosophical meta-theory to underpin transdisciplinary social-ecological systems research

Critical realism is used as a philosophy to underpin this research, and in this sense, it can be viewed as an 'underlabourer'. Roy Bhaskar (2016: 1), the originator of the philosophy of critical realism, explains the idea of underlabouring as follows:

> *Philosophical underlabouring is most characteristically what critical realist philosophy does…it aspires to clear the ground a little, removing, in the first place, the philosophical rubbish that lies in the way of scientific knowledge…and in this way to underlabour for science and more generally for practices oriented to human well-being and flourishing.*

Here he is making particular reference to the 'philosophical rubbish' that has characterised the paradigm wars mentioned above, and has prevented application of science to serving the needs of society. In his acclaim of Bhaskar's last book (published posthumously (Bhaskar, 2016)), David Graeber notes the following about the underlabouring role of critical realism and the work of Bhaskar:

> *His life's work gave us a solid ontological grounding for all those intuitions that most of us feel we should be able to justify, but are constantly being told by the reigning intellectual authorities we can't: that the world, and other people, are real, that freedom is inherent in the nature of the cosmos, that genuine flourishing can never be at the expense of others.*

In the sustainability sciences the issues of the world and people not being real may not be a serious concern. However, in the social sciences, the prominence of constructivist and interpretivist paradigms, in which the world and people are considered to be constructed or interpreted in people's minds, has stifled much applied and problem-oriented research. Hence, critical realism can be considered an enabling philosophy, one which can support inter- and transdisciplinary enquiries in the social sciences to gain a better understanding of the world and pursue emancipatory science towards a freely flourishing world (Bhaskar, 2016) (Refer to Box 4.1 for further personal reflections on selecting critical realism).

There are several reasons why this philosophy is well-suited to TD research in complex SES, however I will focus on four features of critical realism which I consider to be the most significant for this study, each of which I will discuss in turn below. Firstly, the 'depth ontology' of critical realism; secondly, the laminated

totality, and its implications for methodological pluralism; thirdly, theorising agency and structure and its implications for studying stewardship; and finally, the emancipatory agenda of critical realism. I conclude with a brief comment on the different ways in which transdisciplinarity is defined in sustainability science and in critical realism.

4.2.3.1. The depth ontology of critical realism

Ontology refers to how one views the world or reality, and as described above, critical realism recognises that there is indeed a reality (Danermark et al., 2005; Gorski, 2013). Critical realism recognises a layered reality or ontology, also called a 'depth ontology', made up of three layers embedded in one another. The first is the empirical layer, the uppermost layer, where one can observe and experience reality (and collect data), the next layer is the actual, which is the layer in which events actually happen (even if they are not experienced or observed), and the third layer, in which the above two are embedded, and is all-encompassing, is the 'real layer', which is the whole of reality or the world (Bhaskar, 2010). This layered ontology allows for causal explanations of social phenomena that go deeper than visible empirical observations or events, and as Danermark et al. (2005: 36) put it: *"it is the business of science to dig deeper than the immediate experience of events"*.

In any philosophy of science, one must not only consider ontology, but also epistemology. Epistemology refers to how one views knowledge of the world or reality. In critical realism, knowledge is recognised as fallible and incomplete (which aligns with critical complexity, which recognises uncertainty and incomplete knowledge in complex systems (Audouin et al., 2013)), and our knowledge of reality is recognised as being 'conceptually mediated' by theories and previous knowledge. Hence, facts are theory-laden or theory-dependent, and cannot be entirely objective (Danermark et al., 2005). Critical realism offers an epistemology that recognises that knowledge is socially embedded, but is nonetheless an important vehicle for bringing about change, and is founded on an ontology that asserts the material reality of the complex social-ecological challenges which are to be addressed through my research on stewardship in landscapes.

To put this into context of this study: landscapes are real phenomena, the people (and their perceptions, values, and world views) and ecosystems in them are real, and we can study them and begin to understand the underlying mechanisms which cause the events and outcomes which are visible or experienced in the landscape (for example, stewardship outcomes). Our knowledge and understanding of these mechanisms, and our interpretations of events and experiences are also real, but they are fallible and incomplete. Nonetheless, we can and should use this knowledge to support actions and behaviours that can contribute to flourishing of humans and nature in these landscapes, and in doing so we must be conscious and reflect on the role that we are playing as researchers in these open systems.

Box 4.1: A personal note on working with critical realism

My undergraduate training is in the natural sciences. As I began reading journal articles and books on interdisciplinary and social science research, I became keenly aware of the concerns regarding the choice of philosophy to underpin my PhD research. My research is inter- and transdisciplinary; however, it has a strong focus on social science theories, methodologies and methods. I therefore felt an obligation to pay careful attention to the ontology and epistemology underlying my research. Initially this led me to reading social science philosophy and methodology textbooks. I found this process inspiring and eye-opening, but also overwhelming and confusing, particularly as I realised what contested territory I was exploring, and that there was a 'paradigm war' (Mingers, 2004) unfolding on the pages I was reading. Fortunately, whilst trying to decide which 'faction' I would be aligning myself with (for example positivism, or constructivism?), I was introduced to critical realism as a philosophy of science.

The foundational texts on critical realism written by the originator Roy Bhaskar are difficult reading (a widely-recognised fact). Fortunately, there are other, supporting texts which make for an easier way into this work, and the most recent book published posthumously and edited by Bhaskar's colleagues and friends (Bhaskar, 2016), is by far the most accessible of his books and provides an excellent summary of his life's work. The support from colleagues and friends at the Environmental Learning Research Centre at Rhodes University also helped me to navigate this difficult terrain.

My explorations of critical realism have confirmed that this is the right philosophy to support my PhD research. I describe the academic arguments for this in the main text of this chapter, however I feel it is important for me to also express my personal reasons for this choice here. I am drawn to critical realism as it considers itself an emancipatory philosophy of science, and thus allows us as researchers to go beyond our traditional role as neutral observers and reporters of knowledge about the world, to becoming engaged as change agents through our research. I also like the fact that critical realism opens opportunities for inter- and transdisciplinary research and encourages methodological pluralism. Thus, it goes beyond the 'paradigm wars' to create an enabling philosophical space for conducting meaningful, potentially transformative, research on complex social-ecological research questions.

4.2.3.2. A laminated totality and motivations for methodological pluralism

Critical realism views the world as an open system, one in which multiple disciplines and ways of knowing are needed to gain an understanding of complexity, i.e. inter- and transdisciplinarity are needed (Bhaskar, 2010; Cornell & Parker, 2010). An open system perspective means that researchers have a responsibility to recognise the role they play in conducting 'emancipatory science' and participating in 'transformative praxis' (Archer et al., 1998; Bhaskar, 2010). Both critical realism and critical complexity recognise open systems and consequently call for critical engagement with framing, and reflection on the role of the researcher. This reinforces my suggestion that critical realism is a suitable philosophical meta-theory for research in SES research which takes a critical complexity perspective. Recognising reality as an open system means that research must consider reality at different scales and in different domains of knowledge (or disciplines).

This is what is called the laminated totality of critical realism. Bhaskar (2010: 9) suggests applying a model of seven orders of scale (i.e. a 'laminated totality') when analysing and explaining social-ecological phenomena (Table 4.1) I have renamed the original layers proposed by Bhaskar to align with my study (Table 4.1). Bhaskar encouraged such modifications, saying: "clearly the pie can be carved in other ways" (Bhaskar, 2016: 84). In Table 4.1 I provide interpretations for each of the laminations in the context of my study, to show how they apply to stewardship and collaboration in multifunctional landscapes. For example, the 'sub-individual psychological level' (1) is re-named as the 'self' and refers to the individual steward's identity, ethics and values. Similarly, the next two laminations are re-named 'self-to-world' (2) and 'self-to-others' (3) to capture the idea of stewards relating in multiple dimensions to the natural and physical world, and to the other people in the social world.

By recognising a laminated totality across scales (from individual at lamination 1, to the planetary level at lamination 7), critical realism allows one to get to some of the multiple interacting causal or generative mechanisms which underlie social-ecological phenomena, for example in my case, stewardship in landscapes. It thus has potential for a high level of explanatory power. Moreover, the recognition of a laminated totality opens up possibilities for methodological pluralism i.e. the use of a diverse set of approaches and methods to research, which cut across traditional disciplinary boundaries and allow for innovative ways to understand the world (Archer et al., 1998; Danermark et al., 2005).

By taking a critical realist approach in my research, I explicitly address the possibility that there may be multiple causal mechanisms, operating at multiple scales, which influence stewardship outcomes at the local scale (Cornell & Parker, 2010). These might act as enablers or barriers of stewardship or collaboration, and I thus use the concept of 'enablers and barriers' as an analytical tool in my case study chapters (Biesbroek et al., 2013; Shackleton et al., 2015) (Chapters 6 and 7). These multiple causal mechanisms can be elucidated by analysing the landscapes in each case study through the lens of a 'laminated totality' and by attempting to explain the phenomenon of stewardship by using the theory of 'four-planar social being' (which I explain further below in Figure 4.2; see also Chapter 8). For example, although I have collected empirical data only from interactions with people operating at laminations 1-4, I have been able to infer explanatory mechanisms which influence these empirical observations from higher scales (laminations 5-7), by applying this model as an analytical heuristic tool (Chapter 8). This explanatory power is a contribution which critical realism can offer to social-ecological research, as it allows one to move beyond descriptions and analyses of place-based social-ecological phenomena, towards broader tendencies and patterns (Newig et al., 2017). A limitation of existing research applying critical realist philosophy and theory, is that ecological aspects are often under-theorised or under-studied. Thus, social-ecological research, from a critical complexity perspective, can support development of this area in critical realist studies (for examples of other recent studies applying critical realism in social-ecological research see Fox (2014), Burt (2016), and Mukute (2016)).

Table 4.1: Interpretation of Bhaskar's model of 'seven laminations of scale' in this study

	Bhaskar's labels for the seven laminations or layers[1] (Bhaskar, 2010)	Labels for layers used in this study	Interpretation of each layer for 'collaboration for stewardship in multifunctional landscapes'
1	Sub-individual psychological level	'Self': individual level: psychology, values, etc.	Individual steward: their personality, ethics, values etc.
2	Individual or biographical level	'Self-to-World': individual's interactions with nature and the physical world	Interaction between the individual steward and their local context: their personal history, their farm, their landscape, their immediate socio-economic system.
3	Micro level studied, for example, by ethnomethodologists	'Self-to-Others': social-relational interactions between humans	Interaction between the individual steward and others in the community or landscape, e.g. through collaboration
4	Meso level at which we are concerned with the structural relations influencing functional roles	'Self-to Society': structure and culture of society	Interactions between the individual steward and broader society through culture, institutions, etc., e.g. cultural norms and practices, governance structures of the farming industry, communal land, or for natural resource management
5	Macro level orientated to the understanding of the functioning of whole societies or their regions	Society as a whole: characterised regionally (e.g. South Africa)	South African society as a whole: including the socio-economic context, politics, and nationally-determined cultural and social norms and ideologies.
6	Mega level of the analysis of whole traditions and civilizations	Geo-historical trajectories: characterised regionally	Geo-historical trajectories of South African society: including the legacies of Apartheid, colonialism
7	Planetary level concerned with the planet as a whole	Global trends: the entire earth system	Global trends such as globalisation, the capitalist world economy, climate change, increasing inequality, ecological degradation.

[1]Note that the first four layers equate to the model of the 'four-planar social being' (Figure 4.2).

An important concept which critical realism recognises as a result of this open-system, layered totality operating at multiple scales, is that of emergence (Danermark et al., 2005; Bhaskar & Parker, 2010). Emergence is a feature of complex systems (Refer to Section 4.2.1), which once again demonstrates congruence between the critical complexity perspective and critical realism. Elder-Vass (2005: 317) defines emergence as follows:

> *Emergence occurs when an entity possesses one or more 'emergent properties'. An 'emergent property' is one that is not possessed by any of the parts of the entity individually, nor when they are aggregated, without a structuring set of relations between them.*

Emergence is an important concept in critical realism as it allows for explanation of causal mechanisms (Elder-Vass, 2005) which can operate as enablers and barriers of stewardship practice or collaboration. By considering emergence in explanations of social phenomena and systems, one has to focus on the relationships between the entities in the systems, rather than on the properties of the individual entities themselves (Mingers, 2011). Thus critical realism emphasises the relational nature of social-ecological systems (Lotz-Sisitka et al., 2012) and is considered a 'relational ontology'. Although emergence is recognised

as a feature of SES (Holling, 2001), SES research to date has not sufficiently recognised emergence as a causal process which can be used to explain social-ecological phenomena. Through its conceptualisation of emergence as fundamentally causal, critical realism thus offers a useful way of explaining complex social-ecological phenomena.

4.2.3.3. Theorising agency and structure

In understanding social-ecological phenomena, the concepts of 'agency' and 'structure' are important: "…*agents are always acting in a world of structural constraints and possibilities that they did not produce. Social structure, then, is both the ever-present condition and the continually reproduced outcome of intentional human agency.*" (Archer et al., 1998: xvi). Within a critical realist framework, Archer's theories are useful in understanding stewardship in landscapes by considering, for example, the agency of local stewards and steward groups (Berkes et al., 2012) within the broader structural contexts of ecosystems, politics, economics, and institutions in which they are embedded (Lotz-Sisitka et al., 2012) (Figure 4.2).

3. 'Self-to-Others': social-relational interactions between the stewards and other humans

4. 'Self-to-Society': the steward's relations to structure and culture of society

1. 'Self-to-Self': the steward's relations to their own self at the individual level: psychology, personality, values, etc.

2. 'Self-to-Nature': the steward's relations with nature and the physical world
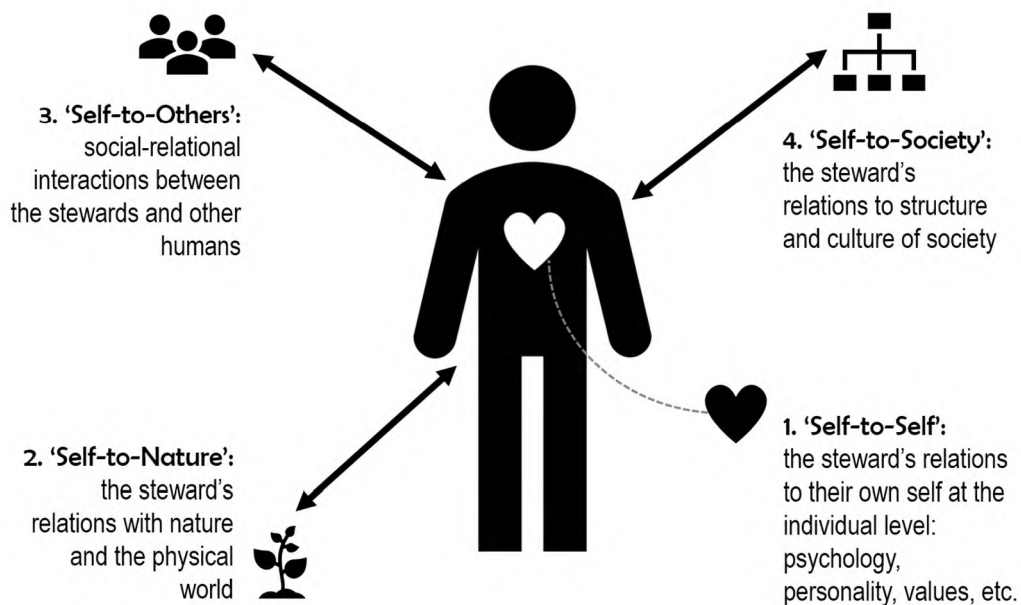
Figure 4.2: A diagram illustrating the theory of the four-planar social being, based on Bhaskar (2016: 54).

Human agency can be defined as the "*capacity of persons to transform existing states of affairs*" (Harvey, 2002: 173). Agency is a key characteristic which distinguishes social systems from ecological systems, and therefore opens up significant conceptual challenges in understanding the interactions between social and ecological systems (Davidson, 2010; Stone-Jovicich, 2015). Although human agency has been recognised as important in social-ecological systems and ecosystem stewardship research (Westley et al., 2013), critics contend that agency is often not sufficiently conceptualised in this literature, both at the individual and collective levels (Cleaver, 2007; Stone-Jovicich, 2015).

In critical realism, the relationship between agency and structure is conceptualised through the model of the 'four-planar social being' (Bhaskar, 2010, 2016) (Figure 4.2). This provides a useful theoretical tool for understanding issues around human agency with regards to stewardship ethic and practice at an individual

or collective level in a particular, local landscape. In this conceptualisation, agency is a fundamentally relational process (Harvey, 2002; Cleaver, 2007).

Using an individual agent, or in the case of my research a steward, as a starting point, every social event or phenomenon occurs in at least four relational dimensions (Bhaskar, 2010: 9) (Refer to Chapter 7, Section 7.4.3; and Chapter 8, Box 8.1). These four dimensions are (Figure 4.2):

1. 'Self-to-Self': the steward's relations to their own self, i.e. individual level: psychology, personality, values, etc. (for example, how individual values might influence a steward to implement stewardship actions).

2. 'Self-to-Nature': the steward's relations with nature and the physical world (for example, whether a steward relates to nature a resource to be used for his or her benefit, or as a source of inspiration for society).

3. 'Self-to-Others': social-relational interactions between individual humans (for example, how stewards might collaborate to take care of a river together).

4. 'Self-to-Society': the steward's relations to structure and culture of society (for example, how western culture's emphasis on individualism might make it difficult for a farmer to collaborate with his neighbours).

Thus, the agency of an individual steward is multi-dimensional, and emerges from his or her interactions with their own values and personality, with the natural and physical world around them, with other people, and with the structure and culture of society as a whole. These four dimensions of human agency align with the first four layers of Bhaskar's model of the 'seven laminations of scale' (Table 4.1). In the four-planar social being, critical realism therefore provides a useful analytical tool for SES research by focusing questions on, and seeking explanatory mechanisms from, multiple dimensions of human agency focused on stewards.

4.2.3.4. An emancipatory agenda

Critical realism is considered an emancipatory philosophy of science, as it explicitly calls itself a 'transformative praxis' (Bhaskar et al., 2010) and recognises the role that research can play in bringing about social change (Archer et al., 1998). Since sustainability science is a normative science, an underlying philosophy which supports normative goals (such as a 'freely flourishing society') is needed to underpin this. In this sense, the philosophy of critical realism supports the transdisciplinary methodology I will be employing in this study, and there is also synergy with critical complexity, in which researchers explicitly view themselves as part of the complex system they are studying, rather than as passive observers looking in on the system from the outside (Audouin et al., 2013). The following quote from Danermark et al. (2005: 150) succinctly captures how a critical realist meta-theory influences methodological choices:

> *If we assume – as critical realism does – that social science studies are conducted in open systems, that reality consists of different strata with emergent powers, that it has ontological depth, and that facts are theory laden, then these are some factors that affect the choice of design and method.*

Beyond the conceptual tools introduced here, critical realism also provides specific methodological approaches, primarily based on retroduction as a mode of inference (Section 4.3.1 below).

4.2.3.5. Transdisciplinarity in sustainability science and critical realism

Transdisciplinarity is defined variously in different bodies of literature (Hirsch Hadorn et al., 2007b; Bhaskar, 2010; Osborne, 2015). The definition of TD which I am using in this study differs from that used by Bhaskar (2010), who describes it as follows: *"involving the potential creative employment of models, analogies and insights from a variety of different fields and disciplines"*. In this sense, he is using the term where the 'trans' refers to transcendent or new, creative knowledge generated by the coming together of disciplines in *"strong transdisciplinarity"* (Max-Neef, 2005; Stokols, 2006), rather than 'trans' to mean going beyond academia into societal problems and practice, as is the case in the Jahn et al. (2012) definition which I am using. The definition I am using is widely cited in the sustainability sciences. Despite this difference in definitions, both critical realism and transdisciplinarity have emancipatory and action- and change-oriented agendas, and the definitions agree on the crucial shift needed to incorporate different knowledge types and perspectives in a more democratic and participatory manner in order to address society's most pressing challenges.

4.2.4 Integrative philosophical and methodological framework

The perspective of critical complexity, the methodological process of transdisciplinarity, and the philosophy of critical realism fit together, each bringing particular strengths, in my philosophical and methodological framework. Four principles emerge as central, shared principles between them, and I have used them to guide my research:

- Principle 1: transformative, action-oriented and diverse methods;
- Principle 2: meaningful engagement with societal actors;
- Principle 3: on-going learning in context, i.e. experience generates new understanding of the system; and
- Principle 4: reflexivity and awareness of the researcher role and framing are important (Figure 4.3).

These four shared principles have implications for the research design and methods in this study. I discuss each of the principles below, explaining how I applied them in the study. I also describe how I used these principles to inform the engaged research in the methods sections of my case study chapters (Chapter 6, Section 6.2.1; Chapter 7, Section 7.2.1).

4.2.4.1. Principle 1: Transformative, action-oriented and diverse methods

I selected the overall approach and methods of my study for their potential to involve societal actors i.e. they are mostly participatory and collaborative. I engaged societal actors in knowledge co-production which can potentially support their everyday actions in terms of stewardship practice and help bring about positive change (Chapter 9). Drawing on the notion of methodological pluralism (Danermark et al., 2005), I utilised diverse methods and approaches to address the complexity of the research questions in various contexts. I

analysed the data in a synthetic, integrative manner (Bazeley, 2011) to gain a deeper understanding of the 'necessarily laminated totality' which underlies the research questions (Bhaskar & Danermark, 2006).

4.2.4.2. Principle 2: Meaningful engagement with societal actors

In my engagement with societal actors I recognised them as more than just 'research subjects' or 'respondents'. As far as possible, I involved practitioners rather as research partners, or as participants, in a manner that not only benefited myself as the researcher, and allowed generation of data, but that also benefited the participants. I first put this into practice during the early engagements with practitioners to frame my research questions (Appendix 2). I also followed these principles in the case study research (Chapter 6 and 7). In addition, I developed a network of stewardship practitioners who have become an transdisciplinary epistemic community of practice for this PhD (Chapter 9). Transdisciplinary epistemic communities of practice emerge from the careful building and developing of informal knowledge exchange relationships between academic and social actors (van Breda et al., 2016).

4.2.4.3. Principle 3: Learning in context: experience generates new understanding of the system

In-depth knowledge of local contexts enable a deeper understanding of underlying causal mechanisms, and thus I selected case studies embedded in local contexts as a primary method for data collection and analysis (Stake, 2005; Yin, 2009) (Chapter 6 and 7). The national context in which stewardship practice unfolds is also important, hence the study began with a country-wide survey across South Africa to gain insight into stewardship practices across the country, and to facilitate identification of potential case studies (Chapter 6 and 7). On-going reflection (see below, Principle 4) enabled me to practice a 'learning orientation' (van Kerkhoff, 2014).

4.2.4.4. Principle 4: Reflexivity and awareness of researcher role and framing

I implemented the principle of reflexivity in two main ways: Firstly, I practiced reflection and reflexivity through an on-going research reflection journal, in which I employed the tools of 'free writing' (a reflective form of writing) and 'through-the-mirror' writing (a more reflexive form of writing) (Bolton, 2010). Secondly, I sought opportunities for collective reflection through reflective conversations with my supervisors, colleagues and practitioner partners throughout the process. This emphasis on reflexivity has helped me to be honest about the shortfalls of my research, to recognise opportunities for mind-shifts for myself, to be flexible and adjust my research approach where necessary, to consider how my own values influence the research framing, and to think carefully and critically about the multiple roles I have played in the TD process (Refer to Chapter 9, especially Section 9.3.1).
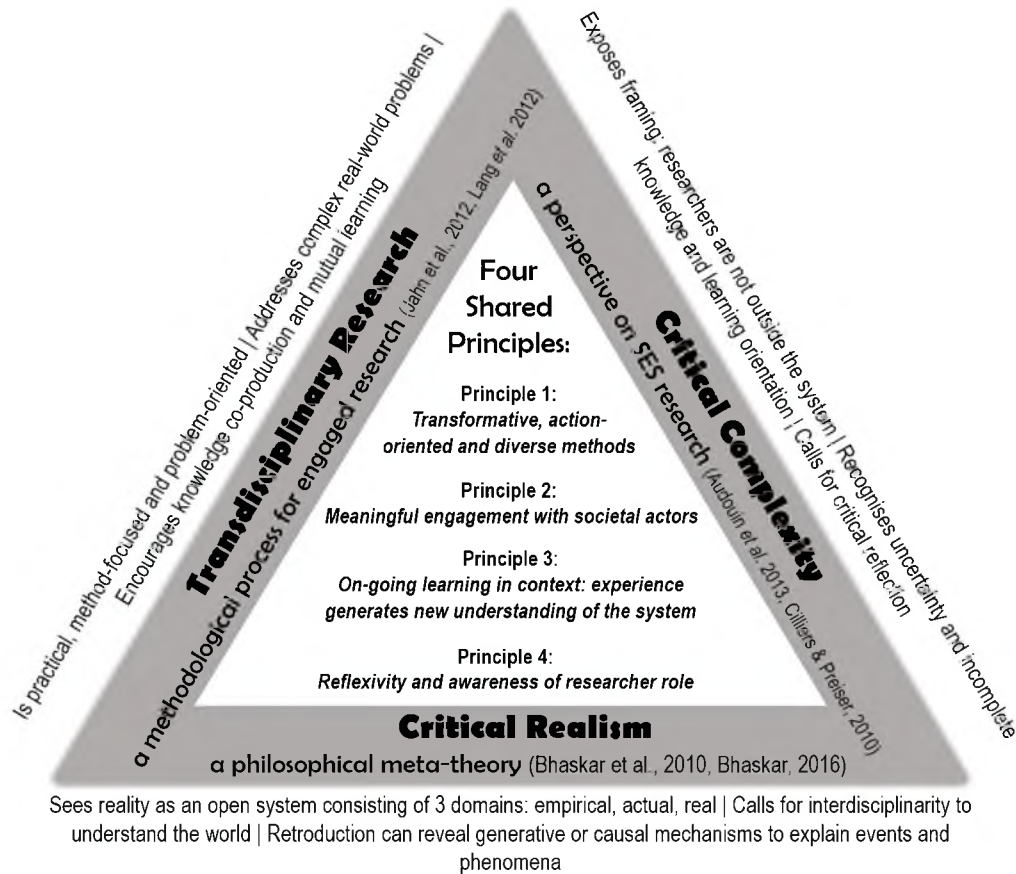
Figure 4.3: Philosophical and methodological framework which illustrates the relationship between the concepts which underpin this study: critical realism, critical complexity and transdisciplinary research. All three concepts share the four central principles.

4.3. Research inference, design and methods

4.3.1 Modes of inference

Considering the limited research on stewardship practice in SES in South Africa (Barendse et al., 2016), I chose to take an open-ended, exploratory research approach in which I sought to develop grounded research insights. This was well-aligned with my commitment to working closely with practitioners and recognising their practice-based knowledge (Weber et al., 2014). A deductive study, or one strongly framed by theoretical propositions up-front, might have limited the potential of learning from practitioners and in local contexts.

My study was based on two primary modes of inference which influenced the way in which I collected and analysed data, namely induction and retroduction (Figure 4.4). The primary mode of inference to guide data analysis in the empirical chapters was induction. Induction is an exploratory research strategy in which there is no particular hypothesis or theory which informs the research and data collection. Rather, theory is developed based on what emerges from the findings i.e. looking for general patterns and associations derived from observations of the world (Snape & Spencer, 2013). This is well-aligned with Principle 3 in the methodological framework above namely 'on-going learning in context and from experience' (Figure 4.3).

Retroduction is considered *"the vital contribution of critical realism"* (Danermark et al., 2005: 11), which I applied in the synthesis chapter of this study (Chapter 8) to identify underlying causal mechanisms and develop an explanatory synthesis of the empirical findings. In an explanatory, retroductive mode of inference, one asks questions such as: 'What qualities or conditions must exist (beyond concrete, observable phenomena) for something to be possible?' (Danermark et al., 2005). Once primary analysis of data (based on the inductive mode) had been conducted in the empirical chapters (Chapter 5, 6 and 7), I used these findings to conduct a retroductive analysis based on a heuristic analytical tool from critical realism (Danermark et al., 2005; Price, 2016).

4.3.2 Research design and sequence of the overall study

The overall design and sequence of my study is summarised in Figure 4.4, focusing on empirical chapters. The empirical chapters in the thesis are arranged along four axes in the diagram: scale and scope (from local and deep, to national and broad), time frame of the PhD project (2015 to 2017), intensity of TD research engagement with practitioner partners (low to high), and modes of inference (exploratory to explanatory). The overall approach was a sequential, mixed methods strategy, with an emphasis on qualitative methods (Tashakkori & Teddlie, 2003; Creswell, 2009).
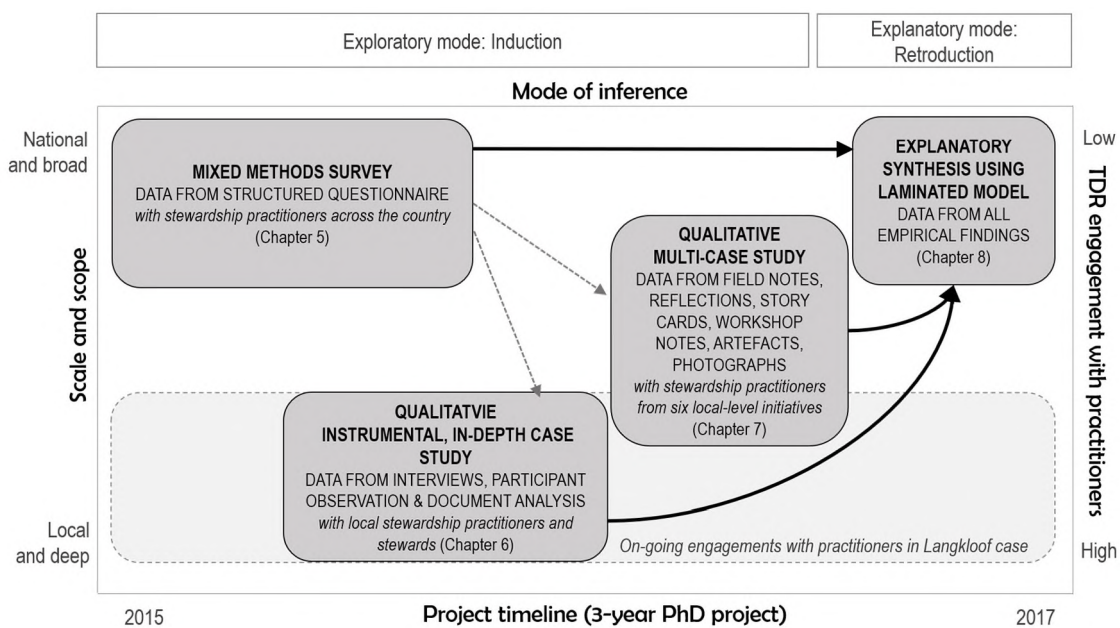
Figure 4.4: Overall study design sequence and research methods, indicating how methods varied according to scale and scope, project timeline, transdisciplinary engagement, and modes of inference.

I started collecting data through a nation-wide mixed methods survey of stewardship practitioners in 2015, taking a broad scope (Chapter 5). The findings from this survey informed selection of case studies. The first case study was a qualitative, in-depth, instrumental case study in the Langkloof (Chapter 6). This was based on on-going engagements with practitioner partners throughout the 3-year period, however interactions were most intense (and I collected most data) from late 2015 to mid-2016. I then zoomed out from this in-depth case to conduct the multi-case study in late 2016, which took place at an intermediate scale and scope,

as was conducted with six cases across South Africa (Chapter 7). The intention of this 'zoomed out' multi-case study was to explore whether the in-depth findings from the Langkloof case study were applicable in other, diverse contexts across South Africa. Findings from all three of these empirical data chapters were integrated in the explanatory synthesis chapter in which I employed conceptual tools and methodological processes from critical realism to synthesise findings across all three chapters (Chapter 8). The level of TD research engagement with practitioner partners, and the level knowledge co-production, varied in different parts of the study, and was highest in the case studies (Figure 4.4).

4.3.3 Methods for data collection and analysis

The research methods for this study drew on mixed methods and qualitative approaches, which were operationalised through survey research and two types of case study research, namely an in-depth instrumental case study; and a multi-case study (Figure 4.4).

Principle 1 of my philosophical and methodological framework (Figure 4.3) 'transformative, action-oriented and diverse methods', guided the selection of methods. A mixed methods approach was considered suitable for this interdisciplinary study since transdisciplinarity emphasises 'method-driven' approaches (Lang et al., 2012), and critical realism enables and encourages 'methodological pluralism' (Danermark et al., 2005). Furthermore, although I have not foregrounded pragmatism as part of the methodology, transdisciplinarity is similar to pragmatism in its orientation to real-world problems and practical methodological choices. To this end, pragmatism is the paradigm most often associated with mixed methods research (Creswell, 2009; Shannon-Baker, 2016), lending further support to the applicability of mixed methods in my study. Further details on specific research designs and methods for sampling, data collection and data analysis, and justifications for the suitability of the specific methods choices are described separately in each of the empirical chapters of the thesis (Chapters 5, 6 and 7).

4.4. Ethical considerations

Ethics is fundamental to the conduct of research (Hallowell et al., 2005; Ransome, 2013). Ethics are rules of conduct that people adopt when they act in social contexts (Ransome, 2013), and this particular context is social-ecological research. Ecological research, unless it impacts on animal ethics guidelines, generally does not require stringent ethical procedures, whereas social research does. Ethical behaviour is underpinned by universally recognised systems of moral values, defined by professional bodies or organisations (Hallowell et al., 2005). For my research, the *Rhodes University Ethical Standards Policy* (along with the *Rhodes University Ethical Standards Committee Handbook*[1]) provides the guiding framework for research ethics for all research conducted in the Department of Environmental Science. I adhered to this closely in my study. I submitted a written research proposal to my supervisor on 15th July 2015, and gave an oral proposal presentation in the Department of Environmental Science on 12th August 2015 (the audience included the departmental

---

[1] Available online: https://www.ru.ac.za/research/research/ethics/

Research Ethics sub-committee). Through these two procedures, the study was given ethical clearance on 12th August 2015 (But, refer to Appendix 2 for reflections on the pre-proposal engagements with practitioners which took place before this ethical clearance procedure).

Free and informed consent is an important aspect of social research. I used written consent forms for the survey questionnaire and the case study interviews (Refer to Appendix 3 for a copy of the consent form, a similar form was used for both purposes). All survey and interview respondents were literate and competent English-language speakers; thus, the written English-language form was suitable. Participants in the online version of the stewardship practice survey confirmed consent by clicking a consent box on the online form.

Providing feedback to the participants in the research is also an important consideration for research ethics. In the engaged TD approach taken in this study, on-going communication about the research with practitioners and communities was a high priority (Principle 2, Figure 4.3). I maintained on-going e-mail contact with a small network of practitioner partners and participants throughout the study, sending out quarterly e-mail updates about my research. The results of Chapter 5 were presented as feedback to practitioners at two events (Symposium on Contemporary Conservation Practice in November 2016, and Western Cape Biodiversity Stewardship Reference Group Meeting on 23 February 2017). Feedback on the case study research occurred on an on-going basis with practitioner partners through e-mail and Skype meetings, and feedback was provided as a written email newsletter to all research participants in the Langkloof case study on 1 December 2016. Through my on-going participation in the Langkloof case study with the local NGO Living Lands (from February 2015 until February 2017), I was able to provide on-going feedback with the practitioner partners and community members encountered through various communication channels and events hosted by Living Lands (Refer to Chapter 9, Figure 9.2 for a brief description of science communication with the broader practitioner community).

4.4.1 Reflecting on the challenge of ethics in a transdisciplinary approach

As this study was explicitly transdisciplinary in nature, my role as a researcher was slightly different to more conventional research: I was both a researcher and a 'change agent' (Fox, 2014). This means that I had a particular normative 'agenda' or 'value standpoint' (Ransome, 2013), in terms of what kind of social-ecological change I wanted to see my research contribute to (Refer to Chapter 1, Section 1.3, where I position myself as a sustainability scientist). I had to be open and honest with research participants about this and took a reflective stance in this dual role (Ransome, 2013). I included a statement about my 'research agenda' in written consent forms for the survey research and the interviews in case studies. As has been described above, reflection and reflexivity are important practices in transdisciplinary and critical realist research, and this is particularly important for the ethical aspects of the research.

The other issue relevant to ethics in a transdisciplinary PhD is that the timelines and structure of this PhD were quite different, and current ethical clearance processes at Rhodes University currently do not account

for this. For example, one of the most important aspects of an individual transdisciplinary study engaged with societal actors is the building of interpersonal relationships and trust between the research and the societal actors who will be participating in the research (see 'Stage 0' in Figure 4.1) (van Breda et al., 2016). If I had waited until completion of my research proposal and ethical clearance before beginning to build such relationships, I would have lost valuable time and opportunities to build these relationships and could not have conducted the research in a truly engaged, transdisciplinary manner. In my case, I was fortunate to be able to build on previous relationships which I developed during the time working in the environmental practice context. I reflect further on this issue in a book chapter (In Press) in Appendix 1. The ethical challenges in an individual transdisciplinary PhD were also considered in the reflective research journal which I kept throughout my 3-year PhD experience, from which I draw lessons for other TD researchers in Chapter 9.

4.5. Conclusion

In this chapter I have argued that the perspective of critical complexity, methodological processes from transdisciplinary research, and the philosophy of critical realism together form an enabling philosophical and methodological framework for the social-ecological research presented in this thesis. Drawing on the principles of this framework, I have introduced the methods and overall design of the study.

The next chapter, Chapter 5, is the beginning of Part II of the thesis, in which I present a set of three empirical chapters. In the first of these, Chapter 5, I will present a country-wide survey conducted with stewardship practitioners to investigate the meanings and practices of stewardship in South Africa. This chapter sets the scene for the rest of the thesis, as it serves to paint a picture of stewardship practice in the country, and indicates some initial insights on the challenges of facilitating collaboration for stewardship at landscape level. It is followed by two case study chapters (Chapter 6 and 7), in which I provide contextual, place-based insights on collaboration for stewardship practice.

PART II: INSIGHTS FROM THE FIELD | EMPIRICAL CHAPTERS

Chapter 5 | The meanings and practice of stewardship in South Africa

"Unless someone like you cares a whole awful lot, nothing is going to get better. It's not." (Dr. Seuss, The Lorax)

This farmer from the Langkloof is an exemplary steward. He cares and shares. Here he was showing me how wide the erosion gully was which he has now restored. He was proud of this stewardship achievement. It is benefiting him now, as there is clean, clear water in the dam at the bottom of this small valley. He also hopes it will benefit future generations.

5.1. Introduction

Stewardship has been put forward as a means of minimising human impacts on ecosystems and 'calls for stewardship' abound in the literature (Chapin et al., 2009c; Chapin et al., 2011a; Steffen et al., 2011; Hails & Ormerod, 2013; Ogden et al., 2013; Sayre et al., 2013; Folke et al., 2016) (Chapter 3). The links between the theory and practice of stewardship are however poorly developed (Worrell & Appleby, 2000; Barendse et al., 2016). The so-called gap between theory and practice is widely recognised in many fields related to environmental stewardship. It has been called the 'science-policy nexus' (Gaffy, 2008), the 'science-policy interface' (Swilling, 2014), the 'science-action gap' (Reyers et al., 2010; Cockburn et al., 2016), or the 'knowing-doing gap' (Knight et al., 2008). If stewardship is considered a significant part of the solution to ecosystem degradation, and a key to sustainability of social-ecological systems, how can it be achieved in practice? In this chapter, I recognise the global calls for stewardship, and seek to respond by investigating how stewardship practitioners are putting the theoretical ideals of stewardship into practice, at the local level in South Africa. I do this by investigating meanings and practices of stewardship and exploring the links between theory and practice.

5.1.1 Conceptualisations of stewardship in theory

Environmental stewardship has had several distinct, yet overlapping meanings attached to it over time. These changing meanings have mirrored shifts in environmental ideologies and evolving understandings of the relationship between humans and nature (Worrell & Appleby, 2000; Berry, 2006; McArthur, 2012) (Figure 5.1). The different understandings or conceptualisations of stewardship in the academic literature do not have distinct 'start and finish points' in time. Rather, they arose during particular times and most still exist, to a greater or lesser extent, in the present day. In all these conceptualisations, stewardship is a metaphor which describes a distinct kind of human-nature relationship (Flint et al., 2013; Raymond et al., 2013).

However, understandings of the nature of that relationship have shifted over time. These started as western Christian understandings based on spiritual and moral obligations for humans to care for nature with answerability to God, which then shifted to more secular understandings in which humans were thought to have dominion over nature for their own benefit. In the industrial era, understandings of stewardship captured a utilitarian conception of nature whereby humans could manage it to maximise productivity. In the 20th century, with the rise of environmentalism, stewardship was characterised by a more protectionist relationship between concerned humans and nature (Berry, 2006; Attfield, 2014) (Figure 5.1).
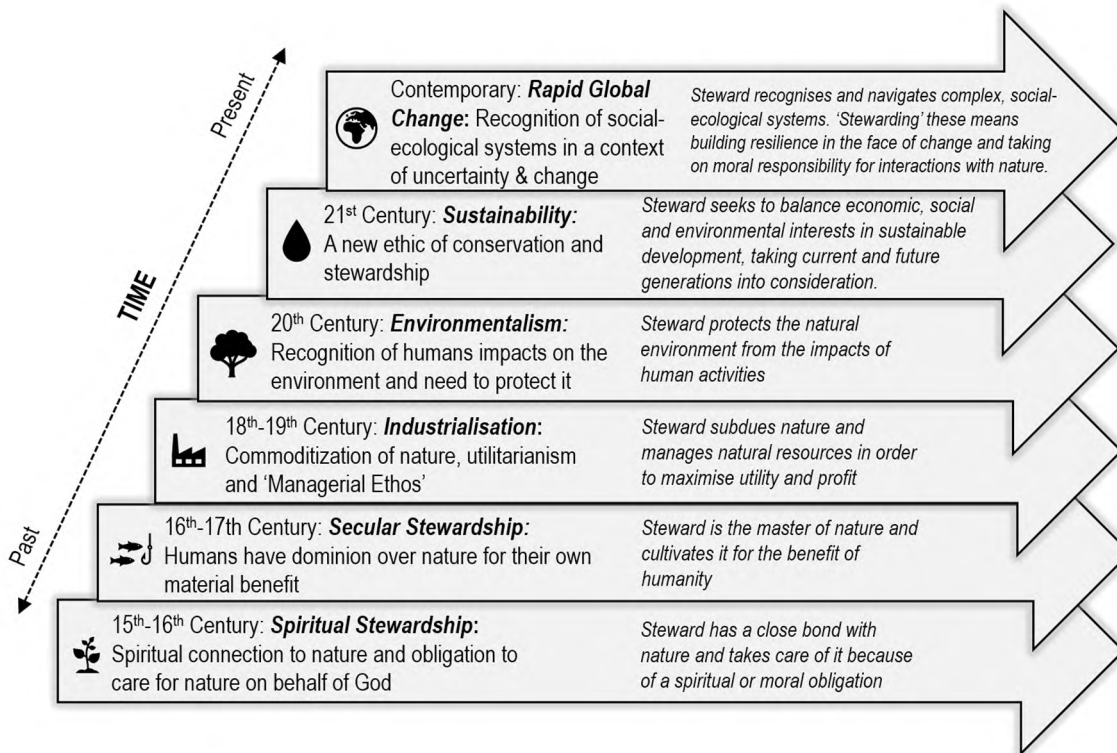
Figure 5.1: A timeline illustrating the changing meanings of environmental stewardship in western history (Adapted from Berry, 2006, McArthur 2012, and Worrell & Appleby 2000).

Of course, a plethora of understandings of stewardship also exist among diverse indigenous groups across the world (Peterson et al., 2010; Holmes & Jampijinpa, 2013; Jeffery, 2013; Reo et al., 2017). However, these indigenous understandings are poorly documented and not well-represented in the English language academic literature. Therefore, while recognising the importance of exploring these indigenous understandings of stewardship, for the purpose of this thesis, I focus on the English language academic literature, and therefore on mostly western understandings.

The global sustainability discourse which arose during the early 21st century in response to the Rio Earth Summit (Haque, 2000), is evident in some of the more recent understandings of stewardship (Welchman, 2012) (Figure 5.1). These recent interpretations indicate a shift towards more integrated, systemic understandings of the relationship between humans and nature, different to previous interpretations based on a more dualistic relationship. In the most recent understandings of the term stewardship (i.e. '21st

Century: Sustainability' and 'Contemporary: Rapid Global Change', Figure 5.1), the term has shifted significantly from a religious to a secular concept, and it incorporates concerns for social justice, democracy, pluralism and a broad and deep ethical basis from which human responsibility for nature arises (Welchman, 2012; Attfield, 2014). Moreover, the concept is considered applicable to a broad range of environmental concerns, including biodiversity preservation, climate change mitigation, and sustainable development (Attfield, 2014). This may explain its appeal to researchers in the sustainability sciences and social-ecological systems (SES) fields where it has recently seen increasing attention and use (Chapin et al., 2009d; Folke et al., 2016).

Contemporary meanings of stewardship are framed by narratives of 'Rapid Global Change' (Figure 5.1) (Chapter 1). These are linked to shifts in environmental discourse characterised by more systemic approaches to understanding and managing human-nature relationships, for example through the metaphor of SES (Chapter 3, Section 3.2.2). 'Ecosystem stewardship' (Chapin et al., 2009c) is one specific expression of the most recent conceptualisations of stewardship in the SES literature (Chapter 3, Table 3.1). An important distinction that sets ecosystem stewardship apart from other interpretations of stewardship not aligned to the SES discourse, is that stewardship action is considered to be a collaborative endeavour, bringing together multiple, diverse stakeholders to address the challenge of management and governance of complex social-ecological systems (Barendse et al., 2016). Other interpretations of stewardship often focus on stewardship actions at the individual level, for example working with individual farmers or private landowners through specific policy mechanisms (Plummer et al., 2008; Adams et al., 2014; Selinske et al., 2015).

Furthermore, ecosystem stewardship is characterised by the following principles: a management approach underpinned by *resilience thinking*; recognition of *ecosystems which provide diverse ecosystem services* rather than single resources; stewardship which recognises *stewards as an integral part of the system they manage* and the inherent *responsibility* they hold; the need for stewards to *work collaboratively with multiple stakeholders*; and the need for stewards to *anticipate and respond to social-ecological change* and shape it for sustainability to avoid loss of future options for the system (Chapin et al., 2009c; Chapin et al., 2009a; Chapin et al., 2009b). Explicit practical applications of ecosystem stewardship are only now starting to appear in the literature (Myers et al., 2012; Hansen, 2014; Chapin et al., 2015; Tai, 2015; Villasante & Österblom, 2015). Most of these originate from the Global North and only few focus on landscapes. There is a need to understand whether, and how, these most recent understandings are put to practice in different contexts, and this is one of the objectives of this chapter.

In this chapter I adopt the definition of 'environmental stewardship' proposed by Welchman (2012) (Chapter 3, Table 3.1). This definition recognises principles of sustainability inherent in the most recent meanings of stewardship (as in Chapin et al's (2009c) ecosystem stewardship), yet maintains the classic, intuitive understanding of stewardship which emphasises an ethic of responsibility. It is thus suitable for the exploratory, inductive research approach in this chapter in which I recognise multiple definitions of

stewardship. When I use the term 'social-ecological stewardship', I will use it to refer specifically to the most recent understandings of stewardship as defined in Chapter 3, Table 3.1.

5.1.2 The practice of stewardship

I use the term 'practice' as it is defined in the Oxford Dictionary: *"The actual application or use of an idea, belief, or method, as opposed to theories relating to it"* (Oxford University Press, 2017). Thus, the practice of stewardship is the actual, practical application of the concept of stewardship in a particular place or context. Worldwide, the concept of environmental stewardship is put into practice in a diversity of ways, however, the literature on stewardship tends to focus more on theory than practice (Worrell & Appleby, 2000).

One of the key features that stewardship practices have in common, despite this diversity, is volunteerism, and a focus on the actions and participation of local people in natural resource management (Carr, 2002; Barendse et al., 2016). Environmental stewardship initiatives focus on engaging the efforts, time, and resources of local people who use natural resources, and on facilitating their ability to steward, or take care of natural resources at the local level (Carr, 2002). Thus, putting stewardship into practice is both about the practical application of the theory or ideals of stewardship, and about moving from the ethic of stewardship held by individuals, to tangible actions based on that ethic (Worrell & Appleby, 2000). Stewardship initiatives may be facilitated by the state or by civil society organisations (Worrell & Appleby, 2000).

Examples of stewardship initiatives in the context of multifunctional landscapes in which agriculture is the primary land use activity (which this research focuses on) are described in Table 5.1. These stewardship initiatives include those which are policy-driven, including private land conservation tools, agri-environmental schemes, watershed or catchment management initiatives, and some forms of community-based natural resource management. There are also initiatives which are often not as formally institutionalised through policy, including a variety of informal community-based natural resource management initiatives, and various integrated landscape approaches. These initiatives vary according to a number of features, including their approach, objectives, stewardship actions, and alignment with the concept of social-ecological stewardship. They range from initiatives like private land conservation tools with a relatively narrow focus on biodiversity conservation objectives and limited alignment to social-ecological stewardship, to integrated landscape approaches, which seek to address multiple integrated objectives and are more closely aligned to social-ecological stewardship.

Recent research in South Africa indicates that while the practice of stewardship in the country is dominated by a fairly narrow biodiversity conservation focus through the 'biodiversity stewardship' tool (Chapter 2, Section 2.4), there is evidence of a diversity of more holistic practices emerging (Barendse et al. 2016). The diversity of meanings attached to stewardship, and specific local practices have, however, not been explored. Moreover, Barendse et al's (2016) study did not engage with stewardship practitioners and initiatives working at the local level, as their study was based primarily on desktop analysis and key informant

interviews. Exploring the meanings and practices of stewardship of people working at the 'coal face' of stewardship practice in South Africa, could provide rich, grounded insights to inform the global discourse of what stewardship encompasses as a concept, and how to pursue it practically.

Table 5.1: Sustainable natural resource management initiatives in landscapes described according to key features of stewardship practice

Type of stewardship initiative and examples in the literature	Features of stewardship practice			
	Type of approach or model	Primary objective of stewardship	Stewardship actions expected from stewards	Alignment to 'social-ecological stewardship'
Private land conservation tools such as conservation easements and land trusts, in the United States of America (Merenlender et al., 2004; Horton et al., 2017), and the biodiversity stewardship programme in South Africa (Von Hase et al., 2010; Selinske et al., 2015)	Policy-driven tool to incentivise biodiversity conservation (private land focus)	Biodiversity conservation	Setting aside land for biodiversity conservation, managing natural areas and water courses.	Low to Medium
Agri-environmental tools such as such as Agri-environmental and Countryside Stewardship Schemes in Europe and the United Kingdom (Dobbs & Pretty, 2004; Franks & Emery, 2013; Raymond et al., 2016), the Environmental Farm Plan Programme in Canada (Plummer et al., 2008); and Land Care initiatives in Australia (Curtis & Lacy, 1998; Cary & Webb, 2001)	Policy-driven tool to incentivise sustainable agriculture and environmental management practices	Sustainable agriculture and natural resource management in rural contexts	Implementing sustainable farming practices in cultivated fields or rangelands, managing natural areas and water courses.	Low to Medium
Community-based, common pool resource management initiatives in a diversity of developmental contexts (Torquebiau & Taylor, 2009; Berkes, 2010; Holmes & Jampijinpa, 2013; Kahui & Richards, 2014)	Various approaches to encourage collective, sustainable resource utilisation	Sustainable livelihoods and natural resource use management	Monitoring and managing use of natural resources such as forests, fisheries, rangelands etc.	Medium
Watershed or catchment management initiatives focused on improved land use management for catchment health (Ferreyra & Beard, 2007; Margerum, 2008; Patterson et al., 2015; Cradock-Henry et al., 2017)	Policy-driven approaches based on collaborative management of natural resources	Catchment management for water quality and quantity, sustainable agriculture	Implementing sustainable farming practices, monitoring, participating in decision-making	Medium to High
Integrated Landscape Approaches (Milder et al., 2012; Sayer et al., 2013; Milder et al., 2014; Minang et al., 2014b; Reed et al., 2016)	Large-scale initiatives addressing agriculture, conservation and sustainable development	Integrated objectives: sustainable agriculture, biodiversity conservation, climate change adaptation	Implementing sustainable farming practices, protecting biodiversity, participating in decision-making	Medium to High

5.1.3 Aims and objectives

The aim of this chapter was to characterise the practice of stewardship in South Africa. I worked towards this by asking the following research question: What are the meanings and practice of stewardship in South Africa, and how do these relate to theory? This question was addressed through three objectives:

1. To characterise the meanings of stewardship held by stewardship practitioners who are implementing stewardship at the local level.

2. To investigate how stewardship is put into practice by these practitioners. To unpack the concept of 'stewardship in practice', this second objective is guided by the following research questions:

   a. What kind of approach or model is employed in the project?

   b. What is the primary objective of the project?

   c. What kind of stewardship actions are expected from stewards?

3. To investigate whether there is evidence of the more recent concept of social-ecological stewardship being applied in practice in the context of multifunctional landscapes, and what challenges practitioners face in facilitating collaboration for stewardship.

This third objective served an additional purpose: it was the first step in the selection of case studies for the in-depth research on collaboration for stewardship in multifunctional landscapes presented in Chapter 6 and 7.

5.2. Methods

5.2.1 Data collection and sampling

I used a mixed methods approach to collect and analyse data (Creswell, 2009). I collected data primarily through a country-wide survey of 'stewardship practitioners'. I define stewardship practitioners as professionals from a variety of organisations (government, non-governmental organisation (NGO), or private sector) working with local land owners and land users (or stewards) to bring about improved stewardship i.e. they *facilitate* stewardship in multifunctional landscapes. Since the initiatives within which these practitioners work stretch across multiple sectors and scales, I employed a purposive snow-ball sampling approach to identify survey participants (Greeff, 2011). I used the National Biodiversity Stewardship Technical Working Group as a starting point for this process, since members of this community of practice self-identify as stewardship practitioners. Barendse et al's (2016: 13) list of stewardship initiatives (although broader in scope than my study) provided a useful benchmark for sample completeness.

The survey questionnaire was structured and included a combination of open and closed-ended questions, providing both qualitative and quantitative data (Fink, 2009) (Appendix 4). The survey was divided into four parts:

1. the context of the participants' project or initiative;

2. what environmental stewardship meant to them (open-ended questions);

3. environmental stewardship practices in their projects (open-ended questions about stewardship approaches, project objectives and actions); and

4. the challenges practitioners faced in facilitating collaboration (open-ended question).

I provided feedback on the research to participants via email updates, conference and workshop presentations, and a publication in a conservation magazine (Cockburn, 2017) (Refer to Appendix 5 for link to online version of the article, and a copy of the infographic which was used in the publication).

I administered the survey through a variety of avenues to increase the response rate (Fink, 2009), including survey interviews (in person or telephonically), and self-administered survey questionnaires (hand written and web-based, using Google Forms). Administering surveys through different means may compromise standardisation of data collection tools (Fink, 2009). However, I felt that it was necessary to make the process as convenient as possible for respondents and to reach out to a wide range of respondents, in order to achieve the largest possible sample. Furthermore, the survey questionnaire was fully-structured, and an identical form was used across all means of administration, which reduced potential variability. I piloted the survey questionnaire with five practitioners and refined the questions based on these experiences. The survey ran for 11 months from August 2015, until June 2016. Ninety-five practitioners from across South Africa participated in the survey.

5.2.2 Data analysis

I analysed the quantitative data using descriptive statistics such as frequencies, presented as percentage frequency values or pie charts (Fink, 2009). I coded qualitative data from open-ended questions in the survey using inductive, open coding through a two-step coding process. The first step was to identify themes of similar responses per question from the data. This resulted in a long list of themes. In the second step, I narrowed this list of themes down to a shorter list of over-arching categories (Creswell, 2009). I labelled the categories as much as possible using 'in vivo' codes, i.e. using respondents' wording, to stay true to the meanings expressed in responses (Saldaña, 2013). Where suitable, and to aid in interpretation, I provide descriptive explanations of coding categories in accompanying tables in the results. For most questions, I quantified the number of responses per category. Therefore, I also present some of the qualitative data using descriptive statistics as frequencies per category, i.e. quantifying the number of respondents per category.

I coded the practical application of the concept of 'social-ecological stewardship' in the initiatives (Objective 3) out of the qualitative data using a pre-determined coding framework. I used the following three criteria for the categories in the framework (Chapter 3, Section 3.3.4). The criteria characterise initiatives which are putting the concept of social-ecological stewardship into practice in multifunctional landscapes. In order for an initiative to be identified as putting 'social-ecological stewardship' into practice, it had to satisfy all three criteria. The initiative had to:

1. be working at landscape-level (i.e. beyond the individual farm or most local village level);

2. be working towards multifunctionality, i.e. towards multiple, integrated social-ecological stewardship outcomes (e.g. biodiversity and water security, or livelihoods and climate change, etc.); and

3. have an explicit focus on collaboration among multiple stakeholders, and stewards are part of a collaborative process (Refer to Chapter 3, Section 3.3 on how I have conceptualised stewardship in the context of multifunctional landscapes, and for a discussion of these features).

Respondents' answers to the question about what kind of stewardship actions they expected from stewards generated a large number and variety of responses, and I therefore treated them as free-list data (Quinlan, 2005). Rather than identifying a few large over-arching categories for actions as I did for the qualitative data above, I quantified the 'stewardship actions' data by counting the frequency of mention of each action across all respondents, and presented them as a frequency histogram.

Word frequency counting is a content analysis tool (Hsieh & Shannon, 2005) which I used on the textual survey data to identify and quantify instances of key terms from the theoretical stewardship literature. I used the full data set for the frequency counts. To avoid reductionist interpretations of word counts, I interpreted these in the context of their usage, by interpreting and analysing them together with the other results (Hsieh & Shannon, 2005).

I employed direct quotes from respondents to enrich analysis, interpretation and presentation of the data (Note: spelling and grammar errors in quotes were not corrected). I used the software packages Microsoft Excel (Microsoft Corporation, 2016) and NVivo (QSR International, 2017) to store and manage data and aid analysis.

5.2.3 Limitations and assumptions

The high proportion of respondents working with the biodiversity stewardship tool might be considered a weakness in this study. However, Barendse et al. (2016) confirm that biodiversity stewardship is a dominant form of stewardship practice in South Africa, so the profile of respondents is perhaps to be expected, given the context. Below, I report that some respondents conflated the general term 'stewardship' with the specific biodiversity stewardship tool. This conflation may have resulted in some non-biodiversity stewardship practitioners not participating in the survey as they thought it was not for them, as they were not working with biodiversity stewardship – even if their work was aligned with the broader definition of environmental stewardship which I used in the survey (Chapter 3, Table 3.1). To counter these two potential shortcomings in the sample and to ensure as broad a representation of stewardship practitioners as possible, I made a concerted effort to reach out to people working in landscape-level stewardship initiatives (Chapter 2, Box 2.2), and people working in relevant sectors other than conservation, such as agriculture, rural development, and water management (Chapter 2, Section 2.4.1). Nonetheless, these findings should be interpreted in the light of this possible bias towards biodiversity stewardship.

5.3. Results

5.3.1 Respondents' background

Participants represented all nine provinces of South Africa and worked in a variety of organisations. Most worked for national NGOs (44%), the next biggest group worked for provincial government agencies (23%), followed by local NGOs (14%), private sector organisations (8%), national government (4%), research institutes (4%), and local government (2%). Considering the importance of the biodiversity stewardship tool in South Africa (Barendse et al., 2016), I also categorised participants by their involvement with this approach specifically: 33% were working solely with the biodiversity stewardship tool, 27% were combining it with other approaches, and 40% were using other approaches. I also asked participants whether they would *characterise the work or purpose of their project as 'stewardship'*. They responded as follows: Eighty-two percent said 'Yes', 16% said 'Maybe or Partly', and 2% said 'No'. These data confirm that a large proportion of the sample in this survey self-identify as stewardship practitioners.

5.3.2 Meanings of stewardship in practice

Practitioners held diverse understandings of the meaning of stewardship, yet these coalesced around the ideas of taking care of nature and performing a balancing act between protecting nature and supporting people's agricultural livelihoods (Table 5.2). Just under half of the respondents understood stewardship to mean 'responsible use and care', for example: "(Stewardship refers to) *responsible use of natural resources for the benefit of current and future generations*".

Twenty percent of respondents conflated stewardship in general with the biodiversity stewardship tool specifically (Table 5.2: 'Stewardship = Biodiversity stewardship). For example, one respondent expressed confusion regarding what they understood about the term:

> *...for me the word 'stewardship' is confusing due to what the word actually means and what is happening in reality. For me the word means taking responsibility for managing ones own natural resources. In reality it seems more like a process to extend protected areas status onto private lands.*

Twenty percent of respondents described stewardship as 'sustainable use and management' (Table 5.2), for example: *"Looking after or managing your natural resources in a sustainable manner - protecting and improving natural resources while you produce"*. This meaning is distinguished from 'responsible use and care' by its explicit use of the term 'sustainability' (Table 5.2). The remaining 18% of respondents' understandings of stewardship included notions of *"preserving and conserving nature"*, an *"ethical or moral imperative"*, and *"holism and human-nature connectedness"*.

The different terms used by respondents to define stewardship and describe how they put it into practice, also give insight into what stewardship means to them, and what discourse is dominant in stewardship practice. For example, the terms conservation, environment, and biodiversity were the three most frequently used terms in definitions given by participants and also in the entire survey data set (Table 5.3). Terms from

the more recent literature on stewardship in social-ecological systems (including in the principles of ecosystem stewardship) such as ecosystem services, resilience, and social-ecological systems were used far less frequently by respondents in their answers to survey questions, including in how they defined stewardship (Table 5.3). This is unsurprising, since they are recent terms, even in the academic literature.

Table 5.2: Practitioner understandings of the meaning of stewardship (n=95)

Meaning	Frequency[1]	Explanation	Illustrative quote
Responsible use and care	42%	The steward needs to use and care for nature or natural resources in a responsible manner, taking an inter-generational approach.	*"Responsible use of natural resources for the benefit of current and future generations."*
Stewardship = Biodiversity stewardship	20%	The term 'stewardship' is considered to mean the same as the term 'biodiversity stewardship' (i.e. the two are conflated): *"Biodiversity stewardship is an approach to securing land in biodiversity priority areas through entering into agreements with private and communal landowners, led by conservation authorities."* (SANBI, 2016: 11)	*"Private land owners signing their properties into a conservation protection class and managing this land for the benefits of biodiversity."*
Sustainable use and management	20%	Use and management of nature and natural resources whilst implementing the principles of sustainability i.e. balancing social, economic and ecological needs.	*"Looking after or managing your natural resources in a sustainable manner - protecting and improving natural resources while you produce."*
Preserving and conserving	11%	The role of the steward is to conserve and protect nature and natural resources from human impacts, taking an inter-generational approach.	*"Landowners and beneficiaries safeguarding the land, its ecosystem services for now and future generations, sustainably."*
Ethical or moral imperative	5%	This meaning focuses on the ethical or moral implications of stewardship: the role of the steward is to take care of nature and natural resources because of an ethical or moral duty, for the greater good.	*"Stewardship is an ethic that embodies the responsible planning and management of resources."*
Holism and human-nature connectedness	2%	In this meaning of stewardship, the interconnectedness of humans and nature is emphasised. Stewardship is a human response to recognising this interconnectedness and acting in a certain manner because of it.	*"...it is important not to view humans as separate from the landscape ... but stewardship implies a responsibility on humans to take care of the life that supports us."*

[1]Frequency percentage = number of practitioners who mentioned this meaning of stewardship

I asked participants to outline the features of their project which characterised it as a stewardship project, or not. The responses to this confirmed that the survey participants are practitioners of stewardship in the sense that they consider themselves 'stewardship facilitators'. In their projects, they are working with local stewards (i.e. farmers and resource users) to support them in becoming better stewards. The following quotes illustrate this facilitating role played by practitioners, and also further illustrate the three most widely held meanings of stewardship (Table 5.2):

'Responsible use and care': *"Yes, in the generic sense of the term where it is about responsible use of natural resources. Resources, planning and processes: that's what a steward does."*

'Stewardship = biodiversity stewardship': *"We are specifically working with landowners… to formally secure sites important for birds and biodiversity using biodiversity stewardship mechanisms".*

'Sustainable use and management': *"We work with landowners and land users who are caretakers of the land… we work on conservation in agriculture and recognise that farmers are stewards of the land."*

Table 5.3: Word frequency counts in the survey data for key terms in the recent stewardship literature

Term from the literature (or root of term)	Overall frequency* in dataset	Respondent frequency* in overall data set	Respondent frequency* in 'meaning of stewardship' responses
conserv- (conserve, conservation, conservancy)	434	84	30
environment- (environment, environmental, environmentally)	359	87	20
biodiverse- (biodiverse, biodiversity)	321	80	25
sustain- (sustain, sustainable, sustainability)	159	56	13
ecosystem (excluding ecosystem services)	85	41	4
ecosystem services	32	19	6
resilien- (resilient, resilience)	13	13	0
social-ecological, socio-ecological	8	4	1

* 'Overall frequency' = how many times the item was mentioned throughout the data set, 'Respondent frequency' = the number of respondents who mentioned the item (N=95)

5.3.3 Practice of stewardship

I characterised the practice of stewardship in South Africa according to:

1. the type of approach employed in the project (Table 5.4);

2. the primary objective of the project (Figure 5.2); and

3. the kind of stewardship actions expected from stewards (i.e. landowners/users) (Figure 5.3).

I present the results for each of these below, and discuss them further in the discussion (Section 5.4).

5.3.3.1. Stewardship approach

A diversity of approaches to facilitating and implementing stewardship are being implemented in South Africa (Table 5.4), with similar approaches, objectives and activities as described for stewardship initiatives worldwide (Table 5.1). The most dominant approach is the biodiversity stewardship tool (33%), however a similar proportion of respondents are involved either in approaches which combine biodiversity stewardship with other approaches (27%), or in integrated landscape or catchment approaches to stewardship (26%).

Overall, 60% of respondents are involved to a greater or lesser extent in implementation of the biodiversity stewardship tool which is driven by policy and legislation in South Africa and receives financial and operational funding from the state (Table 5.4) (Chapter 2, Section 2.4.1).

Table 5.4: Stewardship approaches or models applied in respondents' projects (n=95)

Approach	Frequency[1]	Description
Biodiversity stewardship tool	33%	*"Biodiversity stewardship is an approach to securing land in biodiversity priority areas through entering into agreements with private and communal landowners, led by conservation authorities...The objective of Biodiversity Stewardship is to conserve and manage biodiversity priority areas through voluntary agreements with landowners."* (SANBI, 2016) This tool is driven by policy and legislation in South Africa, and is one of the means by which the country seeks to reach its protected area expansion targets. It is also considered a form of Private Land Conservation (Selinske et al., 2015)
Biodiversity stewardship tool combined with other approaches	27%	Practitioners often combine the biodiversity stewardship tool with other approaches, for example, they will work with landowners to declare a portion of their land as a Protected Environment or as a Nature Reserve, whilst also supporting the farmer in the implementation of agricultural Better Management Practices (BMPs) (Clay, 2004) on the cultivated areas of his/her farm.
Integrated landscape and catchment approaches	26%	These are initiatives which often operate at levels above the individual farm or village, take an integrated approach to land management by working towards multiple objectives, and focus on stakeholder collaboration as a key process in their work (Sayer et al., 2013). The project goals are usually broader than, for example only biodiversity conservation or only sustainable agriculture, and consider the land-based livelihoods occurring in the landscape in an integrated way. These initiatives often have a catchment approach which recognises the important ecosystem services related to water production. Biosphere Reserves (UNESCO Man and the Biosphere Programme) are an example of a landscape-level approach (Pool-Stanvliet, 2013).
Sustainable production or utilisation	9%	Initiatives which focus on sustainable production or utilisation are usually focused on the agricultural production activities occurring on the land. The starting point is to support the economically and ecologically sustainable use of land-based resources for agricultural production. This includes commercial agricultural production and subsistence farming or grazing on communal rangelands. These initiatives focus on balancing the economic needs of stewards with long-term ecological functioning of the land. They are often implemented through development of guidelines for agricultural Better Management Practices (BMPs) (Clay, 2004), and may be linked to market-based incentives to secure premium markets or prices for agricultural products which are adhering to such sustainable use guidelines. These sometimes incorporate short-term contractual agreements with farmers to ensure compliance to management guidelines or BMPs, which may make provision for financial incentives or compensation (Shilling & Osha, 2003).
Other environmental stewardship approaches	5%	This is a small category of initiatives which do not fit into the above four types. It includes, for example: local initiatives around water stewardship with citizen scientists; local volunteer-driven biodiversity monitoring initiatives; or alien plant clearing initiatives which are not part of a broader stewardship project like the ones described above.

[1]Frequency percentage = number of practitioners who mentioned this approach to stewardship

The combination of the biodiversity stewardship tool with other approaches indicates its applicability in a variety of project contexts, beyond the narrow focus on achieving biodiversity conservation targets. Practitioners are integrating it as a tool within broader sustainable land management initiatives. For example:

> *My project is quite varied with a habitat rehabilitation aspect, a more scientific based monitoring aspect and then a stewardship aspect. The monitoring functions to track the progress of rehabilitation work and to identify new threats that need to be addressed and biodiversity stewardship is used as a tool to secure high priority habitats for conservation.*

The combined use of the biodiversity stewardship tool with other approaches (often those focused on sustainable utilisation or production) (Table 5.4) also illustrates that for many practitioners, stewardship is about balancing protection and use of multiple ecosystem services. For example, balancing the protection and management of biodiversity, or regulating and supporting ecosystem services such as water, with the production-oriented use of land for commercial or subsistence agriculture, livestock grazing, or other natural resources (provisioning ecosystem services). Seeking to strike the balance can also bring sectors into conflict with one another, which can lead to new partnerships. For example, one respondent commented that *"For stewardship to work it is important that we are able to 'align with our enemies' e.g. I am working for a conservation agency but I sit in the agriculture office"*.

The characterisation of stewardship practice according to these different approaches (Table 5.4) reveals that sectoral focus areas seem to drive approaches to stewardship. The biodiversity conservation sector currently dominates stewardship practice through the biodiversity stewardship tool, however, catchment management, and sustainable land management, which are represented for example by the departments of water, agriculture and land affairs/rural development, are also important sectors for stewardship (Chapter 2, Section 2.4.1).

5.3.3.2. Objectives of stewardship

Despite biodiversity stewardship approaches only accounting for 33% of the sample (Table 5.4), biodiversity conservation was the primary project objective identified most frequently by respondents (57%, Figure 5.2). Ecological objectives were by far the most cited primary objective, followed by sustainable agriculture and catchment management (Figure 5.2). In responding to the question, most practitioners gave multiple objectives for their initiatives, and so the data in Figure 5.2 provide a reductionist view of the initiatives. They do however give an indication of the most dominant outcomes which are expected from stewardship initiatives. The quotes below illustrate some of the more multi-faceted objectives expressed by many respondents:

> *Sustainable land use, continual provision of ecosystem services, biodiversity conservation, ecosystem based adaptation, improved access to markets for produce.*

> *Ensuring an ecologically functional environment where people can farm, live and thrive happily alongside biodiversity assets for multiple generations.*

> *Providing legal protection through establishing a formal protected area. Using a market incentive (forest certification) to promote stewardship. Training people to better manage their environment.*
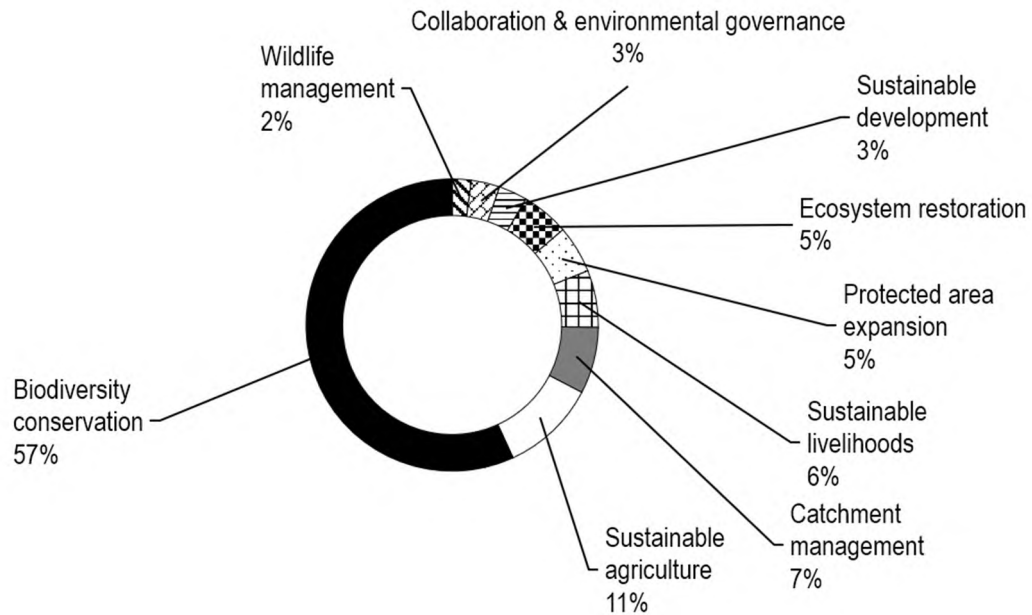
Figure 5.2: Primary objectives of stewardship initiatives (n=95).

These quotes lend support to the notion described above, that practitioners are working with farmers towards balancing the needs of production activities or provisioning ecosystem services (e.g. commercial agriculture, subsistence livelihoods, forestry, etc), with management and protection of regulating or supporting ecosystem services in the landscape (e.g. biodiversity protection, catchment health, and soil production).

5.3.3.3. Stewardship actions expected from stewards

The findings on stewardship actions which practitioners expect from stewards (Figure 5.3) align with those on primary objectives (Figure 5.2), confirming that stewardship practice in South Africa is primarily about engaging with ecological concerns. The most frequently expressed categories of stewardship actions focus on dealing with ecological aspects such as species, ecosystems, habitats, natural resources, and biodiversity (Figure 5.3). However, several categories also illustrate the role of stewardship as balancing both ecological protection or management (e.g. for regulating and supporting ecosystem services), and production or livelihood outcomes (e.g. for provisioning ecosystem services). This is reflected in statements such as: *"utilise resources sustainably"*, and *"implement agricultural best management practices"*. Actions relating to social and collaborative processes were also mentioned, including *"participate in knowledge-sharing and education"*, *"participate in research and monitoring"* and *"participate in collaborative initiatives"*, although these were reported far less frequently (Figure 5.3).
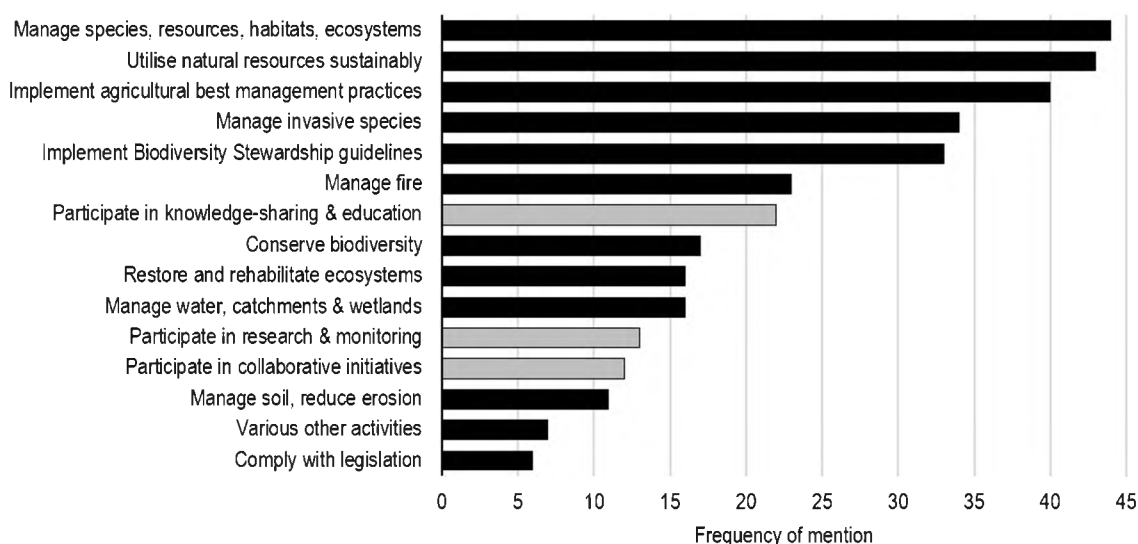
Figure 5.3: Stewardship actions which practitioners expect stewards to implement. Black bars indicate stewardship actions focused on ecological outcomes; grey bars indicate stewardship actions related to social outcomes (n=95).

5.3.4 'Social-ecological stewardship' in practice

Further insights on the nature of stewardship practice and the alignment of initiatives with the most recent meanings of stewardship in the literature (i.e. social-ecological stewardship) are revealed through the following key features (Section 5.2.2): 65% of initiatives operate at landscape-level i.e. beyond the individual farm or most local village level and therefore involve multiple stakeholders with diverse interests, 47% of initiatives are working towards multifunctionality, i.e. towards multiple, integrated social-ecological stewardship outcomes, and 67% of initiatives have an explicit focus on building collaboration among multiple stakeholders, within and between stewards and other stakeholders. Forty-one percent of the initiatives showed all three of these features of social-ecological stewardship, suggesting that in many initiatives, putting stewardship into practice is about more than simply working towards ecological objectives (Figure 5.2) and implementing ecological management actions (Figure 5.3). Many initiatives expect stewards to work towards integrated, social-ecological outcomes (e.g. both conserving biodiversity, and achieving livelihood and business outcomes from the land) and expect stewards to participate in collaborative initiatives at landscape-level.

The finding that 60% of initiatives are implementing the biodiversity stewardship tool (33% solely, and 27% in combination with other approaches (Table 5.4)) might be interpreted as those initiatives having a very narrow focus on biodiversity conservation objectives. The following quote from one of the respondents demonstrates this assumption: There is a "*...misconception that stewardship means only biodiversity conservation and is in direct conflict with agriculture or sustainable resource use*". However, in many cases, the tool is being implemented within a more integrated overall approach where biodiversity conservation is one of many potential outcomes from improved stewardship of multifunctional landscapes.

In looking at how the most recent conceptualisations of stewardship, i.e. social-ecological stewardship (Chapter 3, Table 3.1), are applied in practice, I also investigated whether any initiatives were explicitly applying the resilience-based principles of ecosystem stewardship (Chapin et al., 2009c; Chapin et al., 2009a). In defining the meaning of stewardship, none of the respondents used the term 'resilience', only six respondents (out of 95) mentioned the term 'ecosystem services' in their definition of stewardship (Table 5.3), and the term 'social-ecological' was only used a total of eight times (Table 5.3). These three terms are core to the principles of ecosystem stewardship. In contrast, the word root 'sustain-' (i.e. sustain, sustainable, or sustainability) was used by 13 respondents in their definitions of stewardship, and was mentioned overall in the full data set by 56 respondents (Table 5.3). The lack of uptake by practitioners of the most recent jargon from the stewardship literature is not surprising, especially considering the well-known gap between theory and practice. What is striking, however, is that when one looks beyond the language, meanings and discourse to the actual practice of stewardship, there is evidence of social-ecological stewardship. The three features of 'social-ecological stewardship' in multifunctional landscapes (Section 5.2.2) apply in 41% of the initiatives in this survey, and they indicate that ideas about interlinked human and natural systems do influence the practice of stewardship.

5.3.4.1. Challenges of facilitating collaboration for social-ecological stewardship

The two biggest challenges which practitioners face in facilitating collaboration for stewardship in multifunctional landscapes are: *"Difficulty developing shared visions"* (identified by 26% of respondents as their biggest challenges) and *"low collaborative capacity"* (identified by another 25% of respondents) (Figure 5.4). *"Developing shared visions"* is about getting people to come together to negotiate and come to a shared understanding of what the collaborative landscape initiative should achieve, indicating a move towards consensus. Practitioners shared for example how difficult it was to integrate *"…competing visions for what kind of other economic use can or should take place"* on a farm or in a landscape. For example, a farmer might like to plough up more land for crops (one kind of economic use), whereas the conservation practitioner might rather protect that land for biodiversity's sake and set it aside as an eco-tourism venture (another kind of economic use). The term *"low collaborative capacity"* refers to the challenges facilitators face in getting people to participate, to work with neighbours and other stakeholders, and to overcome various social barriers i.e. their willingness and ability to participate in collaborative initiatives with diverse stakeholders. Many practitioners made statements similar to this one: the challenge is *"…to get people to participate and collaborate"*. This was often related to farmers' *"fierce independence… a great independence driven by wealth"*, which appears to be a stumbling block to collaboration experienced by many practitioners.

Access to sufficient resources was identified by 20% of respondents as their biggest challenge (Figure 5.4). This refers to financial and human resources, and support from funders, particularly as collaborative processes take a longer time to achieve outcomes, for example: *"Lack of understanding from funders side what it takes to bring people together"*.
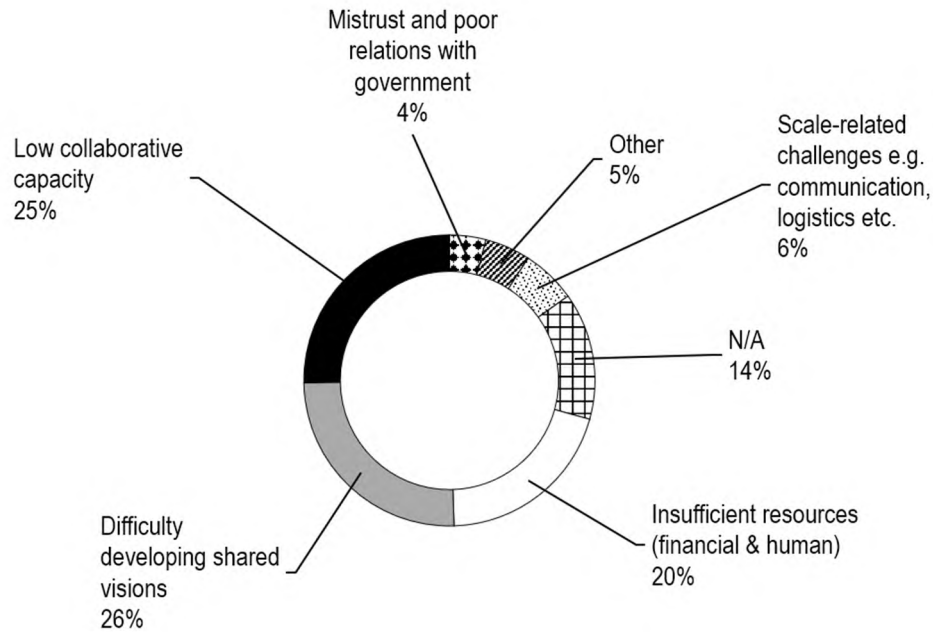
Figure 5.4: Challenges experienced by practitioners who are facilitating collaboration for stewardship at landscape-level (n=95, N/A: respondents not working at local project level, thus insufficient data were provided for these questions).

"Scale-related challenges" refers to the large geographic scale, and vast distances, in landscapes. These result in logistical challenges, making it difficult and costly for people to communicate, meet regularly, and work together. The challenge of *"mistrust and poor relations with government"* relates primarily to the difficulties of building working relationships between farmers and government officials, sometimes because of historical conflict or because of racial tensions. Although not captured explicitly as one of the categories in Figure 5.4, difficulties in managing race relations was identified as a challenge, as shown in these two quotes: *"The fact that one is facilitating a programme being a black men and facilitating with land owners who are whites presents a challenge of its own",* and *"Landowners are scared of change e.g. when new black staff come to see a white farmer".* This is likely to be a cross-cutting issue which may magnify, or be compounded by, many of the other challenges identified.

Many of the initiatives in South Africa which are implementing social-ecological stewardship through integrated approaches which address multiple social-ecological outcomes, are not directly aligned with particular policy approaches to stewardship (e.g. the biodiversity stewardship tool or Catchment Management Forums, see Box 2.2). They are innovating to bring sectors together across traditional 'silos'. For example, a respondent working on conservation of cranes explained that s/he *"realised that conserving cranes in a silo is not going to work…therefore need to work with LO* (landowners) *to conserve areas on a landscape level".* Another respondent commented on the benefits of the Man and the Biosphere approach to landscape-level stewardship: *"One benefit of such an approach is that all sectors can come together…the Biosphere Reserve Management Authority has an MOU with other major stakeholders, works across silos".*

Practitioners pointed out the difficulties of implementing these approaches in top-down 'siloed' governance structures (e.g. *"poor inter and intra institutional coordination"* and *"top-down approaches not allowing/supporting polycentric governance")* and with limited state support. Yet local sustainable development needs, and global drivers such as climate change experienced by local stewards, appear to be driving the emergence of these more integrated approaches to stewardship, as will become evident in the case studies presented in Chapter 7. In the case study chapters (Chapter 6 and 7) I conduct a deeper, contextualised analysis of the enablers and barriers of facilitating collaboration for stewardship, which provides a more nuanced understanding of some of the challenges identified here by practitioners at a national level.

5.4. Discussion

This research provides insights into the practice of stewardship in South Africa, shedding light on how local practitioners are working towards achieving social-ecological stewardship outcomes on the ground. I begin by discussing concerns and opportunities raised by the dominance of the biodiversity stewardship tool in the practice of stewardship in South Africa. I then turn to two new perspectives on stewardship in practice revealed through my research. Firstly, the findings on the meanings and practice reveal insights about the contemporary role of local stewards working in multifunctional landscapes. Secondly, despite the dominance of the biodiversity stewardship tool in South Africa, the practice of stewardship is shifting to align with the most recent social-ecological understandings of stewardship in the literature. I discuss each of these three key findings in turn below.

5.4.1 Dominance of biodiversity stewardship in practice: concerns and opportunities

There are concerns about the dominance of stewardship practice by one sector through the biodiversity stewardship tool (Barendse et al., 2016). This dominance is perhaps to be expected given the institutionalisation of the approach in South African policy (SANBI, 2015b; Barendse et al., 2016) (Chapter 2, Section 2.4.1). This institutionalisation demonstrates that both local and global policy play a strong role in shaping the understanding, discourse, and practice of stewardship in South Africa. For example, the Protected Areas Expansion Strategy (Government of South Africa, 2010) from which the biodiversity stewardship tool emerged, is a response to South Africa's commitments for protected area expansion to the international Convention on Biodiversity (Department of Environmental Affairs, 2010).

One of the survey respondents raised a concern about the effects of biodiversity stewardship dominating the practice of stewardship, saying that there is a *"misconception that stewardship means only biodiversity conservation and is in direct conflict with agriculture or sustainable resource use"*. This comment illustrates that the strong focus of biodiversity stewardship on conservation outcomes may hinder opportunities for other forms of stewardship, and the narrow focus on 'high value' biodiversity within the biodiversity stewardship approach means large areas of the country are excluded from the potential positive impacts of stewardship (Barendse et al., 2016). Possibly in response to such concerns, some national NGOs in South

Africa have adopted more holistic and integrated interpretations of stewardship (Galliers & Barnes, 2013; Barendse et al., 2016) aligned with the notion of social-ecological stewardship or 'Earth Stewardship' (Chapin et al., 2011b). This indicates recognition among the practitioner community that more integrated, holistic approaches to stewardship may be more suitable to addressing the complex social-ecological challenges faced at the local level in South Africa (Chapter 2, Section 2.1). In the case studies presented in Chapter 7, I investigate how practitioners are putting these integrated forms of stewardship, aligned with the notion of social-ecological stewardship, into practice.

Another concern which the dominance of biodiversity stewardship raises, are associations with the problematic history of biodiversity conservation in the country. Because of its strong ties with biodiversity conservation in South Africa, stewardship risks also being associated with the social injustices which were historically enacted in the interests of conservation (Section 2.3.2). For example, one respondent in this survey commented that "*There is a perception that stewardship is for rich white people*". Policy-makers and practitioners of biodiversity stewardship in South Africa would do well to continue working on ensuring that implementation of the biodiversity stewardship tool in no way infringes on local people's voice, rights to equal access of benefits of ecosystem services, and other social justice concerns. This is especially relevant considering critique in the literature about the concept of stewardship and its historical association with paradigms that have benefitted only a narrow portion of society and perpetuated exclusive religious and chauvinist ways of engaging with nature (Peterson et al., 2010; Welchman, 2012; Attfield, 2014).

These concerns are particularly pertinent when considering stewardship in the context of multifunctional landscapes where multiple voices and needs must be balanced and carefully traded-off to achieve shared visions. My findings show that this is indeed a challenge in South Africa (Figure 5.4). Barendse et al. (2016: 8) also commented on this, identifying "*a clear need to evolve Western based concepts of stewardship and conservation to include indigenous values or more collaborative management approaches*". The investment in programmes such as the Biodiversity and Land Reform Initiative driven by the South African National Biodiversity Institute, indicate that the biodiversity stewardship community is seeking to address such concerns (SANBI, 2009). More broadly, the South African government is also using various community-based stewardship programmes, such as the national Working for Water (and related 'Working for...' programmes) (van Wilgen & Wannenburgh, 2016; Bek et al., 2017), and Land Care in communal areas and with emerging farmers (Mulder & Brent, 2006), to improve the contribution of conservation initiatives to poverty alleviation, and address concerns about conservation and social justice conflicts. However, the success of these in achieving these lofty ideals has been questioned by critics for quite some time (Kepe et al., 2004; Shackleton, 2009; Bek et al., 2017).

The dominance of biodiversity stewardship can however also be viewed in a positive light. Certainly within the conservation sector in South Africa, it is considered a success story for biodiversity conservation and protected area expansion (SANBI, 2015a). It is viewed as a cost-effective tool for securing protected areas on

non-state land, and is considered a valuable means of securing commitment and investment from private and communal land users into long-term stewardship (SANBI, 2015a). Through binding contractual agreements with landowners, practitioners can also potentially secure fiscal benefits (for example through tax rebates) for farmers, supporting stewards to off-set the costs of voluntary stewardship actions on their land (Rawat, 2017).

Whilst the concerns about the dominance of biodiversity stewardship in stewardship practice more generally in South Africa are valid, and warrant attention, it is encouraging to note the emergence of a diversity of other approaches to stewardship practice (Table 5.4). Furthermore, the fact that practitioners are combining the biodiversity stewardship tool with other approaches (Table 5.4) indicates that this tool is compatible with other approaches, and can be incorporated into initiatives which seek to address social-ecological stewardship challenges in an integrated manner.

There is an opportunity to leverage the effectiveness and success of the biodiversity stewardship tool to achieve more integrated outcomes, for example by using biodiversity stewardship alongside other approaches in larger landscape-level initiatives, as 27% of respondents are doing (Table 5.4). To successfully implement the ideals of environmental stewardship informed by a social-ecological view, a cross-sectoral policy framework which supports or mandates co-operative governance, and creates an enabling environment for multi-stakeholder collaboration is necessary. Such a framework could alleviate some of the challenges currently being experienced by practitioners facilitating collaboration by enabling access to funding for cross-sectoral collaboration and ensuring committed human capacity for such initiatives (Figure 4). Existing landscape-level stewardship initiatives (Section 2.4.3), such as for example the Man and the Biosphere Reserve programme (and others, see Box 2.2), are promising candidates for this, and require more support to realise their potential in South Africa (Pool-Stanvliet, 2013; Coetzer et al., 2014).

5.4.2 Meanings of stewardship in practice: stewards are expected to care and share

The findings on the meanings of stewardship in practice reported here clarify what kind of role stewards at the local level are expected to play. The meanings of stewardship coalesce around two core themes: Firstly, *'responsible use and care of nature and natural resources'*, and secondly, the idea of *'stewardship as a balancing act'* between utilisation of natural resources for agricultural production, and protection and conservation of nature (Table 5.2). Therefore, according to practitioners, the role of the steward is to use natural resources responsibly and carefully by balancing the use of natural resources for their own agricultural production needs and objectives (e.g. crop or livestock production) with a responsibility to manage and protect natural resources for the good of the ecosystem, and for the greater good of society.

Although practitioners in this research did not use the language of ecosystem services much, interpreting this role of the steward that has emerged from the data through the lens of ecosystem services reveals an interesting feature of their role in the landscape. This is what that interpretation or reformulation might look

like: 'The role of the steward is to interact with ecosystems responsibly and carefully by balancing the use of provisioning ecosystem services for their own direct needs, with the societal and ecological needs of a broader, more diverse suite of ecosystem services, such as regulating, supporting, and spiritual and cultural ecosystem services'. This means that they are in effect stewards of the 'multifunctionality of the landscape', and are expected to act as stewards of an interlinked social-ecological system. Consequently, stewardship, even at the individual farmer level, is about managing trade-offs among multiple types of ecosystem services (Kremen & Miles, 2012). If a steward is to be responsible in their interactions with nature and to take care, then they have an obligation to collaborate with others across the landscape to negotiate trade-offs among the multiple ecosystem services produced from the landscape (Goldman et al., 2007; Stallman, 2011; Prager et al., 2012). A competent steward is expected to care, and to share.

This re-interpretation of stewardship through the lens of ecosystem services in the context of multifunctional landscapes aligns with some of the principles of ecosystem stewardship, including recognition of *ecosystems which provide diverse ecosystem services* rather than single resources; stewardship which recognises *stewards as an integral part of the system they manage* and the inherent *responsibility* they hold; and the need for stewards to *work collaboratively with multiple stakeholders* (Chapin et al., 2009b). However, two of the principles of ecosystem stewardship are not evident in respondents' understanding of the role of stewards, namely a management approach underpinned by *resilience thinking* and the need for stewards to *anticipate and respond to social-ecological change* and shape it for sustainability to avoid loss of future options for the system. This might indicate an opportunity for dialogue and knowledge co-production between stewardship researchers and practitioners in South Africa, which might aid in addressing long-standing frustrations about the knowing-doing gap in conservation and natural resource management (Knight et al., 2008; Sitas et al., 2014). For instance, they could to work together to investigate the practical implications of adapting some of these novel concepts from the literature into practice, as is being done for example in WWF's Resilient Landscapes Approach (WWF-SA, 2015).

In seeking to achieve the 'balancing act' of the benefits of diverse ecosystem services from multifunctional landscapes, stewardship initiatives hold the potential to address the long-standing conflicts between agriculture and conservation (Tanentzap et al., 2015). Successful stewards are expected to be able to manage species, habitats and ecosystems, whilst also utilising ecosystem services sustainably (Figure 5.3). Managing this balance is similar to the role expected of stewards in other countries (Table 5.1), for example in the Australian Land Care programmes (Curtis & Lacy, 1998; Carr, 2002) and in agri-environmental schemes in Britain and Europe (Raymond et al., 2016). Land use conflicts between agriculture and conservation are of increasing concern (Tscharntke et al., 2012), and approaches like stewardship, which seek to address conservation, agricultural and social concerns on a single piece of land are necessary (Gallo et al., 2009). Given that most stewards (at least in South Africa) are practicing stewardship in a voluntary capacity, these are high expectations. Policies and funding mechanisms, as well as platforms for collaboration and

negotiation, which create enabling conditions for stewards to fulfil this important role in society are needed. At present, different land uses, or beneficiaries of different types of ecosystem services, are represented by different, often competing, sectors (e.g. water vs. conservation vs. agriculture) which brings them into conflict with one another and makes it difficult for stewards to become competent in this important role.

5.4.3 Social-ecological stewardship in practice: practitioners 'walking the walk, not talking the talk'

Many stewardship initiatives in South Africa conform to some extent to the contemporary ideas of social-ecological stewardship (Table 5.4, Section 5.3.4), confirming that this is being applied in practice. Whilst the meanings of stewardship (Table 5.2) and the language used by practitioners (Table 5.3) align with older understandings of stewardship in the literature (Figure 5.1), the practice is shifting towards more contemporary and innovative approaches. This seems to indicate that the language and discourse may in fact be obscuring the more contemporary and innovative practice, i.e. that practitioners are 'walking the walk', even if they are not 'talking the talk'.

Practitioners facilitating collaboration for stewardship in multifunctional landscapes face a variety of challenges. Key among these are the challenge of developing shared visions, and the lack of collaborative capacity at the local level (Figure 5.4). The difficulty of building effective working relationships across racial boundaries, and mistrust and difficulties of working with government, are cross-cutting and interactive challenges to facilitating collaboration. These issues are not regularly identified in the literature on collaboration (Section 3.4, and Table 3.2) (Wondolleck & Yaffee, 2000; Margerum, 2007). The existing literature is often from the Global North where racial tensions may not be as pronounced as they are in South Africa, where formal governance structures function comparatively well, and capacity constraints within governments are less of a concern. These challenges are examples of the kinds of concerns likely to emerge from collaboration in complex, contested contexts (Section 3.4.1).

The practice of social-ecological stewardship in South Africa signals an opening for greater dialogue between practice and theory, to counter the usual underlying assumption that theory should inform practice (van Kerkhoff & Lebel, 2006). For example, whilst stewardship practitioners may not have adopted the most recent language of stewardship theory in their discourse, they are putting social-ecological stewardship into practice. Practice-based knowledge is gaining increasing recognition globally (Tengö et al., 2014; Weber et al., 2014), and researchers in the social-ecological systems field are calling for place-based research and comparative case studies of local stewardship initiatives (Carpenter et al., 2012; Norström et al., 2017). South African stewardship practice is therefore an opportunity to conduct this kind of grounded research, whereby practice can inform theory. There are also opportunities for practitioners to challenge themselves with regard to the forward-looking aspects of social-ecological stewardship (e.g. ecosystem stewardship principles) which appears to be lacking in South Africa. Through the transdisciplinary case study research presented in Chapter

6 and 7, I seek to further unpack the opportunities for dialogue between theory and practice and therefore contribute toward this emerging conversation.

5.5. Conclusion

Practitioners' understandings of the meaning of stewardship vary, however they coalesce around the idea of 'responsible use and care' of nature and stewardship as a 'balancing act' between the steward's use of natural resources for agricultural production, and their responsibility to protect and manage the broader ecosystem. Hence, the primary role of the steward is to interact with ecosystems responsibly and carefully by balancing the use of provisioning ecosystem services for their own direct needs, with the societal and ecological needs of a broader, more diverse suite of ecosystem services. In the context of multifunctional landscapes, this means that stewards have an obligation to collaborate with other stakeholders across the landscape to negotiate trade-offs around a diverse suite of ecosystem services.

Stewardship practice in South Africa is dominated by the policy-driven biodiversity stewardship tool; however, many practitioners are integrating the biodiversity stewardship tool with other approaches. Practitioners' understandings of stewardship are strongly influenced by the sustainability discourse, and there is limited evidence in the language of practitioners of the most recent conceptualisations of stewardship in the social-ecological systems literature. However, despite this, there is evidence of social-ecological stewardship emerging in practice. Practitioners' use of 'older' stewardship language to talk about their work appears to be masking more innovative, contemporary practice. These innovative social-ecological stewardship initiatives work at landscape-level and work towards integrated social and ecological stewardship outcomes, by facilitating collaboration among diverse stakeholders. This presents unique challenges, particularly in complex, contested contexts that are evident in multifunctional landscapes in South Africa. Innovative policy and further research are needed to support these collaborative cross-sectoral initiatives.

In the next two chapters, I turn to place-based case studies across South Africa to further investigate how stewardship practitioners are facilitating collaboration for stewardship in multifunctional landscapes. I begin with an in-depth case study in the Langkloof, where practitioners are facing difficulties in bringing diverse stakeholders together to collaborate. I then move on to a set of six cases in diverse contexts across South Africa to investigate how practitioners are overcoming barriers to collaboration and achieving positive social-ecological stewardship outcomes in multifunctional landscapes.

Chapter 6 | Patchworks of collaborations in multifunctional landscapes: Lessons from the Langkloof

"You have your way. I have my way. As for the right way, the correct way, and the only way, it does not exist." (Friedrich Nietzsche)
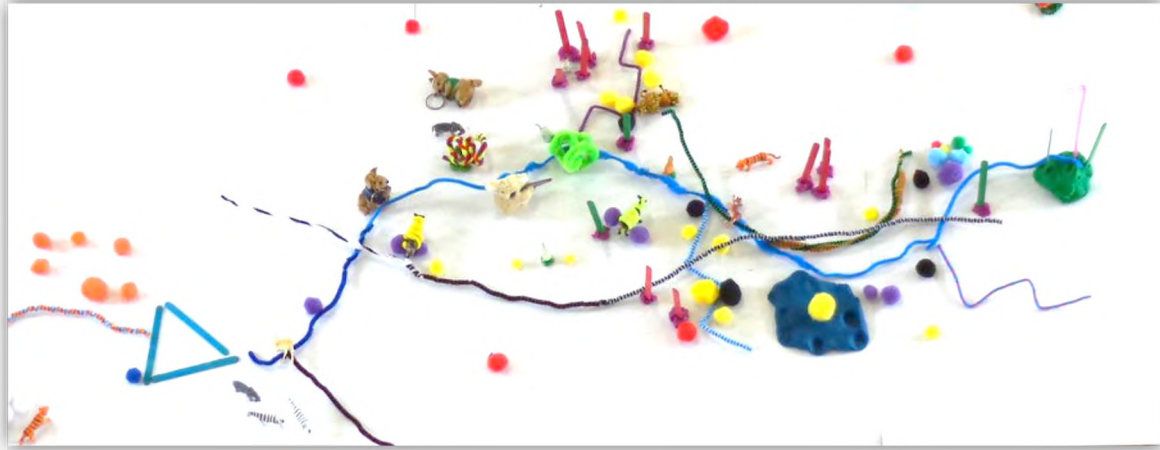
This is a 3D model of the Langkloof landscape made by the Living Lands team during a landscape planning workshop in 2016. It is a visual representation of the diversity and complexity of the landscape. Fostering collaboration in such contexts requires an approach that recognises and works with diversity and difference, rather than trying to flatten it under one large 'blanket' of collaboration.

6.1. Introduction

I argued in Chapter 3 that working towards social-ecological stewardship at landscape level requires collaboration between multiple stakeholders. This means multiple stakeholders working together, pooling their resources, to address shared stewardship challenges which none can solve alone (Gray, 1985; Margerum, 2008). For this chapter, the term 'stewardship' refers to 'social-ecological stewardship', based on the working definition proposed in Chapter 3: "Social-ecological stewardship is the ethical and responsible interaction of humans with social-ecological systems to sustain the supply of diverse ecosystem services and values for the sake of current and future generations of humans and other life on the planet" (based loosely on Welchman (2012) and Chapin (2009c), refer to Chapter 3, Table 3.1).

Multifunctional landscapes are characterised by many multiples (Poteete, 2012): multiple ecosystem services, multiple levels and scales, multiple issues and threats, multiple drivers of change, and multiple and diverse stakeholders (Minang et al., 2014a; Fischer et al., 2017). These all interact to increase the necessity and complexity of collaboration (Patterson, 2017). Managing multifunctional landscapes for sustainability means working to address social-ecological stewardship challenges such as catchment health (water quality and quantity), sustainable agricultural production and food security, land degradation, biodiversity conservation, and the promotion of less tangible values in landscapes (aesthetic, spiritual, cultural) in an integrated manner (Sayer et al., 2013). It also means taking into account concerns about social justice and equitable access to the benefits of ecosystem services in the landscape, by navigating safe and just pathways for a sustainable future (Leach et al., 2013) (Refer to Chapter 3, Section 3.3.4 and 3.5). Collaboration towards

addressing these social-ecological stewardship needs in the landscape can occur between land user and land user, land users and other local stakeholders (such as those working for government departments responsible for natural resource management in areas such as agriculture, water or conservation), and between local actors and various relevant actors at higher levels beyond the local landscape (Margerum, 2008; O'Farrell & Anderson, 2010; Everard, 2011; Vejre et al., 2012).

Understanding collaboration around natural resource use and management is widely recognised as a challenge, and is often explored using the well-developed common pool resource (CPR) literature (Ostrom, 1990; Ostrom, 2009; Ostrom & Cox, 2010; McGinnis & Ostrom, 2014). However, much of this existing literature focuses on a single, clearly bounded common-pool resource (for example forestry, fisheries, or water and irrigation systems) and therefore is often focused on a single user group (Kerr, 2007; Plummer et al., 2012). Multifunctional landscapes are composed of multiple sets of commons, and seeking to manage and govern these at higher levels, beyond individual private farms (i.e. at the landscape level), requires collaboration across levels, among a diversity of stakeholders (Robinson et al., 2017). This poses unique challenges for practice: how can collaboration be fostered in complex, contested contexts like multifunctional landscapes? Put differently, what factors or processes enable or support such initiatives (enablers), and what factors or processes constrain or act as barriers to collaboration?

In this research I will be using 'enablers and barriers' as an analytical tool to better understand collaboration (Refer to Section 6.2.3.3). 'Enablers and barriers' as an analytical tool has not been specifically applied in research on collaboration in natural resource management, though identifying the enablers and barriers of planning and action is considered a useful analytical lens in other fields within the sustainability sciences (Section 6.2.3.3). There is some research on the barriers to or constraints of collaboration for natural resources management (Margerum, 2007; Margerum & Robinson, 2016a); however, there appears to be more literature reporting on enablers or success factors of collaboration. Hence, I now present a brief synthesis of some of the types of enablers or conditions for collaboration identified in this literature. This synthesis draws on the various bodies of literature relevant to collaboration for stewardship in multifunctional landscapes which were introduced in Chapter 3 (Section 3.4, Table 3.2).

6.1.1 Enablers of collaboration

Understanding the enabling conditions for collaboration between multiple stakeholders for natural resource management requires looking at both structural and relational features of collaborative processes (Patterson, 2017).

6.1.1.1. Structural enablers of collaboration

Numerous structural enablers of collaboration are described in the literature. Here, I briefly describe four of the most common categories, i.e., shared interest across the landscape, effective formal institutions and governance, cross-level linkages, and resourcing and funding.

First, shared interest across the landscape, also referred to as a 'common concern entry point' (Sayer et al., 2013), or 'shared vision' (Armitage et al., 2007a), is widely considered an important starting point for collaboration. Related to this is the importance of 'problem salience', which refers to a clearly identified, shared sustainability challenge which requires collaboration to address it (Babin et al., 2016; Church & Prokopy, 2017; Patterson, 2017).

The second key category of enablers relates to effective institutions and governance, including enabling policy. Institution-building to develop governance structures that formalise and support collaborative processes is considered an important enabler of collaboration. This is because formal institutions can play an important role in facilitating power-sharing, negotiation and conflict resolution (Armitage et al., 2007a; Cundill & Fabricius, 2010; Ostrom & Cox, 2010). Institution-building can also enable well-structured projects which pay attention to well-facilitated meetings, and ensure that the right participants or representatives are in the room (Cundill & Fabricius, 2010; Church & Prokopy, 2017; Cradock-Henry et al., 2017). Institutions in the form of formal agreements that provide incentives or contribute to costs of stewardship actions (Church & Prokopy, 2017; Rawat, 2017), can also provide a sense of commitment and security, both for those facilitating collaboration, and for farmers or stewards expected to invest their own time and resources in changing their farming practices. Effective institutions and governance implemented through policy tools and legislation, can also result in an enabling policy context for collaboration (Plummer et al., 2012). For example, regional policies and institutions are important for supporting local stewardship actions and officials with a mandate to enforce natural resource management legislation play an important role in ensuring compliance and fairness in sharing the costs of stewardship practices (Patterson, 2017).

The third category of structural enablers of collaboration is cross-level or cross-scale linkages. This includes forging cross-level linkages for learning and adaptation (Plummer et al., 2012), and identifying governance mechanisms that can enable local resource users to interact with decision-making processes across levels and scales (Robinson et al., 2017). For example, setting up formal institutional linkages and collaborative opportunities between resource users and decisions-makers at the local level and government officials working at regional or national levels can improve decision-making (Armitage et al., 2007a; Cundill & Fabricius, 2008).

The fourth type of enabler is suitable resourcing and funding (for both financial and human resources). Funding needs to be available for long enough time frames and be flexible to account for adaptive processes which may not deliver tangible results as planned or predicted (Carr, 2002; Fabricius et al., 2007; Freeman et al., 2015; Patterson, 2017). Enabling funding is particularly important for initiatives building novel institutional arrangements and bringing together otherwise disparate stakeholders to work beyond their usual mandates. For example, Duff et al. (2017) set up a new stewardship network to improve capacity building and knowledge exchange for potato farmers, bringing agriculture and conservation stakeholders together to support the farmers. The success of the initiative relied on innovative funding mechanisms.

6.1.1.2. Relational enablers of collaboration

As a complement to these structural categories of enablers, a variety of relational enablers have also been identified in the literature on collaboration for natural resource management. These include social networks, trust, individual human agency, social learning approaches, and high-quality facilitation.

Social networks are built on relationships and connectedness between people and institutions. Social networks can be developed through long-standing social relations and good will among actors (Patterson, 2017), or a strong sense of community and place (Carr, 2002; Floress et al., 2015; Church & Prokopy, 2017). They are often the result of development of social capital over time (Pretty & Ward, 2001; Floress et al., 2011; Alexander & Armitage, 2015), for example, through strategic partnerships or connections to other networks (Armitage et al., 2007a; Plummer et al., 2012). Positive previous experiences of working together can strengthen social capital and networks and allow for smoother collaboration (Church & Prokopy, 2017; Patterson, 2017).

A second relational enabler is trust between various stakeholders, often considered a key ingredient in the development of social capital and social networks, and is possibly one of the most widely-cited (Hahn et al., 2006; Armitage et al., 2007a; Plummer et al., 2012; Floress et al., 2015; Church & Prokopy, 2017; Patterson, 2017), yet elusive, enablers of collaboration. Patterson (2017), for example points out that trust and social networks are often more likely to emerge from, or be a result of collaboration or collective action, rather than being an ingredient or pre-existing enabler which can be put in place at the start.

In focusing on collaboration and collective agency, researchers sometimes overlook the role of individual human agency, and the interactions between individual and collective, or distributed, agency (Cleaver, 2007; Garud et al., 2010). Individual human agency (understood as fundamentally relational, refer to Chapter 4, Section 4.2.3.3) is a third key category of relational enablers. The importance of individual agency within collaborative processes is often exemplified through concepts such as 'champions' and 'leaders' (Church & Prokopy, 2017; Patterson, 2017) or 'institutional entrepreneurs' (Moore & Westley, 2011). Enabling human agency within collaborative natural resource management processes may require empowering local actors through capacity-building interventions (Carr, 2002; Fabricius et al., 2007), which may be particularly important in contexts of weak governance (Fabricius et al., 2007; Cleaver, 2012).

A social learning orientation and recognition of plural knowledge systems, are considered a fourth important enabler of collaboration, particularly in contexts where scientific and other knowledge systems (e.g. local knowledge, indigenous knowledge etc.) intersect (Tengö et al., 2014; Weber et al., 2014). A flexible social learning approach which recognises uncertainty and the need for adaptation is important in complex settings (Keen et al., 2005; Armitage et al., 2007b; Cundill, 2010; Plummer & FitzGibbon, 2010), such as those characterising multi-functional landscapes. Platforms for transdisciplinary and cross-sectoral knowledge co-production can create enabling spaces for social learning and knowledge exchange (O'Farrell & Anderson, 2010; Freeman et al., 2015).

This relates to the final relational enabler, namely high-quality facilitation, since such platforms do not always emerge through self-organisation. Actors who are working to actively build collaboration often play a bridging or brokering role (Hahn et al., 2006) to facilitate collaborative processes. This requires a specific suite of facilitation skills, and funding to support it (Carr, 2002; Cundill, 2010; Freeman et al., 2015). For example, de Vente et al. (2016) identified that process design and professional facilitation, played a more important role in the success of collaborative initiatives, than contextual factors.

Although this synthesis of the enablers of collaboration appears to indicate that much knowledge has been generated on collaboration and what enables it, many of the studies cited are not necessarily from cases of 'collaboration on complex, contested systems' such as multifunctional landscapes (Refer to Chapter 3, Section 3.4). There is also a lack of literature on building collaboration in the Global South, and in contexts of weak governance (much published research on collaboration for natural resource management in complex contexts emanates from North America, Australia, and Europe). Furthermore, there is limited qualitative, place-based research which seeks to understand the nuances of social and contextual factors affecting collaborative relationships in multifunctional landscapes.

The aim of this chapter was therefore to investigate how collaboration for social-ecological stewardship can be fostered in contested multifunctional landscapes, by asking the following research question: What can be learnt about fostering collaboration for stewardship in the contested, multifunctional landscape of the Langkloof? I responded to this question by identifying and analysing enablers and barriers of collaboration in the greater Langkloof region (Eastern Cape, South Africa). This analysis was embedded in a detailed social-ecological description of the local context, that considers historical trajectories, thereby conducting a situated and contextual analysis of complex sustainability challenges.

6.2. Methods

In order to investigate the enablers and barriers of collaboration at a landscape level, and to pursue a situated and contextual analysis of the sustainability challenges involved, an instrumental case study was developed. Instrumental case studies are used to shed light on a particular social question (Stake, 2005). Since an instrumental case study is well-suited to answering 'How?' or 'Why?' questions (i.e. 'how collaboration can be fostered') and it focuses on a contemporary phenomenon (i.e. stewardship and collaboration) within a real-life context (i.e. the Langkloof region) (Yin, 2009), I considered this method well-suited to this study. A case study design also allowed me to explore the influence of historical processes on place-based change.

It is important to ground analysis and understanding of sustainability challenges such as stewardship within the social-ecological and socio-political context in which they operate (Leach et al., 2010). Historical changes are often strong drivers behind present-day sustainability challenges, frequently resulting in path dependence (Reenberg, 2011; Boonstra & de Boer, 2014). This is particularly important in contexts where there has been rapid social-ecological change, where socio-political history has had a strong influence on

human-environment interactions, and where there are issues of inequity and contestation with their roots in history (Leach et al., 2010), as is the case in South Africa (Beinart, 2000). The influence of system memory and path dependence on current and future stewardship and collaboration must not be underestimated (Leach et al., 2010; Boonstra & de Boer, 2014).

6.2.1 Transdisciplinary design

The methodology for this chapter is based on the philosophical and methodological framework developed for the entire PhD study, drawing together critical complexity (Audouin et al., 2013), transdisciplinary research (Jahn et al., 2012), and critical realism (Bhaskar, 2016) (Chapter 4, Section 4.2.4 and Figure 4.3). The framework presents four guiding methodological principles, which are operationalised in this chapter (Table 6.1). I put the four principles of the methodology into practice by becoming an embedded researcher (Vindrola-Padros et al., 2017) in the local project team of the NGO Living Lands in the Langkloof (Box 6.1) for almost three years. I implemented an instrumental case study research design which enabled use of diverse methods in a specific local context (Yin, 2009) (Table 6.1).

Table 6.1: Operationalisation of the methodological principles of the overall study in this chapter

Principles of the methodology	How the principle was operationalised in this chapter to inform methods and stakeholder engagement (Refer to Chapter 9 for further reflections)
1. Transformative, action-oriented and diverse methods	• I worked closely with a local NGO for this research, the NGO project team were involved throughout the process (Chapter 4, Figure 4.1, (Jahn et al., 2012; Lang et al., 2012)). • On-going interaction between myself as the researcher and the NGO project team enabled knowledge-sharing to support their actions on the ground. • Case study design enabled use of diverse methods and sources of information (Yin, 2009).
2. Meaningful engagement with societal actors	• I was an 'embedded researcher' (Vindrola-Padros et al., 2017) within the Living Lands project team from February 2015 to February 2017; I discussed preliminary findings with the NGO, enabling a knowledge co-production process (Schuttenberg & Guth, 2015). • The team considered me a 'critical friend' and welcomed my comments, reflections and suggestions.
3. On-going learning in context: experience generates new understanding of the system	• In-depth instrumental case studies provide valuable opportunities for learning about local, unique situations (Yin, 2009). • As an embedded researcher, and through participant observation, I gained a situated, contextual understanding (Cote & Nightingale, 2011). • I applied a realist approach to analysing qualitative data, recognising the role of context in causal explanations about phenomena (Maxwell, 2012).
4. Reflexivity and awareness of researcher role	• I implemented the principle of reflexivity through on-going research reflection and journaling, in which I employed the tools of 'free writing' and 'through-the-mirror' writing (Bolton, 2010); and through reflective conversations with my supervisors and practitioner partners. • Framing practices (Chapter 4, Section 4.2.1): I framed or bounded the research (conceptually and geographically) primarily in alignment with the NGO's project approach (Audouin et al., 2013).

This allowed me to work closely with Living Lands throughout the research process, conducting the research in an action-oriented manner. This included putting the principles of transdisciplinary research into practice by working across the boundary of 'science and society' and engaging meaningfully with practitioner partners

throughout (Jahn et al., 2012). By embedding myself in the team, I could learn on an on-going basis about the local context. This required reflexivity on my role as an embedded researcher (Bolton, 2010; Audouin et al., 2013; Popa et al., 2015), described in Table 6.1, and discussed further in Chapter 9.

6.2.2 Study area and rationale for case study selection

Selection of this instrumental case study was strongly influenced by the theoretical and methodological framework guiding the study (Stake, 2005; Yin, 2009). I did this using a two-tier process. Tier 1 of the case study selection process was to identify cases which focused on the key concepts of 'collaboration', 'stewardship' and 'multifunctional landscapes'. Once I had a short-list of cases, I applied Tier 2 of the selection process, which focused on aligning the case study with the overall critical realism and transdisciplinary research methodology for the study. I selected the Langkloof case because it provided opportunities for learning and intensive study (Stake, 2005), the partner NGO (Living Lands) offered support for logistical aspects such as on-site accommodation, access to and interactions with local stakeholders, and they were willing to engage in a mutual learning and knowledge co-production process. The Living Lands project in the greater Langkloof region fulfilled all Tier 1 and 2 criteria. (Box 6.1).

Box 6.1: Overview of 'Living Lands' in the greater Langkloof region

Living Lands is working in the Langkloof with local farmers and stakeholders to bring about sustainable and just natural resource management across the landscape according to their vision of 'Collaborations working on living landscapes'. Living Lands strives to take a 'Living Landscape Approach' in their work, which focuses on maintaining a long-term presence in the local community, serving the needs of the broader landscape, and identifying project funding opportunities which can support a broader vision for building sustainability in the landscape. They work according to the 'Four Returns' model which seeks to bring about a return of financial capital, natural capital, social capital and inspiration (Commonland Foundation, 2015). To this end, they have a strong focus on partnerships for green business development, for example with Grounded (www.grounded.co.za). They are currently focused on two projects:

1. Development of a **participatory hydrological model of the Kouga-Krom catchments** to build collaboration, developing shared understanding, and shared decision-making and action for catchment management.

2. Development of **local green economy initiatives for sustainable agriculture**, for example developing composting practices and businesses, supporting the sustainable development of the honeybush tea industry, and identifying business opportunities for secondary processing of woody alien invasive species.

Further information on the work which Living Lands does is available on their website (https://livinglands.co.za) and in a recent report (Living Lands, 2017).
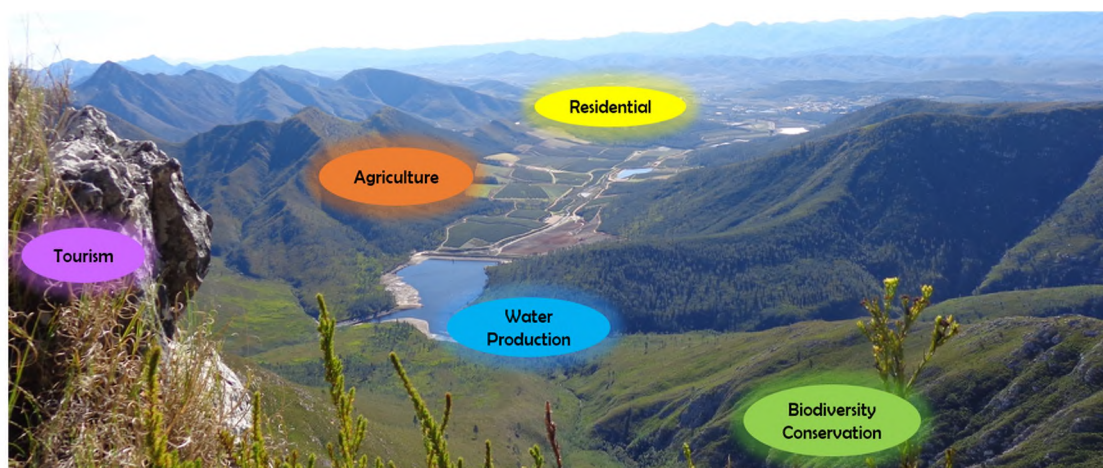
View of the Langkloof, looking north-west towards the settlement of Louterwater (See Figure 6.3 and 6.5).
Each coloured oval indicates a specific land use or function in the landscape – thus the Langkloof can be considered a **'Multifunctional Landscape'**

90

6.2.3 Data collection and analysis

Data collection for the instrumental case study involved primarily qualitative data collection and analysis methods (Newing, 2011; Maxwell, 2012; Miles et al., 2013). I used NVivo software to aid transcription, data management and analysis (Bazeley, 2007; QSR International, 2017).

6.2.3.1. Data collection and sampling

I collected data to construct the case study from a diversity of sources (Figure 6.2). I collected primary data from interviews (primary interviews and additional interviews), and participant observations (captured as field notes and a research journal); and secondary data by reviewing background documents about the Langkloof, including academic literature and books, theses and student research, grey literature, and popular media.

The primary interviews formed the core of the data for this research. I conducted in-depth, face-to-face, semi-structured interviews with a variety of stakeholders (n=68) from February to August 2016 (Refer to Appendix 6 for interview guide). Interview questions centred on five main themes:

1. 'your story' in the Langkloof (history, origins, community);
2. important natural resources (ecosystem services) in the Langkloof;
3. stewardship or sustainability actions;
4. collaboration (for natural resource management, and other issues); and
5. identifying sustainability challenges for the landscape or region.

Interview respondents were either 'stewards' (i.e. farmers: I use the general term 'farmer' to refer to any land owner or land user, refer to Chapter 2, Section 2.2.1), support stakeholders (people who play a role in supporting agriculture, conservation, or natural resource management such as government officials, NGOs, or researchers) or local residents. I conducted interviews in English or Afrikaans (a local South African language), depending on the preference of participants. Interviews were audio-recorded when participants consented to this; where not, I used field notes to capture responses. I transcribed interviews selectively based on the key objectives of the research, only transcribing sections of audio which related to the objectives (Davidson, 2009). I translated Afrikaans interviews during transcription i.e. my data analysis was conducted on a full set of English transcripts. Sampling and participant recruitment was based on purposive snowball sampling (Sadler et al., 2010) with a view to a sample that covered the geographic and demographic diversity of the landscape i.e. the sample of farmers was broadly stratified by geographical location, land use type, and race (Figure 6.1 and Figure 6.5).

Part A: Profile of interview respondents according to frequency of type of stakeholder and race

Type of stakeholder:	Respondents' race:			
	White	Coloured	Black	Total (n=)
Farmer	32	12	0	44
Support stakeholder	8	1	4	13
Resident	10	1	0	11
Total (n=)	50	14	4	68

Part B: Type of stakeholder (frequency and percentage)   Part C: Respondent's race (frequency and percentage)
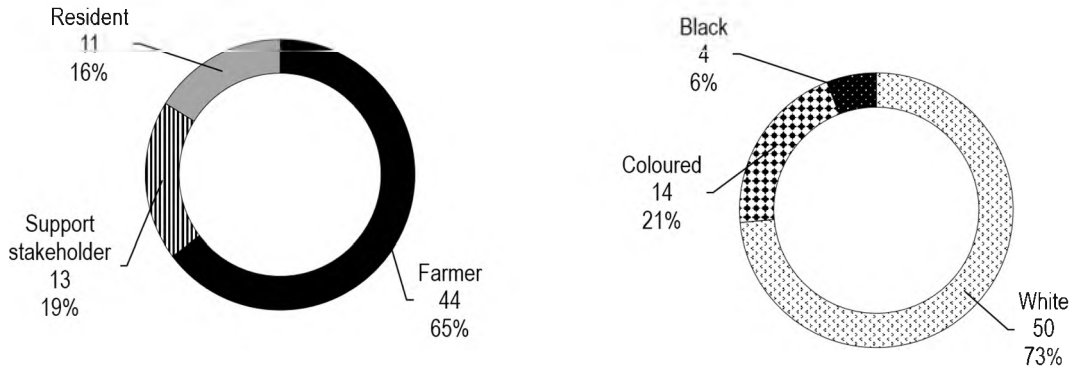
Figure 6.1: Profile of primary interview respondents in the Langkloof case study (n=68).

An overview of the sample of people who participated in the interviews is provided in Figure 6.1. Despite active efforts to ensure greater inclusion of non-white respondents, the largest category of respondents were white farmers (32 out of 68 = 47%). This is because the focus of this research is on people who currently own and manage land and natural resources in the Langkloof. The legacy of Apartheid racial policies still influences land ownership patterns and access to benefits of ecosystem services in the region (Hall, 2009; Kou-Kamma Local Municipality, 2009; de Laat, 2017), and therefore white farmers remain the majority landowners. According to the Kou-Kamma Local Municipality, the biggest land owners in the area are private land owners and the State, who own 85% and 13% of the land respectively (Kou-Kamma Local Municipality, 2009: 104). Approximately 17% of agricultural enterprises in the municipality are black-owned (coloured or black), and the ratio of white to black and coloured farmers is about 5:1 (Kou-Kamma Local Municipality, 2009: 10) (Note: the Langkloof boundary does not align exactly with the Kou-Kamma municipal boundary, however almost two-thirds of the regions falls within this municipality, and thus these figures are the best available proxy of land ownership patterns in the Langkloof region. They may be outdated as the report was published in 2009, but a more recent source of reliable information was not available).

Participant observation took place opportunistically over a two-year period from March 2015 to April 2017. This included my active involvement in six field trips, three stakeholder workshops, 12 project meetings, and six research feedback meetings with the local NGO team. I took field notes during each activity and kept a research journal throughout the process, reflecting generally on experiences and insights, and making notes on anything relevant to stewardship, and enablers and barriers of collaboration (as defined in Section 6.2.3.3). I reflect further on the research journal entries in Chapter 9.

I conducted additional interviews with a wider range of stakeholders who were usually not from the area, but who had relevant information or insights on the Langkloof, i.e. key informants (n=19). These differed from the primary interviews in that they were opportunistic rather than purposive, and informal rather than formal. Information from these interviews was recorded as field notes. Background documents on the Langkloof were identified and accessed via internet searches, the Rhodes University library, and through the Living Lands database of past research and reports from the area.

6.2.3.2. Data analysis

Data analysis followed an inductive, iterative process of coding and analysing qualitative data (Newing, 2011; Maxwell, 2012), with an initial focus on the interview data, followed by additional supporting data sources (participant observation notes, additional interviews and background documents) which were used for triangulation purposes, applying an integrated approach to analysis across data sources (Kara, 2015).

Semi-open coding was used as the starting point for analysis (Newing, 2011; Maxwell, 2012). This was guided by a 'broad coding framework' designed for the two distinct parts of the case study: Part 1: Landscape overview (construction of the case study) and Part 2: Investigating collaboration (Figure 6.2). The analysis for the two differed as follows. Analysis for Part 1 was primarily descriptive in nature, not going beyond identification of themes which are presented as narrative descriptions, tables and diagrams i.e. first cycle coding (Saldaña, 2013). Analysis for Part 2 moved from initial description to an analytical phase, employing second cycle coding tools (Saldaña, 2013). Quotes were used to illustrate key findings in the data and as an aid in data presentation. The labels in brackets after quotes refer to the interview number in the database: LK=Langkloof interview respondents (primary), KI=Key informant interviews (additional).

Data sources and analysis for Part 1: Landscape overview

I combined a social-ecological inventory approach (Schultz et al., 2007) with a historical timeline to analyse and present an overview of social-ecological change in the landscape over time (Bürgi et al., 2005; Boonstra & de Boer, 2014; Zheng et al., 2014). The social-ecological inventory method focuses on identifying the actors and stewardship challenges in the landscape at present, providing a 'snapshot in time' of the landscape (Schultz et al., 2007). The social ecological inventory was conducted around two main focus areas, drawing on data from interviews and from background document analysis (Figure 6.2); namely multifunctionality (I identified ecosystem services), and stewardship challenges (I identified social-ecological stewardship needs in the landscape) (Refer to Figure 6.2 for further details).

The historical timeline was divided into three distinct historical periods. I described each period according to the relative change over time of a number of key features of the social-ecological system (Figure 6.2). The relative balance of multiple ecosystem services was illustrated using ecosystem services flower diagrams (Gordon et al., 2010; Raudsepp-Hearne et al., 2010). I used these to illustrate how the diversity and proportion of ecosystem services utilised from the landscape, i.e. the multifunctionality of the landscape, changed over time. They were loosely based on information on land use/land cover changes over time, using

the information collected for landscape multifunctionality. The Langkloof landscape overview is presented in the first part of the results section below (Section 6.3) in two parts: 1. Brief social-ecological history (based on the timeline), and 2. Current landscape overview (based social-ecological inventory).

PART 1:
LANDSCAPE OVERVIEW:
❑ **Historical timeline**: Describe social-ecological change over time according to:
  1) Population and social structure
  2) Politics, power and governance
  3) Society's environmental values
  4) Land and natural resource use
  5) Responsibility, control and access to natural resources
  6) Balance of multiple ecosystem services
  7) Ecosystem function and biodiversity
❑ **Social-ecological inventory (Schultz et al., 2007)**: Identify and describe the current landscape according to:
  1) Multifunctionality: ecosystem services i.e. supporting, regulating, provisioning, cultural
  2) Social-ecological stewardship challenges

Data sources:

1. **Primary interviews** with farmers, support stakeholders and residents (N=68)

2. **Participant observation and interactions with Living Lands**: field notes and research journal

3. **Additional interviews** (N=19)

4. **Background documents**: academic and grey literature, Living Lands research and reports

Analytical tools:
Broad coding framework guiding a primarily DESCRIPTIVE process of working with data

Analytical tools:
Broad coding framework guiding a descriptive and ANALYTICAL process of working with data

PART 2:
UNDERSTANDING COLLABORATION:
❑ Identify **existing collaborative initiatives**: formal/informal, farming, natural resource management and social/community
❑ Identify **enablers and barriers** of collaboration
❑ Select **vignettes** which illustrate enablers and barriers qualitatively and help to develop explanatory models of specific lessons on collaboration

Figure 6.2: Research design for the development of the Langkloof case study indicating data sources, and analytical tools in the form of two broad coding frameworks which guided analysis: Part 1: Landscape overview, Part 2: Investigating collaboration.

Data sources and analysis for Part 2: Understanding collaboration

I used the broad coding framework to identify collaborative initiatives and enablers and barriers of collaboration from my dataset (Figure 6.2, Part 2). I identified and categorised existing collaborative initiatives according to the level of formality and focus of the initiative, e.g. farming, conservation / natural resource management, and other social or community interests. I defined formal initiatives as those with structural characteristics such as committees, constitutions, and regular meetings; and informal collaborations as ad-hoc interactions between people on a day-to-day and needs-basis. I identified collaborative initiatives and enablers and barriers primarily in the interview data using an open-coding approach whereby themes emerged from the data.

For analysis of enablers and barriers (Section 6.2.3.3), I then conducted a second cycle of coding and analysis. Having developed an initial set of themes, I triangulated these with additional data sources, developing over-arching categories. I then further analysed these themes and categories according to Bazeley's (2009) 'describe-compare-relate' scheme. This enabled me to move from lists of themes and categories, to analysing connectivity or contiguity (Maxwell, 2012). I did this for example by looking for relationships between enablers and barriers, and exploring how they played out in particular local contexts as shown in vignettes. Vignettes (used here as embedded mini-cases within a larger case) are a valuable tool to aid in analysis and

presentation of qualitative data, as they assist in situating and interpreting findings in context (Maxwell, 2012).

The findings on enablers and barriers are presented in a table, with accompanying text to describe and analyse the data using three qualitative vignettes. The table includes frequency response counts indicating in how many interviews an item (enabler or barrier) was mentioned. This does not imply that items mentioned more frequently are more important or significant, however frequency of mention is one of the aspects for consideration in interpreting the significance of an item. Guiding questions from critical realism were used to direct deeper explorations of the data, for example: what underlying conditions can explain the observations? What generative mechanisms, operating across levels and scales, might explain the findings (Danermark et al., 2005; Maxwell, 2012)?

6.2.3.3. Enablers and barriers as an analytical tool

I used the analytical tool of 'enablers and barriers' to investigate the factors, conditions and processes which influence stewardship and collaboration in the Langkloof (I also used this in the multi case study, refer to Chapter 7, Section 7.2.5). This tool provided a useful starting point into thinking about what conditions are needed to bring about collaboration in practice. The concept or analytical tool of 'enablers and barriers' has been used similarly in several related fields in sustainability science, including for example climate change adaptation (Moser & Ekstrom, 2010; Biesbroek et al., 2013; Shackleton et al., 2015; Spires, 2015), and invasive species management (Shackleton et al., 2016). Enablers and barriers are collectively referred to as factors (Guldberg & Mackness, 2009; Biesbroek et al., 2013), dimensions (Seidel et al., 2010), and/or processes (Shackleton et al., 2015) which influence (positively or negatively) the implementation or adoption of a specific initiative like a strategy, plan, or intervention for improved practices, management or governance (Biesbroek et al., 2014; Puzzolo et al., 2016; Shackleton et al., 2016). Enablers and barriers are likely to interact with one another, and may be reducible to specific factors or conditions, or may be labels or identifiers of more complex processes (Shackleton et al., 2015). In my study, enablers of collaboration were defined as factors, conditions and/or processes which enable stewards and stewardship facilitators to collaborate (work together) towards achieving stewardship outcomes. Conversely, barriers to collaboration were factors, conditions and/or processes which hinder (act as barriers to) stewards and stewardship facilitators collaborating towards achieving stewardship outcomes. e.g. insufficient funding to cover costs of activities

6.3. Results: The Langkloof Case Study

6.3.1 Landscape overview

The greater Langkloof region, which is the focus of this case study, stretches across the Kouga and Krom river catchment areas (+- 400 km2) in the Eastern Cape province of South Africa (Figure 6.3). The western-most portion of the area extends into the Western Cape province (my focus is on the Eastern Cape portion). The name 'Langkloof' refers to a social-geographic boundary and does not align perfectly with either the

catchment boundaries or municipal jurisdictions (Mulkerrins, 2015). The Langkloof (which is Afrikaans for 'long valley') is a valley that runs in a west-east direction, bounded by the Kouga and Suuranys mountains in the north, and the Langkloof and Tsitsikamma mountains in the south (Swiegers, 1994; Van Huyssteen, 2008) (Figure 6.3, Figure 6.5). The western and eastern boundaries of the region are less clear. The Living Lands project boundary aligns mostly to river catchment boundaries and provincial boundaries (their work is focused in the Eastern Cape section of the Langkloof), since water security and catchment restoration is one of the key focus areas of the project and the catchment drains into the Eastern Cape. Due to the uncertainty about the exact boundaries of the Langkloof, I use the term Langkloof to refer to the 'greater Langkloof' region as defined by the mountains and catchment boundaries, and the social understandings of place identity as determined from interviews (Figure 6.5).
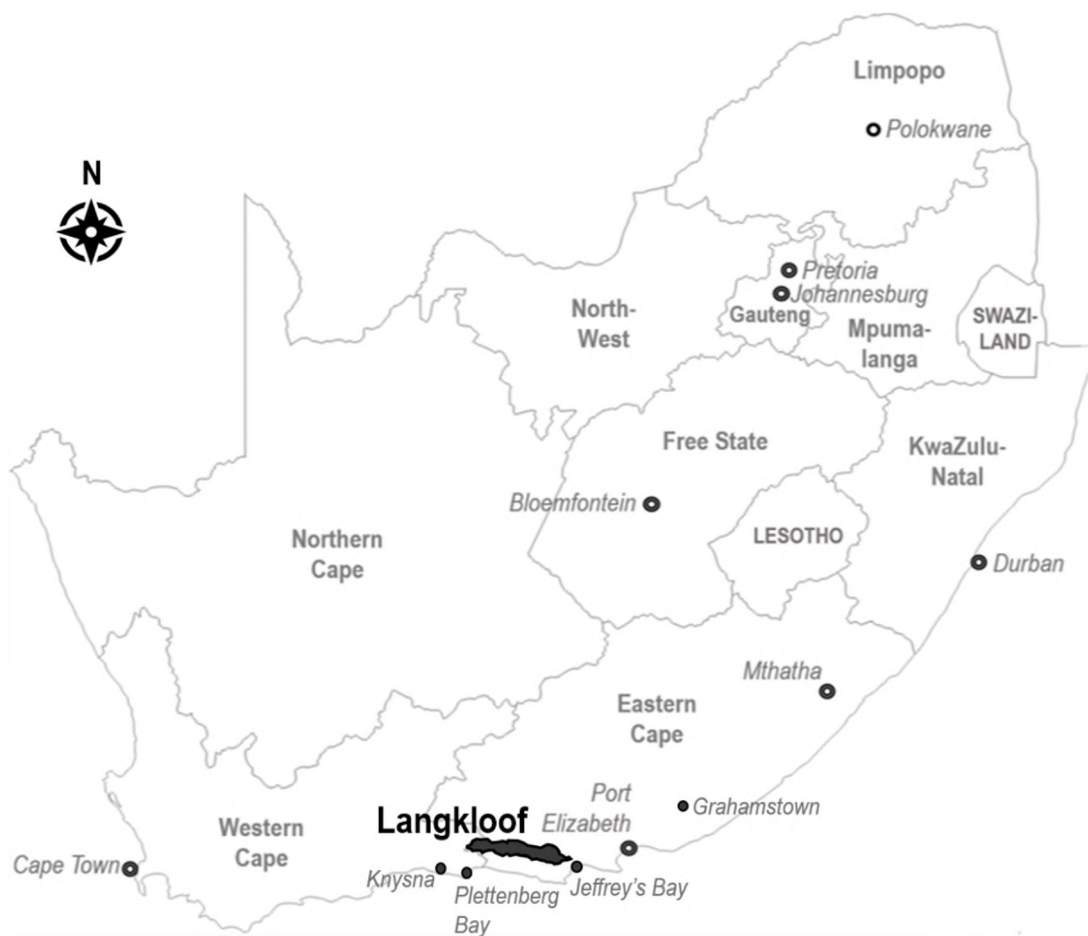
Figure 6.3: Map of South Africa showing location of the Langkloof in the Eastern and Western Cape provinces, west of the city of Port Elizabeth.

6.3.2 History of social-ecological change in the landscape

The descriptions of the history of interactions between humans and the landscape in the Langkloof region are divided into three periods in this section, mainly for clarity of presentation. Period 1, pre-1760, is the pre-colonial era; Period 2 is the colonial and Apartheid era, from 1760 to 1994; and Period 3 is the democratic era, from 1994 until the present (Table 6.2). During these three periods, the proportional use of ecosystem

services has shifted alongside the social changes described in Table 6.2, and these shifts are depicted in Figure 6.4. Each period in this social-ecological history is described in turn below. Understanding the collaboration challenges in the present day requires an understanding of the social-ecological history in the Langkloof. How this plays out in the present is described in Section 6.4.

6.3.2.1. PERIOD 1: Pre-1760

During the pre-colonial era, the Langkloof was inhabited for thousands, possibly tens of thousands of years, by San hunter-gatherers or bushmen and later also by the Khoikhoi, who were nomadic pastoralists and hunter-gatherers (Guelke & Shell, 1992; Swiegers, 1994). Rock art in caves in the mountains surrounding the Langkloof, as well as mummified human remains found in one of these caves (Binneman, 1999), provide evidence of occupation by the San, giving insight into their lives and their interactions with nature. The San and Khoi have shared ancestry and historians debate whether the division between the two groups is clear (Ross, 1983). Their interactions with land and nature were similar, as was the impact of the colonial expansion on them (Ross, 1983), and from here on I will refer to them collectively as the 'Khoisan'.

The Khoisan interacted with nature for both their physical and spiritual needs and much has been written about the close connection which they had with both the animate and inanimate features of the landscape (Guelke & Shell, 1992; Beinart, 2000). They were nomadic, as they followed the seasonal movement of animals which they hunted, and so they never permanently settled on the land in any one place (Ross, 1983).

The historical record suggests therefore that this period of the social-ecological history of the region was characterised by localised power structures and decision-making, and by environmental values based on strong spiritual and subsistence ties to nature (Table 6.2). With low population densities and nomadic hunter-gather lifestyles, one can assume that the landscape was in a near-natural state, though one might consider that the emphasis on livestock and hunting might have enhanced the relative importance of the use of meat (provisioning services), and that the Khoisan's deep spiritual ties to nature may have increased emphasis on spiritual or cultural ecosystem services (Figure 6.4).

6.3.2.2. PERIOD 2: 1760-1994

The colonial and later the Apartheid eras, which began in the 1760s, represented a dramatic shift in interactions between humans and nature in the region, primarily expressed as change in land use (Table 6.2). In 1760, the first European (mostly Dutch) settlers arrived in the Langkloof, and they eventually completely displaced the Khoisan, dispossessing them of land and water (Ross, 1983; Guelke & Shell, 1992). European settlers had been given permission to rent farms from the state for livestock farming due to grazing shortages in other parts of the fledgling colony (Swiegers, 1994). Some of the Khoisan became slaves and then labourers on white farms, and many of the present-day 'coloured' (a locally used term) residents in the Langkloof, many of whom are working class or unemployed, are descended from these original inhabitants of the Langkloof (Van Huyssteen, 2008).

Table 6.2: Historical timeline of social-ecological change in the Langkloof, based on various sources (du Toit, 1931; Guelke & Shell, 1992; Swiegers, 1994; Ross, 1997; Beinart, 2000; Van Huyssteen, 2008; Hamann & Tuinder, 2012; de Laat, 2017).

deeper past ------- past ----------------- recent past -------------- present -------------- future

PERIOD 1   PERIOD 2   PERIOD 3

What has changed?	Pre-1760: Pre-colonial era	1760-1990s Colonial and Apartheid era	Post-1994 Current democratic era
Human population *Who lives in the Langkloof?*	Nomadic San and Khoikhoi	Primarily Dutch (white) settler farmers, initially some San and Khoi but they were eventually dispossessed of land and pushed out, some became labourers on farms, they are now known as 'coloureds'.	Mixed population. On farms: mostly white farmers and coloured or black labourers (a few coloured and black farmers); in towns: white, middle class residents in suburbs, mostly coloured and black working class or unemployed residents in 'townships'[1] New people arriving from outside the landscape known as 'inkommers' (incomers).
Politics and governance *Who has power and control over decisions?*	Localised power and decision-making within small clans or groups; leaders were mostly men.	Colonial era: Colonial authorities (Dutch and British), through regional magistrates. Apartheid era: Authoritarian white minority government: National, provincial and local.	Democratic, pluralist governance model at national, provincial and local level. Strong emphasis on neo-liberal economic policies: markets and economic drivers are also powerful. Land and water reforms are legislated to redistribute rights and access.
Society's environmental values *What values inform interactions with nature?*	Strong spiritual and subsistence ties to nature, strong emphasis on respecting all of nature, living off the land 'as it is'[2]	Dualist environmental values strongly influenced by the Christianity and colonial ambitions to 'conquer' the land.	Environmental values based on sustainability; consideration for the needs of future generations; these values are in conflict with the dominant economic practice of extractivist profit-making informed by neoliberal economic policy.
Land and natural resource use *How are land and natural resources used?*	Wildlife hunting, gathering of natural resources, livestock grazing, drinking water, all for subsistence use, for collective use and benefit.	Initially, livestock and mixed crop farming, primarily for subsistence use, and later commercial agricultural production for profit (livestock, crops, fruit); reliance on irrigation infrastructure for water abstraction and storage, for private use and benefit. Nature reserves declared in early to mid-20th century.	Commercial agricultural production of deciduous fruit, much of it for export markets. Some mixed farming (crops and livestock), for local markets, increasing reliance on irrigation infrastructure for water abstraction and storage, for private use and benefit. Tourism emerges as an important socio-economic activity.
Responsibility for and control over natural resources *Who are the stewards?*	Nomadic San (mostly hunter-gatherers) and Khoikhoi (mostly herders, but also hunter-gatherers)	Primarily Dutch (white) settler farmers; later some policies to regulate land use decisions and practices to promote responsible use.	Mostly white farmers, a few coloured and black farmers; policy to regulate land use to promote responsible use; and policy for regulation of control and access to natural resources (land, water), though policy implementation is inconsistent.
Ecosystem function and biodiversity	Near-pristine state: possibly some grazing and hunting impacts, high biodiversity	Due to agricultural impacts, and invasive alien species, ecosystem function begins to deteriorate, some biodiversity lost due to clearing of vegetation for farming	Ecosystem function is impaired, some biodiversity loss (terrestrial and aquatic), on-going degradation of hydrological systems is a concern, however ecological restoration interventions are being implemented e.g. 'Working for Water' and related initiatives

[1]Townships are residential areas usually on the edge of town which were historically set aside for black and coloured people during the Apartheid era. This spatial, racial segregation persists even into the democratic era.

Throughout the colonial and Apartheid period, the benefits of natural resources (primarily land and water) accumulated among white farmers, and the coloured descendants of the original inhabitants of the Langkloof were marginalised (Ross, 1986). This process was driven and reinforced by a succession of discriminatory land policies that removed possibilities of black land ownership and vested authority and control over natural resources in white South Africans. The Natives Land Act of 1913, Act and the Native Trust and Land Act in 1936, were the most influential of these policies (Beinart & Delius, 2014). They undermined farm labour tenants and segregated the land based on race.

The shift from the pre-colonial to the colonial periods was not a gradual or peaceful one. It was characterised by a clash of worldviews, which at times took on violent dimensions, and was accompanied by episodes of revolt from indigenous populations (Ross, 1997). The following anecdote captures this clash of worldviews and illustrates the different ways in which the Khoisan and the colonists valued the landscape. It is an exchange between Klaas Stuurman, a leader of the Khoisan during the 'Servants' Revolt', and John Barrow, a British official and translator. The 'Servants' Revolt' took place in the late 1700s when the Khoisan tried to regain control of the lands in the south-eastern Cape (including the Langkloof region) in which they had hunted and herded for centuries, and of which they were dispossessed by the Dutch (Note: the Afrikaans term 'Groot Baas' in this quote refers to God): John Barrow writes, starting with what Stuurman says:

> 'Restore', he (Stuurman) *said, 'the country of which our fathers were despoiled by the Dutch, and we have nothing more to ask.' I endeavoured* (writes Barrow) *to convince him how little advantage they were likely to derive from the possession of a country without any other property, or the means of deriving a subsistence from it; but he had the better of the argument. 'We lived very contentedly', said he, 'before these Dutch plunderers molested us, and why should we not do so again if left to ourselves? Has not the Groot Baas given plenty of grass roots, and berries and grasshoppers for our use; and, till the Dutch destroyed them, abundance of wild animals to hunt? And will they not return and multiply when these destroyers are gone.* (Barrow (1806), cited in Newton-King & Malherbe, 1981, cited in Ross (1997: 93)).

During this period, the values of the white settlers in the Langkloof were strongly influenced by the Christian church and the colonial, and later Apartheid, governments with their imperial and authoritarian ideologies. These values were characterised by a dualist understanding of human-nature relationships which manifested in ambitions to conquer the land, protect home and family from 'the wilderness' (including human and animal enemies) and use it for human benefit, showing strong evidence of a 'pioneering spirit' and a utilitarian stewardship ethic (Beinart, 2000) (Refer to Chapter 5, Figure 5.1).

Between the 1800's and the late 1900's, significant land use changes occurred, as farms were sub-divided into smaller units and settlers began to farm the land more intensely (du Toit, 1931; Ross, 1986). By 1800 most farmers were operating on a commercial basis, selling produce (meat and other livestock products like wool, fruit and crops) for profit (Ross, 1986). These changes were accompanied by changes in economic

systems, transport, infrastructure, and technology, including the development of irrigation and dams for water storage (Van Vuuren, 2011), eventually leading to thriving local agricultural economy with export fruit markets (Van Huyssteen, 2008).

This resulted in a shift in the relative proportions of ecosystem services utilised from the landscape during this period, with provisioning services like crops and fruit, meat and dairy, and water storage and use increasing; whilst utilisation of cultural and regulating ecosystem services decreased (Figure 6.4). The emphasis on commercial agricultural production, driven by neoliberal economic models and external market pressures (Ross, 1986), has resulted in numerous stewardship challenges such as reduced ecosystem function, particularly of the river systems, but also of land cover and soil processes, and biodiversity loss (Table 6.3) (Mander et al., 2010; Rebelo et al., 2013; Veerkamp, 2013).
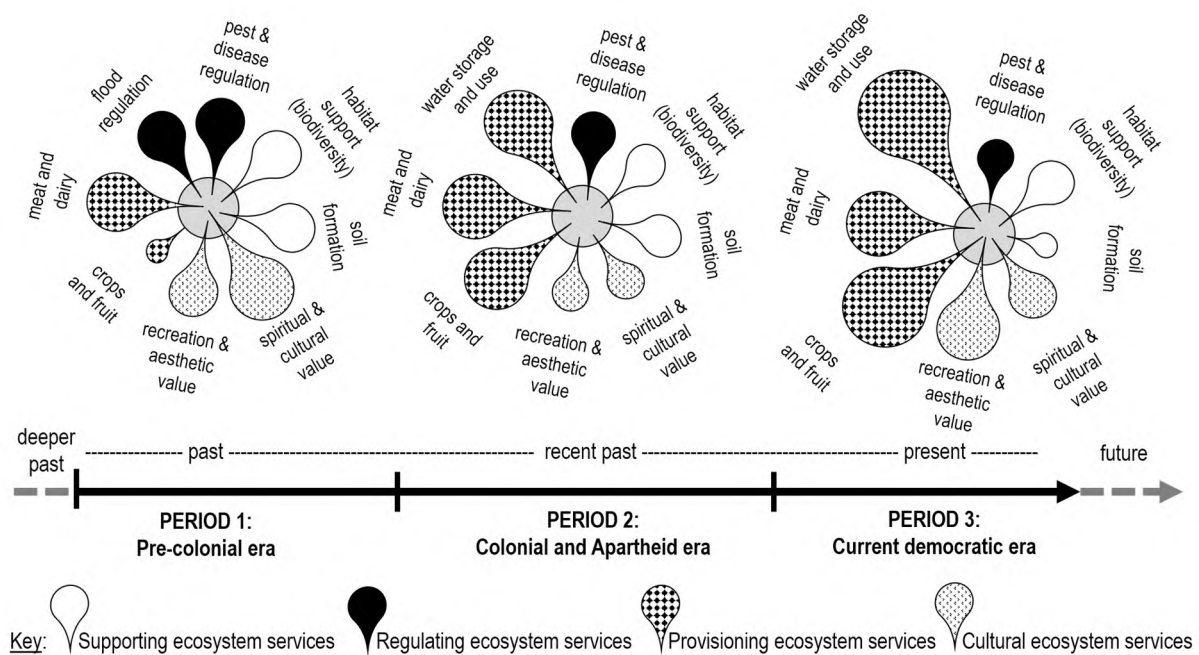
Figure 6.4: Illustrative depiction of changes in proportional use of selected ecosystem services from the Langkloof landscape over time. Note: The size of the 'petals' on each 'flower' indicate the relative proportion of each type of ecosystem services used by the human population. Information to inform the relative proportion of ecosystem services is based on historical and current land and natural resource use patterns described Van Huyssteen (2008) and in the following sources for each period: Period 1 (Guelke & Shell, 1992; Swiegers, 1994), Period 2 (du Toit, 1931; Swiegers, 1994), Period 3 (Van Huyssteen, 2008; Mander et al., 2010; Veerkamp, 2013).

6.3.2.3. PERIOD 3: 1994-present

The democratic period, from 1994 onwards, once again witnessed a shift of values and power (Table 6.2). Politics, in particular, shifted to a more balanced democratic model (in theory at least). At a national level, the values of democracy and diversity are enshrined in The Constitution of the Republic of South Africa, and are characterised by a commitment to sustainable development (with a strong focus on environmental protection and management) and equitable access to the benefits of nature for all citizens (Constitution of

the Republic of South Africa, 1996). This quote from one of the respondents in the Langkloof captures some of the essence of the new values:

> *South Africa … it's a beautiful country with diverse cultures… and we must learn to respect each other's culture. You must learn to adapt, to take hands, and go forward together: share and share alike: Ubuntu: It's about living out all our human characteristics to also let others live. All that I can say that can help, is that we just grant each other a place in the sun.* (LK63)

The growing agricultural productivity described in the colonial and Apartheid periods continued into the democratic period, and the Langkloof is now recognised as a significant producer of export-quality fruit in South Africa (Schafer, 2014), whilst farmers in the Suurveld, in the north-eastern section of the greater Langkloof region continue to successfully farm sheep commercially on extensive rangelands. The relative proportion of ecosystem services has shifted even further towards an emphasis on provisioning ecosystem services. Production of fruit and livestock (Schafer, 2014; de Kock, 2015), and to a lesser degree crops, water storage and use (Van Vuuren, 2011), and harvesting of wild and cultivated honeybush tea (all provisioning ecosystem services) (Joubert et al., 2011), are the most important ecosystem services used in the landscape by private landowners, whilst the state engages in biodiversity conservation and catchment management for water balance regulation in nature reserve areas (Mander et al., 2010; Veerkamp, 2013).

Increasing agricultural commercialisation and productivity in the Langkloof has been accompanied by increasing social inequality, which must be understood against the backdrop of colonial and Apartheid period dispossession of non-white residents from the land as described earlier. Although the region has a lower unemployment rate compared to the rest of the Eastern Cape (Kou-Kamma Local Municipality, 2009), social inequality is still a major concern (Taljaard, 2015; de Laat, 2017). Farms have been consolidated in the last few decades to form larger economically viable units, and a small number of white farmers have become wealthy, whilst the working class and unemployed populations have grown and remained poor. Many people have migrated from other parts of the Eastern Cape (and from further afield in Africa) into the Langkloof in search of work, resulting in rapid growth of low income settlements or 'townships' since the beginning of the democratic period. Work on farms provides an important source of income, however this is often only seasonal work, and does not allow people to escape the poverty trap which they find themselves in. Despite some efforts to shift land ownership patterns from mostly white ownership to more black and coloured ownership through land reform initiatives (Kou-Kamma Local Municipality, 2009; Schafer, 2014), the benefits of natural resources are not yet being shared equitably among the residents of the Langkloof (de Laat, 2017).

6.3.3 Current landscape situation: multifunctionality and stewardship challenges

The greater Langkloof region is part of the Sarah Baartman District Municipality. Most of it falls within the Kou-Kamma Local Municipality, and has a population of approximately 27 000 people (figure based on rough calculations from Census Data from 2011 (Statistics South Africa, 2012)). Socio-demographic data for the Kou-Kamma Local Municipality (KLM) are a useful proxy as the Eastern Cape part of the Langkloof falls within

this municipal area. The KLM is composed of three main population or race groups: coloured (59%), black African (31%) and white (8%). The main language of the region is Afrikaans (spoken by 74% as their home language), though there is a growing population of people speaking isiXhosa and English (Statistics South Africa, 2012). Since the colonial and Apartheid periods (Table 6.2), the private land in the Langkloof has been entirely white-owned; however, there is now land which is state-owned and leased to black or coloured farmers and there are numerous Broad-Based-Black-Economic-Empowerment (BBBEE) Joint Ventures implemented through the South African government's Land Reform process, in which coloured or black owners have 50-50 companies with white farm owners (Kou-Kamma Local Municipality, 2012; Schafer, 2014; de Laat, 2017).

I identified seven agricultural sub-communities in the greater Langkloof region (Figure 6.5). Only two of the seven sub-communities are strictly speaking 'the Langkloof', which is a sub-region identified by most respondents as an apple-growing area (Middel and Onder-Langkloof). Each of the seven agricultural sub-communities (Figure 6.5) is characterised by unique social-ecological and agricultural features. Climate, soils, and topography determine what kind of agricultural activities are practiced within each agricultural sub-community, and respondents strongly identified with the characteristic farming activity of their sub-region. For example, apple farmers in the Middel- and Onder-Langkloof call themselves 'Langkloofers', whereas farmers in the Suurveld, who mostly farm with sheep, call themselves 'Suurvelders'. This illustrates the importance of place identity and sense of place in the greater Langkloof region, which, as I will discuss further below (Section 6.4.3.1), influence collaboration.

The greater Langkloof landscape is a multifunctional landscape at various levels, and this multifunctionality presents both opportunities and challenges for collaboration (discussed later). From the perspective of farmers and residents whom I interviewed, the five primary 'functions' are: agriculture, water storage and use, biodiversity conservation, tourism, and human settlements or residential areas (Box 6.1) (Veerkamp, 2013). Farming activities include livestock farming, crop and fruit farming, and wild harvesting and cultivation of indigenous honeybush tea which grows in the fynbos vegetation (*Cyclopia* spp.) (Joubert et al., 2011) (Figure 6.5).

The area also has high biodiversity value, characterised by a mosaic of fynbos, grassland and thicket vegetation, and high rates of species endemism (Mander et al., 2010; McClure, 2012). Much of this is protected through formal protected areas; however, despite formal protection, biodiversity is still regarded as being under threat from invasive alien plants and unsustainable farming practices (Mander et al., 2010).
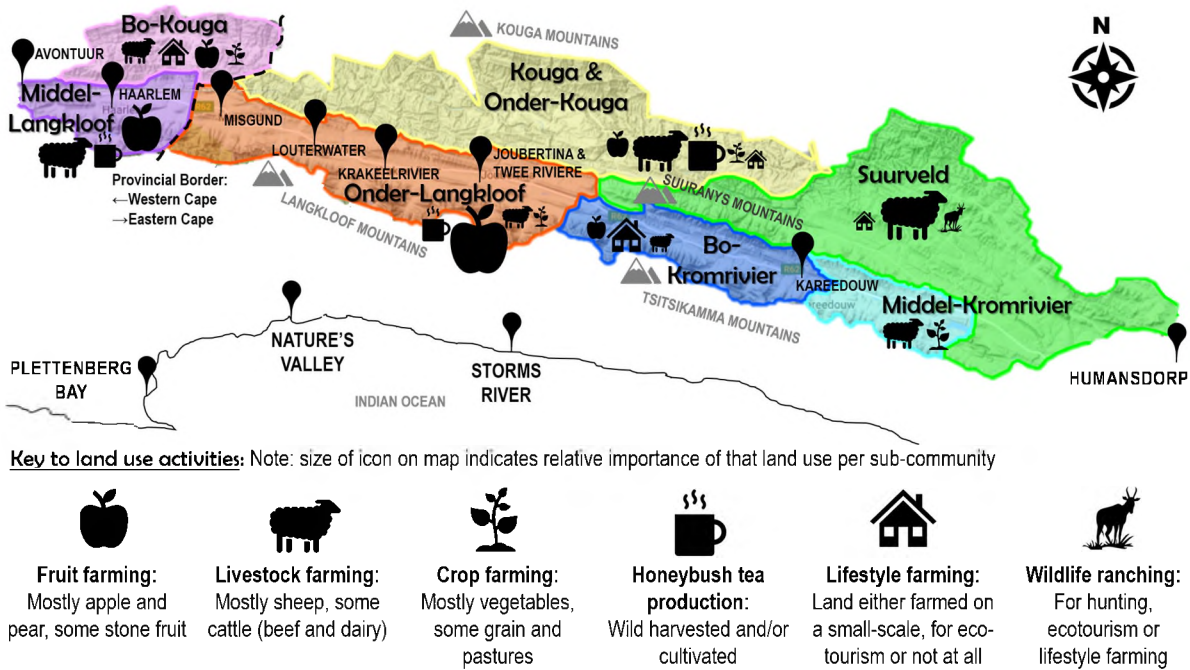
Figure 6.5: Map of the greater Langkloof area indicating different agricultural sub-communities, primary land use activities, and towns or villages. Each coloured patch on the map indicates a different sub-community. Note: information generated from interviews.

To gain an understanding of the Langkloof context, it is necessary to consider influences beyond the local landscape level. The Langkloof also falls within the Kouga and Krom catchment areas, which produce almost 70% of the water supply for the city of Port Elizabeth (Figure 6.3) (Mander et al., 2010; Talbot, 2012). Simultaneously, water is a primary driver of the local agricultural economy (Schafer, 2014; de Kock, 2015). Looking at the multi-level multifunctional uses of the landscape highlights potential trade-offs among multiple ecosystem services in the landscape, which simultaneously highlight the importance of collaboration, and the potential challenges toward achieving this.

There are a variety of stewardship challenges in the Langkloof, including water supply, catchment management, soil management, invasive alien species, unsustainable farming practices and biodiversity conservation (Table 6.3). Many of these challenges relate to the unequal balance of ecosystem services, where provisioning ecosystem services are prioritised over other types (Figure 6.4). Overall, concerns related to water supply and catchment management are probably the most important and over-arching of the stewardship challenges (Mander et al., 2010; Talbot, 2012), as well as overall catchment health and ecological integrity of hydrological systems (Talbot, 2012; Rebelo et al., 2013). Stewardship challenges related to biodiversity conservation include concerns about illegal hunting of wildlife (both herbivores and predators), illegal harvesting of honeybush tea and degradation of natural vegetation and habitats. The threat of invasive alien plants is considered one of the most pressing stewardship issues, as this impacts both ecological function and biodiversity, and has negative impacts on agriculture and water storage and use (Mander et al., 2010; Rebelo et al., 2013; van de Witte, 2015).

In working towards stewardship of the multifunctional Langkloof landscape, concerns about the inequitable sharing of ecosystem services and benefits from the landscape cannot be ignored. These are particularly important in the context of global calls to navigate safe and just pathways for humanity (Leach et al., 2013) by working towards ecological sustainability and social justice in an integrated manner. Some of the most pressing social issues which need to be taken into consideration in the Langkloof include unequal access to land and water (water: both for agriculture and for drinking water), unequal sharing in the benefits of agriculture, and a gender bias in agriculture (few women are involved in high-earning agricultural work or are landowners). These issues related to inequitable distribution of the benefits from the landscape (Leach et al., 2013) pose a challenge to practitioners seeking to foster collaboration among diverse stakeholders across the landscape. I discuss this further in Section 6.5.2 and 6.5.4.

Table 6.3: Stewardship challenges in the Langkloof (Mander et al., 2010; McClure, 2012; Rebelo et al., 2013; Veerkamp, 2013; van de Witte, 2015)

Type of stewardship challenge	Description
Water supply	Insufficient supply, concerns about water quality and quantity.
Catchment management	Degradation of river channels, loss of hydrological function, loss of wetland cover and function.
Soil management	Erosion and loss of soil, loss of soil fertility.
Invasive alien plants	High densities and extent of invasive plant species.
Unsustainable farming practices	Various threats from poor farming practices to ecological function and biodiversity, for example overuse of agrochemicals, modification of river channels and wetlands.
Biodiversity conservation	Control of illegal hunting, and reduction of natural vegetation, illegal honeybush harvesting in the wild, potential threats of commercial monocropping, degradation and loss of natural endemic vegetation e.g. fynbos, thicket.

As I argued in Chapter 3, social-ecological processes operate beyond the individual farm level and thus collaboration is an imperative (Section 3.3 and 3.4). By the same token, addressing these stewardship challenges (Table 6.3) requires collaboration among the multiple stakeholders in the Langkloof. Living Lands has committed to the challenge of facilitating collaboration in the landscape, yet they are facing difficulties in this work (Refer to Section 6.4.1). However, there is evidence of many existing 'seeds of collaboration' in the Langkloof. Below, I begin with reflections on Living Lands' work towards facilitating collaboration in the Langkloof. I then move to a description, and an analysis, of existing collaborative initiatives to set the scene for a deeper analysis of the enablers and barriers of collaboration in the Langkloof (Section 6.4.3).

6.4. Understanding collaboration in the Langkloof

6.4.1 Reflections on Living Lands' efforts to facilitate collaboration

Living Lands have been working in the greater Langkloof region since 2011. They have been actively working towards their vision of 'collaborations on living landscapes', partnering with various organisations in the process (Talbot, 2012; Living Lands, 2017). However, progress towards achieving this vision has been slow and difficult, and I became aware of these frustrations early on in my interactions with them. They have found it particularly difficult to build meaningful relationships with, and collaboration among, commercial

farmers, and have recently shifted focus somewhat to more closely engaging with emerging farmers and farmers pursuing 'alternative' farming approaches (Draugelytė, 2012), who seem more open to collaboration. These initial frustrations are what motivated me to investigate the enablers and barriers of collaboration in this case study. Below, I distil some insights on some of the challenges faced by Living Lands, based on my own observations from the time I spent with Living Lands, and from information reported in student research theses generated through the PRESENCE Network, a research platform hosted by Living Lands (Living Lands, 2017).

Despite the diversity of stakeholders in the Langkloof (Draugelytė, 2012), there is a sense that many share a similar vision for the future of the Langkloof. I observed this across diverse sets of stakeholders, where people's strong sense of place and identity as 'Langkloofers' is shared, despite many other differences. The wish of many stakeholders is for better relationships, for a move away from the current situation of antagonism and conflict towards improved cooperation, and an improved quality of life for all residents (Mulkerrins, 2015). Management of invasive alien plants and water security are potential areas of agreement and collaboration (Draugelytė, 2012; Rebelo, 2012). Most farmers I spoke to mentioned alien plants and water security as the most pressing environmental sustainability challenges, and concerns about poverty, alcoholism and crime (particularly in low income housing areas), were expressed by many people.

However, there are high levels of suspicion, resentment, and mistrust among various stakeholder groups. There are deep divisions between people of different race groups, and there is a lack of communication and willingness to communicate between farmers and municipal and provincial officials. Mulkerrins (2015: 84) sums the situation up as follows: *"multi-stakeholder collaboration, communication and interaction is limited and intermittent, and fraught with resentment due to not only the water issue, but to other issues such as Apartheid-related cultural aspects, property, land and municipal taxes (etc)..."* Farmers are suspicious of efforts to bring them together to collaborate, and it seems that it is currently in the farmers interests to remain 'fragmented' rather than work as a collective, to avoid government control and to maintain what control they have over their land and water resources (de Jong, 2012; Mulkerrins, 2015). As de Jong puts it: *"some farmers feel it is necessary to start cooperating, but the majority rather wants to continue their business as usual without too much cooperation."* (de Jong, 2012: 22).

All of these factors go some way to explaining why Living Lands have found it difficult to facilitate collaboration among farmers, and between farmers and other stakeholders. There are multiple barriers at play, including: social barriers between locals and 'inkommers' who have recently moved in (government officials, Living Lands and other NGO employees, are usually considered inkommers); lack of long-term relationships and trust between different stakeholders (many government officials have not been in the area long enough to build trust, and maybe Living Lands have not either); and racial tension and a lack of collaboration across race groups. Furthermore, the farmers' fear of losing the current access and control they

have over water, coupled with an individualistic mindset and resistance to change means there is limited incentive for them to participate in collaborative initiatives (de Jong, 2012; Mulkerrins, 2015).

6.4.2 Existing collaborations in the landscape

In contrast to the perceptions about a general 'lack of collaboration' among farmers and other stakeholders which I picked up on whilst interacting with the Living Lands team at the start of my research, during my interviews farmers in the Langkloof identified a wide variety of activities on which they collaborate with neighbours and other stakeholders (Table 6.4) for example, farmers collaborate with one another on issues directly related to their farming businesses, and also on natural resource management and broader community issues. They collaborate with other stakeholders through various fora, both formal and informal (Table 6.4). Most informal collaboration happens at the local level between neighbours or within agricultural sub-communities (Figure 6.5).

Table 6.4: Existing and recently existing[1] collaborative initiatives in the Langkloof. Note: this is not intended to be an exhaustive list.

Formal Collaborative Initiatives	Informal Collaborative Initiatives
The business of farming	
• Farmers' Associations: Langkloof, Suurveld, Avontuur • Koukamma Emerging Farmers Task Team • Black Economic Empowerment Joint Farming Ventures • Area-wide Integrated Pest Management • Agricultural co-op stores e.g. Humansdorp Co-op • Granor Passi juice factory • Study groups	• Fruit storage, packing, marketing and transport • Road maintenance • Sharing implements and equipment • Sharing knowledge • Sharing labour • Labour wage negotiations • Livestock auctions
Stewardship: conservation and natural resource management	
• Disaster Risk Management Advisory Forum[2] • Fire Protection Associations[2] • Irrigation Boards[2] • Conservancies[2] • Baviaanskloof Mega-Reserve Steering Committee[1] • Eden-to-Addo Corridor Initiative • Formosa Forum	• Fire-fighting, management and prevention[2] • Hunting problem animals[2] • Natural disasters like fire, floods and droughts[2] • Sharing water[2] • Krom River Catchment Initiative[1] • Language of the Wilderness Foundation workshops and activities (NGO) • Living Lands workshops and activities (NGO)
Other social and community initiatives	
• Haarlem Women's Forum • Various safety and security initiatives • Tourism Associations	• Informal women's groups • Schools and churches • Sports and social clubs and events

[1]'Recently existing' initiatives are those which existed in the recent past, but are no longer active. They are included here because respondents mentioned them, and they provide interesting insights into the challenges or collaboration.
[2]Conservation and natural resource management initiatives with direct relevance to farming business

More formal fora include Irrigation Boards and Fire Protection Associations. This indicates that although farmers do work independently, to the point of this appearing individualistic to a stewardship facilitator organisation like Living Lands, they are reliant on social networks around them and do collaborate on issues important to them and that affect their livelihoods (like labour-sharing, fire, and water management).

Farmers are particularly active in collaborating to manage, mitigate or respond to risks relating to natural disasters such as droughts, floods and wild fires (Table 6.4). Farmers collaborate around these shared risks across the landscape as a whole (i.e. beyond individual agricultural sub-communities).

In addition to shared risk, another major enabler of collaboration is a shared purpose and a common interest (and the inverse, a lack of shared interests, can be a barrier), as illustrated by the following quotes:

> *I think people build relationships over longer periods of time, for instance the guy, at the beginning of the year who would come and help me pick, he is from Louterwater, but that suits him. Keep his people busy, and so on. I think it's need based, there's a need both sides.* (LK53)

> *If you don't have the same interests in, like farming, this side maybe fruit farming, and that side meat farming, so why would you link with each other... it's difficult.* (LK15)

Formal initiatives provide a platform for collaboration that may take place at a broader level beyond the boundaries of agricultural sub-communities, for example through Farmers' Associations, Fire Protection Associations, the Disaster Risk Management Advisory Forum, the Granor Passi juice factory, and livestock auctions. The level of participation and overall success and impact of these various initiatives is highly variable, and a variety of enablers and barriers that influence this are identified in the next section. Three vignettes will be presented below which provide a more detailed and nuanced insight into the successes and failures of some of these initiatives, and relate lessons about collaboration in general, to collaboration specifically for social-ecological stewardship.

The findings in Table 6.4 might give the impression that there is a lot of 'collaboration for stewardship' happening in the landscape, since there are seven formal and seven informal collaborative initiatives related to stewardship for conservation and natural resources management. However, this is not an entirely accurate picture of the situation. Firstly, eight of these fourteen initiatives are conservation and natural resource management initiatives with direct relevance to farming business. So, although they address some aspects of stewardship in the landscape, the primary motivation for farmers participating in them is for their farming business, and stewardship outcomes are a secondary interest (The Zuuranys Conservancy is an exception to this). Secondly, some of the initiatives no longer exist (e.g. the Baviaanskloof Mega-Reserve Steering Committee) or participation in them is minimal and they are battling to maintain meaningful collaboration (e.g. Eden-to-Addo Corridor Initiative, Formosa Forum). Furthermore, three of the NGOs who are actively seeking to build collaboration for stewardship (i.e. Living Lands, Language of the Wilderness Foundation, and Eden-to-Addo), have had some small 'pockets of success', but spoke about the difficulties of bringing people in the Langkloof together to collaboratively work on landscape-level stewardship initiatives, for example (and refer to Section 6.4.1):

...you know this Langkloof it's very fragmented, it's not like we all stand together, it's very fragmented and it's very difficult to get them to stand together on anything, it's very difficult to get them together for anything. (LK54)

The Langkloof is a socially heterogenous place, demonstrating the need for a nuanced, socially-sensitive approach to building collaboration. This quote from a conservation practitioner illustrates this:

There are always cliques... farmers go by valleys really, and even within a valley you can have discontent, obviously... but in that valley, they tend to stick together, and they would do different things to what happens in another valley. (LK25)

While this section has highlighted some of the enablers behind pre-existing collaborations, these examples do not help us to fully understand why new collaborations for stewardship have proven so challenging to facilitate by Living Lands in the landscape so far (Section 6.4.1). In order to understand this better, in the next section, I unpack enablers and barriers to collaborative efforts more generally in the Langkloof, exploring both successful and failed examples in further detail, including vignettes to illustrate contextual nuances.

6.4.3 Unpacking enablers and barriers of collaboration

Four over-arching types of enablers and barriers affect collaboration: contextual, institutional, social-relational, and individual. A fifth type emerged only in the barriers data, namely political and historical factors (Table 6.5).

6.4.3.1. Contextual enablers and barriers of collaboration

Contextual enablers and barriers refer to local social-ecological conditions which influence people's ability or willingness to collaborate, such as geography and topography, or the nature of farming activities e.g. crops or livestock. For example, agricultural sub-communities isolated from the main Langkloof region, such as the Kouga and the Suurveld (Figure 6.5), have strong internal collaboration, but there are barriers to their collaborating beyond their local area, both biophysical (living in an inaccessible valley) and social (resistance to 'inkommers'). Contextual enablers were the most frequent category of enabler mentioned (Table 6.5), indicating that the nature of the landscape, both from a social and ecological point of view, can enable collaboration.

For example, when natural disasters strike, like floods, fires or droughts, collaboration is needed to respond, and people work together very well under such conditions of crisis, as illustrated in this quote:

... there is good collaboration, especially with all these fires and things... I mean here at Avontuur... if a fire breaks out on someone's farm, every man and mouse ... tractors and sprayers and people... you go and help that guy ...I mean you will get exceptions, but in general there is incredibly good collaboration. (LK22)

Table 6.5: Enablers and barriers of collaboration in the Langkloof case study

ENABLERS OF COLLABORATION	No. of mentions[1] (n=68)	Relevant vignettes
1. Contextual enablers in the local landscape	**29**	
Localised collaboration within agricultural sub-communities	13	V2, V3
*Shared farming interests across the region	12	V1, V3,
Shared risks like natural disasters (fire, floods, drought)	9	
Consolidation of farms: More big farmers and companies, less neighbours	5	
2. Institutional enablers	**18**	
*Formal or institutionalised collaborative initiatives	11	V2, V3
Schools and churches acting as hubs of social networks	9	V3
Aligning collaborative initiatives to reduce administrative load	4	V2, V3
3. Social-relational enablers	**22**	
Social activities, especially through sport and leisure clubs	10	V3
Social networks with shared interests	8	V3
Bridging agents or brokers	6	V3
*Long-term relationships and trust between different stakeholders	6	V2, V3
4. Individual enablers	**17**	
*Leadership or champions	14	V2, V3
People skills e.g. listening and communication	4	

BARRIERS OF COLLABORATION

	No. of mentions[1] (n=68)	Relevant vignettes
1. Contextual barriers in the local landscape	**34**	
*Lack of collaboration across agricultural sub-communities	19	
Different farming interests	16	V1
Conflict between neighbours with different land use objectives	13	
Large spatial scale or distance makes collaboration difficult	10	
2. Institutional barriers	**11**	
*Vague or ineffective forums or initiatives that don't address direct needs	10	
Lack of government support and financial resources	3	
3. Social-relational barriers	**43**	
*Social barriers between locals and 'inkommers'	30	
Conflict and competition between farmers	16	V1
Lack of long-term relationships and trust between different stakeholders	9	V1
Apathy and lack of interest and participation in collaborative processes	6	
Lack of collaboration between emerging farmers and commercial farmers	3	V1
4. Individual barriers	**27**	
*Individualistic and autonomous mindset of farmers	25	V1
Poor people skills e.g. listening and communication	3	
5. Political and historical barriers	**27**	
*Racial tension: lack of collaboration across race groups	17	V1
Political interference	3	
Exclusion of emerging farmers from formal collaborative initiatives	3	V1
Unequal power dynamics, particularly along racial lines	2	V1
Conflicts around land rights and on-going land claim processes	2	V1

[1]No. of mentions = number of interviews in which this item was mentioned by respondents
*Most significant enablers or barriers: highlighted in Vignettes and discussed in Section 6.4.3.

6.4.3.2. Institutional enablers and barriers of collaboration

Institutional enablers and barriers are those factors relating to formal collaborative initiatives. These are often provided for in policy and legislation and are usually government-initiated. These kinds of platforms can enable collaboration for stewardship (Table 6.4, Vignette 2 and 3) but they can also be barriers to collaboration (Section 6.4.1 and Vignette 1), depending on how they interact with other enablers or barriers.

VIGNETTE 1: EXCLUSIVE COLLABORATION IN THE LANGKLOOF FARMERS ASSOCIATION (V1)

The Langkloof Farmers Association (LFA) is one of the most important and functional collaborative initiatives in the Langkloof (Table 6.4) and is an influential organisation in the Langkloof farming community. Most commercial fruit farmers in the greater Langkloof, i.e. the Middel- and Onder-Langkloof (Figure 6.5), are members of the association. The LFA is affiliated to the provincial organised agriculture body Agri Eastern Cape, which is in turn affiliated to the national body representing commercial agriculture, AgriSA. Most emerging coloured farmers in this part of the Langkloof whom I spoke to do not participate in and collaborate with the LFA, although they have been invited. Some of the emerging farmers said that they used to attend the meetings, but they felt marginalised and their voice was not heard, as this quote illustrates: *"I was part of the Farmers' Association here. In the end, I didn't go anymore... systematically took myself away from that ... I could see that in this new dispensation there hasn't been a paradigm shift: they are still speaking the same language, they are still speaking in the same direction".* (LK68) One of the emerging farmers spoke about similar experiences with participating in the Misgund Irrigation Board (a formalised, legislated institution for managing water for irrigation at the local level): *"We've got a water board here in Misgund. I was sitting on that board...Misgund Water Board. ... the guys there are still discriminating. They've got their own views, they support each other, you must sit at the back. That is the way they are doing it there. They've got their commercial board...their water board... and they also discuss only their own things, without our* (us) *blacks."* (LK6)

Possibly in response to this exclusion, the emerging farmers have formed their own collaborative group, the Koukamma Emerging Farmers Task Team (KEFTT). This has a representative who sits on the deciduous fruit industry body HortGro, and also represents the interests of vegetable and livestock farmers. The KEFTT however does not seem to function very well: they only meet on an ad-hoc basis and a number of the emerging farmers I spoke to could not clearly explain the purpose or function of the group, nor describe any obvious benefits to participating. This is in contrast to comments made by many commercial farmers about the LFA, which functions well, and most farmers did not find it difficult to explain the benefits of participating.

In contrast to these experiences of exclusion at the institutional level, most of the emerging farmers I spoke to had good working relationships with their white farmer neighbours. For example: *"That neighbour of mine sent us managers to help us, that man came every day to help us. He taught us how to prune, how to take out old trees, how to irrigate, I take my hat off to that man"* (LK63). A similar case of farmer-to-farmer linkages across socio-economic racial divides in the Langkloof has also been described in the literature (Hart & Burgess, 2006), emphasising the importance of farmers networks, and individual inter-personal relationships, for knowledge exchange and innovation.

The lesson from this vignette is that there are indeed deep racial divisions among farmers in the Langkloof, and this is a significant barrier to landscape-level collaboration, for agriculture and rural development, but also for social-ecological stewardship and sustainable land use management. The tacit exclusion of emerging farmers from formal collaborative institutions like farmers associations and irrigation boards serves to further entrench historic social injustices in the region, reducing the potential for the benefits of agriculture and natural resources to be shared more equitably. It also illustrates the important role that formal platforms and institutional arrangements play in enabling collaboration, and that people seek these out, creating them if necessary (e.g. the KEFTT). However, the positive inter-personal working relationships between neighbouring farmers (across racial divides) inspire hope and seem to indicate that it might be at the one-to-one, inter-personal level, that racial boundaries can be overcome first. This might then eventually build momentum and influence race relations at the institutional level.

Photo: These apples were given to me by one of the successful emerging farmers in the Langkloof. This farmer spoke of good working relationships between himself (a coloured farmer) and his commercial farmer neighbours (white farmers), indicating that deep-seated mistrust can be overcome, but that this starts at the inter-personal level and may take time to manifest at the institutional level.

A number of formal, institutionalised collaborative initiatives exist in the Langkloof (Table 6.4), they illustrate how institutions can act as enablers or barriers and how they interact with other categories of enablers and barriers.

'Vague or ineffective forums or initiatives that don't address direct needs' were mentioned ten times as a barrier to collaboration. Examples of these included conservation initiatives in which farmers were expected to participate, but which seemed to have vague objectives or whose objectives were not aligned with farmers interests. For example, the Baviaanskloof Mega Reserve Steering Committee (BMRSC) (Boshoff, 2005), was successful for a number of years, but due to limited funding, conflict among partners, and lack of suitable leaders to take ownership of the process, it did not continue. Furthermore, farmers began to lose interest in the BMRSC as the purpose and benefits of the initiative never became clear to them. One farmer described his view on the BMRSC:

> I was also a member of that steering committee... but up to this stage I don't really know what the purpose of the committee was. (LK9)

This quote captures a sentiment expressed by many farmers about various collaborative conservation initiatives and illustrates the importance of a clear purpose for collaboration that addresses direct needs of farmers. These unsuccessful collaborative platforms led by conservation organisations may also be causing reluctance among farmers to participate, for example, in Living Lands' collaborative initiatives (Section 6.4.1).

On the other hand, 'formal or institutionalised collaborative initiatives' were mentioned 11 times as an enabler, and these include initiatives like the Langkloof Farmers' Association (Vignette 1), the historic soil conservation committees (Vignette 2), and the Zuuranys Conservancy (Vignette 3), which farmers perceived as valuable and effective.

For example, Vignette 2 describes the success of the historic soil conservation committees, which were usually led by champion farmers (an individual enabler) and were organised at the local level where existing networks and relationships of trust (i.e. social capital) could be capitalised on. These committees also illustrated the importance of peer accountability for stewardship actions, as well as the importance of knowledge-sharing platforms to support and encourage stewardship actions.

Another example is the Formosa Forum, which is a platform set up for collaboration between the Formosa Nature Reserve (managed by Eastern Cape Parks and Tourism (ECPTA)), and neighbours and affected stakeholders. The success of the Formosa Forum as a collaborative platform seems to go through stages of functioning well, and then stages of not functioning very well. Its efficacy depends on strong leadership from ECPTA, and on effective long-term relationships among the participating stakeholders. ECPTA have had a rapid turnover of management staff for the Formosa Nature Reserve in the last few years, which has compromised the success of the forum and stakeholders seem to be losing faith in ECPTA to maintain it in the long term.

VIGNETTE 2: HISTORICAL COLLABORATION FOR STEWARDSHIP IN SOIL CONSERVATION COMMITTEES (V2)

Many respondents mentioned the 'old' Soil Conservation Committees which were implemented by the previous government (prior to democracy in 1994) through the Conservation of Agricultural Resources Act (No. 43 of 1983). For example:

"We had... a lot of things in place pre-1994: We had a Soil Conservation Policy, I was on the Soil Conservation Committee as a young man. And we checked that we had fire season, you may only burn (from the) *15th January to 15th March and so on. We had oversight as the committee to police it. The soil conservation committees were dropped, now people who don't worry much burn every year, we as a Farmers' Association still say: this is our policy... but I don't have any means to compel someone to do it, because I am no longer a member of the soil conservation committee, I am just a farmer... we have policies but we don't have policies that have teeth and that can bite."* (LK19)

"On our side as the department, if we can just have those soil conservation committees back, we just need to fund them... farmers are ready, some of them are actually grieved by what others are doing ... some people don't care and you feel bad about it but if there is some way of reporting each other, then it's better." (LK35)

"We don't have those land conservation committees ... there is no control... In the past there were land conservation committees, but now there's no committees. The farmers are doing what they want to do... Because most of the farmers here, they just bulldoze and do whatever they want to do." (LK17)

These committees no longer exist, yet the guidelines for sustainable land management which they promoted are still followed by some farmers, and address many of the stewardship challenges in the Langkloof (Table 6.3). Many respondents lamented the fact that these committees no longer exist, particularly as they operated as a means of keeping farmers accountable to one another for implementing stewardship practices, for adhering to the law, and for information-sharing. One of the success factors of this initiative appears to have been that is was localised within agricultural sub-communities, since soil conservation committees were usually operational at the local level. Another, linked, enabler was the fact that members tended to have long-term relationships and high levels of trust in one another, including with government officials. Provision had also been made for soil conservation committees in legislation, and the committees were supported by government officials, creating a formalised and recognised institutional structure "with teeth" as the respondent quoted above described. Another key feature was that the committees were naturally aligned with other collaborative platforms like farmer associations (the same people sat on both committees), thereby reducing the transaction costs (The Zuuranys Conservancy in Vignette 3 have done the same, aligning with the Suurveld Farmers' Association and the Fire Association). Similarly, the leaders of the committees were usually the existing leaders in the farming community who already had the respect of fellow farmers, highlighting once again the importance of champions and leadership as an individual enabler.

The lesson from this vignette is that, when legislated institutionalised collaboration for stewardship between farmers is coupled with local leadership and alignment with other existing activities, then these can succeed. They have an important role to play in ensuring peer-to-peer accountability for stewardship actions. This example therefore suggests that multiple enablers need to be in place for such interventions to succeed.

Photo: Members of the Living Lands team discussing river bank erosion with a Langkloof farmer. Historical Soil Conservation Committees played an important support and oversight function for natural resource management on private commercial farms. They have fallen away, and in their absence many environmental NGOs are stepping in to support farmers in implementing stewardship practices (See Chapter 2, Section 2.1.2).

This illustrates that mandatory or institutionalised collaboration may not always work, and that a process (and individual people) which builds trust and willingness to participate over time may be more likely to succeed. The next quote lends further support to this:

> *...it comes back to the trust, the general trust, that the farming community has in an entity like Eastern Cape Parks and Tourism Agency (ECPTA). Remember how the human brain works: if you don't trust one policeman, then you won't trust all of them. Just like this case, if they can't trust this guy then how can you walk a road together with ECPTA.... It doesn't take a year or two, trust must come from both sides, you must go from farm to farm and drink coffee with them...* (LK60)

These examples suggest that even collaborative initiatives that are supported institutionally, have funding and have willing people who show initial interest, can fail in the absence of enabling individual, and social-relational factors, and which are not well-enough aligned to farmers interests. In the individual domain, these factors include people skills, leadership and champions. In the social-relational domain, these factors include trust, long-term relationships and friendships (Table 6.5).

This quote from a conservation practitioner who was involved in some of these conservation initiatives illustrates this:

> *I believe that every farmer wants to work together, but with something* (a process) *that he can trust, or that's reasonable, and not enforced.* (LK62)

6.4.3.3. Social-relational enablers and barriers of collaboration

Social-relational enablers and barriers are about how people interact and relate with one another, and these interact with many of the other types of enablers and barriers. For instance, formal collaborative platforms (institutional enabler) can enable collaboration, but this is only likely to succeed if there are long-term relationships of trust (social-relational enabler) among the participating stakeholders (Vignette 3). For example, in Vignette 3, the success of the conservancy (an example of a formal collaborative platform and governance mechanism) can be ascribed to the long-standing relationships of trust among the tight-knit farming community on the Suurveld, although the tight-knit nature of the community who have come to know and trust each other over many generations may make it difficult for new people (inkommers) to participate in collaborative activities.

The most frequent category of barriers mentioned were social-relational barriers (Table 6.5). Many respondents commented on a lack of social cohesion among the diversity of residents in the Langkloof (refer to quotes above at the end of Section 6.4.2, and Vignette 1). This may be due to the changing population demographics since the end of the Apartheid era 1994, before which the population was relatively homogenous, dominated by white people, and before that by semi-nomadic Khoisan people (Table 6.2).

VIGNETTE 3: SUCCESSFUL PLACE-BASED COLLABORATION FOR STEWARDSHIP IN THE ZUURANYS CONSERVANCY (V3)

The Zuuranys Conservancy is a voluntary group of farmers in the agricultural sub-community of the greater Langkloof called the Suurveld (Figure 6.5). This is a small, tight-knit community of mostly sheep farmers. They formed a conservancy (a formal collaborative stewardship initiative recognised in legislation, see Chapter 2, Box 2.2) primarily to manage and regulate hunting of game. However, this also enables them to work together to better manage the area collectively in terms of managing invasive alien plants, fire, and soil conservation (these are some of the key stewardship challenges in the area, see Table 6.3). The farmers in the Suurveld are proud of their conservancy, and sense of place and identity are important enablers. Not all people agree that the conservancy is a success story, since it is primarily based on the farmers' interests in hunting wildlife, however it is a means by which the farmers work together across the landscape to manage the land more sustainably. It also enables them to engage with government officials and other stakeholders on conservation issues, and get technical support. It is one of the few examples of functional, formal collaboration for stewardship in the greater Langkloof.

Leadership and the presence of a champion was a key feature of this successful collaborative endeavour: (Talking about the founder and chairperson of the conservancy) *"...and you've got to have good leadership, and be positive, and motivate people and give good feedback to the people which is relative to the area. ... (he's) got a slot there (at meetings), and says alright, we've done this, done hunting, got Hackeas (invasive alien trees) down, and the water started running again... and then the farmers see they can do it for themselves... and so it takes time, but you must have positive feedback to the whole group, you can motivate the whole group and use things to motivate people to see the big picture."* (LK15). Long-term relationships were another key feature of this successful collaboration. One official from the Department of Environmental Affairs has been particularly instrumental in supporting this conservancy (here I call him 'Mr. X'), playing the role of a 'champion' in enabling this collaboration. *"We work together with Nature Conservation with (Mr. X) on the leopards and so on, we have a friendly relationship, not a department-to-farmer relationship. We try to do things right."* (LK61)

The lesson from this vignette is that multiple, interacting, mutually reinforcing enablers are needed for collaboration for stewardship to succeed, across the individual, social-relational and institutional domains. In this case, the two most prominent enablers of collaboration are strong leadership, and long-term relationships and trust, both within the Suurveld community and with supportive stakeholders from outside. Formalised, institutional collaborative initiatives are an enabler, though I suggest that the success of the formal initiative rests on the individual (leaders/champions), and social-relational enablers. However, the fact that the people who are successfully collaborating in this vignette are all white farmers, and that this is one of the few successful collaborative initiatives for stewardship, raises concerns about the depth of racial divides and speaks to the role of identity in supporting some people to collaborate, while excluding others (See also Vignette 1). When considering the Langkloof holistically as a landscape, this example both gives an indication that collaboration for stewardship is possible and calls into question how inclusive such collaboration can possibly be, given the social, economic and political history of the region. This collaboration is effective at the local level within an agricultural sub-community, but at this level some of the barriers to collaboration which are more likely to operate at the landscape-level were not faced, for example 'social barriers between locals and 'inkommers'', 'vague or ineffective forums or initiatives that don't address direct needs' and 'racial tension: lack of collaboration across race groups'.

Photo: Suurveld farmers are sheep and cattle farmers. They have a strong sense of pride in their identity as stock farmers. There is some rivalry between the Suurveld stock farmers and the Langkloof apple farmers. One proud Suurvelder said: *"I've never seen somebody that's gonna leave a piece of steak or sheep chop to eat an apple"* (LK27)

The single most frequently mentioned barrier was 'social barriers between locals and 'inkommers' who have recently moved in', and is a term most often used by white farmers. 'Inkommers' are people who were not born in the Langkloof and who have recently moved into the area. The term is usually used by farmers to refer to new neighbours who have bought farms, often for lifestyle or conservation purposes rather than for commercial farming. Although less frequently used in this context, some people also considered the migrant workers from the Eastern Cape who come to work on the fruit farms as 'inkommers'. In a valley which was for many generations isolated from much outside contact due to its geography (at one point there were only four roads into the valley (Van Huyssteen, 2008), the influx of new residents from elsewhere appears to have changed the social dynamics and relationships significantly.

Many respondents (mostly white farmers) commented on this in a negative light, and spoke with nostalgia about the 'olden days' when the community felt smaller and more connected, everyone knew everyone, and most people had one of about 6 surnames (Van Huyssteen, 2008) (Refer to historical description in Section 6.3.2, Period 2). The irony is that the white farmers were themselves once inkommers, as one of the coloured farmers who is currently trying to regain rights to his family's historical land through land restitution pointed out. He said about his white neighbours who have farmed the land for four to five generations: *"They are inkommers… they really are"* (LK68).

This suspicion of new residents and resistance to societal change by all sectors of the population, acts as a barrier to collaboration as it takes much longer to build trust with new neighbours, illustrated in this exchange with a farmer: *"JC: Would you say there is good trust between the landowners? LK51: The ones who know each other long enough, yes, but the strangers who come in, not so much."* This mistrust is compounded by the fact that inkommers often have different land use interests and objectives and different environmental values.

For example, one of the farmers spoke about a new neighbour who has bought old farms and is now managing the land for conservation, commenting that he/she *"is one of those fanatical greenies… at one point even feeding the baboons…"* (LK32). Many farmers seemed quite unwilling to interact with neighbours who had very different land use objectives to them, which becomes a barrier to collaboration for stewardship of shared resources. This also indicates that stewardship can mean different things to different people, indicating the importance of individual value systems informing people's willingness to participate in stewardship and collaboration (Section 6.4.3.4). For example, in the above quote, the new neighbour probably considers it good stewardship to feed baboons, whereas the neighbouring farmer might consider it good stewardship to shoot only the most troublesome baboons who steal his crops.

6.4.3.4. Individual enablers and barriers of collaboration
Individual enablers and barriers are features inherent to individual people i.e. their personality, their identity (which in the Langkloof is strongly shaped by race and language), and their value systems. The enabler mentioned in most interviews was leadership or champions, which is an individual enabler.

Where collaborative initiatives are successful and effective, this is often put down to effective leadership and the passion and commitment of champions who 'keep everyone together', as shown for example in Vignette 3, where strong leadership was a particularly important enabler of collaboration. Similarly, the historical soil conservation committees described in Vignette 2 also relied on local champion farmers to lead the collaborative effort.

Increasing economic pressures seem to have forced farmers to become more self-interested and individualistic (an important 'individual barrier'). This drive for autonomy is compounded by decreasing support from government for commercial agriculture and a sense among farmers that they are 'on their own' and need to make sure they survive (Mulkerrins, 2015). This strong sense of individualism appears to also increase the lack of trust between different actors (among farmers, but also between farmers and other stakeholders), and seems to be a significant barrier to collaboration.

6.4.3.5. Political and historical barriers of collaboration

The final type of factors are political and historical barriers. I did not identify any enablers in this category. Most of the barriers of this type relate to the effects of colonial and Apartheid era laws, policies, practices, and social relationships (Section 6.3.2 and Table 6.2), which continue to manifest today. Furthermore, conflicts about land rights and frustrations with the land reform process, as well as unequal access to water resources result in strained relationships across racial groups. Consequently, racial tension is one of the most important barriers in this category (Table 6.5) and could also be considered a social-relational barrier. Very few white respondents commented on racial tensions, even when prompted to. On the other hand, almost every coloured or black person I interviewed commented on this issue. This seems to indicate a complacency among white people that 'things are alright', whereas coloured or black people are still experiencing marginalisation based on race.

Many of the formal collaborative initiatives described in Table 6.4 are delineated along racial lines (Vignette 1). On the other hand, a number of farmers (both coloured and white) mentioned that individual inter-personal working relationships across the racial divide are better than broader relations in formal institutional contexts, for example when farmers share farm implements, labour and farming knowledge with neighbours (a case of this in the Langkloof has been described in the literature (Hart & Burgess, 2006)). For further discussion of this, refer to Vignette 1.

6.5. Discussion

The contested and complex nature of the Langkloof landscape has influenced attempts to foster collaboration for social-ecological stewardship in a variety of ways. The Langkloof landscape is contested due to unequal access to natural resources (land and water) for farming due to the historic legacies of colonialism and Apartheid (Table 6.2), and also because of the conflict between actors representing different interests such as agriculture, water and conservation (Table 6.3). In this context, collaborative approaches focused on the development of governance institutions and formal platforms or structures (structural enablers, Section

6.1.1.1) are only likely to succeed if enabling individual and social-relational conditions are in place (relational enablers, Section 6.1.1.2). However, in the Langkloof, deep-seated individual and social-relational barriers exist due to the socio-political context of the place and overcoming these to successfully foster landscape-level collaboration for stewardship is a substantial challenge. The Langkloof case illustrates that enablers and barriers of collaboration operate across multiple domains and interact with one another over spatial and temporal scales (Figure 6.6). I now draw out and discuss four key findings from this case study.
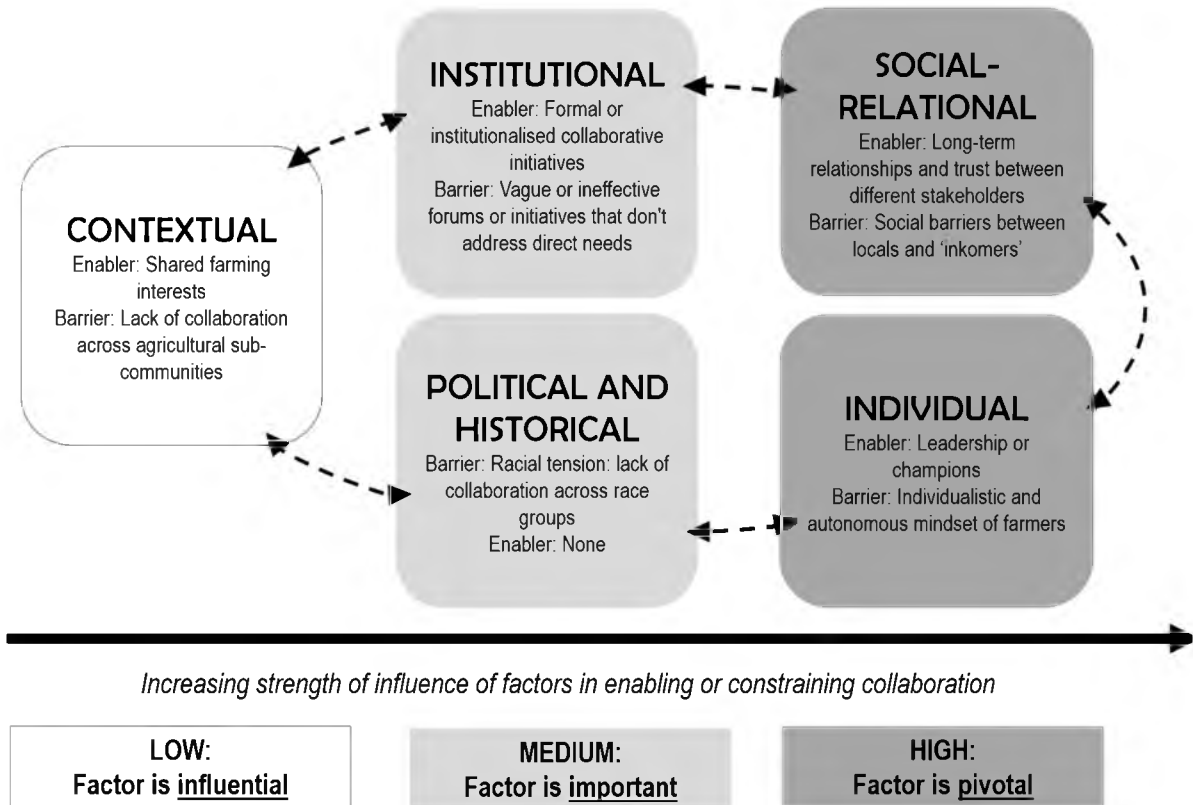
Figure 6.6: Conceptual model illustrating interacting and mutually reinforcing enablers and barriers of collaboration, and their increasing strength of influence on collaboration. Individual and social-relational enablers and barriers are proposed to have the strongest influence.

6.5.1 Individual and social-relational enablers and barriers are pivotal

Individual and social-relational factors (enablers and barriers) appear to have the strongest influence on collaboration, operating as underlying causal mechanisms which strongly influence possibilities for effective collaboration for stewardship in the Langkloof (Figure 6.6). Not only were social-relational barriers the most frequently mentioned type of barriers to collaboration (Table 6.5), but the vignettes illustrate that individual and social-relational aspects play a strong role in shaping the outcome of collaborative initiatives. These aspects are particularly crucial in contexts of poor or eroding governance (Cleaver, 2012), as in South Africa, where institutional function and formal governance, especially at the local level, is often considered to be lacking or dysfunctional (certainly in most of the Eastern Cape, and described by numerous respondents in this research, refer to Chapter 2, Section 2.1.2). In such contexts, the ability of individuals and small, motivated groups to work together outside of the bounds of institutional support becomes even more

important (Cleaver, 2012), highlighting the importance of widely-recognised relational enablers of collaboration such as trust (Hahn et al., 2006; Patterson, 2017), social networks and social capital (Pretty & Smith, 2004; Church & Prokopy, 2017), human agency (Westley et al., 2013), and leadership and champions (Hahn et al., 2006; Church & Prokopy, 2017) (Section 6.1.1.2).

This case study suggests that practitioners, especially those working in NGOs with more flexibility, should pursue bridging and brokering opportunities in the landscape (Hahn et al., 2006), particularly bridging between state officials and local stakeholders, since the relationships between farmers and many government departments can be strained (Section 6.4.1). Existing literature on collaboration often pays close attention to structural factors, such as institutional design and cross scale governance approaches that can support collaborative efforts (Section 6.1.1.1) (Armitage et al., 2007b; Plummer et al., 2012). However, experiences in the Langkloof suggest that individual and social-relational barriers potentially have the strongest influence on collaborative outcomes, as they have the potential to overcome barriers in the other domains (Figure 6.6). For example, in Vignette 1, deep-seated racial divides meant that emerging farmers were tacitly excluded from participating in the Langkloof Farmers' Association, yet emerging farmers spoke of positive and beneficial inter-personal relationships with their white farmer neighbours.

The importance of individual and social-relational factors which influence the success of collaborative initiatives, shows that the work of NGOs like Living Lands should be fundamentally about relationship-building. This has also been recognised by the organisation, as is evidenced by its adoption of the Theory U approach to social facilitation, which is based on a relational philosophy (Scharmer & Kaufer, 2013; Talbot & van den Broeck, 2016). The central importance of relationship-building as a core activity in stewardship initiatives with a strong collaborative focus needs to be accounted for in project design, funding and management. Project budgets need to allow for the long-term processes of relationship and trust building and monitoring and evaluation frameworks need to be designed in a way that support and account for relationship-building as a fundamentally important activity, process and outcome.

6.5.2 Political and historical barriers operate as underlying mechanisms

Political and historical barriers, which manifest as social-relational barriers to collaboration, are difficult to overcome. They operate as underlying causal mechanisms from which social-relational barriers emerge and influence collaborative possibilities (Table 6.5). Political and power-related barriers appear not to have been identified as a significant concern in the literature on collaboration, yet they may be among the most deep-seated and difficult to address in a South African context. These barriers, for example the racial tension resulting in lack of collaboration across racial groups, might be the symptoms of a social-ecological trap (Boonstra & de Boer, 2014). This social-ecological trap is exemplified in the on-going unequal access to natural resources, particularly water and land, evident in the Langkloof (Kou-Kamma Local Municipality, 2009; Taljaard, 2015; de Laat, 2017). Historical policies and societal values resulted in coloured and black people being marginalised and not having access to the benefits of land and water, which has persisted in

large part into the present. Indeed, although the post-Apartheid government in South Africa has made provision, through legislation and policies, for redress, it is taking a long time for these policies to result in tangible, large-scale changes (Hall, 2009; de Laat, 2017). Therefore, a combination of various interacting historical conditions make it very difficult to divert the system off this trajectory (Pierson, 2000; Boonstra & de Boer, 2014).

Social inequality in the Langkloof makes collaboration difficult, especially because for the group currently in a position of power and privilege, i.e. the white commercial farmers, there is a lot at stake. If the ideals of a democratic society are to be realised in the Langkloof, and land and water are to be shared more equally, then the current beneficiaries need to 'give away' some of the benefits they currently receive (for example, access to disproportionately large amounts of water). This is important if the ideals of the pathways approach are to be put into practice (Leach et al., 2012): the third 'D' of the 'Three Ds', namely *distribution*, is about plotting pathways in which the safe operating space between planetary boundaries and the social foundation can be shared between different people. The resistance of white commercial farmers to participating in the formation of a collaborative water governance initiative (Section 6.4.1, and see de Jong (2012)), seems to suggest that farmers are aware of this 'threat' to their current position. This seems to entrench the individualistic and autonomous mindset of farmers, identified as a key individual barrier to collaboration, and demonstrates the mutually reinforcing nature of the barriers to collaboration (Figure 6.6). Fostering collaboration for shared stewardship of natural resources towards sustainable multifunctional landscapes in contested contexts like the Langkloof can therefore result in a collaborative stale-mate, as some groups are currently gaining, but stand to lose in the future, and vice versa. Organisations like Living Lands seeking to play a facilitating role to build collaboration and bring people together need to take these polarised standpoints seriously.

The fact that emerging farmers feel excluded from participating in formal collaborative institutions like the Langkloof Farmers' Association, which enable access to knowledge for example about sustainable farming practices or stewardship, is also of concern for social-ecological stewardship in the landscape (Section 6.4.1, Vignette 1). Land reform beneficiaries already face difficulties in accessing extension support from the state because of the insecurity of their tenure (many just have caretaker agreements or short leases, refer to Chapter 2, Section 2.2.1) (Hall & Kepe, 2017)). The farmers' association could potentially be an important alternative avenue for them to get support. However, in the current scenario where formal collaboration among groups across racial boundaries is rare, an individual case-by-case approach to 'bridging the divide', which draws on individual enablers, i.e. individual 'champion' farmers' willingness and openness to work with others, may be the best way forward (Hart & Burgess, 2006). Ultimately, building individual one-on-one relationships between white and coloured or black farmers, where the barriers to collaboration can be minimised, and the enablers maximised, might generate a pathway for improved collaboration across the landscape in the long-term. This might occur for example between neighbours, where they may share values

like open-mindedness and willingness to work with others (individual enablers), have shared farming interests and live within the same agricultural sub-community (contextual enablers), and can begin to build long-term working relationships and trust (key social-relational enabler).

6.5.3 Barriers and enablers of collaboration are interactive and mutually reinforcing

It becomes apparent from the above two key findings (Section 6.5.1 and 6.5.2), that the barriers and enablers of collaboration are mutually reinforcing and interact with one another across spatial and temporal scales (Figure 6.6). A recent study on fostering collective action conducted in 'ambiguous and contested situations' of natural resource management, similarly identified enabling factors, and commented on the interaction between them as follows: *"It would therefore not be possible to understand the emergence of collective action by looking at only a subset of the capacities, because it was their combined and interactive influence that was most important."* (Patterson, 2017: 266).

The findings described in the vignettes and the strong influence on the social-ecological and historical context of the place (Section 6.3) on collaborative outcomes (Table 6.5) also bring to the fore the interplay between individual and social-relational processes (Figure 6.6). Stewardship actions rely on the agency of individual stewards and are actor-driven (Berkes et al., 2012; Westley et al., 2013). These actors are however embedded in social systems such as multifunctional landscapes with different stakeholders who have different visions for how the landscape and its resources are to be managed. Thus, the stewardship actions emerge out of the interplay between decisions made at the level of individual farmers (individual agency) and other stakeholders, in a context of historical change, and in the context of formal and informal institutions that influence these decisions.

Garud et al. (2010) propose a model of human agency which is distributed across different actors along a pathway of change, whereby agency emerges from the interactions among agents and between agents and their contexts. In applying this to the question of stewardship and collaboration, one could consider the farmers' agency (as stewards) emerging from his or her interactions with various government officials or staff in other organisations such as NGOs tasked with supporting natural resource management initiatives in agricultural landscapes. Each of these actors becomes involved in a process of achieving stewardship outcomes in the landscape, and this process can be envisaged as a 'stewardship pathway', based on distributed agency (Garud et al., 2010), and a relational understanding of the steward (Chapter 4, Section 4.2.3.3). Inputs from different actors along the pathway generate momentum and support for the achievement of stewardship outcomes (or can constrain progress along the pathway), and the actions of each actor along this path influences those of the others. Thus, it is not only the individual agency of farmers as stewards, but a collective process or 'distributed agency' that can eventually lead to effective stewardship outcomes.

This also points to the fact that collaboration may itself be an enabler of stewardship, as a collaborative process can create an enabling space for such a 'stewardship pathway' to unfold. However, navigating such

pathways collaboratively requires deliberating the *direction* of the initiative (aims of the initiative), addressing *diverse* needs and options (there may be more than one way forward), and ensuring equitable *distribution* of benefits (who wins and who loses on which pathway?) (Leach et al., 2012) (Chapter 3, Section 3.5). For example, there are currently concerns about illegal honeybush harvesting in the Langkloof (Table 6.3). If stakeholders were brought together to collaboratively address this stewardship challenge and agree to improve compliance and monitoring on illegal harvesting, then those representing biodiversity conservation interests might be the winners, but those harvesting honeybush illegally to make a livelihood would be the losers. Indeed, many authors have warned that collaboration is no panacea for ensuring sustainable and equitable natural resource management (Wondolleck & Yaffee, 2000; O'Flynn & Wanna, 2008; Campbell et al., 2011; Floress et al., 2015), and it is important to recognise that collaboration in and of itself may not always be necessary or the most important enabler of stewardship.

Bhaskar's theory of the seven laminations of scale (Figure 6.7) (Bhaskar, 2010, 2016) supports the notion of interacting and mutually reinforcing enablers and barriers (Figure 6.6). The enablers and barriers are factors or processes which emerge from multiple levels of reality and interact with one another. From this interaction, the current context for collaboration emerges. For example, the individual enablers and barriers identified in the Langkloof emerge from the 'psychology of individuals' and the 'individual material circumstances' (the first two laminations in Figure 6.7). The social-relational enablers and barriers emerge from the human 'face to face' interaction and the structure/culture of society (the next two laminations).
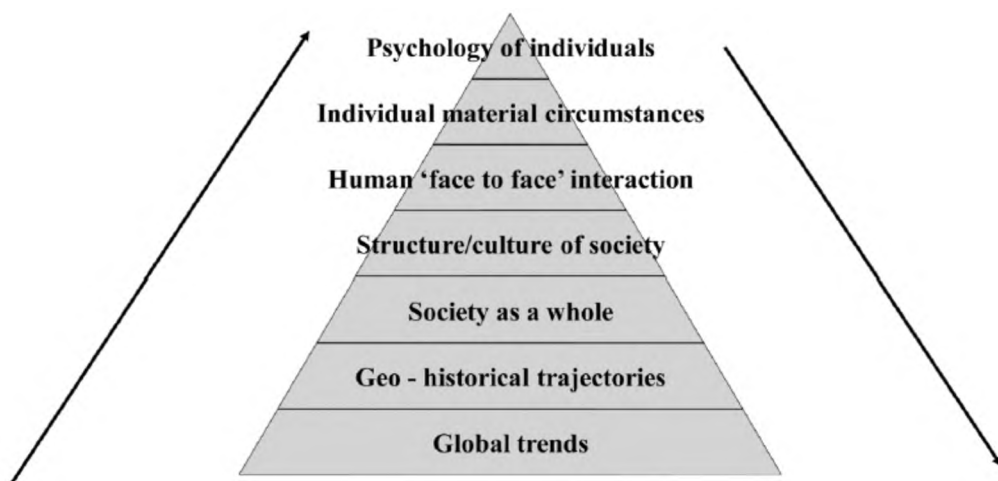
Figure 6.7: A diagram illustrating Bhaskar's (2010) theory of the seven laminations to explain social phenomena (from Price (2014)). (Refer to Chapter 8, Section 8.3 and 8.4 for further application of the laminated model)

The socio-political and historical enablers and barriers emerge from the next two layers, namely 'society as a whole' and 'geo-historical trajectories' (or social-ecological traps and path dependencies) which have shaped the way the Langkloof is today. Thus, in order for organisations like Living Lands to achieve their vision of building collaboration for social-ecological sustainability, an integrated approach is needed. For example, whilst seeking to restore degraded catchments and monitoring ecological processes as measures of success,

Living Lands should not neglect to monitor and measure the social-relational aspects of their work. Furthermore, they cannot afford to ignore the deep-seated socio-political and racial divides in the landscape as these are a basal layer in the laminated model (Figure 6.7).

6.5.4 Contested landscapes call for 'patchworks of collaborations'

Plural, dispersed and diverse 'patchworks of collaboration', based on localised shared needs and interests, may be more realistic than a blanket approach to collaboration across the whole landscape. Despite the importance of a landscape-level approach (which I argue for in Chapter 3), and wide recognition for consensus-based collaboration (Refer to Chapter 3, Table 3.2, and Margerum and Robinson (2016a)), this may not always be possible, particularly in landscapes characterised by contestation. A more flexible and pragmatic way forward is needed, which recognises the diversity inherent in the landscape, and which embraces pluralism (Wollenberg et al., 2005). I suggest that 'patchworks of collaborations' may be a suitable metaphor to guide such an approach.

Collaboration in the Langkloof is needs-based and directly related to the business of farming. One of the most important contextual enablers of collaboration is a shared purpose, a common interest, or a common problem (Table 6.4, Vignette 2 and 3). If a landscape-level initiative does not have a sufficiently pressing issue that is shared by the multiple, diverse stakeholders across the landscape, then 'blanket collaboration', or a single multistakeholder governance platform at a higher level, is not likely to be suitable. This blanket approach is sometimes implied in the literature on landscape approaches (O'Farrell & Anderson, 2010; Everard, 2011; Plieninger et al., 2015), and in integrated catchment management (Lubell, 2004; Ferreyra & Beard, 2007), but has been critiqued elsewhere (Wollenberg et al., 2005; Ferreyra et al., 2008; Robinson et al., 2017). The proliferation of conceptual research about landscape approaches (Milder et al., 2012; Sayer et al., 2013; Minang et al., 2014b; Freeman et al., 2015; Reed et al., 2016; Bieling & Plieninger, 2017) reinforces the notion that landscape-level platforms for collaboration are feasible and the ultimate solution to resource management dilemmas and trade-offs, yet the ability of landscape approaches to serve this purpose has not yet been proven (Reed et al., 2017; Robinson et al., 2017).

Socio-political diversity within agricultural, and indeed all, communities must be taken into account when planning collaborative initiatives (Scott et al., 2000; Ferreyra et al., 2008; Fabinyi et al., 2014). The Langkloof is a socially heterogenous place (Figure 6.5), demonstrating the need for a nuanced approach to building collaboration. Building collaboration at levels and scales matching ecological features of the landscape, like river catchments, may not be socially or politically feasible (Blomquist & Schlager, 2005; Ferreyra et al., 2008). Organisations seeking to build collaboration must also be sensitive to existing social conflict, power imbalances or poor inter-personal or inter-group relationships. In the Langkloof, for example, these exist between race groups, 'inkommers' and locals, between farmers with different farming interests, between different agricultural sub-communities, and between farmers and government officials (Table 6.4). Hence a more nuanced, patchwork vision of collaboration that takes into account existing socio-political-historical

identities, may be a better option, recognising that *"scales for collaboration and integration cannot be imposed but should be emergent"* (Ferreyra et al., 2008: 318). This is well-aligned with the second 'D', *diversity*, in the pathways approach '3Ds' described above (Leach et al., 2012). A diversity of collaborative initiatives, more like a patchwork than a single large blanket over the landscape, is a more resilient and socially-suitable approach.

This patchwork approach to collaboration can be initiated and supported by starting with small local actions. The enabler 'shared farming needs and interests' (Table 6.4) indicate that organisations, such as Living Lands, seeking to build collaboration for stewardship must start with small, local, and tangible actions within agricultural sub-communities relevant to farmers needs to build trust and show commitment. Collaboration can in fact 'emerge' from such small-scale collective actions (Church & Prokopy, 2017; Patterson, 2017), even if the social preconditions or enablers of collaboration do not exist in the first place (Babin et al., 2016). The Living Lands team in the Langkloof have also learnt this lesson in the last 5 years whilst they have been working to build collaboration, as this quote from one of the team members illustrates:

> *The aim now is to do something… when we started, we wanted to build a collaborative, but we didn't know what kind of collaboration that would be, but just build a collaboration with everybody. Where now, we have more sense of what the landscape needs, and … we work on a very small scale to see how you can address challenges and build a collaboration around that and see what we can change. (KI04)*

Although I recommend an approach that fosters plural, dispersed, diverse collaboration across the landscape, this must not be done in a way that perpetuates the status quo i.e. the existing social barriers between diverse groups (e.g. white farmers and coloured farmers) in the landscape. Links across these groups, i.e. a slow but steady 'stitching together of the patchwork of collaboration' are needed in order to realise the visions of sustainable and just pathways for the entire landscape, which requires excellent social facilitation skills, and an approach that pays attention to social-relational and individual enablers and barriers of collaboration.

6.6. Conclusion

Using enablers and barriers as an analytical tool to investigate collaboration in a landscape-scale stewardship initiative has shown that although formalised institutional and governance factors play an important role in fostering collaboration, individual and social-relational factors may in fact be the pivotal enablers. These in turn, are underpinned by socio-political and historical factors and processes which operate as underlying causal mechanisms to produce the present-day, complex context evident in the Langkloof. Having identified this interacting and mutually reinforcing set of enablers and barriers, I now return to the central question in this study: *How can collaboration for social-ecological stewardship be fostered in contested multifunctional landscapes?*

I have proposed that a patchwork, rather than a blanket, approach to building collaboration is better suited to such complex, contested contexts. This approach could start with localised, collective stewardship actions (e.g. within a close-knit agricultural community) from which collaboration can emerge. Explicit focus should be placed on individual and social-relational enablers of collaboration through relationship-building between the facilitators and among landscape actors. Relationship-building should be accounted for in project planning, funding and monitoring. Historical context, which often manifests as path dependencies and social-ecological traps, should be appreciated and such social-ecological traps recognised as key stewardship challenges in the landscape. Finally, practitioners seeking to foster collaboration should keep an eye out for windows of opportunities to stitch together the collaborative patchwork across the landscape. Although there are social divides and sub-communities in complex, contested landscapes such as the Langkloof, and it may be easier to work within rather than across these groups, a commitment to landscape-scale social-ecological sustainability requires explicit recognition of social diversity and inequalities and a commitment to confronting these in a meaningful way.

In the next chapter I move from the in-depth level of description and analysis conducted here in one specific landscape, to an intermediate level of description and analysis. I present a multi-case study of six different landscape-level stewardship initiatives across South Africa. They represent diverse contexts across the country, from which I seek to draw out lessons from practitioners who have been facilitating collaboration for stewardship over a number of years, and who are beginning to demonstrate success in moving towards integrated social-ecological stewardship outcomes across the landscapes.

Chapter 7 | Hubs of collaboration for stewardship: Lessons from six cases across South Africa

"The next revolution has to be a relational one." (Otto Scharmer and Katrin Kaufer, 2013: 174)

The man standing up in this photo is a practitioner in one of the six case studies presented here. He has worked in this landscape for about 15 years. Over this time, he has built meaningful, inter-personal relationships with multiple stakeholders: with farmers, government officials, partner NGOs and businesses. He is a convenor and broker. His work has demonstrated that stewardship and collaboration are fundamentally relational processes.

7.1. Introduction

Findings from the country-wide survey on stewardship practice indicate that stewardship practice and meanings of stewardship held by practitioners in South Africa are dominated by the biodiversity stewardship approach (Chapter 5). However, I also showed that this approach is often combined with more integrated and collaborative approaches that align with the notion of social-ecological stewardship, described in Chapter 3 (Table 3.1). Indeed, social-ecological stewardship initiatives worldwide are often characterised by such integrated approaches which work at landscape scale (Goldman et al., 2007; Prager et al., 2012), are directed towards multifunctionality (Raudsepp-Hearne et al., 2010; Torquebiau, 2015), and focus explicitly on fostering collaboration among multiple stakeholders (Prager et al., 2012; Patterson, 2017).

These alternative, more integrated and systems-oriented approaches to stewardship, are often not labelled as 'stewardship' per se, yet contribute to the aims of stewardship as conceptualised in this thesis (Chapter 3, Section 3.2). In the face of global calls for stewardship to address pressing sustainability challenges, these initiatives offer the potential to investigate how social-ecological stewardship outcomes can be achieved in practice.

In Chapter 5 I highlighted that practitioners who are facilitating collaboration for stewardship face numerous challenges. The three biggest challenges expressed by practitioners were: developing shared visions among multiple, diverse stakeholders; low collaborative capacity, i.e. people's willingness and ability to work together; and accessing sufficient resources (financial and human) to support long-term collaborative

initiatives (Chapter 5, Section 5.3.4.1, Figure 5.4). Furthermore, I argued that a key feature of stewardship in practice is the balancing act between multiple outcomes in a landscape, for example agricultural versus conservation outcomes (Section 5.4.2). Collaboration among diverse stakeholders is needed to deliberate and agree on trade-offs in this balancing act (Rodríguez et al., 2006; Kremen & Miles, 2012). The practical experiences described in Chapter 5 suggest that a focus on understanding how collaboration can be brought about in practice to support equitable decision making towards sustainability in multifunctional landscapes is key.

In Chapter 6 I looked in-depth at the factors and processes that block or facilitate effective collaboration (i.e. barriers and enablers) in a landscape-level stewardship initiative. The most challenging barriers of collaboration in the Langkloof case were identified in the individual and social-relational domains. I argued that many of these barriers emerge from underlying socio-political and historical factors and processes (Section 6.4, Table 6.5 and Figure 6.6). Formal collaborative platforms based on institution-building and formal governance can go some way to enabling collaboration, but without paying attending to the individual and social-relational barriers to collaboration, these showed mixed success in the greater Langkloof region (Section 0). Finally, I proposed that insights from the in-depth case study in the Langkloof case indicate that a patchwork, rather than a blanket, approach to building collaboration across a multifunctional landscape is better suited to such complex, contested contexts, but that this should not be done in a way that further entrenches socio-political divides in the landscape. This raises the question to what extent such an approach is practical, and whether there are other, more effective, approaches being adopted successfully in other contexts?

Thus, to understand whether the findings from the Langkloof findings are typical, I turned to six comparative cases from diverse contexts across South Africa. Each of these cases have been in operation for several years (longer than the Langkloof case) and are generally considered 'success stories' in terms of social-ecological stewardship outcomes. They offer the opportunity to compare and contrast the findings of the Langkloof case study with other initiatives, in order to build a broader understanding of the enablers and barriers of collaboration for stewardship. More importantly, they offer the possibility to investigate how practitioners in a diversity of places are overcoming barriers to collaboration or enhancing and working positively with enablers to practically achieve collaborative social-ecological stewardship outcomes.

The overarching question for the research presented in this chapter was: how are practitioners overcoming barriers and enhancing enablers, to build collaboration for stewardship in multifunctional landscapes? The research aim was to mobilise and synthesise practice-based knowledge about facilitating collaboration for stewardship in landscape-level initiatives across South Africa. To guide the research towards this aim, I worked towards the following objectives:

1. to identify enablers and barriers of collaboration in landscape-scale stewardship initiatives across a diversity of contexts in South Africa, and to compare and contrast these with the findings from the Langkloof case study (Chapter 6); and

2. to explore and characterise how practitioners work to overcome barriers, or enhance enablers, to successfully build collaboration for stewardship in landscape-scale initiatives.

7.2. Methods

7.2.1 Transdisciplinary design

Experiential, local knowledge of place and context, for example the practice-based knowledge held by practitioners who are facilitating stewardship practice, is needed to reveal how stewardship can contribute to addressing the most pressing social-ecological sustainability challenges (Weber et al. 2014; Tengö et al. 2014). My commitment to engaged, transdisciplinary research (Chapter 4), was put into practice for this chapter by partnering with local stewardship practitioners in each of the six cases presented here over the course of approximately one year in a knowledge co-production process. Lessons for transdisciplinary research learned from this chapter are described in Chapter 9, and in Appendix 9.

7.2.2 Research design and case study selection criteria

I employed a multiple-case study design (Yin, 2009) based on a 'community case study' approach. This approach encourages inter-subjective communication and learning between cases, and with researchers, rather than keeping cases separate for analysis as distinct samples (Dredge & Hales, 2012). Here, I considered the 'landscape-level stewardship community of practice' as the 'community' with whom I was engaging. I selected cases from the country-wide survey of 95 stewardship practitioners presented in Chapter 5. From this set of potential cases, I used a 2-tier process of case study selection taking into account a variety of criteria (Stake, 2005). In the first tier (and in order to progress into the second tier) cases needed to meet the following criteria:

1. promising or successful landscape-level initiatives (based on success in building collaboration and/or bringing about change in land use practices i.e. stewardship actions towards positive social-ecological outcomes);

2. the initiative has multiple and integrated social-ecological objectives; and

3. the initiative explicitly takes a collaborative approach.

Cases were considered 'promising or successful' based on how long they had been running, and whether other stewardship practitioners perceived them to be success stories (e.g. they were mentioned during discussions I had with practitioners about successful initiatives, see for example Appendix 2). The cases that made it through this first tier, were then subjected to a second tier, which were methodological and logistical criteria:

1. shared research interest and willingness to participate in a knowledge co-production process;

2. logistical considerations (travel distance, accommodation, etc.); and

3. initiatives which are facilitated by NGOs i.e. not government-run initiatives (to allow for comparison).

Furthermore, initiatives were selected to represent a diversity of biophysical and socio-economic contexts across South Africa, including both private and communal land tenure contexts (Chapter 2, Section 2.2.1). The Langkloof case study presented in Chapter 6 falls within the broader area of one of these six cases (Case BL, the Baviaans-Langkloof). The Baviaanskloof initiative within this broader case has been operational for much longer than in the Langkloof.

7.2.3 Study context: background on cases

The six cases selected for this multi-case study, namely Verlorenvlei (VV), Marico River (MR), Enkangala (EN), Umzimvubu (UM), Baviaans-Langkloof (BL), and KwaZulu-Natal Midlands (KM), are located across South Africa, in four provinces, and across four different biomes (Appendix 7, Figure 7.1). All the cases are located in important water catchment areas. The initiatives are all run by national environmental NGOs and operate at landscape level, i.e. they are working across the boundaries of individual farms and villages towards integrated social-ecological stewardship outcomes across the landscape. The landscapes are characterised by a diversity of different ecosystem services valued in different ways by multiple stakeholders (Figure 7.1).

The initiatives work with different types of farmers (i.e. stewards) depending on the local land tenure context. Two of the cases work almost entirely with commercial farmers (VV, KM), three cases have a strong focus on emerging farmers and subsistence farmers in communal land tenure settings (MR, EN, UM), and in a number of cases practitioners are working with a range of farmers from commercial, to emerging and subsistence, often seeking to build collaborative ties among these groups (MR, EN, UM, BL). All cases have a strong focus on facilitating collaboration, bringing together individuals and groups of farmers, and building new collaborative networks between farmers and other relevant stakeholders across the landscape (Section 7.3.3).

The specific stewardship objectives which the initiatives work towards vary from case to case, however all six cases have a strong focus on integrated catchment management, and are working towards managing landscapes for multifunctionality whilst supporting sustainable agricultural livelihoods. The initiatives face similar stewardship challenges. These include threats to biodiversity, concerns about catchment health and water security, unsustainable farming practices, land degradation in rangelands, invasive alien plants, and mining threats. Some initiatives have a stronger focus on addressing specific stewardship challenges such as, for example, tackling the loss of habitat for endangered species (VV, MR, EN), participating actively in anti-mining campaigns and activities (VV, MR, EN), monitoring and managing water quality or quantity in the catchment (VV, MR, BL, KM), or restoring degraded ecosystems such as wetlands, riparian areas or rangelands (MR, YM, BL, KM). Some initiatives have a strong focus on local people's livelihoods and well-being, actively working to address issues such as poverty and unemployment through job creation, entrepreneurship, and green business development (MR, EN, UM, BL).

Case 2 (MR):
Marico River Catchment Conservation Project
North-West province.
Marico River Catchment area: 1 203 000 ha
Biome: savanna

Case 3 (EN):
Enkangala Grasslands Programme
Northern KwaZulu-Natal province. Upper reaches of Pongola, Vaal, uThukela and Usuthu catchments: +-1 600 000 ha
Biome: grassland

Case 1 (VV):
Verlorenvlei Protected Areas Project
Western Cape province
Verlorenvlei catchment area: 66 000 ha
Biome: fynbos

Case 5 (BL):
Baviaans-Langkloof Landscapes Project
Eastern Cape Province. Project area: Baviaans, Kouga and Krom River catchment areas: +- 560 000 ha; Biome: mostly thicket and fynbos

Case 4 (UM):
Umzimvubu Catchment Restoration Project:
Eastern Cape province
Upper Umzimvubu catchment area: 435 000 ha
Biome: grassland

Case 6 (KM):
WWF-Mondi Water Stewardship Partnership
Central KwaZulu-Natal (KZN) province. Upper uMngeni and mid uMvoti catchment areas: +-600 000 ha
Biome: grassland

<u>**Photographs illustrate iconic features of the landscape in each case, with potentially contested ecosystems services (ES) in brackets:**</u>

Case 1 (VV): Verlorenvlei estuary is an important bird habitat and tourist attraction (supporting and cultural ES), it is threatened by upstream water abstraction for farming (provisioning ES)
Case 2 (MR): Source of the Marico river at 'Die Oog': it provides water for agriculture and is a site of spiritual importance (cultural), it is threatened by mining (provisioning)
Case 3 (EN): Sustainable cattle farming is a key driver of livelihoods (provisioning) and biodiversity conservation (supporting) at Mgundeni
Case 4 (UM): Wetlands (supporting) and cattle (provisioning) in the foreground and the Drakensberg mountains (supporting, cultural) in the background near Matatiele
Case 5 (BL): Dams used for water storage for fruit farming, and for residential settlements in the Langkloof (provisioning), upper catchment areas protected for biodiversity conservation (supporting)
Case 6 (KM): Plantation forestry (provisioning) and wetland conservation (supporting) within one landscape in the Midlands

Figure 7.1: Map of South Africa showing location of cases and key features, including important and potentially contested ecosystem services.

In all cases, practitioners are working with stewards to facilitate more sustainable agricultural practices. Some are focused on crop management practices (VV, MR, BL, KM), others on improved livestock management in extensive rangelands (EN, UM, BL, KM), and others on improving the sustainability of small-scale vegetable production (MR, BL). All the initiatives work either directly, or in partnership with others, on invasive alien plant control initiatives.

Each of the initiatives takes a slightly different approach to facilitating stewardship and collaboration. In four of the cases, practitioners are using the biodiversity stewardship tool to secure conservation commitments from stewards (VV, MR, EN, UM) (Chapter 2, Section 2.4.2). In two of the cases, green business development is a key focus area, and implementation includes signing business agreements with farmers (MR, BL). Other than implementing the biodiversity stewardship, many of the initiatives have developed their own specific theory of change or approach to facilitating stewardship, sometimes drawing on existing theories or approaches. These include the 'People-Health-Environment' approach in the Marico River case (Lopez-Carr & Ervin, 2017), the 'Rangeland Restoration Model and Toolkit' in the Umzimvubu case (UCPP, 2016), the 'Living Landscape Approach' (Living Lands, 2017) in the Baviaans-Langkloof case, and the 'Resilient Landscapes Approach' (WWF-SA, 2015) in the KwaZulu-Natal Midlands case. Detailed descriptions of the six cases are provided in Appendix 7, including information about the organisations running the initiatives, and the full names of the initiative (I use place names here).

7.2.4 Data generation and knowledge co-production activities

I generated data through two activities: Firstly, I conducted site visits to all cases (Figure 7.2, A-C), and secondly, the leaders or project managers from the participating initiatives, hereafter called practitioners, were brought together for a knowledge co-production workshop (Figure 7.2, D-F). The workshop was the core of the knowledge co-production process (each of these processes are described in more detail below).

In line with the commitment to transdisciplinary knowledge co-production (Chapter 4, Section 4.2.2), I selected creative, engaging and interactive research methods for the study. The purpose was not only to generate quality data, but to also facilitate an enjoyable and engaging experience, both for myself as the researcher and for the participating practitioners (Kara, 2015). My intention was to counter concerns about research fatigue among practitioners that I picked up on during the survey interviews I conducted for Chapter 5, and which have been raised elsewhere (Bracken et al., 2015). Bracken et al. (2015) suggest that sometimes the intangible benefits and an enjoyable process can be more valuable to participants in knowledge co-production processes, than formal knowledge outcomes. I therefore aimed to create an environment in which participants would be comfortable to share their experiences honestly and freely, and one which was conducive to learning and would be enjoyable.

The data generating process was guided by a narrative approach (Bold, 2012), emphasising the experiences and practice-based knowledge of practitioners in the landscape through stories from each case, which were

then shared across cases, and eventually brought together during the workshop through story-telling and a 'Map of Stories' (see below). Throughout the process, i.e. during each of the case study site visits and during the knowledge co-production workshop, I recorded field notes and kept a research journal.

7.2.4.1. Site visits

I visited each site once, for a one or two-day visit (depending on availability of the hosting practitioner) between September 2016 and February 2017. During the visit, I was hosted by the practitioner partner(s) from the case study. The visit usually entailed a drive around the landscape during which the practitioner explained their work, with stops at significant places within the landscapes along the way. Where possible, I took opportunities to have conversations with local stakeholders (e.g. local resource users, other partner stakeholders or local residents), or to participate in activities (e.g. workshops and meetings) to get to know the people and the place better.

Figure 7.2: Data collection tools and processes: A: The Learning Jar, B: Sharing and reflecting on Story Cards from the other cases, C: Having fun with the Learning Jar, D: Map of Stories, E: Map of Learning F: Story-telling at the workshop.

I used a 'Learning Jar' as the focus of data generation during site visits (Figure 7.2A). I used the jar as a vessel to collect stories, photographs and artefacts during site visits, which accumulated in the jar over all the visits. Each time I visited a site, we unpacked the jar to share the stories and lessons from other case study site visits and to support mutual learning and a knowledge co-production process. Stories from each case study were collected on 'Story Cards' (Figure 7.2B). These were seven cards which each had a guiding question written on them to elicit different stories or narratives from participants. Practitioners completed the Story Cards for their case, usually during one of the stops on the drive through the landscape. I used the Story Cards to collect stories and information about the landscape, the stewardship activities, collaboration among stakeholders, and successes and challenges, which the practitioners had experienced in their initiative. We then placed the Story Cards into the Learning Jar, along with 2-3 artefacts which the practitioners collected and put into the

jar to represent the key features of their landscape, and to represent the diversity of contexts. These included for example a stone, a leaf, a tea bag, a piece of dried meat, a sea shell, a promotional sticker, and pamphlets. I also asked practitioners to identify two to three iconic scenes in the landscape to take photos of. Later I printed these and added them to the Learning Jar.

7.2.4.2. Knowledge co-production workshop

I organised a knowledge co-production workshop for all participating practitioners once the site visits had been completed. Depending on availability, between one and three practitioners from each case study participated in the workshop. The workshop was hosted in the province of KwaZulu-Natal (in the landscape of the Case KM: Kwa-Zulu Natal Midlands) over two days in February 2017. Eleven practitioners and five facilitators/researchers (myself, my supervisor and three colleagues who assisted with facilitation and workshop logistics) took part in the workshop. An overview of the workshop programme is shown in Appendix 8 (Part 1). The workshop had two primary objectives:

1. team and trust building: to create an inspiring, energising opportunity for participants to share lessons, potentially initiate a new 'community of practice'; and

2. knowledge building: to mobilise and co-produce knowledge on enablers and barriers of collaboration and stewardship, and to share experiences of how to build collaboration for stewardship.

The team and trust building process was guided by principles and 'U tools' from Theory U, a social process facilitation methodology (Scharmer, 2009b; Presencing Institute - Otto Scharmer, 2017) (Refer to Appendix 8: Part 2). The knowledge co-production aspect of the workshop was facilitated through the 'Map of Stories', the 'Map of Learning', and through story-telling, which brought the narrative approach into the workshop process (Bold, 2012). The Map of Stories was a poster with a map of South Africa on it (Figure 7.2D). We unpacked the photos, Story Cards, and artefacts from the Learning Jar at the start of the workshop and stuck them onto the Map of Stories to bring the stories and cases to life. The Map of Learning was a white board on which the guiding questions and topics for knowledge co-production were stuck up on cards (Figure 7.2E, Refer to Appendix 8 for guiding questions). During the workshop, participants were encouraged to write lessons, insights and ideas onto cards, and stick them onto the Map of Learning, adding to lessons learnt about the key questions throughout the workshop. Some of the U-tools functioned both as trust and team-building and knowledge-building activities, including the Case Clinic, the Learning Journey and the Prototyping (Refer to Appendix 8). The Learning Jar, Story Cards, Map of Stories, and Map of Learning are all original tools which I developed experimentally for this process (Refer to Appendix 9 for reflections on the use of these tools).

7.2.5 Data analysis

I generated qualitative data from the site visits (Story Cards, artefacts, photographs, field notes, and a research journal) and the workshop (Map of Stories, Map of Learning, workshop notes, facilitator reflections, and a feedback and evaluation survey completed by participants). These included textual and non-textual

data (i.e. artefacts and photographs) (Kara, 2015). I analysed the multiple data sources using an integrative analysis (Bazeley, 2011; Kara, 2015). In addition, background documents (e.g. project reports, media releases, websites) about each of the initiatives were used to construct the cases and gain a more in-depth understanding of each initiative. Across all these sources of data, I applied a broad coding framework during the first coding cycle (Saldaña, 2013) to code for information and insights on the following topics:

1. information about each specific landscape context (this included social-ecological landscape features, characteristics of the initiative, approach or tools used to facilitate collaboration for stewardship, and unique context-specific experiences or insights);

2. enablers and barriers of collaboration (factors, conditions and/or processes which enable or constrain collaboration);

3. information about what practitioners are doing to overcome barriers or enhance enablers of collaboration (this includes, for example, success stories in the initiative, or stories about challenges that were overcome); and

4. information about how practitioners are practically going about facilitating or building collaboration (i.e. through what kind of activities, processes, strategies or principles they are bringing diverse stakeholders from across the landscape together to implement stewardship actions collectively).

I analysed data according to general principles of case study analysis (Yin, 2009) and qualitative data analysis (Bazeley, 2009; Kara, 2015). I used a two-cycle approach; first using descriptive and structural coding to integrate all the data sources and identify an initial set of themes (first coding cycle); and second using pattern coding, along with the 'describe-relate-compare' scheme, for further analysis of coded data (second cycle coding) (Bazeley, 2009; Saldaña, 2013). The coding categories which emerged during analysis of the data on enablers and barriers of collaboration in the Langkloof case study (Chapter 6, Table 6.5), were used during the first cycle coding in this chapter to enable comparison of the findings from the Langkloof case with the findings of the six cases presented here.

As in the Langkloof case study, I used enablers and barriers as an analytical tool to understand the factors influencing collaboration (Chapter 6, Section 6.2.3.3). Enablers and barriers of collaboration were coded out of the full data set (i.e. from site visits and workshops). First, I developed a list of enablers and barriers across all cases (using the overall categories from the Langkloof case study (Table 6.5), and then I identified their occurrence (presence/absence) within each case. I used NVivo software (QSR International, 2017) for data storage and management, and to support data analysis, with guidance from Bazeley (2007).

7.2.6 Limitations and assumptions

The intention of employing creative, engaged research methods (such as the Learning Jar) was to create a positive and enjoyable experience (Section 2.4). However, this approach risks an overly light-hearted and superficial tone in the research. I attempted to counter this limitation by designing the knowledge co-

production workshop to intentionally provide opportunities for deeper, more reflective discussions about the practitioners' work.

Another possible limitation of this study is that the Langkloof case study features both here, as part of Case 5, and in its own right as an in-depth, instrumental case study in Chapter 6. One might question the validity of 'double counting' this case, or of comparing it to itself. I have two justifications for this choice. Firstly, as mentioned above, I have drawn on community case study research (Dredge & Hales, 2012) as a specific approach to case studies which is aligned to my overall knowledge co-production and mutual learning approach. Thus, I am not treating the cases them as discrete, clinical cases to be compared and examined in an objective manner. Rather, I am treating them as opportunities to learn from and with practitioners situated in different contexts but grappling with similar challenges. In this sense, I recognise that qualitative, situated social research can be a messy process, and a dynamic, flexible approach is needed (Law, 2004). Secondly, one might consider the broader Baviaans-Langkloof case to be two cases in one, and that in this multi-case study, the Baviaanskloof case was foregrounded. In Chapter 6, I focus on the Langkloof (the more recent part of Living Lands' work in the region). Here, in Chapter 7, the practitioners' contributions were from the landscape as a whole, although they have been working in the Baviaanskloof for much longer, and the lessons they have learnt in the Baviaanskloof came to the fore in this process more than their experiences in the Langkloof.

7.3. Results

7.3.1 Enablers and barriers of collaboration

Each of the six cases is situated in a unique context and is implemented in a different way (Section 7.2.3 and Appendix 8). Yet, many of the practitioners experience similar enablers and barriers in their efforts to foster collaboration among diverse stakeholders (Table 7.1). Enablers and barriers of collaboration fell into four of the five categories used from the Langkloof case study i.e. contextual, institutional, social-relational and individual factors (Table 7.1). With the exception of the barrier of 'racial tension', no factors were identified which fitted into the category of 'political and historical' factors in these cases. The barrier of racial tension emerges from deep-seated historical and political factors and causal mechanisms (Chapter 6), Section 6.5.2), however it manifests as a social-relational barrier, and I have thus placed it in that category. I first discuss the main enablers identified in the cases (Section 7.3.1.1), and then I discuss the barriers (Section 7.3.1.2).

7.3.1.1. Enablers of collaboration

The four most important enablers of collaboration were shared interests or identity in the community or landscape (contextual); knowledge-sharing and learning platforms (institutional); the stewardship ethic of individual farmers (individual); and multiple enablers in the social-relational category i.e. practitioners playing a convening, bridging or brokering role (as a hub) building meaningful, long-term inter-personal relationships and trust, and making new social-relational links in the landscape. I will discuss each of these in turn below.

Table 7.1: Enablers and barriers of collaboration identified across cases

ENABLERS OF COLLABORATION	Cases in which the item was identified:						
	VV	MR	EN	UM	BL	KM	Total[1]
1. Contextual enablers							
*Shared interests or identity in the community or landscape	●	●	●	●		●	5
Relevance of stewardship initiative to farmers' interests		●	●	●	●	●	5
Water scarcity or priorities		●	●	●	●	●	5
Threats or risks can catalyse collaboration	●	●		●		●	4
Work with tight knit farming community	●	●	●				3
2. Institutional enablers							
*Knowledge-sharing and learning platforms	●	●	●	●	●	●	6
Work with existing governance structures	●	●	●	●	●	●	6
Diversity of stewardship models or approaches		●		●	●	●	4
Suitable and relevant incentives for participation			●	●	●	●	4
Formal agreements with farmers	●		●	●	●		4
Good team work within the facilitating organisations	●				●		2
Using social theory to support engagement process					●	●	2
3. Social-relational enablers							
*Practitioners convening, bridging or brokering	●	●	●	●	●	●	6
*Building meaningful, long-term relationships and trust	●	●	●	●	●	●	6
*Making new links in the landscape	●	●	●	●	●	●	6
Working with the community and living in the Landscape		●	●	●	●	●	5
Effective communication in the local language	●	●	●	●			4
Empowering and investing in stewards		●	●	●		●	4
Small collective local actions and willingness to fail and learn	●				●	●	3
Sharing inspiration		●			●		2
4. Individual enablers							
*Stewardship ethic of individual farmers	●	●	●	●	●	●	6
Champions and leadership	●	●	●	●		●	5
Open-minded and willing farmers	●	●		●		●	4

BARRIERS TO COLLABORATION

	VV	MR	EN	UM	BL	KM	Total
1. Contextual barriers							
*Conflict between land uses	●	●	●	●	●	●	6
Conflict and competition for scarce resources	●	●			●	●	4
Diversity of stakeholders and conflicting interests	●	●		●			3
2. Institutional barriers							
*Funder-driven inflexible workplans and short-term funding	●		●		●	●	4
3. Social-relational barriers							
Need for practical stakeholder engagement skills and tools	●	●			●	●	4
*Racial tension or divides		●	●		●		3
4. Individual barriers							
*Stakeholders unwilling to participate	●	●	●	●	●	●	6
Individualistic attitude and narrow-mindedness of farmers	●	●				●	3

[1]Total frequency of occurrence = number of cases in which the item was mentioned or identified (N=6)
*Most significant or important enablers or barriers: Based on frequency occurrence and qualitative findings

Having a shared interest (such as precious or threatened water sources (Case MR, UM, KM), or a shared rangeland ecosystem (Case EN, UM)) or a shared identity in the landscape, can enable collaboration among people, as they recognise the need to work together to protect and manage their interest. A shared identity

and local pride (e.g. *"the Moutonshoek farmers are proud of the area and there is a sense of belonging"* (Case VV), *"the pride and joy of the area is the Marico Eye"* (Case MR)) can also enable a stronger sense of togetherness and ability to collaborate. Similarly, water is an important contextual factor which can act as an enabler expressed as a shared interest around which people collaborate, shown in this quote:

> *The collaboration has led to this common vision of this landscape as a 'water factory.'* (Case UM)

Similarly, the cases also illustrate that a threat of mining (an example of a 'contextual enabler'), which manifests as a shared interest across the landscape, can enable collaboration. For example, in the Verlorenvlei (Case VV) the threat of possible mining in the upper catchment incentivised farmers to work together to find a way to counter it. This was the motivation for them getting involved in the collaborative stewardship initiative:

> *The threat placed by mining in this area forced landowners to stand together under a single banner and to work together to achieve a common goal. This has led to greater collaboration on other sectors in the valley such as alien clearing and water resource management.* (Case VV)

Knowledge-sharing and learning platforms play an important role in enabling collaboration. Through them practitioners often step into the void left by collapsed agricultural extension services (Chapter 2, Section 2.1.2), providing access to information on sustainable farming practices, environmental management or restoration. This brings people together and acts as an incentive for participation and collaboration in the initiative. Practitioners facilitate the 'knowledge sharing platforms' in different ways. One method is to bring together different stakeholders in the catchment for water security dialogues (Case KM). Another way is to facilitate knowledge exchange between farmers and conservation officials or experts during field days or learning journeys, on topics such as for example invasive alien species (Case VV, UM, BL), irrigation efficiency (Case KM), wetland rehabilitation (Case BL, KM), sustainable grazing management (Case EN, UM, BL), and permaculture (Case MR) or compositing practices (Case BL) for sustainable vegetable production. In some cases, practitioners bring stakeholders from different sectors together for a regular multistakeholder forum or meeting (Case MR, EN, UM). For example, representatives from health, education, agriculture, and conservation are brought together to gain a better understanding of community needs and stewardship challenges across the landscape (Case MR, EN). In two of the six cases, explicit attention to social learning theories and techniques is part of the process (Case BL, KM), and in three of the cases, long-term research partnership with academic institutions have been set up to encourage research, knowledge exchange and social learning in the landscapes (Case UM, BL, KM).

Three distinct types of social-relational enablers were identified as important in all six cases (Table 7.1). Firstly, practitioners play a convening, bridging, or brokering role (i.e. acting as a hub within a larger network or relationships). For example, they link together farmers and researchers to enable knowledge sharing (Case UM, BL, KM), they bring in consultants to advise on sustainable land use management practices and

stewardship actions (Case MR, EN, UM, BL, KM), or they link farmers to other stakeholders such as state departments that can provide access to technical advice (Case VV, EN, UM, BL).

Secondly, they build meaningful, long-term, inter-personal relationships and trust between themselves and stakeholders, and among stakeholders. The relationships which practitioners build between themselves and farmers are crucial for the success of their initiatives. These relationships take a long time to develop, yet these might be the most fundamentally important success factors of collaboration. In all six cases, practitioners spoke about significant inter-personal relationships between themselves and individual farmers or other stakeholders which have developed over many years (often with champion farmers motivated by a stewardship ethic) (Case EN, UM, BL, KM).

Thirdly, they make new social-relational links in the landscape, such as new inter-personal relationships, partnerships, and networks. Often the success of initiatives is due to the practitioners forging novel links among varied stakeholders or across sectors in the landscape. For example, this might be done by linking otherwise disparate actors along an agricultural supply chain (Case KM), by bringing in novel business partners or investors in 'green businesses' (Case UM, BL), by bridging racial divides in the landscape (Case MR, EN), by bringing together people who have a shared passion for the landscape and its resources but might not have known about each other (Case MR, UM, BL), or by themselves building new inter-personal relationships with farmers and other stakeholders, as described above. In the Marico Case (MR), a stakeholder from a partner organisation commented that *the circle is widening*: as a result of mining threats, people are standing together to protect their water resources, and many new relationships and friendships have been created.

The stewardship ethic of individual farmers is probably the strongest individual-level enabler of collaboration for stewardship, and was identified in all six cases (Table 7.1). Farmers' individual stewardship ethic can manifest as a form of human agency inspiring them to participate in collaborative initiatives. In all six cases, practitioners have actively sought out champion farmers who demonstrate a stewardship ethic as a starting point for their work. These champions often become demonstrations or models for others or take a leading role in facilitating collaboration among their peers (Case VV, BL, KM). They also lead the way for example, by experimenting with novel sustainable farming practices such as permaculture (Case MR), implementing better crop or livestock management practices (Case EN, UM, BL, KM), participating in formal collaborative governance processes such as Water User or Catchment Management Forums or Farmers' Associations (Case VV, EN, KM), or leading activist responses to threats such as mining or hydraulic fracking for shale gas (Case VV, MR, UM). This highlights the importance of individual agency of stewards as a key to the success of collaborative initiatives.

In the Langkloof case study, similar enablers of collaboration were identified (Chapter 6, Section 6.4,

Table 6.5). The most significant enablers in the Langkloof case were identified in the social-relational and individual domain. The findings above from the multi-case study confirm the importance of the social-relational enablers. These often interact with other enablers, which was also shown to be the case in the Langkloof (Figure 6.6). For example, 'knowledge-sharing and learning platforms' was identified as an important institutional enabler here, but it is through the social-relational enabler of 'building meaningful, long-term inter-personal relationships and trust' and 'making new links in the landscape: relationships, partnerships, networks' that the knowledge-sharing platforms work.

The individual enabler of 'champions and leadership' was also identified here and in the Langkloof and is linked to 'stewardship ethic of farmers' since the farmers who act as champions and leaders in the community are often motivated by an ethic of stewardship. The contextual enabler of 'shared interests or identity in the community or landscape' was found to be important both in the Langkloof and in these cases, and shared interests can sometimes be threats. For example, the threat of mining was seen to motivate collaboration in these cases (Case VV, MR, UM), and in the Langkloof shared threats or risks such as wild fire, floods and droughts were found to be contextual enablers of collaboration, possibly more so than a shared resource like water.

7.3.1.2. Barriers to collaboration
The four most important barriers to collaboration were: conflict between land uses e.g. agriculture and conservation (contextual); funder-driven inflexible workplans and short-term funding (institutional); racial tension or divides (social-relational); and stakeholders being unwilling to participate (individual) (Table 7.1). I discuss each of these in turn below.

Different land uses such as agriculture and conservation are often represented by different actors or stakeholders in the landscape (e.g. farmers represent the agricultural sector, whilst provincial nature conservation officials represent the conservation sector). The conflicting objectives and interests of the different land uses often brings actors into conflict with one another. Long-standing historical competition for resources among different sectors and the different visions which representative actors might have for the landscape, can be a significant barrier to working together and developing shared visions (Chapter 6, Section 6.5.2). Examples of this kind of conflict include: using grasslands for livestock grazing and needing to protect rare plant species in the same area (Case EN, KM), intensive irrigation for crop farming which depletes the 'ecological reserve' of a river resulting in degradation of downstream habitats for biodiversity (Case VV, MR, BL), or use of vegetation for livestock grazing which results in overgrazing and reduced ecological function (Case EN, UM, BL).

The other competition among land uses in the cases is between mining and agriculture and/or conservation, which is a growing concern in a number of the cases. This results in significant conflict among stakeholders in the landscape, or with outside stakeholders like mining companies and state officials from the Department of Minerals and Energy (Case VV, MR, EN, UM).

Similarly, conflict around 'shared' resources can also act as a barrier (not always as an enabler, as described above under 'shared interests'). For example, conflict or competition for water can also be a barrier to collaboration. For example, one participant described the competitive way in which water is viewed:

> *I have found that water is viewed by agri-business as strategic, making it fall within the competitive space. This has made it very difficult for us to facilitate constructive dialogue between businesses (which includes farmers) that view themselves as competing to maintain their water rights in a time of high political uncertainty and heightened focus by government on land and water reform.* (Case KM)

The inflexible short-term work plans and funding which most NGOs in the cases are dealing with do not sufficiently account for long-term social processes of relationship-building. This barrier to collaboration was not mentioned across all cases (Table 7.1).

), but became a key discussion point during the workshop. Since all these cases are run by NGOs, they rely on donor funding and the long-term sustainability of their work is thus a significant concern. Funders' demands for short-term tangible deliverables do not recognise the long-term nature of social processes required to build collaboration in the landscape. Another concern is that funders define too narrowly what their funding is to be used for, for example in one of the initiatives funding was ring-fenced for conservation activities, and it was difficult for the practitioner to find funding for activities related more to farming, or other needs of stewards related to healthcare or education (Case EN).

As described above, the barrier of racial tensions or divides was not mentioned in all cases (Table 7.1) and it was also not discussed much during the workshop, yet due to its prominence in the Langkloof case, and general importance at a national level in South Africa, it warrants attention. There are still significant power imbalances in terms of equitable access to natural resources among different race groups, with white farmers mostly still benefitting more from land and water resources than black farmers, or rural black communities on communal land. This results in conflict among race groups and makes collaboration difficult, which was identified in three of the cases (Case MR, EN, BL).

Bearing in mind the South African context (Chapter 2, Section 2.1.1), it is important to reflect upon why concerns about racial tensions were not prominent in these cases. Firstly, it may be an effect of the relatively short time which I spent with each case, which may not have allowed for deeper, more difficult discussions (for example about race) to come to the surface. Secondly, in some of the cases, practitioners are working closely within one particular group of farmers (e.g. commercial farmers in Case VV, BL and KM) and although they are linking them with other stakeholders (e.g. government departments, water users etc.) they may not yet have encountered racial tensions because of the focus within this one group. Thirdly, in three of the six cases, practitioners are consciously and explicitly seeking to bring together people from different race groups. They do this for example by working towards bringing black emerging farmers into irrigation board meetings

previously dominated by white farmers (Case MR), facilitating livestock auctions between black emerging and white commercial farmers (Case EN, UM), and hosting regular collaborative meetings which bring together otherwise disparate groups across the landscape (Case MR, EN, UM). In this way they are acting as brokers or bridging organisations.

Stakeholders' (including farmers and others) lack of willingness to participate in collaborative initiatives might be one of the biggest barriers to collaboration and was expressed in all six cases (Table 7.1). This relates to the challenge of 'low collaborative capacity' (i.e. inability or unwillingness to collaborate) identified in the survey in Chapter 5 (Section 5.3.4.1). There was a sense in some of the cases that farmers are experiencing stakeholder fatigue i.e. that there are too many different organisations trying to involve them as stakeholders in different processes and they are getting tired of this (Case VV, EN, BL, KM). Another aspect of unwillingness to participate may stem from the historical land use conflicts described above, where the NGOs facilitating these processes are considered 'greenies', i.e. environmentalists who have historically played a watch-dog role (Case VV, EN, UM, BL, KM). Finally, farmers may be unwilling to participate in collaborative processes because of the opportunity costs involved, and the lack of obvious short-term benefits in participating.

The barriers to collaboration identified in these cases are somewhat different from those in the Langkloof (Chapter 6). Social-relational barriers were identified to be significant both here and in the Langkloof case (Section 6.4.3). As mentioned above, the barrier of 'racial tension' was also identified here, however it was not as prominent as it was in the Langkloof case (Chapter 6, Section 6.4.3.5, and Section 6.5.2). The most widely-occurring barrier in these six cases was the conflict between agriculture and conservation, identified in all cases. This did not emerge as an obviously important barrier in the Langkloof, although conflict between neighbours with different land use objectives was a concern and is related to this issue. Another important barrier identified here was 'stakeholders unwilling to participate', which was the most widely-occurring individual barrier to collaboration and was in some cases related to concerns about stakeholder fatigue. This also came up in the Langkloof case, though not as prominently. That may be due to the fact that the data for these cases was collected from the practitioners who are trying to bring people together, whereas the data in the Langkloof case was from practitioners as well as farmers.

7.3.2 Overcoming barriers and enhancing enablers to build collaboration for stewardship

The practitioners in these six cases are finding innovative strategies to overcome the long-standing conflict between agriculture and conservation, and the actors which represent these and other land use sectors (Table 7.2). They are finding ways to integrate objectives to achieve integrated stewardship across the landscape. This has been achieved, to a greater or lesser extent, in four of the six cases (Case EN, UM, BL, KM). In two of the cases this has been achieved by entering into agreements with livestock farmers in which farmers commit to improved management of grazing lands for the sake of conservation, and in return they are ensured access to markets (in some case with additional price incentives) that they did not previously have (an important institutional enabler).

Table 7.2: Examples of how practitioners are building collaboration for stewardship by overcoming barriers and enhancing enablers

Important enablers	Examples from cases of how enablers are enhanced	Iconic landscape photos to illustrate the example
Shared interests or identity in the community or landscape	Practitioners identify and highlight a shared interest or identity in the community or landscape and leverage this to enable collaboration. Photo: For example, in the Marico case (see photo), the source of the Marico River, 'Die Oog', is a beautiful place which has spiritual and cultural value for many people across the landscape. People seem to be willing to put aside other differences to rally around protection of their precious water resources and this special place.	
Knowledge-sharing and learning platforms	Improving access to information: The practitioners in one of the cases brought in irrigation experts to provide advice to farmers on how irrigation efficiency measures can help them save water and costs and be better stewards at the same time. In another example, the practitioners mobilised funding for student research to generate knowledge about key stewardship concerns in the landscape. Photo: A field day where farmers are learning about techniques to improve irrigation efficiency.	
'Multiple social-relational enablers': convening or brokering; meaningful long-term relationships; new networks and partners	Practitioners enhance social-relational enablers by operating as a hub of relationships or links in the landscape, bringing diverse people together around shared interests and operating as a knowledge-sharing platform. Photo: This sign board for a project in one of the cases shows names or logos of 10 different organisations which have partnered with this project. The practitioner has made a lot of new links among stakeholders through the project, by developing a forum which meets regularly to support the landscape stewardship initiative.	
Stewardship ethic of land owners or users	Practitioners begin by identifying champions or leaders, and these are often farmers who express a strong, inherent stewardship ethic. They become role models for other farmers. For example, in one case, the practitioner explained how the leading farmer, who had a stewardship ethic, had a positive influence on his neighbours through 'peer pressure'. Photo: The photo shows blue cranes flying over a farm in one of the cases. I was with the farmer at the time. He pointed out these birds to us and was very proud of the fact that his farm provides habitat for them.	

Important barriers	Examples from cases of how barriers are overcome	Iconic landscape photos to illustrate the example
Conflict between land uses e.g. agriculture and conservation	Practitioners work with farmers and other stakeholders to identify innovative stewardship actions or practices which address farmers' needs (often economic) and also have benefits for conservation and long-term sustainability of the landscape. e.g. growing novel, high value drought-tolerant crops to reduce water use or providing access to higher market prices for sustainably farmed beef. Photo: A large floodplain wetland in which farmers are growing crops. This illustrates the conflict between agricultural livelihoods and ecosystem integrity.	
Funder-driven inflexible workplans and short-term funding	Practitioners overcome the limitations of funding constraints by identifying strategic partnerships with other stakeholders to pool resources and work together across sectors, types of organisations etc. Photo: This photo was taken during a field trip in one of the cases where representatives from five different organisations interested in diverse forms of stewardship came together to seek alignment and find ways to pool resources and find synergies to achieve landscape-scale stewardship	
Racial tensions	In one of the cases, the practitioner identified and made explicit the concerns about racial tension. He acted as a broker to bring together white commercial farmers and black emerging farmers through their shared interest in cattle farming. Photo: The 'bull of collaboration' (left): the bull was donated by the commercial farmers to the emerging farmers to help them improve the genetic stock of their herd. It has become a symbol of improved collaboration across deep, historical divides between black and white people in the area.	
Stakeholders (including farmers and others) unwilling to participate	Practitioners overcome this barrier by empowering and investing in stewards. They meet farmers 'where they are at', e.g. by identifying relevant project activities areas aligned to their interests and needs, invest in stewards and recognise their agency, empower them. This requires openness and flexibility to seek alignment between the initiative's priority objectives and what farmers' objectives are. Photo: Discussion with cattle herders about their understanding of what it means to be a steward of the land, and what kinds of activities could support them in this.	

This acts as an incentive and assists the farmers to offset (perceived or real) costs of changing their grazing practices (Case EN, UM). This quote describes one of these initiatives:

What happened is that we helped the community access funding from UNDP and with that grant we managed to improve the infrastructure, to formalise the herd, to do livestock feeding in winter, and set up the camps for rotational grazing... that really helped ...they told us they used to experience

about 35-40 out of 500 cows dying per year ... but in 2013, after we got the funding...only 7 died, 2014 zero died, in 2015 there were some deaths due to drought and lighting, but not due to bad condition... so it really helped the community. (Case EN)

In two examples (See also Table 7.2), practitioners have worked to overcome barriers by empowering and investing in stewards. A strong focus on the steward, and an emphasis on building meaningful, long-term inter-personal relationships of trust with stewards, is shared by the successful cases presented in this chapter. This echoes the importance of the interplay between the individual factors (enablers and barriers) and social-relational factors as identified in the Langkloof case study (Section 6.5.1, Figure 6.6). The practitioners in these cases provide support systems and empower stewards to overcome the barriers to stewardship, or in fact, to turn the barriers into enablers. Furthermore, by focusing on stewards, practitioners can leverage the stewardship ethic of individuals for the greater collaborative effort. This illustrates the importance of individual agency as part of a collective process. These processes are slow and take a long time. Four of the six cases have been doing this work for more or less ten years (Case EN, UM, BL and KM), and they have only recently seen tangible social-ecological stewardship outcomes.

During the discussions at the workshop (Section 7.2.4.2), the value of long-term time commitment needed by individual practitioners 'in situ' (i.e. embedded in the community or landscape) to engage meaningfully with stewards and understand their needs and aspirations, was discussed frequently. For example, in the Enkangala case (Case EN), the practitioner has partnered with the provincial Department of Education to address concerns about the quality of school facilities in the community, and in the Marico case (Case MR), the practitioner has partnered with an NGO working on maternal health and child care to address concerns about mothers who would like to be involved in the stewardship activities but are constrained by family responsibilities.

These examples illustrate that the practitioners are looking beyond just achieving ecological stewardship outcomes and are paying attention to the needs and priorities of stewards as part of their work, thus empowering and enabling them to participate in the stewardship activities. However, practitioners also face difficulties in their effort to focus on stewards, as they often find it difficult to access suitable, flexible funding (this topic was discussed in one of the case clinics in the workshop).

The commitment to focusing on stewards is necessary, particularly in the South African context, where many 'potential stewards' may find it difficult to participate in stewardship, when the most immediate concern is ensuring the daily food needs of their families. Practitioners are taking this into account, as one pointed out in explaining their approach:

We are mainstreaming biodiversity conservation in agricultural production landscapes... as much as we want to conserve the area, but people have got to put food on the table...and some don't even have a table. (Case EN)

He went on to explain that they are looking for ways to improve the management and conservation of biodiversity, whilst also ensuring that the farmers' or stewards' basic needs are met, i.e. they are not prioritising the biodiversity outcomes of the initiative over the socio-economic outcomes but looking for ways to address these in an integrated manner.

In another case, the initiative named their project together with the local community to illustrate and embed their commitment to empowering local stewards through the work, and to ensuring both ecological and socio-economic outcomes from the work:

> *The project was named: A Re Itireleng - 'Let's do it ourselves' - by the local community focus group in the spirit of empowerment and independence. It is very much a community-led approach to enhancing sustainable water management and green economy for the benefit of people and the environment in the Marico River Catchment.* (Case MR)

The emphasis on stewards evident in many of these cases also emerges from the practitioners being embedded in the local community and understanding the social context well, which shows the importance of long-term relationship building. This quote illustrates this:

> *Be part of the community, avoid a top down approach and work with the community not for the community…make time for informal one-on-one discussions to understand community dynamics. (Case 3)*

Another reason why this focus on stewards is important is that NGOs can be catalysts or orchestrators of collaboration, but community ownership of the initiative and of the collaborative network is necessary for the long-term sustainability of the stewardship outcomes on the ground.

In many of the initiatives practitioners facilitate knowledge-sharing and learning platforms to enhance the enabler of 'knowledge-sharing'. They are acting as hubs of 'good will and good sense' by working closely with stewards to develop economically-sound and innovative stewardship practices. For example, in the Baviaans-Langkloof case (BL) practitioners actively work to improve access to information, by bringing in irrigation experts to provide advice to farmers on how irrigation efficiency measures can help them save water and costs and be better stewards at the same time (Refer to Table 2 for another example).

Many of the barriers experienced by practitioners can be overcome through enhancing social-relational enablers, knowledge-sharing and innovation, and by working with stewardship champions, however institutional barriers (such as rigid requirements from funders and short-term funding cycles) can prevent practitioners from realising the potential of this social-relational approach.

7.3.3 How practitioners build collaboration for stewardship: practical insights

The practitioners in these six cases are actively building collaborative links and networks in the landscapes. How they do this, who is collaborating with whom, and at what level, differs in the individual cases. What they all have in common is that they built novel collaborative linkages between various actors by acting as

'hubs' of social networks to enable stewardship practice in the landscape. These hubs work by building different kinds of links and relationships between stakeholders (Refer to Figure 7.3: '1. Types of links or relationships', and Table 7.3), by operating according to some guiding principles which emerged across all cases as an important driver of success (Refer to Figure 7.3: '2. Guiding principles'), and by working closely with stewards and other stakeholders on practical actions towards achieving social-ecological stewardship outcomes (Refer to Figure 7.3: '3. Practical Actions'). In effect, these network hubs operate as informal institutions enabling collective stewardship actions among stakeholders across the landscape.

1. Types of collaborative links or relationships:

- **H-F** Hub to Farmer (individual)
- **H-O** Hub to Other Stakeholder (individual)
- **H-H** Hub to other Hub
- **F-F** Farmer to Farmer
- **FG-O** Farmer Group to Other Stakeholder
- **FG-OG** Farmer Group to Other Stakeholder Group

2. Guiding principles:
1. Focus on stewards and invest in them
2. Social learning orientation: build platforms for knowledge-sharing
3. Collective planning and acting: WITH the community not FOR the community
4. Create the right space for engagement
5. Be part of the community and the landscape
6. Think big, start small, act now

3. Practical Actions:
1. Get to know the people and the landscape, develop a shared understanding
2. Initiate small local actions to experiment and innovate
3. Mobilise knowledge, learn and reflect together
4. Build new relationships, collaborative links and networks

Figure 7.3: How to build collaboration for stewardship in the landscape. Practitioners and their organisations operate as a hub of 'good will and good sense' in the landscape and build collaboration and new networks through 1. Making new collaborative links or relationships, 2. Applying guiding principles, and 3. Implementing practical actions.

Practitioners build new links through inter-personal relationships with individual farmers, farmer groups, and other stakeholders, and they facilitate or catalyse new collaborative links between various actors, e.g. between individual farmers and other stakeholders, between different farmer groups, or between farmer groups and other stakeholders (individuals) or stakeholder groups (Table 7.3). The hubs may be either individuals or groups of practitioners, representing one specific NGO (Case VV, MR, EN, KM), and in some cases, they are collective hubs lead by a core group of practitioners from multiple organisations (Case UM, BL) (Table 7.3).

The hubs often link up with other hubs (stakeholder groups) in the landscape, creating a network of hubs, which appears to be an important strategy for improving the long-term sustainability of the collaborative initiative. For example, in the Marico case (Case MR), the practitioner is operating as an 'individual hub' in

the landscape, but he has made strong links with existing hubs, for example with an anti-mining NGO and with a local youth group working on green business development, in this way extending his own function as a hub into a larger social network. Similarly, in the Umzimvubu case (Case UM), the core group or hub have made ties to numerous other groups of stakeholders in the landscape, including the local and district municipality, two conservation NGOs, a research institute working on sustainable livestock management, and numerous local farmers' associations.

Another important type of link made to other stakeholders which strengthens the ability of practitioners to achieve integrated social-ecological outcomes, is to link with stakeholders working on issues of importance to stewards, which the practitioners themselves may not have the funds or expertise to work with. For example, where practitioners have partnered with educational or health organisations to address the immediate needs and concerns of stewards, as described above (Section 7.3.2).

Table 7.3: Types of collaborative links that characterise the hubs and networks built by facilitators (for codes of types of links, refer to Figure 7.3):

Case	Description of collaborative links or relationships made by the practitioner
Case 1 (VV): Verlorenvlei	The practitioner has made new links between herself as the hub, and individual farmers and farmer groups (H-F, H-FG), and is facilitating new collaborative links between individual farmers (F-F), between farmers groups and other stakeholders (FG-O) and in the long-term aims to bring together farmers groups along the length of the catchment area (FG-FG).
Case 2 (MR): Marico River	The practitioner is making links between himself as the hub and individual farmers and farmer groups (H-F, H-FG), and between himself and other existing stakeholders groups across the landscape (H-FG, H-OG) or to other collaborative hubs (H-H). He also facilitates linkages among those different groups (FG-OG, OG-OG). He works closely with another NGO acting as an important hub in the landscape (H-H).
Case 3 (EN): Enkangala	The practitioner is making links between himself, as the hub, and the local farmers, both individuals and groups (H-F, H-FG). He also makes links between himself and other stakeholders – individuals and groups (H-O, H-OG), and has now formed a forum through which he facilitates links between the farmers and the other stakeholders (F-O, FG-OG etc.)
Case 4 (UM): Umzimvubu	The UCPP hub is co-ordinated by a core group of 'champion' practitioners who form a collective hub. They have built relationships between one another's organisations (OG-OG), between their own organisations and farmers (OG-F, OG-FG) and facilitate linkages between farmers and farmer groups (F-F, F-FG, FG-FG) and between farmer groups and other organisations (FG-OG). They also make links to other hubs of collaboration (H-H).
Case 5 (BL): Baviaans-Langkloof	The smaller focused activities implemented by Living Lands within the broader landscape process are at different stages, and thus the collaboration they are building varies across the different catchment areas within the overall landscape. Types of collaborative links which practitioners are building include H-F, H-FG, F-F, FG-FG, H-O, F-O, FG-O. They operate as a collective hub.
Case 6 (KM): KwaZulu-Natal Midlands	The practitioners running this initiative act as a core team or 'hub' within the landscape. They build relationships between themselves and farmers (individuals and groups) and other stakeholders, particularly value chain stakeholders (H-F, H-FG, H-O, H-OG). They are also making new collaborative links among farmer groups (FG-FG) and between farmers and other stakeholders (F-O, FG-O, etc.)

Facilitating collaboration among diverse, competing stakeholders in a contested landscape can be difficult. This kind of relationship-building work can be emotionally demanding and may require personal sacrifices. Particularly where practitioners are acting as individual hubs in the landscape, the personal challenges of

working in contested landscapes need to be taken into account, and support systems must be in place for these practitioners. For example, in one of the case clinic discussions during the workshop, a practitioner shared their frustration of trying to work with farmers who have a deep-seated mistrust of conservation projects. The practitioner found it very difficult to remain motivated in the face of much resistance and rude responses from farmers to phone calls and visits. It appears that the success of the hubs depends heavily on the relational competencies of practitioners, i.e. on their ability to build meaningful long-term relationships with stewards and other stakeholders, and to facilitate or broker relationships between stewards and other stakeholders, whilst not sacrificing their own personal well-being in the process.

An important feature shared by all the cases is that collaboration is mostly voluntary, and is not driven by any policy, legislation or mandate, for both the organisations who are convening or driving the collaborative process, and for the participating farmers and other stakeholders. Since participation in the activities of the hub is mostly voluntary, one could call these hubs of 'good will', and this name is underscored by the importance of 'open-minded and willing farmers' as an important individual-level enabler of collaboration (Table 7.3). The cases illustrate that initiatives built on good will, supported by good sense, i.e. access to knowledge and information to support development of economically-sound and innovative stewardship practices, are more likely to succeed in their stewardship goals.

The informal, yet effective, nature of these hubs suggests that putting formal governance structures and institutions and 'rules of the game' in place, as promoted elsewhere in the literature, may not always be necessary. The experience of the cases is that relying less on formal, institutionalised approaches to get people involved, and more on the stewardship ethic and good will of participants, and aligning this with good sense solutions to reduce the conflict between agriculture and conservation, may ensure better commitment or buy in from participants and may ensure a more sustainable initiative in the long-term, as one of the participants noted:

> *The objective is livelihoods, rural livelihoods off a sustained landscape. And our philosophy around sustainability is not that it is a technical property around grass growing, but that it is an emergent property of good collaboration, that is what sustainability is. So, if I moved out of the landscape... collaborative relationships would continue and ensure the sustainability of what is going on in the landscape.* (Case UM)

The hubs often support and help to facilitate formal natural resource governance mechanisms (for example conservancies (Case BL), or catchment management forums (Case MR, BL)). In some cases, they recognise the lack of natural resource governance:

> *We are realising that we can't restore landscape function unless we restore governance, it's very broken down.* (Case UM)

It seems that in some cases these informal hubs are stepping into natural resource governance gaps left by the state. For example, one practitioner mentioned that the state has asked their collaborative initiative to operate as the Catchment Management Agency (a legislated water governance institution, refer to Chapter 2, Box 2.2, Part 2). Another interesting observation related to natural resource governance, is that in three of the six cases (Case VV, MR, UM), the NGOs facilitating the initiative have initiated, or supported, local community participation in public participation processes for mining applications.

The way in which the hubs operate across the landscapes appears to confirm the recommendation I made based on the Langkloof case in Chapter 6, that a diverse, pluralistic 'patchwork approach' to facilitating collaboration is needed, rather than a blanket approach across the whole landscape (Section 6.5.4). Dynamic, informal hubs seem to be as important (particularly at smaller scales) as formal institution building. In contexts of ineffective formal governance, they may be even more important. An interesting discussion during the workshop was the idea that building large-scale collaboration at the start may not always be necessary, and that small local clusters of collaboration around focused stewardship actions are an important starting point. This was the focus of one of the case clinic discussions. It seems that practitioners are implementing the patchwork approach suggested in Chapter 6, but that it can be difficult for them to move from the local-level clusters of collaboration based on inter-personal relationships and a stewardship ethic, to broader collaboration at a landscape level, and deciding when to do this is also challenging. They do not want to jeopardise the relationships of trust they have built with a few local stewards, by bringing them together with other stakeholders at higher levels across the landscape too quickly. This challenge of how to 'stitch together' the patches of collaboration at larger scales requires further investigation. It is possible that at higher levels, formal institutional governance approaches, for example policy-driven collaborative processes like catchment management forums (Chapter 2, Box 2.2, Part 2), that might mandate collaboration across deep divides between stakeholders, become more important again. There is perhaps a threshold beyond which informal institutions such as the social-relational hubs and networks described here must be complemented by formal institution building for large landscapes. Similarly, in order to embed and upscale informal, voluntary initiatives and provide more sustainable funding models, they may need to be supported by more formalised governance processes and policy instruments.

7.4. Discussion

Based on the analysis in this chapter, I suggest two insights which shed new light on collaboration and stewardship practice. Firstly, the importance of taking a more relational approach to collaboration for stewardship, and secondly, the need to re-focus stewardship on stewards. But what is meant by these two statements?

Taking a relational approach to collaboration for stewardship means paying closer attention to the enabling role which social-relational processes play in underpinning stewardship. Collaboration is inherently a relational endeavour (Bromwich, 2014; Ashcroft et al., 2016). A relational approach to collaboration for

stewardship implies that the relationships within a given social-ecological system become a key focus in facilitating collaboration and stewardship. My research has highlighted two types of relationships to which attention needs to be paid in multifunctional landscapes. Firstly, I have proposed that the social relationships between different stakeholders are an important enabling feature of effective collaboration. Secondly, individual farmers' stewardship ethic is a specific type of relationship between humans and nature (Flint et al., 2013; Raymond et al., 2013), and stewardship is therefore also, like collaboration, in essence a relational concept.

Re-focusing stewardship on stewards means shifting the unbalanced emphasis on the ecological outcomes of stewardship initiatives towards a more balanced, social-ecological approach, in which we re-focus on stewards as the primary agents of change through their individual and collective decision-making and local actions. In South Africa, the biodiversity stewardship model is dominant (Chapter 5, Section 5.4.1) (Barendse et al., 2016). In this model, project priority areas and activities are determined by a focus on biodiversity priorities, as determined through spatial conservation planning approaches (Gallo et al., 2009; Von Hase et al., 2010). Findings in Chapter 5 support this, as they indicate a heavy emphasis on biodiversity objectives, and ecological stewardship activities (Chapter 5, Figure 5.2, Figure 5.3). This seems to obscure the fact that it is in fact stewards who need to be the key focus of stewardship approaches. Attention must be paid to their needs, motivations, interests, and capabilities, and innovative stewardship practices must be identified which enable them to put their stewardship ethic into action (for example, see Table 7.2). From this it becomes evident that any initiative that seeks to bring about stewardship through collaboration cannot ignore the agency of the individual steward in the process.

Below, I further discuss the relational approach to stewardship, and then explore the idea of re-focusing stewardship on stewards and consider the implications thereof. But first, I set the scene by discussing three lessons from the analysis on enablers and barriers of collaboration conducted above (Section 7.3.1, and 7.3.2) which provide evidence for these two insights.

7.4.1 Three lessons from the cases: relationships, knowledge-sharing, and an ethic of stewardship enable collaboration

The first lesson is that long-term relationship-building is an important activity, and sufficient funding and institutional support need to be put in place to support this. Secondly, knowledge-sharing, innovation, and social learning platforms are important processes for bringing different stakeholders together. In these cases, such learning opportunities are key in the development of innovative stewardship actions to address the conflict between agriculture and conservation. Thirdly, the importance of an individual stewardship ethic which motivates champions and leaders to actively participate in, and support, collaborative landscape-level initiatives, needs to be recognised, rewarded and supported.

All three of these processes are enacted through practitioners operating as hubs within a larger network of collaborations across the landscape. These hubs can be seen both as central (or important) nodes within a

larger social network of relations (Hawe et al., 2004) and as informal institutions which support collaboration and stewardship practice in multifunctional landscapes. Hubs are central network nodes in that they are represented by an actor (or an organisation or group of actors) who is connected to other actors in the landscape through relational ties (Hawe et al., 2004; Crona & Hubacek, 2010). The centrality of a node in a network is a measure of its importance in terms of how well-connected it is to other nodes in the network (Hawe et al., 2004). This description of hubs as networks supports the notion of the practitioners in these cases acting as relationship brokers among diverse stakeholders across the landscape and emphasises the relational nature of the hubs and the functions they perform.

In describing the hubs as informal institutions, I draw on Ostrom's (2005) definition of institutions as 'prescriptions that humans use to organise all forms of repetitive and structured interactions' (Ostrom, 2005: 3) or 'regularised social interactions' (Ostrom, 2005: 5). I consider the hubs informal, since participation in the activities of the hubs is based on good will and volunteerism, is mostly opportunistic, and sometimes happens on an ad-hoc basis (Section 7.3.3). This is in contrast, for instance, to mandatory collaboration through formal institutional governance structures, as might be put in place through government policies for natural resource management (See for example Cradock-Henry et al. (2017)). One such example is the Protected Environment agreement in biodiversity stewardship, which requires groups of landowners to form landowner associations before they can sign the agreement (Chapter 2, Section 2.4.2, Figure 2.2).

Long-term relationship-building as a primary competence and enabler of collaborative processes in natural resource management is widely recognised. The rapid growth in research on social network analysis in this field attests to this (Bodin & Crona, 2009; Crona et al., 2011; Alexander & Armitage, 2015), as does a large body of literature on common pool resources, social capital and collective action (Ostrom & Ahn, 2003; Ostrom, 2005; Plummer & FitzGibbon, 2010).

Research on social networks in natural resource management has revealed that the structure of social networks, i.e. the characteristics of the links and ties among different stakeholders, play an important role in the outcomes of stewardship initiatives (Bodin & Crona, 2009). This suggests that strongly centralised networks in which one or a few actors are very well connected, with a high density of connections around the central actor (or node), and where the rest of the network is rather loose or diffuse (such as the 'Hub of collaboration': Figure 7.3), may potentially be risky. Such arrangements tend to centralise power and may create dependence on central actors (Hawe et al., 2004); however, they can also facilitate high levels of co-ordination among different actors (Hawe et al., 2004). Thus, if the practitioner who is operating as the centre of a hub leaves the landscape, the initiative may not continue, unless local stewards or other hubs have been empowered. This is something which the practitioners in the cases presented here are aware of; therefore, they are working towards linking with other hubs and stakeholders in the landscape to strengthen the overall collaborative network. Through these efforts, the network can become less centralised, and the density of connections more evenly distributed across the network (Hawe et al., 2004).

The important role of brokers or convenors (either individuals or organisations) as relationship-builders in collaborative processes is also widely recognised (Hahn et al., 2006; Olsson et al., 2007; Klerkx & Leeuwis, 2009), though their specific brokering functions differ (e.g. knowledge brokers, innovation brokers, etc.). For example, in catchment management initiatives involving multiple stakeholders, the function of knowledge brokers is to enhance connectivity between science, policy, and practice and this is recognised as a fundamentally relational process (Ison et al., 2011). This relational knowledge-brokering is evident in the Enkangala, Umzimvubu, Baviaans-Langkloof and Midlands cases, where practitioners have worked to enhance links between themselves and local stewards, and scientists or experts in various fields, which has enabled the development of innovative stewardship practices. Another example from the literature is the case of innovation brokers in agricultural innovation systems for sustainable agriculture (Klerkx et al., 2009). Here, innovation brokers act as systemic intermediaries, *"an in-between in a many-to-many relationship"* (Klerkx et al., 2009: 412), whose main purpose is to build appropriate linkages between stakeholders and facilitate innovation for developing sustainable agricultural practices. This is similar to the 'good sense' function of hubs in my cases (Section 7.3.3), where development of innovative stewardship practices is important. In examples from adaptive co-management, where there is a strong focus on multi-level governance, brokers are considered to function as a bridge across levels (or scales), which is a particular position in a social network (Olsson et al., 2007; Ernstson et al., 2010). Considering the challenge of 'stitching together' the collaborative patchwork at different levels in the landscape described above, the ability of practitioners to broker across levels may be particularly important but challenging. I did not find much evidence of this kind of brokering in my cases.

The other important role played by the hubs of collaboration is to provide a knowledge-sharing platform. Whilst the stewardship ethic of individual farmers is an important enabler of stewardship practice (Table 7.1, Table 7.2), without access to suitable information to inform stewardship practices, farmers may not be able to shift from ethic to actions. As Parker (2010: 205) says: *"A disposition to care is not sufficient – effective care requires knowledge."* Knowledge-sharing, innovation and social learning as key enablers of collaboration and sustainable natural resource management have also been widely researched (Leeuwis & Pyburn, 2002; Cundill & Rodela, 2012; Klerkx & Proctor, 2013). For example, social learning has emerged as an important field of research within adaptive co-management (Plummer & FitzGibbon, 2007; Cundill, 2010), and in natural resource management more broadly (Leeuwis & Pyburn, 2002; Keen et al., 2005). Similarly, research on innovation platforms in supporting sustainable agricultural development also supports the importance of collective learning processes for developing novel solutions to sustainability challenges among multiple stakeholders (Klerkx & Leeuwis, 2009; Klerkx & Proctor, 2013).

Brown et al. (2005: 247) provide an important reminder about working together whilst crossing boundaries: *"Social learning for environmental management hinges on our abilities to work together collectively and constructively. This can be achieved only if we cross the jurisdictional, disciplinary and social boundaries that*

divide us". The practitioners in my cases are attempting to facilitate such boundary-crossing learning processes. Examples include interactions among diverse stakeholders in dialogue sessions, field days, and regular multi-stakeholder forums (Section 7.3.2). In many of the cases stakeholders are being brought together to exchange knowledge and learn together with people from sectors who usually do not work together, for example bringing in government officials from health and education into a conservation project (Case EN) or partnering with NGOs working on family planning and childcare as part of a catchment management initiative (Case MR). These opportunities hold potential for mediating or reducing conflict between stakeholders representing different land uses (e.g. agriculture vs. conservation).

The important role of individual farmers' or stewards' agency in broader collaborative stewardship processes has also been recognised in various bodies of literature (Lubell, 2004; Cleaver, 2007; de Snoo et al., 2013). Their agency as stewards of natural resources can be mediated by their identity (Sulemana & James, 2014), personal values and ethics (Kabii & Horwitz, 2006; Selinske et al., 2015; Floress et al., 2017), attitudes (Sulemana & James, 2014), and place attachment (Cheng et al., 2003; Chapin & Knapp, 2015; Selinske et al., 2015). The economic contexts within which they conduct the business of farming or make their livelihoods (Lubell, 2004; Kabii & Horwitz, 2006; Floress et al., 2017), and the interactions they have with others and with institutions (Cleaver, 2012; Ling & Dale, 2013), also influence their behaviour, decision-making and ultimately their agency.

All three of the processes outlined above play a role in enabling practitioners to facilitate or build collaboration across the landscape, but relationship-building is the central activity, and a key competency of practitioners, which enables the other two processes (knowledge-sharing and enabling individual stewards' ethic), and without which none of the others could function. This analysis suggests that taking a more relational approach to collaboration for stewardship may strengthen practice; and secondly that re-focusing stewardship on stewards is necessary in order to achieve stewardship outcomes at the local level.

7.4.2 Unpacking a relational approach to stewardship

Although the idea of relationality is inherent in systems thinking (Hammond, 2005), explicitly relational approaches to natural resource management are relatively new. For example, a recent study of environmental governance in conflict-ridden Sudan proposed a relational approach, suggesting that "*good resource governance reflects a network of collaborative relationships amongst communities, institutions of government, civil society and the private sector, with each group pursuing their respective objectives in an equitable manner.*" (Bromwich, 2014: 8). Bromwich (2014) further points out that relationships among different stakeholders enable effective environmental governance, and that effective governance enables relationships. In another study, the authors suggest that water security should be viewed as a dynamic, relational and situated process, rather than one solely based on parameters such as water access, quality or availability (Jepson et al., 2017). In both these instances, focusing on relational aspects is not intended to replace the focus on governance, technical measurement, assessment or management, but rather they

suggest that paying closer attention to relational processes can enable more effective governance and management. Similarly, in proposing that we need to take a more relational approach to stewardship, I am not suggesting that a relational approach should replace the role of formal governance institutions such as policies, incentive mechanisms, rules and regulations (in the case of collaborative governance and management); or ecological measures, priorities and planning processes (in the case of stewardship actions or practices). Rather, I suggest that paying closer attention to relationships can enable the attainment of improved management and governance for stewardship practice towards interlinked social-ecological sustainability outcomes.

Theory U lends further support to my argument for a relational approach. Drawing on complex systems thinking, Theory U is an approach to facilitating transformative social change for sustainability (Scharmer, 2009b). Scharmer and Kaufer (2013: 174) contend that *"the next revolution will be a relational one"*. Theory U is based on the 'Iceberg Model' of understanding the world we live in (Figure 7.4). The iceberg model proposes that there are three divides which characterise surface-level symptoms of the deep-seated structural and paradigmatic sustainability challenges or problems we face. The three divides are (Scharmer & Kaufer, 2013: 5):

1. the eco (ecological) divide is the divide (or potential relationship, in a relational approach) between humans and nature;

2. the social divide is the divide between self and other, i.e. the social-relational divide between human beings, both at an inter-personal level and in terms of inequality among different groups in society; and

3. the spiritual divide is the divide between one's current self and the emerging future self which represents one's greatest potential. In terms of stewardship, one could consider this a divide between the current self, or individual state of being, of stewards and their future potential of becoming a better steward by re-connecting with nature in a more positive relationship, and with fellow human beings across the shared landscape.

The three divides characterise the challenge of achieving social-ecological stewardship through collaboration in multifunctional landscapes. For example, the barrier 'conflict and competition for water and other scarce resources' (Table 7.1) illustrates the ecological divide, where economic pressures drive stewards to compete over resources, rather than caring for them collectively. The divides between actors representing different sectors (i.e. 'conflict between land uses e.g. agriculture vs. conservation' (Table 7.1) are an example of the social divide. 'Individualistic attitude and narrow-mindedness of farmers', a barrier to collaboration identified in these cases (Table 7.1), is an example of the spiritual divide, whereby farmers are not able to achieve their highest potential as stewards because of cultural or personal habits. A relational approach to stewardship seeks to restore the connections across all three of these divides.

The focus on relationship-building, and on the relational dimensions of stewardship, challenges to some extent the established focus on formal institution building in natural resource management and governance. In this literature, rules, and formal institutions and arrangements for multi-scale governance tend to be the focus. This is the case for example in policy-driven watershed collaboration (Margerum, 2008; Cradock-Henry et al., 2017), adaptive co-management (Olsson et al., 2004; Armitage et al., 2007a; Cundill & Fabricius, 2010) and landscape-level forest restoration (Walpole et al., 2017) (but there are exceptions, see for example Duff et al. (2017)). Similarly, the widely-cited literature on common pool resources propose generalised design principles for the effective functioning of institutions for stewardship of common pool resources (Ostrom, 1990; Ostrom & Cox, 2010), an emphasis which somewhat obscures the critical role of dynamic inter-personal relationships and human agency that underpins effective natural resource management and governance (Cleaver, 2002; Saunders, 2014).
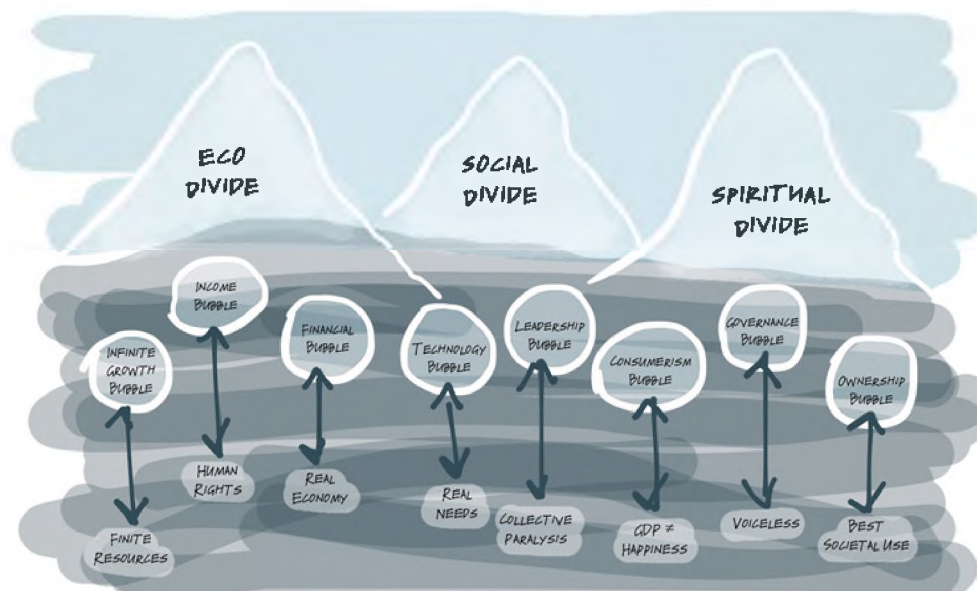
Figure 7.4: The Iceberg Model on which Theory U is based. The 'peaks' of the three icebergs are the three divides, which are considered surface-level symptoms of deeper-seated sustainability challenges, illustrated here as bubbles (Scharmer & Kaufer, 2013; Presencing Institute - Otto Scharmer, 2015).

However, as mentioned in the previous section (Section 7.4.1), for all its benefits, there are weakness in the hub of good-will approach described in this chapter, as it relies on champions and volunteerism, is based on individuals' stewardship ethic, and the social networks show strong centralisation (Figure 7.3) (Bodin & Crona, 2009). The cases show that practitioners are overcoming this through formalising some of their relationships and by linking with other long-standing initiatives in the landscape to improve the long-term sustainability of their initiatives. Biodiversity stewardship, which is an example of a policy or governance mechanism (i.e. a formal institution), is recognised as a good 'investment tool' for conservation because it secures commitment from landowners through legal agreements (SANBI, 2015a). Three of the cases in this study have used this tool to formalise collaboration in their projects (Case VV, EN, UM). Another case also uses a similar mechanism called 'conservation stewardship agreements' (Case UM). In a fourth case, business agreements are drawn up between farmers and the NGO to support development of sustainable agricultural

businesses (Case BL). This illustrates the importance of the interplay between individual, social-relational and institutional enablers of collaboration for stewardship (Chapter 6, Figure 6.6). For example, DeVente et al. (2016) discuss design principles for participation, which are often used to guide and structure formal collaborative governance (Ansell & Gash, 2007; Ostrom & Cox, 2010). Their findings lend support to this proposed approach of combining 'good will' hubs of collaboration based on inter-personal relationships with more formal, institutionalised collaboration: *"transparency and trust, especially between land users and government bodies, are needed to make these structured forms of participation successful"* (de Vente et al., 2016: 8).

My research on these oft over-looked informal collaborative processes, has revealed the otherwise hidden, and possibly underappreciated, role played by interpersonal relationships in enabling collaboration for natural resource management. I recommend taking a relational approach, as an enabler or a complement to formal governance approaches, to collaboration for stewardship. Such an approach draws on individual's ethics and values, recognises the importance of listening to different voices, optimises the benefits of informality, and relies on mutual respect and trust-building as foundational to successful social-ecological stewardship. I do not suggest that the relational approach should replace or be preferred over a governance-based institutional approach, but rather that more attention needs to be paid to relational aspects within collaborative initiatives to manage and govern natural resources at landscape-level. Therefore, the best approach may be to provide an informal good-will platform for collaboration based on strong inter-personal relationships and trust, along with opportunities to formalise collaboration and stewardship commitments through formal institutional arrangements and governance mechanisms, such as incentives, with willing participants to ensure sustainability and secure long-term investments and support.

A relational approach alone is unlikely to have the large-scale impact needed to address the challenging global sustainability challenges which global calls for stewardship seek to address (Chapter 1), and enabling formal institutional governance mechanisms, policy innovations and funding are needed to support these social-ecological stewardship initiatives operating at landscape-level (See also Chapter 5, Section 5.4.3). My research has indicated that it takes a long time (approximately ten years) to build collaboration for stewardship to achieve integrated social-ecological stewardship outcomes in practice (Section 7.3.2). The high cost (both human and financial resources), and difficulties in accessing funding to support collaborative processes was also identified in Chapter 5 (Section 5.3.4.1, Figure 5.4). This is a resource intensive approach which requires specific skills and tools. Stewardship practitioners need good interpersonal skills, also referred to as relational (Scharmer, 2009a) or interpersonal (Wiek et al., 2011) competencies. Access to training and learning opportunities for practitioners to develop these competencies is needed, as there is currently an over-emphasis on technical competencies in the environmental sector in South Africa (Rosenberg et al., 2016). Furthermore, practical tools and methods for stakeholder engagement which support the core activity

of relationship-building are needed, as are monitoring and evaluation frameworks which measure and report on these important aspects (Du Plessis & Ranger, 2017).

7.4.3 Re-focusing stewardship on stewards and their agency

The importance of individual stewardship ethic as an enabler of collaborative stewardship (Table 7.1, Table 7.2, Section 7.4.1) calls for a sharper focus on the agency of individual farmers within collaborative processes. The practitioners in these cases are working to empower stewards and support them in finding innovative ways to overcome some of the most challenging barriers to stewardship, i.e. the lack of access to knowledge and extension support, the need for economic benefits from stewardship, and the related conflict between agriculture and conservation. In this way, they are putting the primary focus of their work on the stewards themselves and finding ways to enable and empower them.

Critical realism potentially offers valuable theory and conceptual tools to investigate the relationships between individual agency, collaboration and broader societal structure (Bhaskar, 2010; Price, 2014; Bhaskar, 2016). In critical realism, the relationship between individual agents and the broader world in which they are embedded is presented through the model of the 'Four-Planar Social Being' (Bhaskar, 2016: 53) (Chapter 4, Section 4.2.3.3, Figure 7.5).
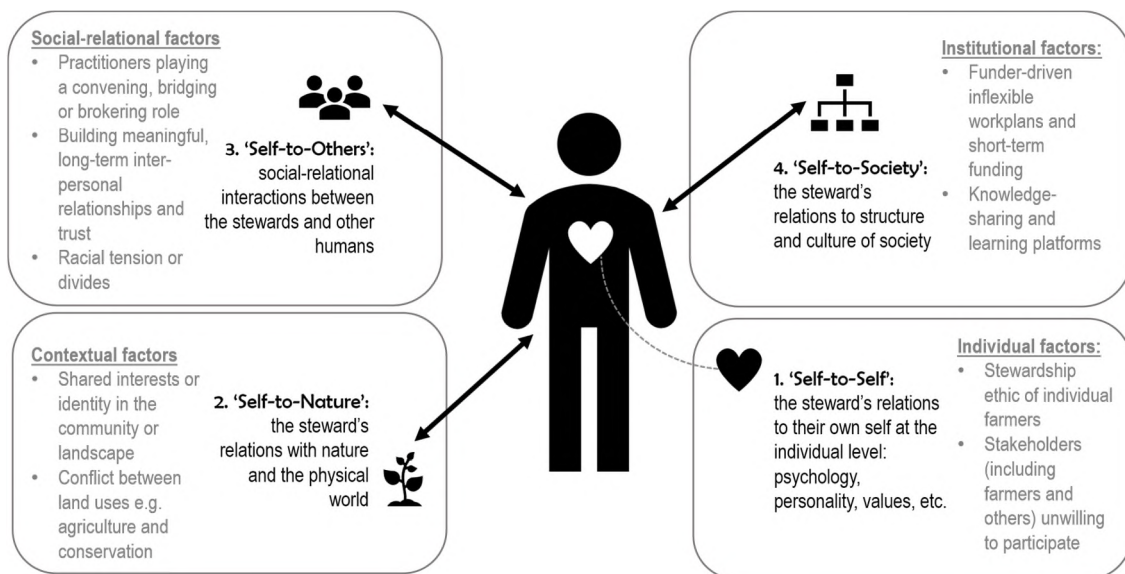
Figure 7.5: A diagram of the four-planar social being, a conceptual model for understanding the multi-dimensional nature of individual human agency. Key enablers and barriers of collaboration (grey text, refer to Table 7.1) are mapped onto the model.

This conceptual model provides a useful means of further understanding the implications of an approach to collaboration and stewardship based on 're-focusing stewardship on stewards' (Figure 7.5). The assumption of using the model in this way, is that the agency of individual stewards is multidimensional, and has an influence on the outcomes of collaborative stewardship processes. The applicability of the model for understanding the factors influencing collaboration for stewardship is demonstrated in Figure 7.5, where the most important enablers and barriers of collaboration (Table 7.1) are plotted onto a diagram of the four-

planar social being. This shows that these key factors (manifesting as enablers of barriers), all influence the individual agency of stewards.

For example, at the individual level (1: Self-to-Self), the individual ethics and values of stewards influence their willingness and ability to participate in collaboration for stewardship, a key enabler identified across all cases (Table 7.1). Another important enabler is shared identity in the landscape, which emerges from the biophysical context in which stewards are embedded (2: Self-to-Nature) and can enable stewardship and collaboration (Table 7.1). The strong influence which meaningful, long-term relationships between stewards and practitioners have on stewards' ability and willingness to collaborate and practice stewardship (3. Self-to-Others) has also been shown in all six cases (Table 7.1). These examples demonstrate that the agency of individuals is contextual and multi-dimensional, and that stewardship and collaboration are situated practices. These ideas will be explored further in Chapter 8 (Box 8.1, Section 8.2.3).

7.5. Conclusion

As described above, stewardship practice is often focused on ecological outcomes, and collaboration on institutional aspects. However, according to my findings on the enablers and barriers (Section 7.4.1) and the theory of the four-planar social being (Figure 7.5) stewardship and collaboration are relational processes, and we therefore need to re-focus stewardship on stewards.

Practitioners are facilitating collaboration for stewardship practice through informal, voluntary hubs of 'good will and good sense'. Although there are inherent risks in the informal nature of these collaborative initiatives, some of them have been in existence for over ten years. This is testament to the value of long-term inter-personal relationships, and the importance of focusing on stewards, something which is particularly valuable in contexts of eroding governance and accountability. While I am not suggesting that informality works everywhere, in these contexts where formal governance structures for natural resource management are absent or poorly functioning, it appears important. Furthermore, the strong influence which long-term, inter-personal relationships have on the apparent success of these informal collaborative hubs indicates that a relational approach may be important in underpinning or enabling more formalised natural resource governance processes. Considering the key role of long-term relationships, policy-makers and funders need to recognise the long time-frames needed to achieve social-ecological stewardship practice though collaborative processes. Capacity-building which supports development of relational competencies and practical toolkits for stakeholder engagement is needed to support the work of practitioners working at the local level to bring about positive social-ecological stewardship outcomes.

Re-focusing collaborative natural resource management on stewards has a number of implications for policy, research and practice. Firstly, it re-iterates the importance of providing suitable incentives for stewards to participate in stewardship initiatives and where possible to provide economic support for the costs which often result from changing land use or farming practices (for example through tax rebates, which is a kind of

formal institution). Thus, formal institutions do have a role to play in enabling stewardship, but they are unlikely to succeed in the absence of relational enablers such as inter-personal relationships of trust, which might be considered an important entry point. Moreover, funders and policy-makers need to make provision for project spending and activities which seek to empower stewards and support their livelihoods, as a means of enabling them in reaching their full potential as stewards.

Secondly, further research is required to understand the ways in which individual and collective or distributed agency interact along pathways to sustainability. The importance of understanding the interplay between individual and collective or distributed agency was also discussed in the Langkloof case study (Chapter 6, Section 6.5.3) and is an important area for future research to better understand the social processes underpinning effective and successful landscape-level stewardship. There is limited research on the notion of 'stewardship as agency'. Yet, research into human agency in social-ecological systems holds great promise not only for a better understanding of collaboration and stewardship in multifunctional landscapes, but it could also contribute to related and growing areas of research such as human well-being (Daw et al., 2011), values (Chan et al., 2016), and power and politics (Fabinyi et al., 2014) in complex social-ecological systems.

Having taken a broader view in this chapter to gain an understanding of collaboration for stewardship practice across diverse contexts in South Africa, I now move on to Part 3 of the thesis. In Part 3 I synthesise the empirical findings (Chapter 8), reflect on lessons learnt in operationalising transdisciplinarity (Chapter 9), and conclude the thesis with recommendations for ways forward (Chapter 10). In the next chapter, I provide an integrated picture of the findings from all three empirical chapters (Chapter 5, 6, and 7), and develop an explanatory synthesis to explore underlying causal mechanisms which might explain the empirical findings.

PART III: SYNTHESIS, REFLECTIONS & RECOMMENDATIONS

Chapter 8 | Explanatory synthesis: Investigating underlying causal mechanisms of the practice of stewardship and collaboration in multifunctional landscapes

"Some people care too much. I think it's called love." (A.A. Milne, Winnie-the Pooh)

Stewardship is relational. Here is a steward explaining how he takes care of his livestock, in a changing climate, whilst taking care of the vegetation. The man next to him is a researcher who spent many months with the herders, developing a lasting relationship with them. He is collaborating with the herders and the local NGO to better understand the life of local herders, and how they relate to and steward nature.

8.1. Introduction

In this chapter I provide an explanatory synthesis of my research findings and theorise the practice of stewardship and collaboration in multifunctional landscapes. The following research question guided this process: What underlying causal mechanisms explain the empirical observations about stewardship practice and collaboration? First, I develop an integrated picture of stewardship practice and collaboration, drawing on my research at different levels to synthesise insights from the empirical chapters (Chapters 5, 6, and 7) towards my research objectives. I structure this according to four core propositions that emerge from my findings. Based on these propositions, I posit that stewardship practice and collaboration are situated practices embedded in complex social-ecological systems and are influenced by mechanisms which operate across space and time. Next, I present Bhaskar's seven laminations of scale as an analytical heuristic to deepen this analysis. I explore what critical realism reveals about the practice of stewardship and collaboration. I do this by applying the heuristic to identify underlying causal mechanisms which explain the empirical observations from Chapters 5, 6, and 7.

In this chapter I focus on the research objectives relating to stewardship practice and collaboration, i.e. Objectives 1 and 2 (Chapter 1, Section 1.2). I address Objective 3, related to transdisciplinary research, in Chapter 9.

8.2. Synthesis of core propositions: an integrated picture of stewardship practice and collaboration

The overall aim of my research was to investigate the practice of stewardship and collaboration in multifunctional landscapes through a transdisciplinary enquiry (Chapter 1, Section 1.2). The first research objective was to *characterise stewardship in practice in South Africa*. From the empirical findings in Chapter 5, I suggest the following proposition towards this objective:

> Proposition 1: the practice of stewardship is a social-ecological balancing act in the landscape for which integrated approaches are emerging in practice.

The second research objective was to *investigate how practitioners are building collaboration for stewardship in South Africa*. From the empirical findings in Chapters 6 and 7, I suggest the following propositions towards this objective:

> Proposition 2: stewardship and collaboration are inherently relational processes and thus a relational approach is required.

> Proposition 3: to achieve integrated social-ecological stewardship outcomes, it is necessary to re-focus stewardship on stewards.

> Proposition 4: a patchwork approach is required to foster collaboration for stewardship in complex, contested landscapes.

I now discuss these four propositions, developing an integrated understanding of stewardship practice and collaboration in South Africa.

8.2.1 Proposition 1: the practice of stewardship is a social-ecological balancing act in the landscape for which integrated approaches are emerging in practice

Stewardship practice in South Africa can be characterised both by the role which stewards are expected to play in the landscape as well as by the approaches which practitioners use to implement stewardship in practice (Chapter 5). Practitioners' understandings of the meaning of stewardship coalesce around the idea of 'responsible use and care' of nature and stewardship as a 'balancing act'. According to stewardship practitioners, the primary role of stewards is to balance their agricultural production and livelihood needs with the responsible management and protection of nature. In other words, the role of the steward is to interact with ecosystems responsibly and carefully by balancing the use of provisioning ecosystem services for their own direct needs with management of a broader, more diverse suite of ecosystem services (such as regulating, supporting, and spiritual and cultural ecosystem services), which serve society. Therefore, in the context of multifunctional landscapes, this means that stewards have an obligation to collaborate with other stewards and stakeholders across the landscape to negotiate trade-offs around a diverse suite of ecosystem services (Chapter 5).

This 'balancing act' which is expected of stewards might go some way to explaining the emergence of integrated, social-ecological stewardship approaches in practice. Practitioners' perceptions of the role of stewards described above are likely guiding the way in which they put stewardship into practice in their projects. Many practitioners' use of 'older' stewardship language to talk about their work (identified both in the way they express meanings of stewardship as well as in the terminology which they use to describe their work) appears to be masking more innovative, contemporary practice.

Integrated, social-ecological stewardship approaches are characterised by working at landscape level (beyond the farm or village level); working towards multifunctionality (towards multiple, integrated social-ecological stewardship outcomes); and a focus on fostering collaboration among multiple stakeholders (Chapter 3). The case studies presented in Chapters 6 and 7 are examples of these kinds of initiatives. The practitioners in these case studies appear to recognise the balancing act required from stewards and are supporting stewards in achieving social-ecological outcomes by re-focusing stewardship on stewards.

8.2.2 Proposition 2: stewardship and collaboration are inherently relational processes, and thus a relational approach is required

The practice of stewardship in multifunctional landscapes is characterised by at least four (and possibly more) relational processes (Figure 8.1). Firstly, collaboration among multiple stakeholders (between stewards and stewards and between stewards and other stakeholders) is based on inter-personal relationships (R_1). This creates a form of collective agency between many individuals. Collaboration is accordingly an inherently relational endeavour. This may seem like an obvious claim; however, the existing literature on collaboration tends to focus on structural aspects of collaboration such as institutions, governance arrangements, and policies (Chapter 3, Section 3.4, Table 3.2 and Chapter 6, Section 6.1.1.1) (Armitage et al., 2007a; Margerum, 2008; Cradock-Henry et al., 2017). I suggest that in this focus on structural aspects, the relational nature of collaborative endeavours can be overlooked. Although formal institutional and governance factors play an important role in enabling collaboration, individual and social-relational factors may in fact be stronger enablers (Chapters 6 and 7) and effective relationship-building therefore underpins the success of structural approaches to collaboration.

In contexts of eroding governance of natural resources, as is the case in South Africa, individual and social-relational factors may become even more important. The role played by NGOs in supporting local stewards to act upon their individual stewardship ethic supports this (Chapter 7). Conversely, individual's fear and unwillingness to interact with people from different backgrounds can be a significant barrier to stewardship and collaboration as was shown in the Langkloof case, where deep-seated boundaries between people of different races, cultures, and agricultural sub-communities were a significant barrier to collaboration (Chapter 6).

Key to relational processes (indicated by arrows):

R_1 = collaboration: collective agency

R_2 = stewardship: individual agency

R_3 = coordination: individual/collective agency (link)

R_4 = collaboration for stewardship: collective agency
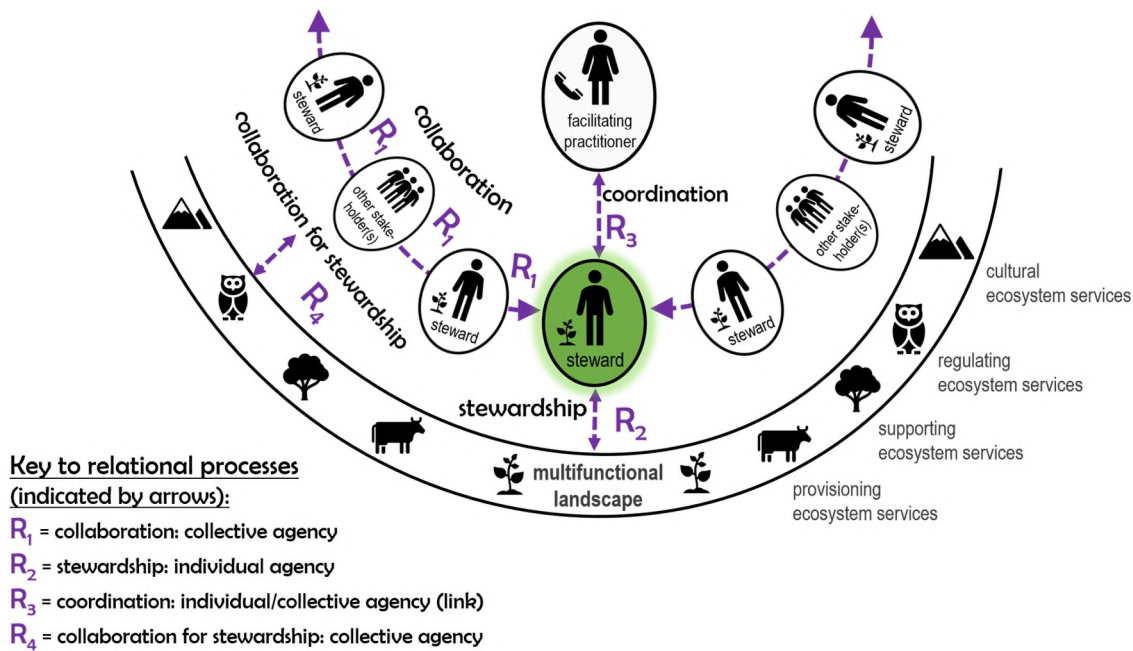
Figure 8.1: Conceptual model of stewardship and collaboration in multifunctional landscapes, illustrating multiple relational processes at play and re-focusing stewardship on stewards.

Secondly, stewardship practice is a relationship between individual stewards and nature or the landscape (R_2 in Figure 8.1). As described above (Proposition 1), the primary role of the steward is to interact with ecosystems responsibly and carefully by balancing their own needs with the broader needs of society (Chapter 5). Hence, stewardship is a specific type of relationship between humans and nature (Flint et al., 2013; Raymond et al., 2013). The importance of an individual farmer's stewardship ethic (a possible indicator of the quality of this relationship) as an enabler of collaboration (Chapter 7) suggests that stewardship practice is also a relational process. Stewardship practice is thus a form of individual human agency and manifests, in practice, as stewardship actions which the steward undertakes. Examples of stewardship actions include clearing alien invasive plants, supplementing livestock with feed to reduce pressure on grazing, implementing better management practices in cultivated orchards, or using mulch on crops to reduce water use.

Thirdly, when stewardship practice and collaboration are facilitated by a practitioner, there is a relationship between the individual steward and the practitioner (R_3 in Figure 8.1). The co-ordination relationship which the practitioner has with individual stewards and other stakeholders across the landscape enables other relationships (e.g. R_1 in Figure 8.1). In this way, the practitioner facilitates the development of new inter-personal relationships between diverse, disparate stakeholders that might not have been there before (Chapter 7, Figure 7.3). These long-term, inter-personal relationships among diverse stakeholders (R_1, R_3 in Figure 8.1) are an important enabler of effective stewardship and collaboration (Chapters 6 and 7).

Fourthly, when stewards collaborate for stewardship and implement stewardship actions collectively, they relate to the landscape collectively (R_4 in Figure 8.1). This is a form of collective action. Examples include

agreeing to adhere to better management practices for crop farming as a collective across the landscape, co-ordinating soil erosion management activities across multiple farms, implementing area-wide integrated pest management, participating in a livestock association which puts in place rotational grazing plans across the landscape, or investing collectively in a development company to plant novel drought-tolerant crops and thereby use less water. This collective action emerges from the interaction between individual and collective agency (Chapter 6, Section 6.5.1 and 6.5.3) and has the potential to bring about more systemic change across the landscape (see for example a recent case about sugarcane farmers shifting to more sustainable farming practices collectively (Burt, 2017; Cockburn et al., 2018)).

Grounding my investigation into stewardship practice and collaboration in the relational ontology of critical realism (Chapter 4, Section 4.2.3) provides further support for my proposition for a relational approach. In Box 8.1 I draw on the 'four-planar social being' (Bhaskar, 2016) to unpack what a relational approach means and how one might put it into practice.

8.2.3 Proposition 3: to achieve integrated, social-ecological stewardship outcomes, it is necessary to re-focus stewardship on stewards

In the integrated, social-ecological stewardship approaches investigated in Chapter 7, practitioners are operating as hubs of collaboration in the landscape. Through these hubs, practitioners create enabling conditions for stewards to overcome the long-standing conflict between agriculture and conservation, to realise their potential as competent stewards, and to develop a more positive relationship between themselves and nature. Furthermore, through knowledge-sharing and learning platforms, they empower stewards to overcome economic, knowledge and other barriers to stewardship which they might be facing (Duff et al., 2017). They are focusing on the individual challenges faced by stewards and focusing their work on empowering stewards. Hence, they are re-focusing stewardship on stewards.

This too seems an obvious claim and might even be considered a tautology—isn't stewardship already focused on stewards? However, existing research and practice of stewardship has a strong focus on ecological outcomes (for example, biodiversity protection, land restoration, or water quality improvements) (refer to Chapter 5 and Von Hase et al. (2010), Gallo et al. (2009)). In biodiversity conservation, this manifests as an emphasis on spatial prioritisation, which requires technical, quantitative information that can be converted to spatial data layers for Geographic Information Systems applications (Knight et al., 2011; McClure, 2012). This focus on ecological outcomes and spatial data drives planning, funding, monitoring and evaluation in stewardship initiatives (Knight et al., 2011). The overly strong focus on ecological outcomes was demonstrated in the recent evaluation of a successful biodiversity stewardship initiative in the Western Cape of South Africa. The evaluators identified the importance of long-term relationships and trust, although these were not explicit in planning and monitoring for the project, which was focused on ecological outcomes and spatial priorities (Du Plessis & Ranger, 2017).

> **Box 8.1: What is a 'relational approach' to stewardship and collaboration and how does it look in practice?**
>
> Critical realism offers concepts that help to provide a deeper, more integrated interpretation of stewardship and collaboration. The diagram below, which illustrates the relational approach, is a conceptual model which I have developed based on Bhaskar's theory of the 'Four-Planar Social Being' (Bhaskar, 2016). According to this theory, any social phenomenon, for example stewardship and collaboration, can be understood through to the way individual humans relate to the world.
>
> When we focus on the steward, we need to understand how the steward relates to him-/herself, i.e. their personality, values, and ethics. They relate to the physical world, including nature; they relate to others through inter-personal relationships or collaboration; and they relate to the broader structure or culture of society. Stewardship practice is currently focused on ecological outcomes, and collaboration on structural or institutional aspects. However, according to my findings on the enablers and barriers of collaboration (Chapter 6 and 7) and the theory of the four-planar social being (Bhaskar, 2016), stewardship and collaboration are relational processes and we therefore need to re-focus stewardship on stewards.
>
>
>
> 3. 'Self-to-Others': social-relational interactions between the stewards and other humans
>
> 4. 'Self-to-Society': the steward's relations to structure and culture of society
>
> 2. 'Self-to-Nature': the steward's relations with nature and the physical world
>
> 1. 'Self-to-Self': the steward's relations to their own self at the individual level: psychology, personality, values, etc.
>
> Taking a 'relational approach' to stewardship and collaboration means that we need to approach stewardship initiatives differently. The relational approach works towards social-ecological stewardship outcomes and recognises the importance of structured, institutional mechanisms to support collaboration and governance of natural resources. However, it foregrounds the building of relationships as a primary enabler of achieving these social-ecological and structural outcomes. In a relational approach, initiatives are explicitly planned, designed, monitored, and evaluated to account for the time and resources it takes to build relationships between practitioners (or facilitators) and stewards, between stewards and other stakeholders, and between stewards and nature. A relational approach recognises that there are divides between humans (stewards) and their best potential selves (self-to-self), between humans and nature (self-to-nature), and between humans and other humans (self-to-others), and that these divides can be crossed by building meaningful, transformative, new relationships (Scharmer & Kaufer, 2013).
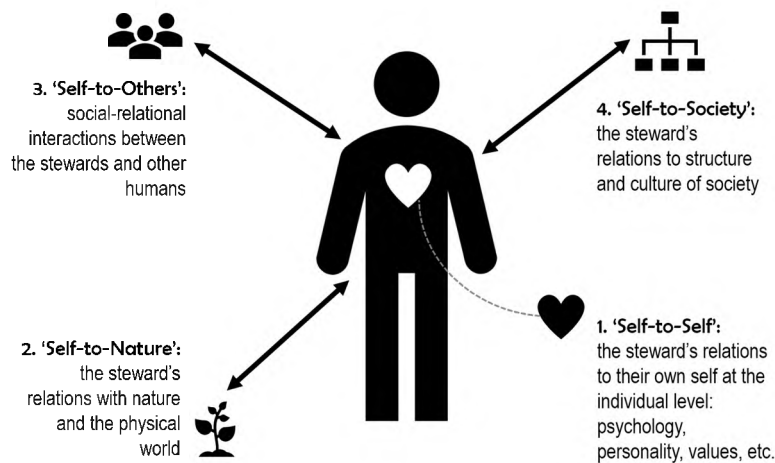
I suggest that in this very overt focus on ecological outcomes we have begun to overlook the central role of stewards in stewardship and the pivotal role of inter-personal relationships between practitioners and stewards. We need to recognise stewards as keystone agents in social-ecological systems and pay attention to their agency, both individually and collectively (Figure 8.1). We need to work towards enabling stewards to act on their stewardship ethic, even if it might be difficult to account for individual and collective agency in quantitively-focused spatial planning and prioritisation processes which currently seem to dominate

stewardship practice in South Africa. Stewards are foregrounded in the term '<u>steward</u>ship' and we need to put them back in the middle of the stewardship picture (Box 8.1). In the case studies presented here, practitioners have demonstrated, by re-focusing stewardship on stewards and their agency and building meaningful relationships with them, that a more relational approach to stewardship practice is necessary (Chapter 7). This is particularly important if we are to achieve integrated, social-ecological stewardship outcomes in response to global calls for stewardship.

8.2.4 Proposition 4: a patchwork approach is required to foster collaboration for stewardship in complex, contested landscapes

The Langkloof case study demonstrates that fostering collaboration in socially and politically contested landscapes is challenging. A 'patchwork' rather than a 'blanket' approach may therefore be better suited to fostering collaboration in such contexts (Chapter 6). This means building collaboration from the bottom up, by first working on small, tangible stewardship actions within local sub-communities or stakeholder interest groups (individual 'patches' of the patchwork). Once trust and momentum have been built at this level—as is often achieved through collective action (Patterson, 2017)—in different 'patches' across the landscape, facilitators can work to begin 'stitching together' the patches into a patchwork, in a way that recognises and appreciates diversity and heterogeneity, rather than flattening it (Wollenberg et al., 2005; Ferreyra et al., 2008).

In Chapter 6, Living Lands, a local NGO, faced many challenges to fostering collaboration, mostly due to the contested nature of the landscapes and the diversity of stakeholder interests. They are now working with stakeholders on stewardship actions at smaller levels to build inter-personal relationships. In the cases presented in Chapter 7, practitioners build collaboration by operating as hubs of 'good will and good sense' to facilitate collaboration for stewardship. This model of informal, voluntary collaboration lends further support to the idea that an iterative, step-wise, and patchwork approach to collaboration may be necessary. The relative success of these initiatives seems to have been enabled by a spirit of volunteerism and an individual stewardship ethic among so-called 'champion' stewards (Chapter 7). This also indicates that successful stewardship is about the interplay between the agency of individual stewards, with the collective agency distributed across the landscape (Figure 8.1). A patchwork approach to collaboration, which recognises the plurality of voices and of interests in the landscape (Wollenberg et al., 2005), can provide an enabling context in which the interplay between individual and collective agency can be nurtured towards achieving positive social-ecological outcomes.

8.2.5 Stewardship practice and collaboration are situated social practices

The strong influence which socio-political and historical processes have on collaboration in the Langkloof suggest that stewardship and collaboration are situated social practices (Chapter 6). This means that they emerge from a particular context and are influenced by underlying mechanisms. The Langkloof case also suggests that the enablers and barriers of collaboration are interactive and mutually reinforcing and cannot

be separated out from one another in a reductive manner. Thus, whilst seeking to facilitate stewardship and collaboration, the influence of historical context, which often manifests as path dependencies or social-ecological traps, should not be underestimated.

The multiple social-relational processes described above (Figure 8.1) support the idea that stewardship is not only a relational, but also a situated social practice. According to practice theory (Kemmis & Grootenboer, 2008; Kemmis & Mutton, 2012), practices such as stewardship are held in place by preconditions or underlying processes that can enable or constrain the actions which characterise that practice. Similarly, West et al. (2016) argue that adaptive management of social-ecological systems, which might be considered a form of stewardship practice, is a socially-situated knowledge practice. Thus, the individual stewards, the collaborating stewards, and their practices emerge from a complex social-ecological system and cannot be well-understood in isolation from this broader system. This understanding is supported by the laminated model of reality proposed by Bhaskar and colleagues (Bhaskar & Danermark, 2006; Bhaskar, 2010; Price, 2014).

8.3. Analytical heuristic: Bhaskar's seven laminations of scale

Up to this point in the thesis, I have focused on how stewardship practice and collaboration emerge at the local level, recognising that they are embedded within multifunctional landscapes (Figure 8.1). However, that is only one layer of the complex social-ecological reality from which stewardship and collaboration emerge. I now turn to an analytical, heuristic tool from critical realism. I use this tool to conduct a deeper analysis which accounts for multiple layers of complex reality, to better explain the findings of the research (See for example Fletcher (2016)). Applying this interdisciplinary, heuristic tool, allows me to move beyond the findings of the contextual research (particularly the case study research in Chapter 6 and 7) to gain an understanding of patterns, tendencies and mechanisms which might be present beyond these contextual cases (Newig et al., 2017). Through this interdisciplinary analysis, I will be testing the propositions of my contextual research and seek to deepen these insights by situating them in a broader context.

Here, I apply retroduction (a mode of reasoning; refer to Chapter 4, Section 4.3.1) to further interpret the propositions based on the empirical chapters (Chapters 5, 6, and 7) and develop an explanatory synthesis. I do this by applying Bhaskar's model of the seven laminations of scale (Bhaskar, 2010; Price, 2014; Burt, 2016) to investigate underlying generative mechanisms which might explain the empirical findings presented in Chapters 5, 6, and 7.

The model of the seven laminations of scale posits that reality is composed of a number of layers (Chapter 4,
Table 4.1). Bhaskar (2016) argues that using this kind of laminated model to understand reality is helpful in guarding against reductionism, or the flattening of reality. Using a layered model to understand reality, or the world, is not in itself novel. For example, in sustainability science, a nested model of society, the economy, and the biosphere is widely used to describe and analyse the interactions among the various drivers of change

in social-ecological systems (Figure 8.2). In this model, the economy is understood to be embedded in society, which is itself embedded in the biosphere (or in ecosystems). This model seeks to illustrate that the biosphere is fundamentally important, and without it, neither society nor the economy could function (Folke et al., 2016). This is just one example of a layered model used in interdisciplinary studies. There are many others, and in most of them the three aspects that are drawn out are the economy, society, and the environment.
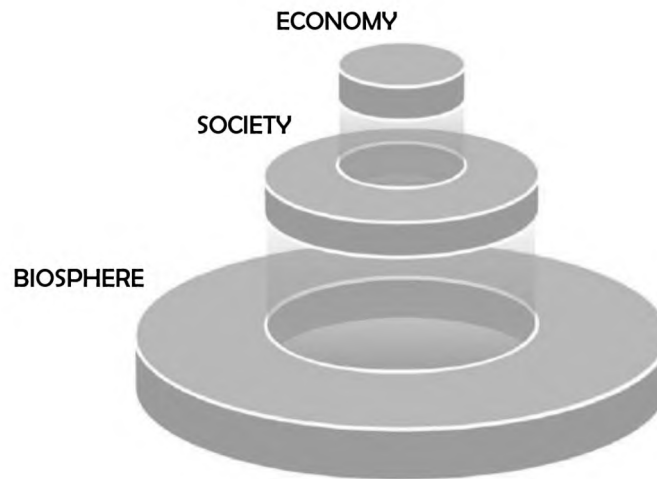
Figure 8.2: A nested model illustrating the economy, society, and the biosphere as layers embedded within one another which is widely used in the sustainability sciences (Folke et al., 2016).

However, Price (2014) critiques these widely used interdisciplinary models of the world. She suggests that, because they are focused on the empirical, i.e. on aspects of the world which we can measure or observe directly, they tend to overlook aspects of reality which exist outside of the empirical realm such as unconscious psychological processes within individuals or social ideological structures such as gender relations and geo-historical trajectories and global trends.

If one thinks about the mainstream 'economy-society-biosphere' model, one can see how it might not capture these less empirical aspects of the world. For example, it does not make explicit the individual and their agency, and it does not consider history and global-scale societal processes. Moreover, it does not situate the individual (in my cases, the role of individuals in the practice of stewardship and collaboration) as emerging from broader social-ecological processes or structures and obscures the interplay between agency and structure (Burt, 2017).

Bhaskar's (2010) model of the seven laminations of scale can be used to deepen and broaden our analysis and understanding of the world. For example, it was used by Bhaskar and Danermark (2006) to critique existing scientific understanding of disability in Norway. They argued that both the scientific explanation and the more social explanation of disability were not enough to understand and explain the experience of disability. Applying critical realist philosophy as well as the laminated model and thereby understanding the experience of disability as multi-faceted revealed novel understandings thereof. In other examples, Price (2014) used the seven laminations of scale model to illustrate how existing approaches to understanding

violence by men against women, promoted by large international organisations, were based on an incomplete understanding of the world. Burt (2017) furthermore used the model to reveal underlying contradictions and novel insights in a project working towards sustainability in the South African sugarcane farming sector.

In a critical realist understanding of the world, the layers of reality are seen to emerge from one another, but are not readily reducible to each other (Danermark et al., 2005). That means that there are interactions among the layers and that they influence each other, but that they are distinct from one another and produce different effects in the observable, empirical world (Bhaskar, 2016). Therefore, the model can be used to analyse and explain phenomena observed empirically in the real world, for example the propositions emerging from the empirical findings in my thesis, summarised above in Section 8.2.

For the purposes of this analysis, I have developed a composite model, by combining two of Bhaskar's laminated models (Figure 8.3). This is a combination of the seven laminations of scale (Chapter 4,

Table 4.1) and the four-planar social being (Chapter 4, Figure 4.2) (Bhaskar, 2010, 2016). The four-planar social being aligns with, or is embedded in, the first four levels of the seven laminations model (refer to Chapter 7, Figure 7.5, where I applied the four-planar social being model to make the case for a relational, steward-focused approach to stewardship practice). Bhaskar (2016) points out that one of the advantages of the four-planar social being over previous versions of the laminated models is that it pinpoints the ecological dimension of the social being, which is often under-theorised in social science (i.e. Lamination 2: 'Self-World': individual's interactions with nature and the physical world, Figure 8.3). This is a relatively recent theoretical development in critical realism, which has previously not paid sufficient attention to theorising human interactions with the natural world (but, see Burt (2016), Burt (2017), and Fox (2014) for examples of applied critical realism used to understand environmental questions, though they did not explicitly use the four-planar social being). My study provides an opportunity to apply this composite model empirically, since my research has a focus on the interactions of humans with the ecological dimension through stewardship.

The model of the seven laminations of scale begins at lamination one, the individual or the self, i.e. the steward and their personality, values, and ethics (Figure 8.3). It then proceeds through seven distinct laminations moving higher in scale, i.e. from individual people to collective interactions among people (collaboration among multiple stakeholders across the landscape), to society and culture (regionally and then globally), and finally to geo-historical and planetary scales. Price (2014) argues that one might consider the first three layers of the model as relating to individual human agency (Lamination 1 – 3). In my study these pertain to the individual agency of stewards.

Figure 8.3: Composite scalar model of reality combining Bhaskar's model of the seven laminations of scale with the four-planar social being.

She suggests that the last four laminations represent the structure of society (Laminations 4 - 7), which in my case represents the broader social-ecological system, within which the steward is embedded (Price, 2014). I suggest an additional differentiation, whereby Lamination 2, 3, and 4 are the layers from which collective agency (i.e. collaboration for stewardship among multiple stakeholders) emerges (Figure 8.3). I include Lamination 2 in this, as it is at the interface of individual and collective agency that stewards, and other stakeholders, can collectively practice stewardship and relate to nature through stewardship actions (Figure 8.1).

8.4. Application of the heuristic: What underlying causal mechanisms explain the findings about the practice of stewardship and collaboration?

I now discuss, in turn, what Bhaskar's model of reality reveals about each of my core propositions on the practice of stewardship and collaboration. I re-word the propositions as 'Why?' questions and respond to these by proposing explanatory mechanisms which emerge from the laminations. I start each section with a proposition for an explanatory mechanism and then develop a brief argument for each proposition, introducing relevant disciplinary theory for investigating each lamination.

My intention here is not to present a fully-fledged argument for each proposed explanatory mechanism. Rather, I aim to identify potential avenues for further exploration of an interdisciplinary set of theories which can aid in further developing our understanding of stewardship practice and collaboration. By applying Bhaskar's laminated model as an interdisciplinary heuristic, I am knowingly sacrificing depth for breadth. However, having made the case for transdisciplinary approaches to addressing complex social-ecological challenges (Chapter 4), I believe this analysis adds value, despite what one might consider a superficial presentation of propositions and theories.

8.4.1 Why is the practice of stewardship a social-ecological balancing act in the landscape, and why have more integrated, social-ecological stewardship approaches emerged in practice?

There is a deep-seated conflict and competition for resources between agriculture and conservation (or environmental protection) (Potter & Tilzey, 2005; Brannstrom, 2009). Consequently, practitioners perceive the key role of stewards as balancing the needs of agricultural production with conservation (Chapters 5 and 7). I propose that the agriculture-conservation conflict makes it difficult for farmers to act responsibly and engage in a caring way with nature and natural resources, therefore making it difficult for them to be responsible, caring, and competent stewards. We live in a world in which it is difficult to care for and take responsibility for our interactions with nature and our fellow humans. The case studies in Chapter 7 illustrate innovative approaches by which practitioners are overcoming economic barriers to stewardship practice, but this takes a long time and significant resources, illustrating the deep-seated, systemic nature of these barriers. I propose that this explanatory mechanism based on the agriculture-conservation conflict emerges from the following laminations:

- Lamination 5 (society as a whole): South African neoliberal economic and agricultural policies and societal culture entrench the conflict between agricultural and conservation land uses. This is because agriculture is an economic livelihood for farmers, whereas conservation does not provide an income. Agricultural policies in South Africa furthermore drive commercialisation at the expense of environmental sustainability and social justice (Clover & Eriksen, 2009; Bond, 2018), making it difficult for stewards to care and share. Consequently, society has come to value natural resources more for their ability to generate income in the short-term than for their long-term and less tangible values, for example through provision of spiritual and cultural ecosystem services.

- Lamination 6 (geo-historical trajectories): The history of commercialisation of agriculture for the benefit of a few (Beinart, 2000) and the marginalisation of black people from land exacerbate the conflict between agriculture and conservation in South Africa (Clover & Eriksen, 2009).

- Lamination 7 (global trends): Global neo-liberal policies and global agri-industrial markets drive profit-seeking in agriculture at the expense of the environment and the interests of local people.

The agriculture-conservation conflict can be traced back to the industrial revolution, where nature was utilised and controlled for humanity's benefit, including through intensive agricultural production (Goudie, 2013). This conflict persists today in the form of neoliberal economic policies which favour economic growth (e.g. commercial agricultural production) over environmental protection and responsible use of natural resources (Büscher et al., 2014; Bond & Ruiters, 2016; Raworth, 2017). There is growing recognition that current neoliberal policies, particularly with respect to economics and international relations, are one of the primary causes of the social-ecological sustainability challenges we face (Klein, 2014; Raworth, 2017). These policies (both economic and agricultural policies) are also recognised as a challenge to effective and socially just natural resource management in South Africa (Bond, 2002; Clover & Eriksen, 2009; Bek et al., 2017).

Some authors suggest that neoliberal policies pose a 'threat to multifunctionality' (Dibden et al., 2009) and that the discourse of multifunctionality has arisen in resistance to the neoliberalisation of agriculture, at least in Europe (Potter & Tilzey, 2005). Consequently, working towards stewardship of multifunctional landscapes goes against the fundamental principles of neoliberalism.

Theorists in political ecology investigate issues of neoliberalism and environmental conservation (for example Fletcher et al. (2015), and Büscher et al. (2014)). They suggest that attention must be paid to the power of markets and corporate actors in influencing agricultural and conservation policies and practices. In the Southern African context, Bond (2002; Bond & Ruiters, 2016; 2018) has written much on the influence of neoliberal political and economic processes on environmental sustainability and social justice. According to Bond (Bond, 2018), current neoliberal policies which rely on 'self-regulation' of the market are not well-suited to sustainable natural resource management, especially when it comes to addressing pressing concerns about anthropogenic climate change.

Another useful theoretical field for understanding the challenges of living in an un-caring world is the theory of care ethics (Tronto, 1993; Held, 2006; Robinson, 2010). This speaks to the challenge which the agriculture-conservation conflict poses to stewards' ability to take care of nature and to collaborate with fellow stewards in a relational manner. We live in a world in which it is difficult to care for and take responsibility for our interactions with nature and our fellow humans (Lamination 5, Lamination 7). Robinson (2010) proposes an international political theory of care, suggesting the use of *"alternative ontological lenses of interdependence and relationality to reveal the extent to which the practices of care and responsibility, and the moral negotiation and deliberation which surround them, play an important role"* (Robinson, 2010: 141). She writes this from the point of view of care-giving in social welfare and healthcare, but it is equally relevant to stewardship and collaboration. Robinson's proposition lends further credence to my argument for a relational approach. A more relational approach to stewardship and collaboration is needed if we are to support stewards in realising their full potential, to care for nature, and to take responsibility for their interactions with nature and other humans.

8.4.2 Why is it necessary to re-focus stewardship on stewards to achieve integrated social-ecological stewardship outcomes?

The role of stewards, as perceived by practitioners (Chapter 5, Section 5.4.2), puts them at the centre of the stewardship picture, which means we need to focus on their agency and how they relate to the natural world and other humans (Figure 8.1). The interactions between individual stewards' ethics and values, and how these influence their relationships with nature and other people, are an important underlying causal mechanism which explain empirical insights into stewardship and collaboration (Figure 8.1). I propose that this explanatory mechanism emerges from the following laminations:

- Lamination 1 (self-to-self, individual level): The ethics and values of individual stewards, i.e. how they relate to their inner selves, inform their actions in the world and whether they behave as competent

and responsible stewards (Welchman, 2012). We therefore need to re-focus stewardship initiatives on individual stewards in order to find ways to empower, enable, and encourage them to realise their full potential to care about and act responsibly towards nature and other people (as practitioners are seeking to do in the case studies presented in Chapter 7 (Section 7.4.3).

- Lamination 2 (self-to-world): The relationship between stewards and nature is strained and there is a disconnect between self and nature (Chapter 7, Figure 7.4). This strained relationship can explain why it is difficult to put stewardship into practice. Stewardship initiatives need to re-focus on stewards to identify novel ways to re-connect stewards to nature so that they do not have to bear the burden of the societal conflict between agriculture and conservation (Section 8.4.1). Taking an integrated, social-ecological approach, which recognises the inter-connectedness of humans and nature (Chapter 3, Section 3.2.2) can support such efforts.

Critical realist theory of agency and structure (Bhaskar, 2016) provides opportunities to further research and thereby to deepen our understanding of how the agency of stewards influences stewardship practice and collaboration in the landscape. The theory of care ethics (Tronto, 1993; Held, 2006), and Robinson's proposal to foreground responsibility and relationality in processes of caring (Robinson, 2010), can shed further light on how individual's values can manifest as a caring interaction with nature and other stakeholders in the landscape. Research on values (Schwartz et al., 2001; Bardi & Schwartz, 2003) can be useful in further investigations of how individual and collective values inform behaviour and decision-making by stewards. Within the relational approach to stewardship which I suggest here (Box 8.1), the idea of relational values requires further attention (Chan et al., 2016; Jones et al., 2016). Relational values emerge through the interaction of humans and another object, for example nature (Jones et al., 2016), therefore they emerge from the interaction between Lamination 1 and Lamination 2 in Bhaskar's model. However, in researching values for stewardship, the widely-held assumption that human values can be shifted in the interests of environmental protection needs to be questioned (Manfredo et al., 2017). Values should not be viewed one-dimensionally as motivational goals which might influence their stewardship actions, but also as ideologies that are deeply embedded in the material culture, collective behaviours, traditions, and institutions of society (Manfredo et al., 2017). Thus, deliberate efforts to facilitate value shifts towards stewardship are not likely to be successful and research on values which accounts for their dynamic and multidimensional nature (for example working with the 'four planar social being' model of human agency, Box 8.1) is needed.

The emerging theory of critical institutionalism (Cleaver, 2012; Cleaver & de Koning, 2015), which recognises a relational, critical realist ontology, has the potential to provide an overarching 'holding theory' to bring together the above-mentioned theoretical fields of human agency and structure, care ethics, and human values. Critical institutionalism (CI) has emerged from the interface between the common pool resource (CPR) literature and critical social theories such as political ecology and political economy (Cleaver, 2002; Cleaver & de Koning, 2015). Critical institutionalism proposes a more critical understanding of the dynamic

interactions between individual agents (stewards) and the social, institutional, and biophysical world they inhabit, suggesting the concept of 'institutional bricolage' as a more dynamic approach to understanding these interactions. It proposes a keener focus on the nature of human action in natural resource management, suggesting a move away from the dominant focus on economic rationality in mainstream institutional approaches (e.g. in CPR theory), towards 'thick models of human agency' (Cleaver & de Koning, 2015: 8).

8.4.3 Why is a relational approach to stewardship and collaboration necessary?

The long-standing agriculture-conservation conflict emerging from global economic trends (Lamination 7) described here (Section 8.4.1), and the fractured nature of society in South Africa mean that one of the most difficult underlying mechanisms to address is the disconnect between different people in the landscape. I propose that these mechanisms emerge from the following laminations:

- Lamination 2 (self-to-others), together with Lamination 5 (Society as a whole - South Africa): The divided nature of South African society explains why we need to take a more relational approach to social-ecological stewardship and collaboration. South African society is characterised by deep divisions between people from different racial, cultural, language, and class backgrounds (Lamination 2) (Rhoodie & Liebenberg, 1994; Moodley & Adam, 2000; Seekings, 2008). Moreover, it is one of the most uneven societies in the world (Bond & Ruiters, 2016), and this inequality extends into the context of agriculture and access to natural resources (Hall, 2009; Bond, 2018), making collaboration and stewardship challenging (Chapter 6, Sections 6.5.2 and 6.5.4).

- Lamination 6 (geo-historical trajectories): The deeply divided society in South Africa and the need for relational approaches mirrors (Bond, 2002) and can to some extent be explained by the deep social divides at global geo-historical scales (Scharmer & Kaufer, 2013) (Chapter 7, Figure 7.4). In this sense, I agree with Scharmer and Kaufer's (2013: 174) claim that *the next revolution has to be a relational one.*"

In South Africa, there is conflict over equitable access to resources; there are racial, class and cultural differences between people; and there are divides between stakeholders who represent different interests in the landscape (e.g. agriculture, conservation, or social justice, Chapter 6). In Chapter 3, I argue that stewarding multifunctional landscapes requires collaboration. The nature of the ecological processes and the diversity of social interests in the landscape require multiple people to work together. Because of the conflicts described above, this therefore becomes a significant social-relational challenge and relational approaches are needed to overcome these disconnects ('The three Divides': Chapter 7, Figure 7.4 (Scharmer & Kaufer, 2013)). There is a need to build new relationships to begin to heal these deep social divides and this starts with inter-personal relationship-building.

Furthermore, as illustrated in Chapter 7, practitioners are taking a relational approach to overcoming the negative impacts of eroding governance in natural resource management by building new relationships. For

example, they are creating novel collaborations in the absence of formal institutionalised collaboration, creating new knowledge-sharing platforms in the absence of extension services, and supporting stewards to manage natural resources responsibly in the absence of implementation of environmental law and policies.

To gain a better understanding of how social-relational processes can be supported to enable stewardship and collaboration, the emerging theory of relational sociology holds great promise (Crossley, 2011; Donati, 2011). The fundamental claim of relational sociology, which sets it apart from other sociological theories, is that *"the most appropriate analytic unit for the scientific study of social life is the network of social relations and interactions between actors"* (Crossley, 2011: 1). This makes it relevant to the challenge of bringing together diverse stakeholders to build new inter-personal relationships in a landscape (Chapter 7). Relational sociology underpins much of the research on social networks in natural resource management (Crona et al., 2011; Alexander & Armitage, 2015). However, I suggest that theories such as critical institutionalism can complement current approaches focused on quantifying social network characteristics, contributing to a better understanding of social-relational processes in natural resource management.

Theories of collective action (Ostrom, 1990) and social capital (Pretty & Ward, 2001; Putnam, 2001; Ostrom & Ahn, 2003), which are central in CPR theory, may also be of value to understanding social-relational processes. However, I suggest that relational sociology and critical institutionalism, which pay greater attention to individual agency and are based on a relational ontology (Donati, 2011; Cleaver & de Koning, 2015), are better aligned to understanding stewardship practice as an embedded practice (Figure 8.1). In this sense I agree with Saunders (2014: 636):

> The focus of CPR theory on efficiency and functionality results in a tendency in commons projects to overlook how local conditions are forged through relations at multiple scales. Commonly politically complex and changing relations are reduced to institutional design problems based on deriving the incentives and disincentives of 'rational resource users. The corollary is that CPR theory oversimplifies the project context that it is seeking to change because it offers little or no direction to deal with the social embeddedness of resource use or implications of different stratifications.

8.4.4 Why is a patchwork approach required to foster collaboration for stewardship in complex, contested contexts?

Conflict, competition, and unequal access to resources have emerged as key features of multifunctional landscapes in my study (Chapter 6). Landscapes in South Africa (but also in many other parts of the world (Colfer, 2005)) are therefore socially and politically contested and complex. This explains why a patchwork, rather than a blanket approach, is better suited to facilitating collaboration in multifunctional landscapes. I propose that this causal mechanism emerges from the following laminations:

- Lamination 5 (society as a whole - South Africa), together with Lamination 6 (geo-historical trajectories): The legacies of colonialism and Apartheid have resulted in unequal access to the

benefits of ecosystem services in many landscapes in South Africa (Guelke & Shell, 1992; Beinart, 2000; Bond, 2002).

- Lamination 7 (global trends) together with Lamination 4 (structure and culture of society): Unequal access to resources and benefits is exacerbated and can be explained by current neoliberal, growth-driven, economic policies which give power to commercial agriculture at the expense of other stakeholders in the landscape and the environment (Bond, 2002; Clover & Eriksen, 2009). These also result in a consumer-driven societal culture which emphasises material growth and accumulation for individuals over the collective well-being of humanity through sharing of resources (Raworth, 2017).

This conflict and competition over resources is apparent in the Langkloof case study (Chapter 6), where I identified significant social-relational barriers to collaboration and proposed that these emerged from underlying political and historical barriers. The historical overview of the Langkloof landscape presented here (Chapter 6, Section 6.3.2, Table 6.2) provides further details on the underlying mechanisms described above. This historical context goes some way to explaining the difficulties practitioners (for example Living Lands) are facing in facilitating collaboration for stewardship in that region. Applying concepts from the pathways approach (i.e. the Three Ds: direction, diversity, distribution) in Chapter 7 helped to reveal and explain some of the challenges associated with facilitating collaboration in contested contexts and pointed towards a more pluralistic, diversity-oriented approach to collaboration.

Whilst complex, contested landscapes pose a challenge to fostering collaboration, especially when this is underpinned by a consensus-building approach (Wondolleck & Yaffee, 2000; Margerum & Robinson, 2016b), the diversity of viewpoints, cultural backgrounds, values, and needs of stakeholders can also be considered a strength (Wollenberg et al., 2005; Cleaver & de Koning, 2015). The emphasis on institutions, governance structures, and design principles in mainstream literature on collaboration and CPR (Chapter 3, Section 3.4, Table 3.2) unintentionally 'flattens' the social diversity in landscapes. When resource users are one of many variables in the study of a social-ecological system (Ostrom, 2009), yet each of them is different from the next, applying quantitative models becomes a challenge (Agrawal, 2003; Hinkel et al., 2015). Whilst I recognise the value of quantitative models for understanding social-ecological systems in a holistic and integrated way, I believe that further qualitative studies on collaboration that recognise the diversity of stakeholders in the landscape can improve our understanding of stewardship in complex social-ecological systems.

As already described, critical institutionalism seeks to develop theoretical insights into the dynamic, complex, and diverse nature of interactions between stewards, other stakeholders, and natural resources. I suggest that drawing on this emerging body of research can support research on a patchwork approach to fostering collaboration in complex, contested contexts. According to Sick (2008), commenting on institutional change for management of CPRs: *"historically, culturally, politically, and economically shaped social relationships and structures play a fundamental, yet underanalysed, role in how institutional change occurs"*. Thus, theories in

environmental history (Beinart, 2000) or historical ecology (Balée, 2006) (amongst others) can aid in untangling the influence of global trends (Lamination 7) and regional geo-historical trajectories (Lamination 6) on collaboration and stewardship practice among diverse stakeholders in the landscape. For example, historical ecology, which has a strong focus on landscape change, offers conceptual tools for comprehending temporal and spatial dimensions of the relationships between humans and local environments as well as for investigating the cumulative global effects of these relationships (Balée, 2006).

8.5. Conclusion

In summary, this analysis revealed four mechanisms, which emerge from different laminations, to explain the findings of my research. Firstly, the deep-seated conflict between agriculture and conservation make stewardship and collaboration, a difficult task (Lamination 5, 6, 7). Secondly, we live in a world in which it is difficult to care for, and take responsibility for our interactions with, nature and our fellow humans (Lamination 5, 6, 7). Thirdly, individual stewards' ethics and values influence their interactions with nature and fellow human beings (Lamination: 1 and 2). Finally, South Africa is a deeply divided and unequal society, and in this sense parallels many of the most pressing issues regarding inequality and social justice globally. Such deep structural inequalities make stewarding and sharing natural resources difficult (Lamination 4, 5, 7).

The overall aim of my research was to investigate the practice of stewardship and collaboration in multifunctional landscapes through a transdisciplinary enquiry. In this chapter I have presented an integrated picture of stewardship and collaboration in multifunctional landscapes. I followed this with an explanatory synthesis to investigate underlying causal mechanisms which explain my research propositions. The explanatory mechanisms (Section 8.4) help to explain more than one of the propositions, indicating that they may be general trends applicable across various contexts and may help us gain a deeper understanding of the challenges of fostering stewardship practice and collaboration in multifunctional landscapes. I will consider the policy and practice implications of this understanding in the conclusion (Chapter 10).

In the next chapter, I turn to a reflection of my experiences in applying a transdisciplinary research approach in my PhD. I begin by telling my personal story of the 'Transdisciplinary PhD Journey', with the aim of drawing out lessons which may be of use to other students and supervisors embarking on a similar process. I then make recommendations to institutions on how to better support engaged, transdisciplinary research in postgraduate studies.

Chapter 9 | What lessons can be learnt from operationalising a transdisciplinary approach to PhD research on stewardship in practice?

"Knowledge without wisdom is like water in the sand." (Guinean proverb)

A rainbow - much-loved symbol of hope - over Twee Riviere and Ravinia in the Langkloof.
My hope is that the lessons I have learnt about doing engaged research, in an attempt to let my science
serve society, will provide inspiration and guidance to others walking this path.

9.1. Introduction

In this research I committed to applying a transdisciplinary (TD) approach, calling this a 'TD PhD' right from the beginning. To me, a TD PhD means explicit and intentional design of the entire PhD research process following the principles of transdisciplinary research (van Breda et al., 2016). I introduced the TD literature from the sustainability sciences in Chapter 4 (Section 4.2.2), making a case for its suitability and relevance for my research.

I selected TD to guide my research because I felt the need to conduct research that was relevant and that would serve the interests of society. I wanted to partner with non-academic societal actors in a meaningful way and for my research to contribute to bridging the gap between research and practice which is evident in sustainability science (van Kerkhoff, 2014; Lang et al., 2017). Taking a transdisciplinary approach to my PhD created an enabling space in which I could conduct rigorous research, whilst acting on my personal beliefs about the role of science in society (Burt et al., 2016). Furthermore, TD allowed me to be reflective and honest about my active role in shaping and directing the research, rather than playing the 'neutral observer' role of the scientist for which I was trained as an undergraduate BSc student. This shift from observer to active participant is something which critical complexity foregrounds (Audouin et al., 2013), and I discuss the implications thereof in Chapter 4 (Section 4.2.1). As I explained in Chapter 1, this was part of the rationale for my decision to write this thesis in the first person.

Two fundamental characteristics of TD research make it challenging to implement in PhD research. First, TD research is an engaged process of knowledge co-production between academic and societal actors who bring in various forms of knowledge. These knowledge forms include for example experiential knowledge, local knowledge, practice-based knowledge, and indigenous knowledge (Tengö et al., 2014; Bracken et al., 2015; Schuttenberg & Guth, 2015). As a PhD student implementing an action-oriented, knowledge co-production

approach, I therefore had to commit to building relationships with practitioners throughout the process and to not just generate knowledge for the purpose of the academic qualification I sought, but to contribute towards addressing the challenges practitioners face in their everyday efforts toward stewardship.

Second, TD is inherently interdisciplinary, seeking to bring together academic ideas and actors from a variety of disciplines to transcend disciplinary 'silos' and address sustainability challenges in an integrative, generative, and transformative manner (Max-Neef, 2005; Polk, 2015). Since my PhD was not part of a broader research programme, I had to explicitly seek out supervisors from different disciplinary backgrounds and had to read and work widely across disciplines in an attempt to become a transdisciplinary researcher capable of transcending disciplinary boundaries in my own reading, thinking, and writing (Max-Neef, 2005; van Kerkhoff, 2014).

For the reflections in this chapter, I will focus on the first of these two features of transdisciplinarity, i.e. on the engaged process of knowledge co-production between academic and societal actors. I decided to focus on this aspect since I found the demands of conducting engaged TD particularly challenging in the current institutional context of postgraduate research. I reflect on the second feature of TD in the conclusion of this thesis (Section 10.4.1).

The aim of this chapter is therefore to provide a reflective account of my PhD experience and to distil insights and lessons for other researchers who might embark on a similar journey. I do this according to the following guiding research question: What lessons have I learnt from operationalising a TD approach to PhD research on stewardship and collaboration? I begin with a brief narrative of how I came to adopt a TD approach in this research. I then structure my reflections around three core arenas of TD engagement with societal actors through which I sought to operationalise TD in my research. I reflect on my early expectations of how the TD processes would unfold in these arenas and then share the reality of TD processes for an individual PhD student, highlighting both challenges and opportunities which emerges from the process (Boxes 9.1 to 9.4). I conclude with a consolidated set of lessons and recommendations.

These reflections offer a personal perspective and focus on the academic 'side' of the TD process (i.e. 'Scientific Practice' on the right-hand side of Figure 4.1). Although a collective reflection together with practitioners would have been beneficial, the tone of this chapter mirrors the reality that a PhD in its current form is an individual endeavour, and I therefore share my personal journey here. However, some reflections and feedback from practitioners are shared in Box 9.4 and in Appendix 9.

9.2. My transdisciplinary PhD journey

9.2.1 Finding transdisciplinarity and 'feeling at home'

Although I did not have a word for it yet, I knew that I wanted to find ways to bridge gaps between academic and societal actors back in 2013 when I made the following recommendation in the concluding chapter of my MSc thesis (Figure 9.1):

Collaboration between researchers, extension staff and farmers is going to be crucial for the successful implementation of this knowledge-intensive approach to pest management... It is time for the sugar industry to move away from the traditional top-down transfer of technology paradigm in research and extension, to a more participatory approach... implementation of agroecological practices, of which push-pull and Integrated Pest Management are examples, requires shifts in the roles of farmers, extension staff and researchers. Rather than researchers being represented as knowledge superiors ...researchers need to recognise that farmers are the experts on their land and that the best solutions to agricultural problems can only be found where farmers and researchers build partnerships and work together with mutual respect. (Cockburn, 2013: 156)

Figure 9.1: I worked with farmers, extension officers, researchers, and environmental NGOs in the sugar industry for my Masters (MSc) research. This photo was taken on a field day about natural resource management with sugarcane farmers.

After completing my MSc, I had two part-time jobs which both influenced the decisions I made about my PhD research. I worked for WWF-South Africa as a project co-ordinator for sustainable sugarcane agriculture. Now I was on the 'other side' of the research-practice divide and it was an eye-opening experience. It raised many questions about what kind of research was needed in support of sustainable agriculture and stewardship of natural resources. I also worked as a Research Fellow in the Land Use Planning and Management research group at the University of KwaZulu-Natal (UKZN), helping to co-ordinate a transdisciplinary research partnership with the local municipality in Durban, eThekwini Municipality. One of my tasks at UKZN was to lead on an academic paper about the research partnership, which is when I first came across the idea of transdisciplinarity (Cockburn et al., 2016). This felt like a good fit and I quickly started 'feeling at home' in the sustainability science TD literature. Here were established academics asking the very questions I had been asking about knowledge, about the links between researchers and societal actors, about how we can do more relevant research, about how to bring together different disciplines and different types of knowledge, and

about integrated approaches to address the complex sustainability problems we face. It was exciting to read the literature on transdisciplinary research and I felt that this would be a useful enabling approach for me to do the kind of engaged, problem-oriented research I wanted to do during my PhD.

9.2.2 Operationalising transdisciplinarity through engagements with societal actors in three arenas

Drawing on the TD literature in sustainability science (Jahn et al., 2012; Lang et al., 2012; Cockburn et al., 2016), I sought to operationalise TD according to an on-going process of interactions with societal actors (Figure 4.1). In my case, the societal actors were stewardship practitioners working in sustainable agriculture, natural resource management, and conservation. My expectation was that I would start off by identifying potential research partners with whom I would begin exploring shared research interests and build relationships. We would then move (together) into a process of developing common understanding of research questions and making commitments to work together in a knowledge co-production process. Next, we would move into knowledge co-production, during which we would co-create relevant, solution-oriented, transferrable knowledge. Finally, we would re-integrate and apply the co-created knowledge and reflect on the process together, possibly considering options to begin another co-production cycle or build on the existing one. I expected that all of this interaction would rely on, and result in, the development of meaningful relationships between myself and a number of stewardship practitioners. I also expected that it would result in the development of knowledge that was of relevance and benefit both to myself as an academic as well as to practitioner partners, and that both parties would learn together throughout the experience. These expectations are based on ideal TD process as suggested in theory, and below I will reflect on how this actually took place in reality.

Through an exploratory, opportunistic, and iterative process (which took almost a year) I eventually outlined three possible arenas within which these TD engagements could unfold: the 'TD Learning Team', the 'Living Lands TD Team', and the 'Landscapes TD Team' (Figure 9.2). I engaged with stewardship practitioners in these three arenas at varying levels of intensity throughout the PhD research process.

Other than these three focused arenas of engagement, and in the spirit of engaged practitioner-oriented research, I also had on-going interactions with the broader stewardship practitioner community (Figure 9.2). I will, however, not reflect further on this aspect of the engagement, as this was more of a science communication exercise than an on-going process of transdisciplinary knowledge co-production and engagement which is the focus of this chapter.

9.2.3 Early engagements with practitioners: the beginnings of the 'TD Learning Team'

I engaged with the 'TD Learning Team' in an ad-hoc, opportunistic manner over about three years, starting in mid-2014 (Figure 9.2). This team was modelled on the idea of a *'transdisciplinary epistemic community'* suggested by Van Breda et al. (2016) as important for supporting individual TD PhDs.

	2014	2015	2016	2017
Interactions and comm-unication with the broader stewardship practitioner community	• Symposium of Contemporary Conservation Practice: Presentation about proposed research	• Country-wide survey of stewardship practitioners Presentation about proposed research at: • National Biodiversity Stewardship Technical Working Group Meeting • Western Cape Biodiversity Stewardship Reference Group Meeting • Arid Zone Ecology Forum	• Country-wide survey of stewardship practitioners • Symposium of Contemporary Conservation Practice: Presentation: Presentation about stewardship survey findings, Workshop session to discuss implications of findings for policy and practice	• Western Cape Biodiversity Stewardship Reference Group Meeting: Presentation about stewardship survey findings • Magazine article about stewardship survey findings in 'Conservation Matters'
TD Engagement Arena 1: 'TD Learning Team'	• Informal mini-survey about stewardship practice and research questions • Skype calls and visits to learn about projects (ad-hoc)	• Monthly email updates about PhD research	• Bi-monthly email updates about PhD research	• Ad-hoc email updates about PhD research
TD Engagement Arena 2: 'Living Lands TD Team'	• Initial contact and conversation about possible collaboration	• 'Prospecting Phase' (See Figure 2): Getting to know each other, exploring possible research questions • Active involvement and participant observation of stakeholder engagement and activities within the Living Lands team	• March – September: Intensive field work phase: individual stakeholder interviews • Active involvement and participant observation of stakeholder engagement and activities within the Living Lands team	• Ad-hoc involvement and participant observation of stakeholder engagement and activities within the Living Lands team
TD Engagement Arena 3: 'Landscapes TD Team'	• No engagement	• Country-wide survey of stewardship practitioners	• Contact with potential case studies to determine willingness and interest and secure commitment to participate • Knowledge co-production process: Part 1: Site Visits	• Knowledge co-production process: Part 2: Workshop • On-going communication about preliminary research findings, conference presentations. blog article etc.

Figure 9.2: Timeline of transdisciplinary engagements with stewardship practitioners in four arenas throughout the PhD process: the broader stewardship practitioner community, the 'TD Learning Team', the 'Living Lands TD Team', and the 'Landscapes TD Team'.

I had one-on-one meetings and skype calls with several stewardship practitioners, starting with colleagues I had worked with at WWF and eThekwini Municipality. I attended a local conservation conference with a focus on stewardship, where I gave a presentation in which I shared my proposed research ideas and invited practitioners to participate in my research by joining my 'TD Learning Team'. I also conducted an informal mini-survey with stewardship practitioners. This was to collect information on what kind of challenges they were facing in their work, to 'check' whether my broad research topic was relevant and might add value to their work, and to invite them to join my 'TD Learning Team' (refer to Figure 9.2 for a summary of these

interactions, and Appendix 2 for an overview of the findings from these early engagements with practitioners).

By early 2015, I had identified several stewardship practitioners who were interested in my research and were willing to possibly partner with me in the research (either as learning partners or potentially as case studies at a later stage). I set up a mailing list of the 'TD Learning Team' and added new people as I met them. I sent emails on a regular basis giving them updates on my research and inviting comments and discussions. I visited some of them in person and had skype calls with others to learn more about their projects and to get to know them better and begin building a relationship.

Despite these efforts, this aspect of my engagement with societal actors was not much of a success and I experienced numerous challenges (Box 9.1). In hindsight, the process was too vague and the benefits for the practitioners of interacting with me and learning about my research were not apparent. They were all genuinely interested in my work, but not to the extent that they saw the need to maintain regular contact and build a more meaningful relationship over long distances. Without regular face-to-face interactions, it was difficult to build these relationships and maintain two-way communication. From the initial attempts to build relationships, where I was in contact with a group of about 15 practitioners, there are only three people who have remained in contact consistently throughout my three-year research project.

Box 9.1: Challenges of operationalising TD principles with the 'TD Learning Team'

- **Long time needed to identify suitable partners and begin building relationships:** I was fortunate to have six months before my PhD to begin connecting with practitioners and am grateful that I could build on existing relationships and networks. The long lead-in time would otherwise have delayed me significantly.
- **Low success rate in making relationships 'stick':** Despite reaching out to many people and working hard to keep up communication (via email, skype, and opportunistically through visits), I have only been able to maintain meaningful exchanges with three people in this network.
- **Difficulty of maintaining relationships over long distances with no enough face-to-face interaction:** I could not maintain relationships sufficiently through remote communications. If I had more budget allocated to relationship-building (and more time), I could have paid these potential practitioner partners more visits in person and got to know their projects, which may have helped to keep the momentum going in the relationship-building process.
- **Insufficient direct benefit for practitioners who have very tight schedules:** I think that one of the reasons that many of these relationships did not last is that most of the practitioners are very busy people, and they did not see an immediate benefit from communicating with me and participating in the research.

Nonetheless, these early engagements with the rather loosely constituted 'TD Learning Team' were pivotal in setting the agenda for my PhD research. By the time I started the official preparations to write my research proposal in early 2015, my interactions with these practitioners had helped me to devise research questions which were of interest and relevance to them and which were also scientifically or theoretically interesting and novel, which was a significant benefit for my research (Box 9.4) (Appendix 2). Managing the tension between practical relevance and theoretical novelty became an important TD challenge throughout the process.

9.2.4 Being an embedded researcher in an NGO: The 'Living Lands TD Team' experience

My interactions with Living Lands took place over three-and-a-half years (Figure 9.2) and began in 2014 when I contacted one of the directors. We immediately found common ground in our interests in transdisciplinary approaches to research on stewardship and sustainable landscapes. In February 2015, I made the decision to partner closely with Living Lands for my research and we agreed that their work would be an in-depth case study in my PhD (Chapter 6). We decided that I would work with their project team based in the Langkloof. In addition to our interests being aligned, crucially, they were open to partnering with me in the spirit of transdisciplinarity.

The intention was that I would embed myself within the Living Lands team in the Langkloof, along the lines of an 'embedded action researcher' (Vindrola-Padros et al., 2017). I hoped I would be able to improve the links between research and practice, and that I would be able to co-create the entire research process, from research questions and objectives, to methodological frameworks, data collection, and data analysis with the practitioner team. The intention was that both parties would benefit from the process. I would benefit from the NGO's ties to the local community, from easier access to stakeholders and research participants, and from knowing that my research was relevant and might be able to contribute to change on the ground. I would be able to collect data through participant observation in the various stakeholder engagement and social learning activities they had planned. Furthermore, they would support me logistically with accommodation, access to vehicles for field work, etc. They would hopefully benefit from having a researcher in the team for at least 3 years, from having someone conduct research directly aligned with the work they were doing and could learn with me what the academic literature had to say about the work they were doing.

I started working with the Living Lands team in the Langkloof in March 2015. I treated the first year as an exploratory phase where we were just getting to know each other and started to think about what kind of research questions would benefit both parties. I participated in all the Living Lands team building activities and in the few stakeholder meetings and workshops they had in the Langkloof during 2015 and 2016 (Figure 9.3). I learnt about Living Lands' approach to stakeholder facilitation and collaboration (especially about Theory U) and about the challenges they faced in the Langkloof and about the area in general. However, the work was moving slowly and there was quite a negative atmosphere in the Langkloof team at the time, which I found difficult to deal with, and I did not get on easily with everyone in the team. It quickly became apparent to me how important relationship management was going to be in this engaged research process, both from a personal and a professional point of view.

In mid-2016, about halfway through my PhD and right in the middle of my field work (i.e. data collection), sudden and unexpected staff changes happened in the Living Lands Langkloof team which affected the initiative in many ways. This made my field work quite challenging and I had to change my initial ideas of conducting on-going, participatory monitoring of the social learning and stakeholder engagement processes they were facilitating (this had been in line with 'Principle 1: Transformative, action-oriented and diverse

methods' in my methodological and philosophical framework, Figure 4.3). Eventually, I decided to conduct individual stakeholder interviews as the primary means of generating data for the case study. I was able to do this somewhat independently of Living Lands and I took on an identity as a university student rather than a member of the Living Lands team, in order to distance myself from the problems they were facing at the time and to protect my research process somewhat. I was disappointed about this, but the reality was that if I wanted to complete my PhD in time, this was the only way forward. The lesson I learnt from this was the importance of being flexible with research methods and expectations, that the day-to-day realities faced by practitioner partners can influence the transdisciplinary research process in unexpected ways, and that there is some benefit to taking on an identity as an 'outside researcher'.
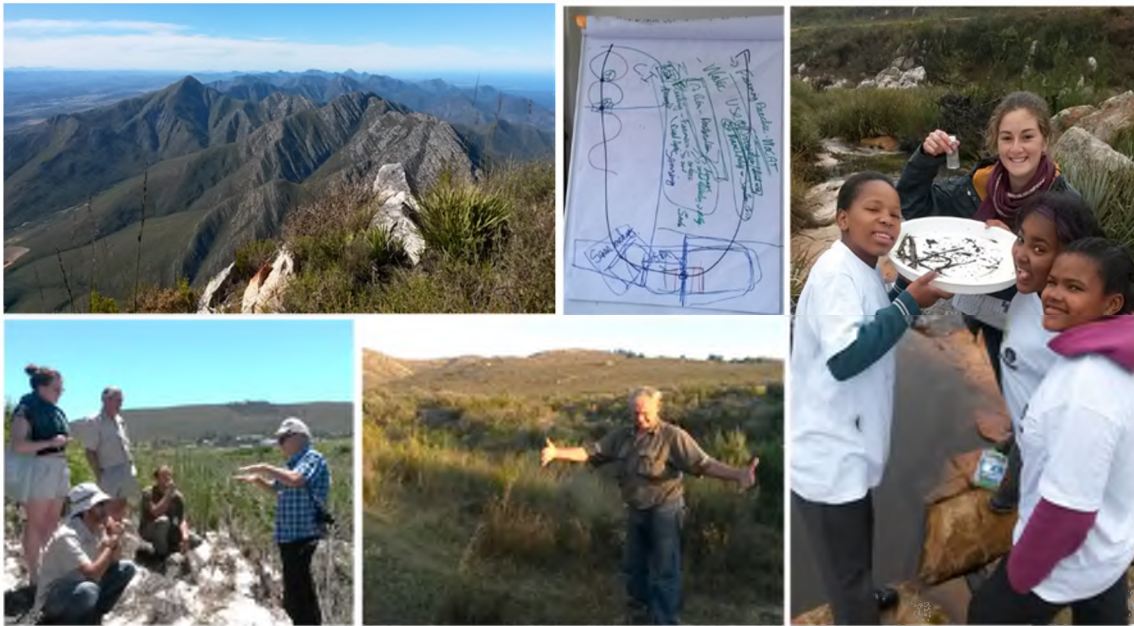
Figure 9.3: Impressions from the Langkloof. Clockwise, left to right: view over the Langkloof mountains, project planning using Theory U, biomonitoring with local school children, one of the farmers explaining his restoration activities, a wetland site visit.

The experience of partnering with an NGO worked out differently to what I had expected, and I experienced a number of challenges in seeking to implement TD principles in this arena (Box 9.2). I had hoped that my research would enrich their practice in a mutual learning and knowledge co-production process and that this would be enabled through building long-term inter-personal relationships with the practitioners. Instead, the tables turned, and I became the holder of some of this knowledge of people and place because the unexpected staff turnover meant that I was the person in the Living Lands team who had been 'in the Langkloof' for the longest. The directors of Living Lands turned to me for advice and insight into what was happening in the project, in the team, and in the landscape with stakeholders. I became a bridge between the 'old' and 'new' teams in the Langkloof, acting as a knowledge broker. While I was happy to be of help, this was not what I had imagined when I set out on a TD journey with Living Lands.

By reflecting on an on-going basis, I began to realise that I was playing multiple roles in the TD process with Living Lands. I was primarily a researcher, but in my interactions with Living Lands I took on other roles: knowledge broker, team-member, advisor, mentor, friend, critic, supporter, advocate, and confidant. Another lesson I learnt was about setting boundaries and learning to say 'no', whilst trying to be 'everything to everyone'. Because I was working at the interface of research and practice, I was constantly being pulled more into the intellectual depths of the research process, or more into the everyday realities of practitioners, than I felt I had the time for. I had to manage these competing demands on my time carefully. I found this difficult, as it felt like I was compromising on all sides. This was made even more challenging because I wanted to complete the PhD within the 3 years for which I had funding, and so managing my personal boundaries was also about time management.

Box 9.2: Challenges of operationalising TD principles with the 'Living Lands TD Team'

- **Managing the tension between practical relevance and theoretical novelty**: by framing the research together with practitioners, I ensured that it would be relevant to their needs. However, I also had to ensure that I contributed theoretically novel insights to the academic field, as required for a PhD.
- **Difficulties of working in the 'real-world' environment of a local NGO**: Living Lands' work in the Langkloof was moving slowly, and the negative atmosphere in the Langkloof team when I first joined them made it difficult to work there.
- **Difficult relationships**: I did not get on easily with everyone in the Living Lands team, and this pushed my own personal and professional boundaries in terms of relationship management.
- **Unexpected changes**: the sudden and unexpected changes that took place in the Living Lands Langkloof team meant that I had to change my research plans. I was disappointed about this, as I had imagined an 'ideal TD' experience, which turned out differently.
- **Managing multiple roles**: I mostly played a researcher role, but also took on other roles such as knowledge broker, advisor, friend and confidante. I felt like I had to justify the time spent in these 'non-research' roles quite carefully (to myself and to my supervisors).
- **PhD time and budget constraints on my involvement**: the time and budget constraints of the PhD made it difficult for me to engage as fully and meaningfully with Living Lands as I would like to have, this also relates to 'saying no'. Fortunately, I had a generous travel budget from an additional funder, but this was still not enough to cover all the possible trips I could have made to participate in team activities in the Langkloof.
- **Learning to 'say no' and make decisions independently and *in-situ* was difficult**: I was invited to far more activities with Living Lands than I had the time to participate in, and it was difficult to decide when to say yes and when to say no. I also often felt like I was letting them down.
- **Balancing PhD needs with expectations from practitioner partners**: overall, Living Lands have been supportive and understanding of the demands of a PhD. However, I would like to have been more flexible in responding to their requests for my help and input on things, participate in the team more actively, and have been able to produce answers and results quicker. This would have meant allowing for a longer PhD timeline.

The importance of mutual benefit in TD research was also an important lesson I learnt from my experiences with Living Lands. As I described earlier, I had expected and hoped that the TD research partnership would benefit both myself and Living Lands; however, these mutual benefits played out a bit differently to what I had initially expected. Nonetheless, both sides gained something from the experience (See Box 9.4). The opportunity to partner with a local NGO benefitted me in several ways: it offered the potential to conduct impactful and relevant research and gave me in-depth experiences of working with an NGO. Having free

accommodation and a 'home-away-from-home' on site made my field work easier and allowed me to stay in the field for longer than I would have been able to otherwise. I have now built lasting working relationships and friendships with members of the Living Lands team and have benefitted from learning about the day-to-day running of an NGO working on sustainability issues. Living Lands benefited from having a researcher on their team, and from having direct and faster access to my preliminary research findings, reflections and outputs than one would usually expect from the academic research process. See Box 9.4 for further reflections on potential benefits to practitioner partners.

9.2.5 Co-producing knowledge with practitioners across the country: the 'Landscapes TD Team'

The 'Landscapes TD Team' is the third arena through which I engaged stewardship practitioners in the TD research process. In this arena, I partnered with the practitioners in the five additional case studies which I started working with in late 2016 (Chapter 7). I interacted with these practitioners for about two years, but most intensely from mid-2016 (Figure 9.2). Between one and three practitioners from each of the case studies became part of the 'Landscapes TD Team' (11 practitioners in total). The team was spread across the country and only got together face-to-face once for the knowledge co-production workshop (Section 7.2.4.2).

I intentionally designed the research process for the multi-case study as a TD knowledge co-production partnership with practitioners (Chapter 7, Section 7.2). My expectation was that through the interactive and engaging research methods I used during the site visits and the knowledge co-production workshop, practitioner partners would be inspired to participate in a meaningful way in the process. I hoped that through this process we could mobilise their practice-based knowledge to improve our collective understanding of facilitating stewardship and collaboration across a variety of contexts. I also hoped that bringing together people from different parts of the country working in similar initiatives might spark new relationships among them and possibly lead to the development of a new 'community of practice' among landscape stewardship practitioners. My engagements with the practitioners had two main parts. Firstly, I visited them in their landscapes for a one to two-day visit, sharing lessons between them myself, and secondly, I brought them all together for a 'learning exchange' workshop once I had completed all the site visits (Figure 9.4) (Chapter 7).

I selected the six cases based on the results of the countrywide survey (Chapter 5) and an important criterion in making this selection was the shared research interests and willingness and interest of practitioners to partner in a knowledge co-production process. Of course, working with these five additional case studies (I added the broader Langkloof-Baviaanskloof work of Living Lands in as a sixth case study) over a 6-month period at the end of the field work phase of my PhD was never going to be as deep or intense an engagement as my relationship with Living Lands.

I experienced various challenges during the process of engaging with the 'TD Landscapes Team' (Box 9.3), although there were also benefits and successes (Box 9.4)). Once again, I played a variety of roles during this process. At times I was a scientist, either as an advisor or a scholar. At times I was a facilitator, convenor, organiser, and host. I often felt like a broker or bridging agent, with one foot in the academic world and one foot in the world of practice, again, trying to keep both sides happy. Although I had somewhat expected this, in reality it was stressful, and I had to manage my time and personal emotional investment in the process carefully so as not to become overwhelmed with all the demands.

Figure 9.4: Impressions from multi-case study site visits. Clockwise, site names from left to right: Enkangala, Baviaanskloof-Langkloof, Umzimvubu (2 photos) and Marico River (further details in Chapter 7).

Facilitating the knowledge-sharing process with the practitioners using creative, engaging tools and methods (Section 7.2) made the experience interesting and enjoyable, both for me, and I think also for most of the practitioners (Appendix 9 details further reflections). Upon reflection, I felt that the site visits went well. They provided an opportunity to begin building relationships with practitioners in a more meaningful way, and I gained valuable contextual knowledge about each case. Moreover, during the site visits, I was able to scope the kinds of topics and interests of each of the practitioners, which I then used to design the workshop to make it as relevant as possible to their needs.

The knowledge co-production workshop was more challenging. I was pushed beyond my comfort zone and I had to learn new skills, all while I felt the expectations of both the practitioners and my supervisors (as well as my own expectations) weighing on me. Fortunately, I had support in planning and facilitating the workshop from colleagues from Living Lands and from their partner foundation, Commonland. Having attended the Presencing Foundation Programme (training for using Theory U tools and processes; Appendix 8, Part 2) gave me some confidence in facilitating this process. I documented some lessons on the methods and tools used in this knowledge co-production process and briefly report on an evaluation conducted with practitioners

after the workshop in Appendix 9. I also consider some of the potential benefits to practitioner partners in Box 9.4.

Box 9.3: Challenges of operationalising TD principles with the 'Landscapes TD Team'

- **Knowing 'how much is enough' to call something a TD process:** I felt that the knowledge co-production process for Chapter 7 was only partially a TD process, since we did not frame the questions together, and we did not re-integrate the knowledge together into societal and scientific practice.
- **Finding the balance between team- and trust-building and knowledge production:** this challenge came to the fore during the workshop but was a challenge I experienced throughout the PhD. Every time I spent extra time interacting with practitioners, I had to ask myself: "how will this contribute to my thesis?" (my supervisor prompted me with this question too). Building trust didn't seem to matter as much as generating novel theoretical insights.
- **Challenge of facilitating processes that need to generate knowledge for a PhD, and benefit practitioners who are participating:** I also experienced this challenge with Living Lands, but here it was more acute, as I was very conscious of how much precious time the practitioners were investing in the process and I wanted to make it worth their while. I also had to make it worth my time, and the research budget we spent on it, which was counted in the standard academic currency of 'new knowledge' generated.
- **Difficulty in managing the multiple roles I played:** At times I felt more like a facilitator, and at times more like a researcher or 'scientist export'. I think that I ended up spending too much time as facilitator and not enough time as researcher during the workshop, which might explain why the knowledge co-production aspect felt compromised.

The challenge of finding the balance between team-building and trust-building, and co-producing knowledge during the workshop, was something which was reflected in the feedback from participants (Appendix 9, Figure 1). Most participants felt that they connected with one another and enjoyed the feeling of community, that they learnt and shared together, but less felt that they gained specific new knowledge, skills or perspectives which they could apply in their work (Appendix 9, Figure 1). This illustrates the challenge of facilitating a process which had dual objectives, namely seeking both to bring people together into a safe space and build a team or community and a feeling of trust as well as to produce tangible knowledge on stewardship and collaboration.

During the workshop, I battled to balance the tension between my role as an expert researcher who has done a lot of reading, thinking, and research on stewardship and collaboration, versus my role as a learning facilitator who was trying to facilitate a space in which the practitioner participants felt that their experiential and local knowledge (non-academic knowledge) was valid and recognised. I was conscious of potential power imbalances and not coming across as an academic expert, so as to allow participants the space to share their knowledge. However, I may have leaned too far in that direction, and should have probably shared a bit more of my understanding and knowledge in the process. This might have helped to focus the discussion and knowledge production process.

Box 9.4: Opportunities and benefits of operationalising TD principles in a PhD

From the researcher perspective:

- **Creating dialogue and knowledge exchange opportunities within the 'research-practice' gap:** committing to conducting engaged researcher helped me to develop novel research approaches to address the research-practice gap.
- **Conducting relevant, applied and implementable research:** by applying TD principles I was able to conduct PhD research that not only serves the interests of academia and helps me to get a qualification but has also been of interest and relevance to stewardship practitioners.
- **Learning about the 'nuts and bolts' of running a sustainability NGO:** getting to know the six cases in my multi-case study (Chapter 7) and becoming part of the team with Living Lands in the Langkloof case study (Chapter 7), gave me valuable insight and work experience of the day-to-day running of sustainability-oriented NGOs in South Africa.
- **Gaining new skills at the research-practice interface:** through this experience I had to further develop my skills in inter-personal and professional relationship management, facilitating social learning and knowledge co-production processes, knowledge-brokering, and science communication.
- **Building long-term relationships and networks:** a number of the relationships I have developed with practitioner partners during the PhD are likely to last beyond the PhD, enabling me to keep conducting engaged, relevant research as I get started in my academic career.

Potential benefits from the practitioner perspective[1]:

- **Opportunities for reflection on practice:** numerous practitioner partners commented on the opportunities which this engaged research provided for reflection on their work. They feel they are often so busy running around keeping the project going that they do not take time to reflect.
- **Links to research and academia:** partners commented on how useful it was to gain insights from academic theory about stewardship and collaboration; they also appreciated being sent recent, relevant journal articles which they do not have time to look for and sometimes cannot access.
- **Networking and feeling connected:** through interacting with my research, practitioners have been able to make new links to others doing similar work and they feel part of something bigger.
- **Additional publicity for their project:** through blog posts, conference presentations, and potential future journal publications practitioners get more coverage of their work.
- **Improved relevance and accessibility of research:** faster access to research findings than through usual channels which could inform day-to-day decisions making in projects; tailor-made research outputs that suit project objectives and context (e.g. the map of agricultural sub-communities for the Langkloof, see Chapter 6, Figure 6.5); practical research findings and outputs which are of relevance to practitioners (e.g. the hub-based model of collaboration, see Chapter 7, Section 7.3.3, Figure 7.3).

[1]These insights were drawn from on-going informal conversations and email exchanges with practitioner partners in all three arenas of TD engagement (See Figure 9.2), and from the evaluation survey conducted after the knowledge co-production workshop for Chapter 7 (See Appendix 9).

I was left with two questions for reflection after the workshop: firstly, what is my role as a researcher in knowledge co-production processes? Secondly, how does one balance the need to build trust and create a safe space, with the need to produce tangible, novel academic knowledge outputs; and what counts as knowledge? I presented the findings from this process at the Transformations 2017 Conference in Scotland in August 2017. During the discussions, I was prompted to think about trust as a form of knowledge. I had pointed out my concerns about the process having been too focused on team- and trust-building, to the point that we did not generate much tangible new knowledge. But one of participants at the conference said this:

"Maybe you did not have enough time to really generate new knowledge about stewardship and collaboration, but surely the trust that was starting to form between practitioners is also a form of knowledge?" Trust is a more relational kind of knowledge, rather than 'academic' knowledge. But it is an important form of knowledge for transdisciplinary research, and indeed for stewardship and collaboration. Maybe the true challenge which TD and other engaged forms of research pose to academia, is to begin recognising that we need to generate knowledge which is relationally situated, in order to move towards wiser ways of addressing our deep-seated social-ecological challenges.

9.2.6 Reflections on the challenges of a transdisciplinary PhD journey

I have enjoyed my TD PhD journey immensely, despite the challenges I faced (Boxes 9.1, 9.2, and 9.3). There were also distinct benefits to myself, and potentially to practitioner partners from the process (Box 9.4). Although I experienced distinct difficulties within each of the three engagement processes described above, a few of the challenges were cross-cutting, and I discuss these below with the intention of suggesting lessons for others considering applying TD.

Firstly, I was frequently challenged by the multiple roles I had to play. I was somewhat unprepared for this, and had to quickly take responsibility for my actions within each of these roles (this included taking responsibility for conducting ethical research; refer to Appendix 1). Secondly, reconciling the mismatched purposes and demands of an academic research process, with the expectations of and potential benefits for practitioner partners, was difficult. This was compounded by time and budget constraints. Thirdly, managing relationships was personally and professionally challenging. Throughout the three years, I was constantly thinking about whether I had been communicating with all my different partners enough, whether I had included all the right people in my emails, and whether there was any creative way I could find time and money to visit practitioners on site and participate in their projects. I often felt pulled in different directions, challenged, and at times exhausted by the feeling of needing to be 'everything to everyone'.

I have relished the opportunity to push the boundaries of research practice, whilst being true to my personal convictions. I am grateful for the support which I received from my supervisors throughout the process. I think they sometimes rolled their eyes at my somewhat unusual requests (*"attend a facilitation course? Have you read the literature yet?!"*) and ideas (*"a learning jar... isn't that a bit cheesy?"*), but they always gave me the space to innovate and try things out. They were willing to spend research funds on activities which some academics might not consider core to research such as training or 'short courses' on transdisciplinarity (the Tsama Hub TD Summer School at Stellenbosch University) and facilitation tools (the Presencing Foundation Programme run by the Presencing Institute), and travel and accommodation costs for practitioners to attend a workshop. Furthermore, each of my three supervisors has a different disciplinary background, and this helped to strengthen my own ability to work as an interdisciplinary scholar. Working with supportive supervisors who themselves had experience in TD research and a commitment to conducting engaged, impactful and relevant research was a key enabler of my TD PhD research.

The partnerships and friendship I have developed with practitioners through this process have inspired me and were a critical success factor in this TD PhD process. They constantly 'brought me back down to earth' and helped me stay on track with my commitment to do relevant, action-oriented research. They all work for NGOs on tight time and money budgets, and their enthusiasm and willingness to participate in my research was a compliment, and affirmation that I may be on the right path towards conducting useful research in service of society.

9.3. Lessons and recommendations

A transdisciplinary PhD poses two unique challenges to students, supervisors, and institutions, making it qualitatively different from conventional PhD research. Firstly, taking a TD approach in a PhD changes the role of the researcher in the PhD process. The researcher takes on multiple roles, and has to balance the demands of academia with expectations from societal actors (Wittmayer & Schäpke, 2014; Carton & Ungureanu, 2017). Secondly, building and maintaining relationships with a team of societal actors, or a 'transdisciplinary epistemic community', is one of the central challenges and activities during the PhD (van Breda et al., 2016). The current emphasis on academic knowledge in measuring the outcomes of a PhD obscures the value of other forms of knowledge, such as relational knowledge or reflective knowledge, in engaged, change-oriented research process (Park, 2006; Toomey, 2016). Furthermore, the impact of PhD research is measured through scientific outputs, rather than societal impact or change. Consequently, since TD PhD differs from conventional PhD research and poses these unique challenges, different means of measuring or evaluating success, and rewarding and incentivising research, are necessary. These distinct characteristics of a TD PhD have important implications for research and teaching in higher education. I explain each of these characteristics below, highlighting the lessons I learnt on my TD PhD journey and considering the implications thereof for others seeking to embark on a similar journey. I conclude with recommendations for research institutions and researchers working on complex sustainability issues.

9.3.1 The fluid and dynamic role of the researcher

In my PhD, my role as a researcher was fluid and dynamic. At times I was a researcher, a facilitator, and at times a knowledge broker between research and practice. The primary purpose of a PhD is to generate novel knowledge and develop young researchers' skills to work independently (Mullins & Kiley, 2002). A TD research process also sets out to generate novel knowledge; however, this knowledge is intended to serve the needs of society and have an impact by solving real-world problems (Lang et al., 2012). In addition, TD researchers are required to work collectively with diverse stakeholders to co-produce this knowledge (Enengel et al., 2012; Bracken et al., 2015). This difference in the primary purpose and approach of a conventional PhD and TD PhD accounts to some extent for the various roles which I had to play as a TD researcher and begs the question of whether an individual PhD is a suitable vehicle through which to implement TD PhD, a question which has also been asked elsewhere (van Breda et al., 2016).

The difficulties which researchers face in managing multiple, fluid roles is recognised in TD research (Pohl et al., 2010; Lang et al., 2012), in sustainability science generally (Wittmayer & Schäpke, 2014), in similar approaches such as participatory action research (Ferreyra, 2006), and in the theory-practice interface in management studies (Carton & Ungureanu, 2017). Examples of the roles recognised in the literature include reflective or self-reflexive scientist, knowledge broker or intermediary, learning process facilitator, and change agent (Pohl et al., 2010; Wittmayer & Schäpke, 2014).

In all these fields, acknowledgement of the multiple roles of researchers is the first step in developing better support mechanisms, after which most advocate training (Pohl et al., 2010; Haider et al., 2017) and the development of role management strategies by researchers working at the research-practice interface (Ferreyra, 2006; Carton & Ungureanu, 2017). I experienced many of these difficulties of managing multiple roles during my different TD engagements with societal actors. The strategy I adopted was to become more conscious of which role I was playing at any one time and to make sure I did not spend too much of my time and energy on non-research roles since these were not directly being counted as part of the PhD research process. I also had to take full responsibility for my actions and decisions within each of these different roles, even if the PhD process was only holding me to account for the 'researcher role'.

When taking on multiple roles, it is important for researchers to reflect on their positionality, as the potential for biases and subjectivity in the research increases in these situations (Ferreyra, 2006; Cheng & Randall-Parker, 2017). The notion of positionality, drawn from qualitative social science disciplines (Bourke, 2014), is useful as a reflective device in considering the multiple roles we play in TD research. Positionality refers to one's personal motivations, interests, and assumptions in the research setting, as well as one's roles, identity, and power relative to other participants (Cheng & Randall-Parker, 2017). Considering the fluid role of researchers in TD processes and the potential this has to influence the research outcomes, it is important for researchers to be reflexive about how their positionality affects their research practice and knowledge co-production processes (Ferreyra, 2006; Bourke, 2014). Reflection and reflexivity are not embedded into research practice in all disciplines (though more so in the social sciences (Bourke, 2014)) and systems should be put in place to encourage and support reflective practice among TD researchers (we encourage reflective practice in terms of the ethics of TD research in Appendix 1). Reflecting on my own positionality helped me to be honest about what was motivating me to do this research and was a useful way for me to find common ground with practitioner partners, since this often hinged on shared values, interests, and motivations.

Despite the challenges I faced, I still believe that we should be exploring ways to apply TD principles in PhD research. I think this is important because the PhD is an opportunity for young researchers to develop skills and competencies which they will employ for the rest of their research careers (Tassone et al., 2017) including for example relationship management, facilitation and knowledge-brokering skills. In the sustainability sciences, working with diverse stakeholders in knowledge co-production processes and developing the ability to work across disciplines should be among the competencies which young researchers develop (Wiek et al.,

2011; Haider et al., 2017). Furthermore, if we can only start working with stakeholders to address real-world questions after we have graduated a PhD, I believe we are starting too late.

Therefore, we need to look at what kind of support systems are needed in institutions of higher education (IHE) and research to support PhD researchers in becoming adept at managing the multiple, dynamic roles they need to play in TD PhD research (Morse et al., 2007). This includes providing access to training in facilitation and stakeholder engagement techniques and approaches (for example the Presencing Foundation Programme), providing capacity building support for supervisors who are mentoring TD PhDs, and encouraging spaces and opportunities for TD PhDs to connect with others doing similar research and develop communities of practice and reflect on their research. Such communities of practice can provide important opportunities for reflection and sharing on the challenges of conducting research together with stakeholders (refer also to Appendix 1). Bearing in mind the challenges of conducting TD research, it is also important to recognise that TD research is not for everyone, but that those choosing this means of conducting research should be suitably supported.

9.3.2 Building and maintaining a transdisciplinary team

The second key feature of TD research which my story has illustrated is the central role of team-building in TD. Team-building and engagement with diverse stakeholders is widely recognised as a core activity in TD research (Bracken et al., 2015; Cundill et al., 2015; Thompson et al., 2017), as is the importance of long-term interpersonal relationship-building and trust (Harris & Lyon, 2013; Cockburn et al., 2016). Building and maintaining relationships with a team of societal actors or a 'transdisciplinary epistemic community' is a key challenge and a time-consuming activity in TD PhD research (Enengel et al., 2012; van Breda et al., 2016). Related to the process of team-building in TD is the need to identify mutual benefits from the research process for both academic and non-academic partners. For example, my efforts to build a broad 'TD Learning Team' may have faltered due to insufficient evidence of benefits to the practitioner partners. Conversely, the relative success of my TD partnership with Living Lands could be due to the benefits which both parties experienced in the process.

As we argued in our book chapter on TD ethics (Appendix 1, (Cockburn & Cundill, In Press)), current institutional ethical research procedures do not sufficiently account for the early engagements and relationship-building required for TD PhD. I propose that the IHE and supervisors investigate innovative funding mechanisms to support a period of at least 6 months before formal research begins to allow for PhD students to begin building relationships with practitioner partners in the 'Prospecting Phase' of TD research (Chapter 4, Figure 4.1), which may require extending the period of study.

Moreover, stakeholder engagement and team-building to collectively address complex sustainability challenges requires skills and competencies which conventional academic training often does not provide (Wiek et al., 2011; Toomey, 2016; Tassone et al., 2017). These include, for example, co-production capacities

(Schuttenberg & Guth, 2015), relational or interpersonal capacities (Scharmer, 2009a; Wiek et al., 2011), communication skills (Morse et al., 2007), and the capacity to navigate different disciplines and knowledge systems (Morse et al., 2007; Haider et al., 2017). Reflecting on the challenges of inter- and transdisciplinary postgraduate studies, Haider et al. (2017) suggest that scholars must develop methodological groundedness and epistemological agility (Chapter 10, Section 10.4.1). These are capacities which single-discipline training would not develop in undergraduate students and thus require attention at postgraduate level where inter- and transdisciplinary research is encouraged.

Not only do PhD students need to develop the needed skills and capacities, but support systems such as communities of practice or psychological counselling services may need to be put in place in recognition of the potential emotional challenges which students might face as a result of being personally involved with a diversity of stakeholders and in 'real-life' situations (Moncur, 2013). I had to take on a lot of personal responsibility to make my TD PhD work, not only for the sake of ethical practice, but also for the sake of the relationships I was building, and this resulted in pressure on me as an individual. The importance of researcher well-being is under-appreciated in many academic institutions (Moncur, 2013) and is particularly relevant in TD research where individuals take on significant responsibilities in managing relationships with stakeholders and face challenges in managing their time commitments and personal boundaries in the process.

9.3.3 The need for different measures and incentives for success

Having made the case for TD PhD being qualitatively different from conventional PhD research, I propose that different measures and incentives for success are needed. Currently, the primary measure of success of a PhD is the production of novel academic knowledge in the form of a thesis or dissertation (Mullins & Kiley, 2002). Furthermore, the impact of academic research at PhD level is measured in terms of scientific outputs such as journal articles and other academic publications. The societal impact of PhD research, or its contributions to addressing real-world or societal challenges, is not well understood (Halse & Mowbray, 2011). Moreover, the societal impact of research is often not clearly accounted for in current evaluation processes or incentive structures (Bornmann, 2013; de Jong et al., 2016). There are increasing calls for a radical shift in the responsibility taken by students and academics in contributing to addressing the pressing and complex sustainability challenges we face and in conducting responsive science in services of society (Keeler et al., 2017; Lubchenco, 2017; Tassone et al., 2017). If PhD research is considered a public good, which should benefit society beyond the individual capacity building gained by the student (Frick et al., 2017), then a TD PhD can be a means to achieve this. If we cannot begin to serve the needs of society within a PhD, and be evaluated and incentivised accordingly, I believe we are not doing justice to the PhD as a public good.

The importance of relational and reflective knowledge in supporting the production of academic knowledge requires closer attention (Park, 2006). Institutes of higher education should consider putting in place ways of measuring and evaluating the success of TD PhDs which account for the multiple roles played by researchers

as well as for the importance of team-building and relationship management in TD research. This could include incentives which recognise the societal impact of TD research, for example by rewarding researchers for the additional societal roles they play beyond the confines of academia. Where PhD students have built long-term relationships with practitioner partners through TD research, this needs to be recognised and possibly rewarded.

For example, at Rhodes University, awards are given to researchers involved in Community Engagement through their research. During a recent community engagement campaign at Rhodes University I saw a poster showing a quote from the Vice-Chancellor of Rhodes University, Dr. Sizwe Mabizela, in which he said: *"Transformation begins with meaningful relationships"*. This indicates that the university leadership recognises the importance of engaging meaningfully with stakeholders beyond the university. One of my colleagues in the RU TD Group recently received a Rhodes University Environmental Award for his engaged TD PhD research with local stakeholders around water management in Grahamstown. This provides much-needed encouragement to researchers seeking to balance their roles as researchers and change agents; however, there are still institutional barriers to TD research and a deeper look at how universities can be an enabling environment for TD PhD students is required.

9.4. Conclusion

My reflections on the experience of operationalising TD principles as an individual PhD student suggest that a TD PhD is qualitatively different from a conventional PhD. A TD PhD presents numerous additional challenges to the researcher (Boxes 9.1, 9.2, and 9.3), but also opens up novel opportunities and benefits to researchers seeking to conduct research that serves society (Box 9.4). Institutes of higher education are under increasing pressure to prove their societal worth as well as to contribute to addressing the urgent and challenging sustainability concerns of our time. I appreciate that TD research may not be relevant to all fields and disciplines and that TD research is not suitable for all postgraduate students; however, where academics are working to address sustainability challenges in complex social-ecological systems, I recommend that institutions consider providing support systems, capacity building opportunities, and measures and incentives for success which are better aligned to the realities of scholars working according to principles of transdisciplinary research.

In the next chapter, I draw the thesis to conclusion. I provide a final, integrative summary of the key findings of the research. I then reflect on the significance, strengths, and weaknesses of the research. Finally, I suggest recommendations for policy and practice for stewardship, collaboration, and transdisciplinarity.

Chapter 10 | Conclusion and ways forward

"The whole purpose of education is to turn mirrors into windows." (Sydney J. Harris)

One of the most beautiful places I visited during my PhD was 'Die Oog' – the eye, or source, of the Marico River. The water is unbelievably clean and clear. One can see deep down to the bottom, as if one might see through to the other side of the world. At the same time the surface is clean and smooth, and reflects the waving reeds above. This body of water seems to be both a mirror and a window.

10.1. Introduction

I now draw the thesis to a close. I do this by considering how my research might contribute a small shift in in our understanding of stewardship practice, collaboration, and transdisciplinary (TD) research. I begin by drawing together the key findings from my research on stewardship practice and collaboration. I then highlight concluding lessons on TD research. Next, I reflect on the weaknesses, strengths and significance of my research. I then draw on the key findings and lessons to make recommendations for policy and practice. Finally, I share my closing thoughts on some ways forward.

10.2. Key findings about stewardship practice and collaboration

Practitioners' understandings of stewardship vary; however, they coalesce around the idea of 'responsible use and care' of nature. Accordingly, the primary role of the steward is to interact with ecosystems responsibly and carefully by balancing the use of provisioning ecosystem services for their own direct needs, with the societal and ecological needs of a broader more diverse suite of ecosystem services. Stewardship practice in South Africa can be characterised as a role played by local stewards in which they are expected to perform a social-ecological balancing act in the landscape. Although the biodiversity stewardship approach is dominant, integrated approaches, which align with contemporary social-ecological understandings of stewardship, are emerging in practice (Chapter 5).

In contested landscapes, the most challenging barriers to collaboration for stewardship emerge from the individual and social-relational levels (Chapter 6). Although formal, institutional approaches play an important role in enabling stewardship, these are underpinned by enabling social-relational processes. Historical and political processes have a strong influence on the willingness and ability of local stakeholders to collaborate for stewardship, and in many cases mistrust between stakeholders is a significant barrier to

collaboration. In South Africa, contested natural resources in the landscape bring conflicts between different race groups to the fore. Stewardship practice and collaboration should thus be understood as situated practices, which means that their outcomes are dependent on multiple, interacting contextual conditions. For example, in the Langkloof case study, historical social-ecological path dependencies were shown to undermine efforts to foster collaboration among diverse stakeholders. Consequently, a context-sensitive patchwork approach which recognises diversity and values pluralism, is required to foster collaboration for stewardship in complex, contested landscapes.

Practitioners are building collaboration for stewardship by operating as hubs of collaboration and making links between multiple, diverse stakeholders through long-term, inter-personal relationships (Chapter 7). Through these hubs they facilitate knowledge exchange and social learning among stakeholders and develop innovative solutions to address the conflict between agriculture and conservation. They work towards social-ecological stewardship outcomes in the landscape by re-focusing stewardship on stewards. They recognise the important role of individual and collective agency, working to build capacity and empower local stewards to reach their potential as competent stewards. From this analysis, it emerges that both stewardship and collaboration are inherently relational processes, and I consequently advocate for a relational approach to fostering stewardship in multifunctional landscapes.

Analysing the findings of my empirical research using a heuristic tool from critical realism revealed novel areas for future research (Chapter 8, Section 8.4). Through this critical realist analysis, I was also able to identify four underlying generative mechanisms which explain my empirical findings on stewardship practice and collaboration. Firstly, the deep-seated conflict between agriculture and conservation makes stewardship, and collaboration, a difficult task. Because of this conflict, stewards are engaged in a balancing act between their own agricultural production needs and taking responsibility and care of ecosystem services to serve the needs of the broader social-ecological system. Re-focusing stewardship on stewards reveals the need to support and enable stewards in this challenging task.

Secondly, we live in a world in which it is difficult to express care and take responsibility for our interactions with nature and our fellow humans. This constrains stewards in their ability to manage natural resources in careful and responsible way and to collaborate with other stakeholders in the landscape. By applying a relational approach, we can try to re-connect stewards with nature and with fellow human beings, and work towards applying an ethic of care to address the multiple divides which characterise our society.

Thirdly, individual stewards' ethics and values influence their interactions with nature and fellow human beings. Although this may not be a particularly novel finding, it reinforces the notion that we need to put stewards in the centre of the stewardship picture, in order to find strategies and mechanisms to support them in the important role they play in the landscape. Furthermore, the interplay between individual stewards' ethics and values and their relationship with nature (i.e. their relational values), offers a novel

avenue for future research. Stewards' individual values and ethics influence not only how they engage with nature, but also how they interact with other stakeholders in the landscape, and in contested landscapes this becomes a central challenge of stewardship.

Finally, South Africa, 'a world in one country', is a deeply divided and unequal society. This makes stewarding and sharing natural resources difficult. Together with the strong influences of global neoliberal economic policies, this fractured society impacts the ability of stewards to balance the needs of agriculture and conservation in the landscape. It also explains why social-relational aspects must be addressed in support of stewardship practice and collaboration among diverse stakeholders. Finally, it calls for an approach to building collaboration based on pluralism. This means celebrating and working with diversity, and envisioning collaboration as a patchwork across the landscape, rather than a single, large blanket of consensus.

10.3. Lessons learnt about transdisciplinary research on stewardship practice

Putting a TD research approach into practice in my PhD (Chapter 4) came with many challenges, but also opened up important opportunities for mutually beneficial learning and knowledge co-production with practitioner partners (Chapter 9). My reflections on the experience of operationalising TD principles as an individual PhD student suggest that a TD PhD is qualitatively different from a conventional PhD. Two distinct features set my PhD journey apart from many others. Firstly, my role as a researcher was dynamic and fluid, which is perhaps linked to the differences in purpose between a conventional PhD and a TD research process. Secondly, the key challenge of a TD PhD is for the individual PhD scholar to build and maintain a 'TD team' around them through which they can operationalise the principles of TD research. Since a TD PhD is qualitatively different from a conventional PhD, different measures are needed to evaluate the success of a TD PhD.

The TD process has enabled me to partner and engage in a meaningful way with practitioner partners at various levels (Appendix 2, Chapter 9). Through this, I sought to ensure that the research was framed in a way that addresses the needs and interests of stewardship partners, and that generated knowledge of direct relevance and value to their work. Through the knowledge co-production processes in my case study research (Chapter 6 and 7), I have gained valuable insights into the everyday experiences of stewardship practitioners. I was able to draw on their practice-based knowledge to develop novel insights on the practice of stewardship and collaboration. I am also hopeful that some of the working relationships I have developed with practitioners through this process will continue forward as I develop my career as a 'pracademic' working at the research-practice interface.

10.4. Reflections on the research: weaknesses, strengths and significance

I now move to a reflection on the weaknesses, strengths and significance of my PhD research, according to three themes: short-comings of the work; new perspectives, understandings and questions; and novel methodological and theoretical integration.

10.4.1 Short-comings due to sacrificing depth for breadth

There are several short-comings in this research, and most of them stem from the fact that I have had to sacrifice depth for breadth in my knowledge practices. This stems from the commitment I made to implementing a TD approach, which has stretched me as an individual across various knowledge fields (Chapter 4, Section 4.2.3.5). There are two depth-breadth sacrifices at play. The first is that I have worked at breadth across the knowledge divide between academia and practice and have gained an understanding of both these knowledge 'worlds', possibly at the expense of a deeper engagement with academic knowledge. The second is that I have worked across the knowledge divides between disciplines, covering a breadth of disciplinary knowledge. This means I have not been able to go in depth into any one discipline within the timeframes of a PhD.

In South Africa, a PhD is expected to be completed in three years, and funding is allocated accordingly. This time pressure made it challenging to implement a TD approach, whilst also conducting deep, intellectual, theoretically novel, and practically relevant research. I spent a lot of time building relationships with practitioners (Chapter 9). Since a PhD is currently still evaluated primarily on its intellectual contribution in the form of scientific outputs (Mullins & Kiley, 2002), I had to be disciplined to ensure that I did not take on too many commitments with practitioner partners.

Despite my efforts to counter-act the possible limitations of an interdisciplinary approach, I recognise that I may have skirted over important features of some theoretical approaches which I foregrounded. For example, I feel that my lack of attention to social-ecological change, particularly since I introduce the 'calls for stewardship' in the context of rapid global change, is a short-coming. Principles of ecosystem stewardship (Chapin et al., 2009c; Chapin et al., 2009a) clearly frame the role of stewards as 'responding to change' (Chapter 5, Section 5.1.1, Figure 5.1), yet this characteristic of stewardship did not emerge as a key feature of the practice in South Africa. Although I identified historical change as an important driver of social-relational interactions and environmental values in the Langkloof case study (Chapter 6, Section and 6.5.2), I would like to have paid more careful attention to a change-oriented notion of stewardship.

Another concept which I would like to have paid better attention to is the issue of power. The lack of attention to power is a widely-cited shortcoming of social-ecological research (Cote & Nightingale, 2011; Fabinyi et al., 2014; Olsson et al., 2015). The issue of power did feature as part of the social inequalities described in the Langkloof case study (Chapter 6, Section 6.3) and my application of the pathways approach helped to elucidate this to some extent. Nonetheless, in the context of the deep-seated socio-economic inequalities in South Africa this issue warrants sharper focus.

One of the underlying assumptions of my research has been the pre-existence of a stewardship ethic among farmers and resource users. At the start of the thesis I posed questions about how we can move from the theory of stewardship to practice, and from stewardship ethic to action (Chapter 3, Section 3.2). This starting

point rests on the assumption that resource users have some sort of pre-existing land or stewardship ethic, and that the problem lies in how to put this into action or enable it. I did this intentionally, as I wanted to focus on the practical challenges faced by practitioners, rather than conducting detailed psychological research on whether land users do or do not have an ethic. My suggestion to re-focus stewardship on stewards further emphasises the importance of individual values and ethics. The question as to whether land users do or do not have a 'pre-existing stewardship ethic' remains unresolved and requires further research.

Another shortcoming of my research is that the case studies I selected were led by NGOs, which means my research findings may have a limited audience. This was not my intention at the start. However, the findings of the country-wide stewardship survey (which were used to select the case studies) indicated that the more innovative, integrated, social-ecological stewardship initiatives were primarily run by NGOs. Since these kinds of initiatives were the focus of my case studies, this led me to select only NGO-run initiatives so that they were at least somewhat comparable. In future, I would like to conduct further research to identify government-led, or public-private-partnership-type, initiatives and do similar research with them.

10.4.2 New perspectives, understandings and questions

Firstly, this research has contributed new perspectives on stewardship in practice. In Chapter 3, I identified a gap between recent calls for, and theoretical conceptualisations of stewardship in the literature, and the practice of stewardship. My research has contributed a practitioner perspective on the practice of stewardship (Chapter 5) by characterising the practice of stewardship according to stewardship approaches, objectives and activities; and by distilling the meaning of stewardship held by practitioners. To my knowledge, there is only one other study (McArthur, 2012) which paid explicit attention to the perspective of practitioners on the most recent social-ecological understandings of stewardship. My research thus makes a novel contribution in this regard, bringing the practitioner voice into the conversation on social-ecological stewardship. These insights raise interesting questions about the theory-practice interface, suggesting that it be viewed as a dialogue rather than a gap which needs to be bridged (Chapter 5, Section 5.4.3).

The second novel perspective which this research contributes, is on the challenges of building collaboration in complex, contested landscapes. I have argued that deep-seated individual and social-relational barriers to stewardship emerge from underlying historical and political mechanisms. Therefore, a patchwork approach to facilitating collaboration across the landscape may be better suited to such contexts (Chapter 6, Section 6.5.4). Much of the existing literature on collaboration is focused on a consensus-building approach (Wondolleck & Yaffee, 2000; Margerum & Robinson, 2016b) in which diversity and contestation are viewed as stumbling blocks. In contrast, I agree with Wollenberg et al. (2005) and suggest a shift in perspective from seeing diversity and contestation as barriers, to seeing them as inherent characteristics of the landscape and sources of creativity. Facilitating collaboration from pluralism as a starting point, and working with, rather than flattening or over-simplifying dynamics and diversity (Ferreyra et al., 2008), requires a relational, people-focused approach (Wollenberg et al., 2005).

Thirdly, by working closely with practitioners through a transdisciplinary knowledge co-production process, and focusing on lifting out practitioner voices and mobilising practice-based knowledge (Weber et al., 2014), I hope to have contributed some practical insights on building collaboration for stewardship (Chapter 6 and 7). Little of the existing research on collaboration elaborates on the practical 'nuts and bolts' of how practitioners facilitate collaboration, and how they operate or function in the landscape. The hub-based model, in which I identify different types of relational links in the landscape, guiding principles, and practical actions (Chapter 7, Section 7.3.3, Figure 7.3), provides a practical tool which can guide practitioners in facilitating collaboration. Moreover, it can be a tool for opening up dialogue between researchers and practitioners. This knowledge is from practitioners, for practitioners, and I hope to develop this further into an accessible practice brief or toolkit to share with the stewardship practitioner community.

10.4.3 Novel methodological and theoretical integration

As far as I know, this study is one of the first to integrate critical realism with social-ecological systems research in an investigation of stewardship, making it a novel theoretical integration. Although there have been many calls to deepen social research in the field of social-ecological systems and resilience (Davidson, 2010; Cote & Nightingale, 2011; Olsson et al., 2015; Stuart, 2016) and some have specifically suggested that critical realism could contribute (Stone-Jovicich, 2015), there is limited empirical research applying critical realism and social-ecological systems in an integrated way. For example, a search in *Ecology and Society* (one of the leading academic journals in social-ecological systems research) using the terms 'critical realism/realist', returned only three articles (Gonzalez et al., 2009; Stone-Jovicich, 2015; Whaley & Weatherhead, 2015).

Bhaskar, the originator of critical realism, recognised that insufficient attention has been paid to the ecological side of the relationships between humans and nature by social theorists (Bhaskar, 2016). Accordingly, the integration of the two fields of critical realism and social-ecological systems, creates important opportunities to contribute to both fields. Applying a critical realist philosophy in this social-ecological research has enabled a sharper focus on questions of agency and structure (Chapter 7, Section 7.4.3, Chapter 8, Box 8.1, Section 8.4.2) and has deepened the interdisciplinary analysis in this research by providing a heuristic tool to explore underlying explanatory mechanisms (Price, 2014) (Chapter 8, Sections 8.3 and 8.4).

This research has also contributed novel methodological integration through the combination of creative research methods (Chapter 7, Section 7.2) (Kara, 2015), transdisciplinary knowledge co-production approaches (Lang et al., 2012; Schuttenberg & Guth, 2015) (Chapter 4, Section 4.2.2;Chapter 6, Section 6.2.1; Chapter 7, Section 7.2.1), and multiple case study research (Chapter 7, Section 7.2) (Yin, 2009; Dredge & Hales, 2012). Conventionally, multiple case study research seeks to treat each case as an independent unit of analysis for comparison. By drawing on community case study research, which allows for inter-subjective communication between cases to facilitate learning, I used multiple case studies within a knowledge co-

production process (Chapter 7, Section 7.2). In the interests of facilitating a learning experience for participants (Lawrence, 2015), I experimented with creative, tangible methods for generating data, such as the Learning Jar, Story Cards, photos, Map of Stories, and Map of Learning (Chapter 7). The mostly positive feedback from participants about their experiences indicates that this innovation was effective (Chapter 9, Section 9.2.5 and Appendix 9).

There is growing interest in bringing together the arts and science in sustainability research (see for example a special issue on this in Ecology and Society on reconciling art and science for sustainability: Athayde et al. (2017) and Polfus et al. (2017), and others). Nevertheless, whilst searching for ideas on creative and interactive methods in social-ecological or environmental research, I found few examples. The field of participatory research methodologies, which draws on visual and tangible tools such as mapping and photographs, provided some ideas and inspiration (Chambers, 1994; Loader & Amartya, 1999). I also found literature on creative methods in the social sciences (Kara, 2015) and geography (Trell & van Hoven, 2010). There is growing interest in the use of photographs in social-ecological research, for example through the use of photovoice (Berbés-Blázquez, 2012; Masterson, 2016) from which I also drew inspiration. The experimental methods and tools I have developed here sparked much interest at two conferences where I presented the work. Hence, there seems to be an opportunity to innovate and develop more people-focused research-action partnerships with practitioners and local communities (Lawrence, 2015).

The other way in which I have integrated methodologies and theories is in my application of TD research in an individual PhD research process. Whilst this has been done elsewhere (Enengel et al., 2012; Fox, 2014; Zylstra, 2014; Clifford-Holmes, 2015; van Breda et al., 2016), I believe that the multiple levels at which I engaged practitioners (Chapter 9, section 9.2.2), the diversity of methods I applied (Chapter 6 and 7), and my strong focus on documenting and writing about my reflective practice (Chapter 9), sets my individual TD PhD apart. Moreover, I was not part of a formal purpose-designed TD PhD programme (Muhar et al., 2013) or part of a larger TD research team (Clifford-Holmes, 2015). Consequently, my supervisors, research partners and I (as a team) were experimenting, learning, and adapting as we went along. Each individual TD PhD will of course have its own unique approaches, especially since application of TD principles in PhD research is still relatively recent (van Breda et al., 2016; Haider et al., 2017). This new way of doing PhD research is distinctly different from a conventional PhD process and innovation is needed in methodologies, supervision, and assessment criteria (Mitchell & Willetts, 2009). Thus, I dedicated a chapter in my thesis to reflecting on and sharing the lessons learnt from my efforts to operationalise TD principles (Chapter 9).

Taking an interdisciplinary approach to my engagement with academic knowledge has been an inspiring and energising experience, despite the challenges noted in Section 10.4.1 above. I have read across multiple fields and theories, including for example stewardship and natural resource management, integrated landscape approaches, biodiversity conservation, environmental governance, political and economic sciences, rural development, transdisciplinarity, critical realism, sociology, critical social theory, social-ecological systems

and resilience, environmental history and so on. The TD, critical realist, and social-ecological systems framing of my research necessitated such a broad engagement with the literature. Furthermore, applying and inductive and exploratory methodology in my case studies revealed multiple enablers and barriers of collaboration, which cut across several bodies of theory.

Working with a laminated ontology meant that I was committed to not following one particular line of argument, or reducing my findings down to a particular framework or theory. Rather, my task was to integrate across theories and develop a coherent, interdisciplinary explanation for the phenomena I had observed. The intellectual challenge for me has therefore not been to master one or two theories (as might be the case in a disciplinary PhD), but to demonstrate the value of an interdisciplinary approach, applying theoretical multiplicity (Karpouzoglou et al., 2016), to develop a coherent understanding of stewardship practice and collaboration. Haider et al. (2017) suggest guidance to inter- and transdisciplinary scholars in this regard, calling the experience an 'undisciplinary' research journey (Figure 10.1).

They suggest that one needs to balance methodological groundedness and epistemological agility. I sought methodological groundedness by developing a strong methodological framework based on the enabling philosophy of critical realism (Chapter 4, Section 4.2.4). I attempted to practice epistemological agility by being open to explore as wide a range of disciplines, fields, and theories as I needed to explain, interpret, and analyse my research findings. The challenge has been to do this in a coherent and consistent manner.
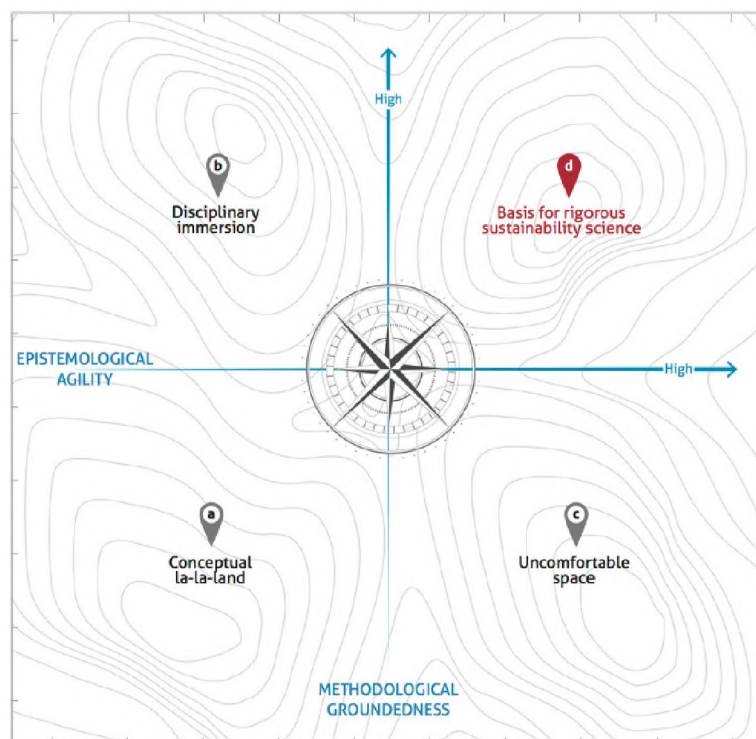

Figure 10.1: A compass to guide the 'undisciplinary' journey in sustainability science. This compass suggests striking a balance between epistemological agility and methodological groundedness (Haider et al., 2017b).

10.5. Recommendations for policy and practice

10.5.1 Supporting social-ecological stewardship in practice

Evidence of social-ecological stewardship approaches emerging in practice, and of practitioners combining biodiversity stewardship with other approaches, indicates recognition of the need for integrated social-ecological stewardship approaches (Chapter 5). The value of integrated landscape-level approaches to address interlinked social-ecological sustainability challenges is recognised globally (Chapter 3, Section 3.3). The cases presented here from South Africa suggest that such approaches can indeed contribute to addressing social-ecological sustainability challenges. However, an enabling policy environment; premised on co-operative governance across sectors such as water, agriculture, conservation, and land reform; is needed. Currently, most effective landscape-level social-ecological stewardship initiatives are facilitated by NGOs, and the long-term financial viability of such approaches is not clear. The policy tools developed for biodiversity stewardship have been successful, and lessons could be learnt from these to develop effective policies and mechanisms to enable landscape stewardship. Furthermore, attention needs to be paid to enabling existing landscape-level stewardship approaches such as biosphere reserves, conservancies, and catchment management institutions (Chapter 2, Box 2.2) through suitable capacity development (Section 10.5.4) and funding mechanisms.

10.5.2 Re-focusing stewardship on stewards

In order to support and enable local land users to realise their potential as competent stewards, stewardship policy and practice needs to re-focus stewardship on stewards. Currently, stewardship and collaboration are heavily focused on ecological and spatial priorities, and formal institutions and governance mechanisms, respectively. This has resulted in somewhat of a blind spot about the importance of the individual and collective agency of local stewards in bringing about ecological and governance outcomes. Re-focusing stewardship on stewards will require a shift in the way in which stewardship initiatives are funded, planned, implemented, monitored, evaluated, and reported. If stewardship is a situated practice, then the multiple underlying aspects which influence the ability and willingness of stewards to collaborate and to implement stewardship practices, need to be taken into account. This includes, for example, recognising the economic barriers to stewardship practice and supporting stewards in finding innovative means to overcoming these. It also includes flexible funding mechanisms which address the steward as a whole person; recognising, for instance, the relevance of sufficient health care and educational opportunities for stewards and their families, particularly in rural areas where poverty and poor social services are a concern.

10.5.3 Fostering collaboration requires an action-oriented patchwork approach which recognises diversity and values pluralism

In complex, contested landscapes, a blanket-like approach to collaboration which seeks to bring together all stakeholders across the landscape is unlikely to succeed. Rather, a patchwork approach which is sensitive to contextual diversity and values pluralism is needed. Such an approach should focus on fostering small, local

stewardship actions from which collective action and positive momentum for sustainability can emerge across the landscape. The challenge practitioners face, which also requires further research, is how, when and whether to 'stitch together' the patchwork of collaborative stewardship activities across the landscape. This will require identifying pathways to sustainability for the landscape which create opportunities to deliberate the direction of change towards sustainability; nurture diverse approaches, forms of innovation and options; and ensure that the benefits of the landscape are evenly distributed among multiple stakeholders (Leach et al., 2012).

10.5.4 Putting a relational approach into practice

I have shown stewardship and collaboration to be inherently relational processes. A relational approach foregrounds the connections between components of a system, rather than focusing on the components themselves. This means paying attention to the relationships between stewards and their own personal values, between stewards and nature, between stewards and other people in the landscape, and between stewards and the structures of society in which they are embedded. For policy and practice, this means, for example, finding ways to allow stewards to re-connect with nature and care for nature, despite the constraints of the current political, economic, and socio-cultural system in which they operate. It means foregrounding inter-personal relationships between stewards, practitioners, and other stakeholders in the landscape. This can be done, for example, by putting in place flexible and long-term funding mechanisms which pay for facilitator's time to build relationships in the landscape. It also means planning, implementing, monitoring, evaluating, and reporting on relational aspects of stewardship and collaboration. For example, this might mean asking practitioners to track and report on their inter-personal relationships with stewards, or to evaluate their success in facilitating new and meaningful interpersonal relationships among diverse stakeholders across the landscape.

Another important consideration for putting a relational approach into practice is that it requires skills and competencies which professionals working in the environmental sector (and related sectors such as agriculture, water and land) may not ordinarily be trained in. Yet relational (or inter-personal) competencies are recognised as a key requisite for sustainability work (Scharmer, 2009a; Wiek et al., 2011; Rosenberg et al., 2016). These competencies are of particular importance in South Africa where deep social-relational divides exist between people from different race and class groups. Hence, relational competencies should be incorporated as a learning outcome into curricula at institutions of higher education (IHE) and on-going professional development and capacity building opportunities should be provided for stewardship practitioners to develop these competencies.

Similarly, practical toolkits which can support practitioners in implementing a relational approach to facilitating stewardship may be needed. Such toolkits could include practical ideas for how to build and maintain long-term relationships with diverse stakeholders at the individual level, how to manage conflict between stakeholders with different interests, how to facilitate engaging social learning experiences, or how

to create inspiring opportunities to re-connect stewards with nature. Theory U (Scharmer, 2009b) is one approach which offers some ideas towards such a toolkit. However, adapting such toolkits to local contexts, and developing toolkits in partnership with practitioners in a knowledge co-production process, would likely result in more relevant products and sustainable outcomes.

10.5.5 Aligning agricultural and natural resource management policy to support stewardship

The challenging balancing act required of stewards, whereby they are expected to be successful agricultural producers whilst protecting ecosystem services for the greater good, requires better policy support. Currently, the neoliberal influence on economic and agricultural policies in South Africa pushes commercialisation and profit-making at the cost of environmental sustainability and social justice. Stewards are caught in the middle of this conflict, and considering that most stewardship actions in South Africa are currently voluntary, this places a lot of pressure on stewards. My research suggests that if the South African government is serious about its commitments to environmental resilience and addressing the inequalities of the past in rural landscapes (as for example laid out in the National Development Plan (Government of South Africa, 2012), then agricultural and natural resource management policies need to be better aligned. Support measures need to be put in place to help stewards to access knowledge and financial support to implement sustainable agricultural practices. As described above, this requires multi-sectoral collaboration across various departments to realise the potential of landscape-level stewardship.

10.5.6 Enabling transdisciplinary postgraduate research

Transdisciplinary engaged research holds great potential to contribute to addressing our most pressing social-ecological sustainability challenges, and to making IHE relevant by conducting science in service of society. However, conducting TD research at postgraduate level within current institutional structures is challenging, and may jeopardise students' chances of completing their studies in time and with a healthy state of mind. Based on my experiences, I suggest that IHE ought to consider putting in place innovative mechanisms to support, incentivise, fund, and reward postgraduate students who choose to conduct engaged research. Furthermore, current ethical clearance procedures are not well-suited to conducting engaged TD research, and I therefore urge research ethics committees to re-imagine themselves in their role as enablers of ethically responsible and societally-relevant research.

10.6. Ways forward

By proposing a relational approach to stewardship, I hope to have provided a new perspective on a well-established concept which has taken on a new meaning in the Anthropocene. This relational approach is a reminder about the pivotal role of human agency and social-relational processes which underpin collaboration for stewardship. Efforts to foreground the ecological objectives of stewardship, and to put in place formal institutional structures to enable collaboration, are only likely to succeed if we attend to the relationships between humans and nature, and humans and other humans. By actively seeking ways to

improve these relational aspects of stewardship and collaboration, we might start moving towards a world where we can care and share.

Taking a transdisciplinary approach in my PhD has enabled me to engage meaningfully with practitioners to gain new perspectives on the challenges of putting stewardship into practice in multifunctional landscapes. Unwittingly, I have developed new relational knowledge (such as trust) in this process, and although this may not be one of the primary purposes of a PhD, I believe it has contributed to my growth as a researcher. I hope through this approach to have generated new insights into the challenges facing postgraduate scholars seeking to conduct engaged, interdisciplinary science in service of society. If the "*purpose of education is to turn mirrors into windows*" (Sydney J. Harris), then I believe that a deeper appreciation of the importance of relational knowledge in conducting meaningful research is a window to a better kind of science.

APPENDICES

Appendix 1: Book chapter (In Press): Ethics in transdisciplinary research

"Ethics in transdisciplinary research: Reflections on the implications of 'Science with Society'"

By Jessica Cockburn and Georgina Cundill

Note: Please refer to the published book chapter (contact the thesis author for a full-text copy: jessicacockburn@gmail.com):

Cockburn, J., & Cundill, G. (In Press). Ethics in transdisciplinary research: Reflections on the implications of 'science with society'. In C. Macleod, J. Marx, P. Mnyaka & G. Treharne (Eds.), Handbook of ethics in critical research: Stories from the field. London, United Kingdom: Palgrave Macmillan.

Appendix 2: Early engagements with practitioners to frame the PhD research

Here I describe how I included societal actors, in this case stewardship practitioners, and in some cases land owners or users, working on stewardship in South Africa, in my PhD research from the early stages of developing research questions.

I initiated this process about 6 months before the official start of my PhD research, in mid-2014. I did this in three phases and included specific methods for collecting information from practitioners and iteratively developing the research questions for the PhD research (Table A2-1). I initially focused these engagements around the Symposium for Contemporary Conservation Practice (SCCP) which was a key event at which many stewardship practitioners in South Africa would be gathered together in one place and where the initial broad research questions could be shared with a wide audience, but also where individual engagements with specific practitioners could take place.

Table A2-1: Process of engagement with stewardship practitioners to develop research questions for the PhD.

Phase	Engagement activities and methods	Reflection and refinement of research scope and questions
1: Broad scoping phase in preparation for SCCP	Interviews with stewardship practitioners through previous/existing work relationships to develop initial research questions	Broad research area defined with some possible research questions.
2: Engagements at the SCCP and subsequent discussions	Feedback from SCCP presentation and informal discussions with 'new' stewardship practitioners identified (in person and via email)	Refined initial research questions developed in Phase 1.
3: In-depth, follow-up engagements with specific practitioners	In-depth discussions and exchanges with selected stewardship practitioners based on 'mirroring back' refined research questions emerging from Phase 1 and 2.	Research questions further refined and presented in this proposal.

Each of the phases described here included specific engagement activities with practitioners, followed by reflection and adjustment of the research scope and questions for the PhD. The practitioners were selected based on their involvement in a variety of settings and project priorities in South Africa (Table A2-2). The following guiding questions were used during discussions with practitioners:

- What does stewardship mean in the context of your work? i.e. provide a broad definition?
- What lessons have you learnt about the social processes required to successfully implement stewardship?
- What do you see as enablers or drivers of stewardship in your work? What do you see as barriers of stewardship in your work?
- If you could write a wish-list of three stewardship practice issues which you think need research attention and input, what would those be?

I kept careful notes of all interactions, and archived email exchanges. I used these records to compile a list of key research questions and general findings across all the projects (Table A2-3). From this list, key themes were summarised which informed the way I developed the research questions (see Box A2-1 below).

Table A2-2: Profile of stewardship practitioners and projects included in the engagement process

Project name	Organisation and province	No. of people engaged	Social-ecological and agricultural context	Project focus and type of stewardship
1. Mid-Step Sugarcane Catchment Stewardship Project	National NGO: WWF-SA (KwaZulu-Natal)	2	Private and communal land; sugarcane farming; grassland biome	Sustainable agricultural practices, water stewardship
2. Upper Umngeni Water Balance Project	National NGO: WWF-SA (KwaZulu-Natal)	3	Private land, beef, dairy and vegetable farming; grassland biome	Biodiversity Stewardship tool, water stewardship
3. eThekwini Stewardship Task Team	Local Municipality: eThekwini Municipality (KwaZulu-Natal)	3	Communal land; grazing & peri-urban housing; grassland biome	Biodiversity Stewardship tool
4. African Crane Conservation Programme	National NGO: Endangered Wildlife Trust (KwaZulu-Natal)	1	Private land; beef, dairy, and vegetable farming; grassland biome	Wetland stewardship and crane conservation
5. Grasslands and Forestry Project	Regional NGO: African Environmental Services (KwaZulu-Natal)	2	Communal land; grazing and small-scale forestry; grassland and forest biome	Small-scale forestry stewardship, Biodiversity Stewardship Programme
6. Umzimvubu Catchment Collaboration	Regional NGO: ERS (Eastern Cape)	2	Communal land; grazing; grassland biome;	Restoration and invasive plant clearing, sustainable land use, communal stewardship
7. Four Returns Landscape Restoration Project	Regional NGO: Living Lands (Eastern Cape)	4	Private land; various agricultural land uses: grazing, fruit production; various biomes: thicket, fynbos etc.	Landscape restoration, water stewardship and sustainable land use
8. ZZ2 farming conglomerate	Private business: Bertie van Zyl (Pty) Ltd (Limpopo)	2	Private land; farming or tomatoes, avocado and other fruit; savanna, grassland, woodland and forest biomes.	Sustainable agricultural practices, catchment stewardship

Table A2-3: Research themes identified through engagement with practitioners

Project	Key issue or research theme	Other important findings
1. Mid-Step Sugarcane Catchment Stewardship Project	• What are the linkages between markets and consumers and stewardship practice by producers on the ground? • How can different stakeholders be brought together to address social development and stewardship concerns?	• Understanding the local context and the needs of communities is crucial for successful stewardship projects • Good corporate governance in supply chains is key for local producer stewardship • There is a difference between the dominant protectionist, species-driven 'biodiversity stewardship' paradigm, and other forms of stewardship in

	• How can 'emergent stewardship' (e.g. champion farmers) be nurtured/fostered?	production landscapes which revolve around responsible practices
2. Upper Umngeni Water Balance Project	• Institutional capacity shortages are the biggest threat to the biodiversity stewardship programme in SA – how can the model be re-structured? • What are farmers' perceptions about stewardship and how can we shift the negative mind set of farmers? • Why do many stewardship projects fail? There is a lot to learn from these failed cases. • What incentives can be used for stewardship?	• Successful stewardship projects rely heavily on building relationships between practitioners and landowners, which needs a long-term commitment and secure funding • Practitioners need good facilitation skills and tools to run suitable processes • Practitioners may not just need researchers to generate knowledge, but rather to be partners in the stewardship process and support a more reflective process
3. eThekwini Stewardship Task Team	• Can we support champions and leaders who are interested in stewardship? • What incentives can we develop for local communities around stewardship? A 'basket' of incentives would be useful as one can adapt them to the local context. • What tools/methods are best for engaging communities e.g. which 'participatory methodologies' could be relevant for stewardship? • How can we improve reflection and learning-by-doing in our team?	• Good local leadership and governance is crucial for successful stewardship • The role of a researcher in a stewardship project or partnership might be more valuable in terms of a 'partner for reflection' than actually generating knowledge outcomes • Other 'types' of stewardship are also needed and need to be recognised (not just BSP). • The team would like to learn more from the literature about how stewardship is implemented elsewhere.
4. African Crane Conservation Programme	• How can we support champions/influencers in communities? • How do we bridge the gap between stewardship on the ground and corporates higher up the value chain?	• Biodiversity stewardship is not enough on its own to bring about better stewardship in agricultural landscapes, and it is not suited to all contexts: we need to consider different 'types' of stewardship • Stewardship practitioners need good social facilitation skills
5. Grasslands and Forestry Project	• What 'type' of landscape configuration has the biggest 'total benefit to society': a communal 'low-impact' landscape mostly disconnected from global markets and serving local people's needs, or a monoculture-dominated commercial farming landscape where commodities are going into value chains where large profits are being shared among few beneficiaries?" • At what scale does one assess this? • Who bears the cost of stewardship? • Need to consider some 'bigger picture' ideas e.g. What is stewardship? What is a resilient landscape?	• The current 'profit-driven economic system' is probably one of the biggest barriers to stewardship • Social and institutional systems will have a large impact on the potential 'emergence' of stewardship e.g. commercial cropping context (large-scale, corporate governance and centralised decision-making) vs. communal context (local-scale negotiated, collective decision-making) • Working together (researchers + practitioners) on this will be useful as a form of reflection and to specifically analyse and extract, in a meaningful manner, some of the lessons learnt in practice. It would also be great to learn more from the literature.

6. Umzimvubu Catchment Partnership Programme	• Need to find a way to revive traditional/indigenous stewardship e.g. 'Maboella' • Need to monitor social processes and 'capture' these processes to share lessons learnt and up-scale • How can one integrate stewardship and livelihood priorities in one landscape? • How do we mobilise communities for stewardship? • What are the enablers and barriers to effective communal landscape stewardship?	• It is crucial to engage traditional leadership in stewardship process • Capacity-building and training are needed • For landscape-scale stewardship, we need to restore effective governance simultaneously with restoring functional landscapes and ecosystem processes
7. Four Returns Landscape Restoration Project	• How does social learning bring about better stewardship? • How does one monitor social learning? • How does one facilitate collaborative processes?	• There is more to stewardship than the BSP: What about the farmer who has no high biodiversity value land but is practicing sustainable farming?
8. ZZ2 farming conglomerate	• What is the relationship or inter-connectedness of social, economic and ecological components of a landscape (or complex system)? • Who bears the cost of stewardship? • How can this company become a community? And one in balance with society and the environment – how does the company remain relevant?	• (Open) systems thinking can bring about better stewardship • Landscape-scale stewardship goes beyond the ecological to include the social responsibility of land users in the landscape • You cannot have sustainability without profitability
9. Other[1]	• Champions, leaders, innovators play a key role. How can one 'use them' more effectively, but also not over-use them? • There is a need for more integrated, landscape-scale interventions • Peer-learning among landowners/communities is key for sustainability of the BSP: how can this be facilitated?	• Relationships and trust-building are key • Need more 'warm bodies' in order to build relationships and provide institutional and technical support.

[1]Other: this refers to additional insights gathered from practitioners and landowners outside these projects, mostly through informal discussions

Box A2-1: Key themes emerging from engagements with stewardship practitioners:

Stewardship enablers:

- Relationships and trust-building
- Champions and leaders
- Social process facilitation skills and tools
- Collaboration among multiple stakeholders
- Systems thinking: integrating social, economic and ecological priorities in a landscape

Stewardship barriers:

- Capacity shortages
- Poor governance and leadership
- Not enough 'feet on the ground' to build and maintain relationships and support

Research areas:

- Integrated, landscape scale approaches
- Linking across supply chains i.e. beyond local level
- Who pays for stewardship?
- How should these collaborative processes and social learning be facilitated?

Relationship between researchers and practitioners (TD process):

- Partners for reflection: extracting lessons learnt in a meaningful way
- Links to other research and literature
- Researcher could facilitate learning across projects

Appendix 3: Research ethics and informed consent form

1. <u>Name and affiliation:</u>
   Student researcher: Jessica Cockburn. PhD student at Rhodes University: Department of Environmental Science.
   Supervisor: Dr. Georgina Cundill. Senior Lecturer at Rhodes University: Department of Environmental Science.

2. <u>Project Information:</u>
   This project is conducting social-ecological research on stewardship in South Africa. It includes surveys and case study research. The purpose of the research is to contribute to an understanding of the social and institutional change processes which underpin shifts to stewardship in multifunctional landscapes in South Africa. The hope is that the research will be useful to scientists and practitioners involved in environmental stewardship.

3. <u>What is expected from participants:</u>
   - To participate in the verbal survey interview or written survey by providing answers to questions. The survey has 21 (written) or 26 (verbal) open-ended questions, and should take 30-45 minutes.
   - Participants are requested to please answer the questions as openly and accurately as possible.
   - Interviews may audio-recorded if participants are willing.
   - The researcher does not foresee any risks for participants in the survey research.

4. <u>Rights of participants:</u>
   - Participants are free to withdraw from the research at any time without penalty or reason
   - Participants have the right to anonymity and confidentiality
   - Participants have the right to feedback and to be informed about how their information will be used

5. <u>Responsibility and commitments of the researcher:</u>
   - The researcher commits to respecting participants' confidentiality and anonymity, and will not reveal their names in any public use of the research results.
   - The researcher commits to being open and honest to participants about the nature of the research.
   - The researcher will provide feedback about the research findings to all participants in the research.

6. <u>Declaration about the researchers' role:</u>
   "I see myself as both a researcher and a change agent. Thus I have a particular 'agenda' which I must be open about. My personal wish for this project is that it brings about positive change in the way in which stewardship is practiced in South Africa, to improve the well-being of people and the state of ecosystems. I hope that the research brings about a better understanding of how the barriers to environmental stewardship can be overcome." (Jessica Cockburn)

7. <u>Contact details:</u>
   Please feel free to contact the student researcher or supervisor at any time if you have questions or concerns about this research: Student: Jessica Cockburn: jessicacockburn@gmail.com | Cell: 072 1022 875 Supervisor: Dr. Georgina Cundill: georgina.cundill@gmail.com | Office: 046 603 7580

8. <u>Declaration of informed consent by the participant:</u>
   I have read this document and understand the implications of participating in this research. I am willing to participate and do so of my own free will.

   _____ _____ _____
   Full Name   Signature   Date

Appendix 4: Stewardship survey questionnaire

Stewardship Survey for Practitioners

SELF-ADMINISTERED QUESTIONNAIRE VIA EMAIL OR WEB LINK

Note: Please sign the "Research Ethics and Informed Consent for Stewardship Survey" (separate document).

I am using the word **stewardship** here in a broad sense in terms of the environment i.e. think 'environmental stewardship'

Please answer all the questions honestly and express your own opinion, based on your personal experience of working in stewardship projects.

Please write your answers into the blue-shaded cells.

Date:		Role:	
Name of respondent:		Project name:	
Organisation:		Project location:	

Suggestions for other projects/practitioners to interview (especially landscape-scale):

Part A: Environmental stewardship in your project

A1.   Would you characterize the work or purpose of your project as 'stewardship'? (Mark 'X')   Yes: No:

A2.   Why? Or: Why not?

A3.   What do you understand stewardship to be?

A4.   What kind of activities would someone be involved in if they were practicing stewardship?

A5.   What are the main outcomes of the stewardship project you're involved in?

A6.   Is this a landscape-scale initiative? i.e. does it require multiple land users to collaborate with one another? (Mark with 'X')   Yes: No:

A7.   Is there a collaborative platform in place for multiple stakeholders in the landscape to engage? (Mark with 'X')   Yes: No:

A8.   Who is collaborating?

A9.   Which agricultural land tenure context does the project represent: Communal or Private? (Mark with 'X')   Communal   Pvt:

A10. Which type of stewardship is best aligned with the work of your project? Select two and mark with 'X'.

	Environmental		Environmental-Landscape		Biodiversity		Agricultural		Water

Part B: The meaning of environmental stewardship

B1. Who is/should be a steward?

B2. What is the goal/purpose of stewardship?

B3. Stewardship is often referred to as a 'management activity'- what is being managed?

B4. Who/what are the beneficiaries of stewardship? i.e. stewardship is for the sake of....?

B5. To whom/what should stewards be accountable?

B6. Who should bear the costs of stewardship?

B7. Do the participants in your projects have a stewardship ethic? (Mark with 'X')   Yes: ☐   No: ☐
B8. How do you know?

B9. Is this ethic important in driving stewardship actions?   Yes: ☐   No: ☐
Why?

B10. Is the concept of stewardship useful in your work?   Yes: ☐   No: ☐
Why?

B11. If you didn't/don't use the word 'stewardship' in your work, what alternative would you use?

Part C: Enablers and barriers of environmental stewardship

C1. What drove or motivated you to start/join this stewardship project?

C2. In your experience, what are the biggest *barriers* to stewardship? (Please list at least 3 in order of importance)
i.
ii.
iii.

C3. What are the biggest *enablers* of stewardship? (please list at least 3 in order of importance)
i.
ii.
iii.

C4. What are the particular challenges of facilitating stewardship at landscape scale?

C5.   What role do you feel that the Department of Environmental Affairs Natural Resource Management or 'Working for…'
programmes play in enabling stewardship?

C6.   What changes could be made to these NRM programmes in order for them to be *better enablers* of stewardship?

EXTRA NOTES OR COMMENTS:

'Stewardship in Multifunctional Landscapes'
PhD Research Project
Department of Environmental Science: Rhodes University, Grahamstown
Aim: To contribute to an understanding of the social and institutional change processes which underpin shifts to stewardship in multifunctional landscapes in South Africa
<u>Contact details:</u>
Student: Jessica Cockburn: jessicacockburn@gmail.com | Cell: 072 1022 875
Supervisor: Dr. Georgina Cundill: georgina.cundill@gmail.com | Office: 046 603 7580

THANK YOU VERY MUCH! Please return this completed questionnaire form to: jessicacockburn@gmail.com

Appendix 5: Infographic developed for public communication about the research on stewardship practice in South Africa

This infographic was published as part of an article in a conservation magazine in South Africa and is based on the findings of the country-wide stewardship survey presented in Chapter 5.

Citation and online link for the magazine article:

Cockburn J. (2017) Stewardship matters: For people, for the earth. Conservation Matters 2017: 3 - The Earth Edition, 5-6. Available online: http://www.ewt.org.za/MAGAZINE/April%202017/Conservation%20Matters%20April-%20Small%20file.pdf

The infographic was also widely circulated on social media, and the article circulated to a mailing list of stewardship practitioners.
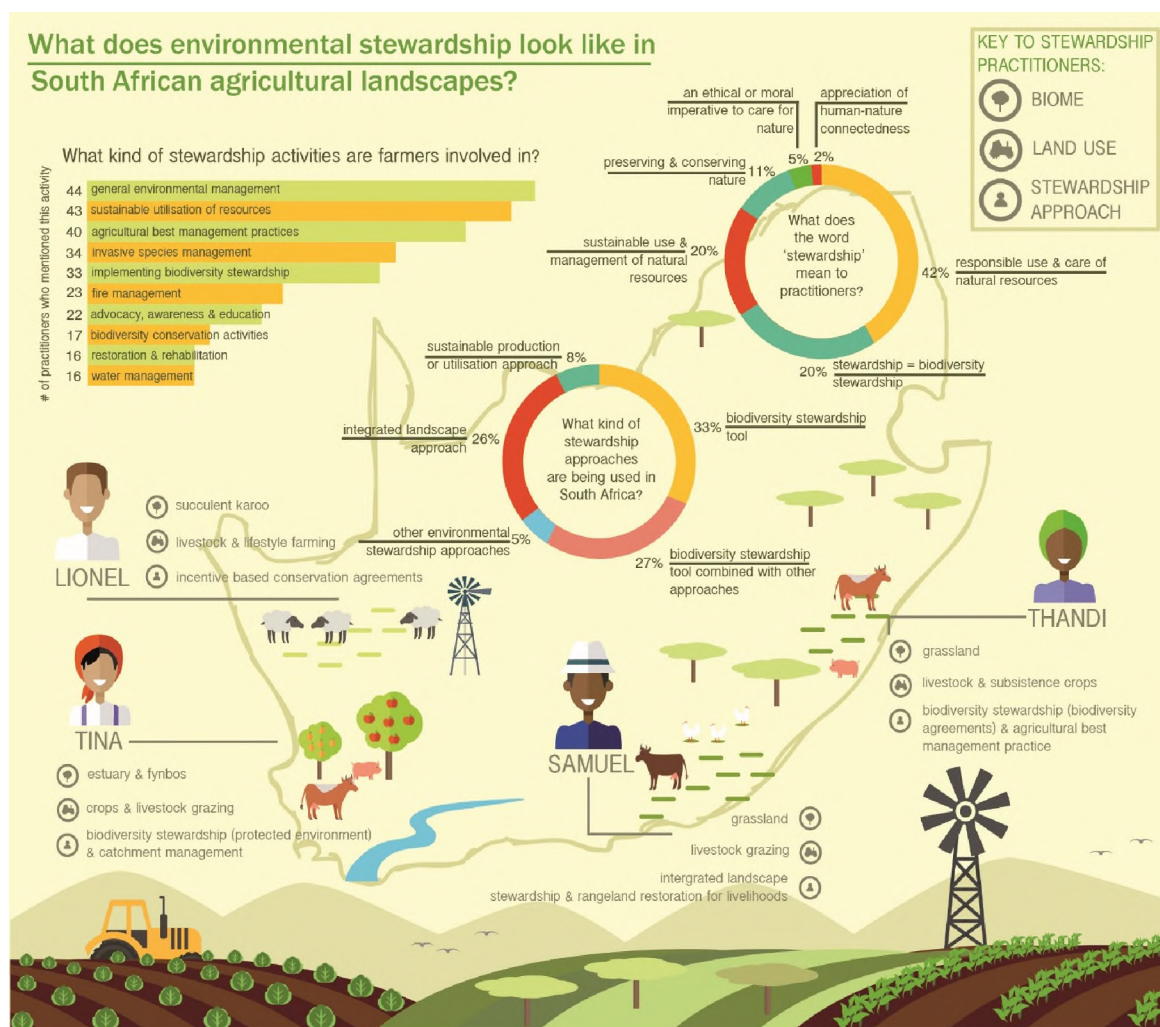
Appendix 6: Langkloof case study interview guides

Interview guides used for in-depth, face-to-face, semi-structured qualitative interviews in the Langkloof case study.

- **A:** Guide for interviews with landowners or land users.
- **B:** Guide for interviews with various 'support stakeholders' working in agriculture, natural resource management.
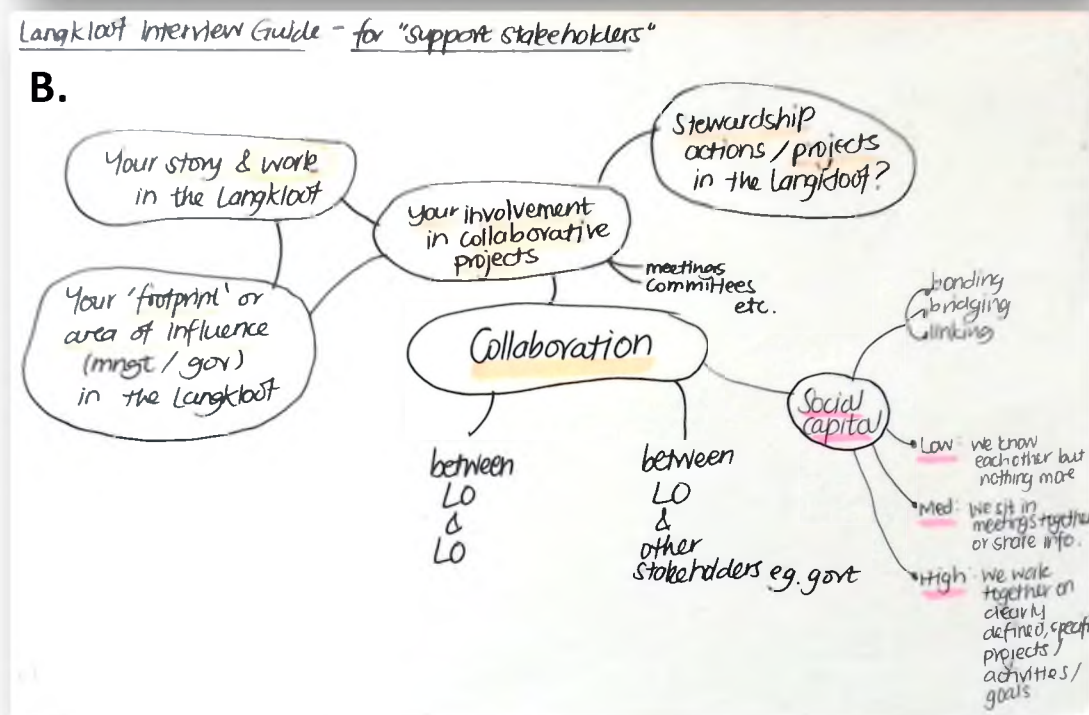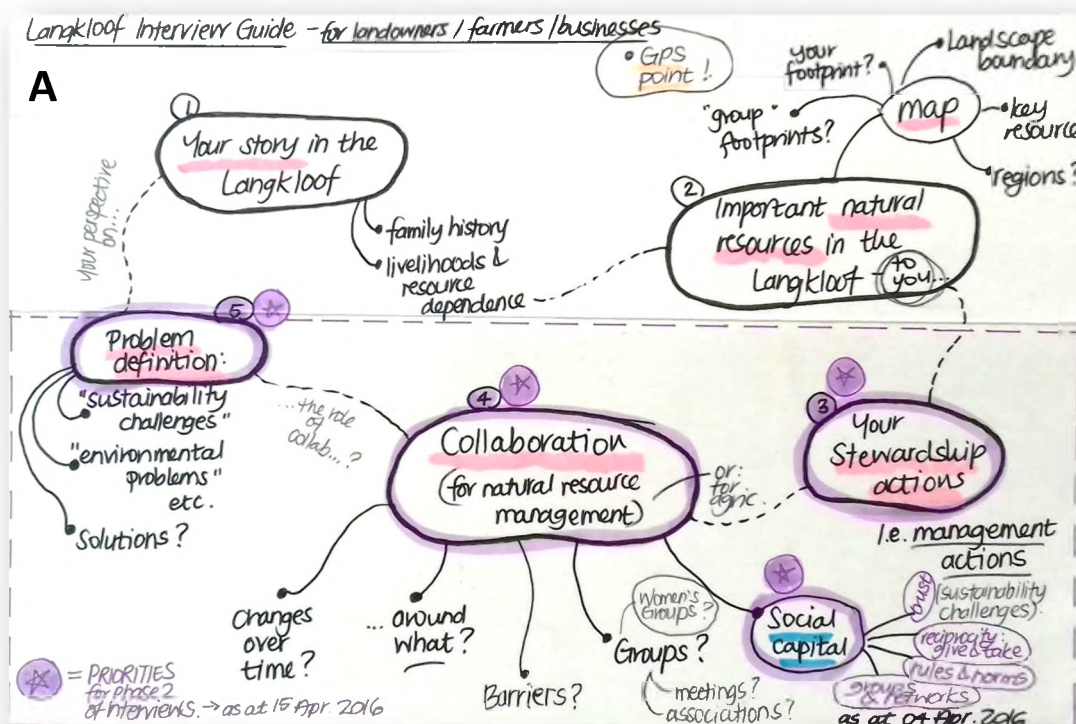
Appendix 7: Descriptions of six cases for the multi-case study

Case 1 (VV): Verlorenvlei Protected Areas Project

Run by BirdLife South Africa and WESSA (Wildlife and Environment Society of South Africa)

Landscape overview:
The Verlorenvlei estuary (near Elands Bay) and catchment area are major conservation priorities on the West Coast, in the Western Cape. The estuary is an Important Bird and Biodiversity Area, and a proclaimed Ramsar Wetland site. It hosts over 200 bird species, and threatened and endemic fish. The middle and upper reaches of the catchment area are under intensive agricultural land use (farming of potatoes, rooibos tea, and pasture-fed livestock (cattle and horses)). The initial motivation for landowners to participate in a conservation initiative was a response to a threat of mining in the upper catchment area (Moutonshoek). Key ecosystem services include amongst others commercial crop and livestock agriculture, and water production (provisioning); habitat for biodiversity conservation, especially bird habitat in the estuary (supporting); and ecotourism and recreation associated with the estuary (cultural).

Social-ecological objectives and activities:
The main objective of the initiative is to protect biodiversity in the catchment area, whilst allowing for existing agricultural activities to continue in a sustainable manner. Thus, the initiative strives to achieve the parallel objectives of conservation and sustainable land use. They plan to develop management plans with landowners which give guidelines on improved farming practices for stewardship.

Approach to facilitating stewardship and collaboration:
The initiative is implementing the national Biodiversity Stewardship (BDS) tool (SANBI, 2015b). The objective of biodiversity stewardship is to conserve and manage biodiversity priority areas through voluntary agreements with landowners. NGOs often act as 'brokers', although the agreement is between landowners and the state. The aim of BDS is to conserve biodiversity, while making allowances for sustainable land use activities. The specific type of BDS agreement in this case is a 'Protected Environment': this requires a collaborative farmer group to sign the agreement together (SANBI, 2015b). Collaboration among farmers and with the NGO is formalized through this agreement. The initiative is run by one facilitator in the landscape, with support from two remote managers.

Photo: Intensive potato farming is an important economic activity in the area, yet it is resource intensive and has significant impacts on ecosystem services and biodiversity. This photo shows the 'potato circles' i.e. circular fields shaped to accommodate the movement of irrigation pivots. The Verlorenvlei Protected Areas Project is trying to find ways to support sustainable farming practices and improve the condition of riverine and wetland ecosystems at the same time. However, conflict between stakeholders with different interests across the landscape is a serious challenge to this work.

See the BirdLife South Africa website for further information on this initiative:
http://www.birdlife.org.za/conservation/important-bird-areas/iba-projects/verlorenvlei-protected-area

Case 2 (MR): Marico River Conservation Project

Run by the Endangered Wildlife Trust (EWT), with various local partners including African Pride Conservation Trust and Mmultwa wa Noko.

Landscape overview:
The Upper Marico River catchment has been identified as a National Freshwater Priority Area in South Africa. The Marico River supplies water to the town of Groot Marico, the commercial farmlands downstream of the town, and rural subsistence farming settlements in North-West province. The source of the Marico River, called 'Die Oog' ('the eye') is a site of natural beauty and of spiritual and cultural significance. The river is also home to endangered fish species, and the upper reaches of the catchment are an important biodiversity area. The region is under significant pressure from repeated and on-going applications for mining. Unsustainable farming practices and rapidly growing human populations are placing increasing threats on water sources. Key ecosystem services include amongst others mixed subsistence and commercial agriculture, water production and mining (provisioning); some habitat for biodiversity conservation, especially in upper catchment areas (supporting); and 'Die Oog' and the cultural history of the region bring in tourism (cultural).

Social-ecological objectives and activities:
The main objective of the initiative is to protect the strategically important water resources of the Marico River catchment, and to improve catchment governance and management. The initiative includes a focus on sustainable agriculture practices, and other green economy initiatives. It also focuses on engagement with institutional catchment management processes. They are taking a landscape approach and collaborating with existing community structures and initiatives to gain momentum.

Approach to facilitating stewardship and collaboration:
The initiative is pioneering a novel integrated catchment conservation approach called the PHE: People-Health-Environment which seeks to combine solutions to population-environment issues with health-environment initiatives for conservation of natural resources while simultaneously improving human health and livelihood security (Lopez-Carr & Ervin, 2017). This signals a shift in the organisation's approach from concentrating only on the conservation outcomes, to working with the people and bettering their lives. To reach the end goal of protecting the catchment, they believe that they need people to get involved, and for that they need to realise the needs of the people. Collaboration is informal and based on good will and shared interests. The initiative is run by one facilitator in the landscape, with support from a remote manager.

Photo: This photo shows a vegetable harvest by one of the emerging farmer groups (at Koffiekraal) who are involved in the project to implement sustainable farming practices, combining traditional knowledge systems and modern permaculture techniques. Photo credit: JP Le Roux, Endangered Wildlife Trust.

See the following websites for further information on this initiative:
Endangered Wildlife Trust: https://www.ewt.org.za/SOURCETSEA/marico.html
Mmutlwa wa Noko – a partner organisation: http://sunbirdmedia.wixsite.com/mwnoko

Case 3 (EN): WWF-SA Grasslands Programme - Enkangala

Run by WWF (World Wide Fund for Nature) South Africa, with various partners.

Landscape overview:
The Enkangala grasslands (enkangala means 'high altitude') are an area of high biodiversity value and a strategic water source area in northern KwaZulu-Natal. Land is used primarily for extensive livestock farming (mostly beef), by commercial farmers, communal land owners and emerging farmers who have successfully claimed land through South Africa's post-Apartheid land restitution process. Coal mining is a significant threat to the ecological integrity of the area: large areas have already been transformed by intensive agriculture and mining. The main focus of the case study, including the site visit, was with the Mgundeni community, who are successful beneficiaries of a land claim. Key ecosystem services include amongst others commercial and subsistence livestock agriculture, water production and mining (provisioning), habitat for biodiversity conservation, especially in endangered grasslands (supporting), and game ranching is a growing tourism industry in the region (cultural).

Social-ecological objectives and activities:
The initiative aims to mainstream biodiversity conservation into agricultural production landscapes to secure the biodiversity and relevant ecosystem goods and services. It seeks to do this whilst supporting farmers to continue making a viable livelihood off the land and thus contributing to socio-economic development. A primary activity of the initiative is to make links between farmers and other stakeholders who can support them in addressing issues not directly relevant to conservation, such as health and education.

Approach to facilitating stewardship and collaboration:
The initiative is implementing the national Biodiversity Stewardship (BDS) tool (SANBI, 2015b). Two types of BDS agreement have been used in this case: 'Biodiversity Agreement' and 'Protected Environment', which requires a collaborative farmer group to sign the agreement together (SANBI, 2015b). The initiative has also set up a collaborative forum among stakeholders relevant to the community's needs. They meet regularly and provide an informal platform to discuss issues across the landscape in an integrated manner. The initiative is run by two facilitators in the landscape, with support from a regional manager.

Photo: This photo shows a fenced grazing camp with Bald Ibis (an endemic and endangered species of bird). By fencing off grazing camps as part of a stewardship agreement and managing grasslands responsibly, these farmers are contributing to conservation of endangered fauna and flora through good habitat management. This photo is a new take on the old metaphor of 'fences and fines' for protected areas. In this case, the fences are benefitting both the farmers and the birds.

See the WWF South Africa website for further information on this initiative which is part of the Grasslands Programme:
http://www.wwf.org.za/what_we_do/land/grasslands/wwf_s_work_in_the_grasslands_biome/

Case 4 (UM): Umzimvubu Catchment Restoration Project

Run in partnership by Environmental Rural Solutions, Conservation South Africa, the Maloti Drakensberg Transfrontier Conservation and Development Programme, Endangered Wildlife Trust and others.

Landscape overview:
The Umzimvubu river catchment has been prioritised nationally as one of the few remaining "near-natural rivers", but is classified as vulnerable due to rapid rates of degradation. The current phase of the initiative is focused in the uplands of the Umzimvubu catchment. The catchment is comprised of almost 70% communal land used for subsistence grazing and small-scale cropping, and 30% private commercial farm land, primarily used for livestock farming. The communal land is part of the former 'Transkei' homeland. Grasslands in the region are threatened by land degradation due to overgrazing and invasion by alien plant species. Key ecosystem services include amongst others subsistence and commercial livestock agriculture, water production (provisioning); habitat for biodiversity conservation, especially in upper catchment grasslands (supporting); the Drakensberg mountains are an important tourism destination (cultural).

Social-ecological objectives and activities:
The aim of the initiative is to build climate change adaptation capacity and support the maintenance and restoration of ecosystem services. They have a special focus on water catchments and habitat linkages for optimal flora and faunal persistence. The approach seeks to empower private and communal land stewards. Current activities focus on alien plant clearing and rangeland management and are focused at the local village level. There is a strong emphasizing on building partnerships with other stakeholders, including other NGOs, local municipalities and researchers.

Approach to facilitating stewardship and collaboration:
The initiative is implemented according to the Rangeland Restoration Model and Toolkit (UCPP, 2016). This takes a holistic landscape management perspective. The basic principle is that healthy rangelands will produce increased quality livestock, which, with improved market access, will improve returns for rural livelihoods, with a positive feedback loop for better rangeland stewardship. This will support livestock health, resulting in improved basal cover and grassland biodiversity, and improved ecosystem services. Collaboration is informal and based on good will and shared interests, through a forum which meets quarterly and is open to all interested stakeholders. The initiative is run by a team of about three facilitators in the landscape, with support from a team of local managers, and many links with partner stakeholders.

Photo: This photo was taken at a cattle auction near Matatiele in the upper Umzimvubu catchments. Cattle auctions are used to incentivize sustainable grazing management. Farmers who comply with grazing guidelines get better prices at auctions than those who do not. The auctions also bring black and white cattle owners together, in the communal area, which is a new experience for everyone involved. Photo credit: Nicky McLeod, Environmental and Rural Solutions.

See the Umzimvubu Catchment Partnership Programme website for further information on this initiative: https://umzimvubu.org/about/

Case 5 (BL): Baviaans-Langkloof Landscapes Initiative
Run by Living Lands, in partnership with Commonland and Grounded

Landscape overview:
The Baviaans, Kouga and Krom catchments fall within a strategic water source area and supply 70% of the water supply to the downstream city of Port Elizabeth. The area includes two distinctive sub-regions: the Baviaanskloof and the Langkloof (See Chapter 6). The landscapes have high biodiversity value (including seven of South Africa's nine biomes), and a high proportion of land is under protected area management. The remaining land is primarily used for private, commercial farming, including livestock (goats, sheep and cattle), intensive fruit farming (apples and pears and stone fruit), mixed farming and lifestyle farming. Threats to the catchment in the Baviaanskloof include degradation due to unsustainable farming and subsequent change in hydrological function. In the Langkloof threats include unsustainable farming and land management practices and alien invasive trees, increasing competition for scarce water resources. Key ecosystem services include, amongst others, mixed commercial agriculture and water production (provisioning); habitat for biodiversity conservation in a large protected area network (supporting); and ecotourism for biodiversity and cultural heritage, and recreational activities (cultural).

Social-ecological objectives and activities:
The aim of the landscape initiative (they prefer calling it a 'process') is to work towards living landscapes with a focus on ecological restoration for social-ecological sustainability. Water security is a key objective. They focus on the facilitation of collaboration between farmers and other stakeholders for knowledge creation through individual relationships; working on implementing sustainable farming and land use practices practices; ecological rehabilitation including invasive alien plant control and land restoration; development of green economy businesses.

Approach to facilitating stewardship and collaboration:
The initiative is implemented according to the 'Living Landscape Approach' (Living Lands, 2017), guided by social learning principles from Theory U (Scharmer, 2009b). They also use the Four Returns business model promoted by the international NGO Commonland, which proposes landscape management according to different use zones. This aims at bringing a return of financial, natural, and social capital; and inspiration (Commonland Foundation, 2015). Collaboration is mostly informal, focused on willing farmers or stewards. Where suitable, formal conservation or green business agreements have been signed with landowners. Living Lands also partners with various other stakeholders, including an organization focused on green agri-business development called 'Grounded', and the international foundation Commonland. The project is run by a team of about six facilitators in the landscape who are supported by a team of managers and support staff (some local, some remote), and a team of nine who do practical rehabilitation work.

Photo: A farmer in the Baviaanskloof talking about how he has restored thicket vegetation by planting 'spekboom' (an indigenous succulent plant). He is one of the 'champion' farmers with a strong stewardship ethic whom Living Lands has worked with and has demonstrated that changing farming practices for better stewardship can make financial sense.

See the Living Lands website for further information on this initiative: https://livinglands.co.za/

Case 6 (KM): WWF-Mondi Water Stewardship Partnership – KwaZulu-Natal Midlands

Run by WWF (World Wide Fund for Nature) South Africa

Landscape overview:
The upper uMngeni and mid-uMvoti catchments in the province of KwaZulu-Natal (KZN) are the focus of this case study, and form part of the Southern Drakensberg Strategic Water Source Area. Approximately 70% of land cover is commercial agricultural land (forestry, dairy, sugarcane, piggeries, poultry and beef), and the catchment supplies water for 5 million people. Water, soil and land are in high demand, and biodiversity is under threat from development. There is not enough water for the ecological reserve (water which should legally be set aside for ecological functioning), and concerns about water security, with respect to water quality and quantity are increasing. The initiative has a specific focus in three sub-catchments: Little Mooi, Karkloof, and mid uMvoti (Midlands North). Key ecosystem services include, amongst others mixed commercial agriculture and water production (provisioning); some habitat for biodiversity conservation (supporting); and various tourism and recreational activities (cultural).

Social-ecological objectives and activities:
The initiative works in major water-stressed catchments with agricultural industries that have traditionally impacted wetlands and water resources, including sugar, dairy and forestry. The aim is to bring about improved water stewardship, focused on both water quality and quantity, through implementation of scientifically-based stewardship actions such as improved farming practices. There is a strong focus on working across the agricultural value chain.

Approach to facilitating stewardship and collaboration:
The initiative is applying the Resilient Landscape Approach for Water Stewardship: The approach has 3 Pillars: 1. Social-ecological resilience, 2. Creating Shared Value, 3. Social Learning (WWF-SA, 2015). The approach is aimed at strengthening the resilience of the freshwater ecological infrastructure. The initiative works with key stakeholders in these catchments, to collaboratively share their learning to gain a deeper understanding of the shared value of the freshwater ecological infrastructure to different business interests, shared risk of its degradation, and shared actions to secure the integrity of these freshwater ecosystems. Collaboration is mostly informal and based on working with willing stewards and governance structures such as irrigation boards. The initiative is run by a team of two facilitators in the landscape, with support from remote managers.

Photo: This photo shows a group of people in a 'Water Security Dialogue' which was facilitated by WWF in the KZN Midlands. This is part of their work facilitating social learning among diverse stakeholders across the agricultural value chain, to explore shared water risks and move towards identifying collective stewardship practices. Photo credit: Sue Viljoen, WWF-SA.

See the WWF South Africa website for further information on this initiative which is part of the Mondi Wetlands Programme: http://www.wwf.org.za/what_we_do/freshwater/mwp/

Appendix 8: Additional information about knowledge co-production in multi-case study

PART 1: WORKSHOP PROGRAMME

<u>Day 1:</u>
- Introduction and setting the scene: Unpacking the Learning Jar to make the 'Map of Stories', introducing the 'Map of Learning'.

    <u>Guiding question (topics) on the Map of Learning:</u>
    - *What are the underlying enablers of stewardship?*
    - *What are the systemic barriers to stewardship?*
    - *How do we build collaboration?*
    - *What kinds of tools, approaches and methods do we use?*
    - *How do we incentivise participation?*
    - *What kind of practical activities do we use to build collaboration?*
    - *What tips and tricks can we share for bringing people together?*
    - *What kind of guiding principles or philosophy underlies our work?*
    - *Who are the stakeholders we bring together?*
    - *What kind of outcomes do we seek in our projects?*
    - *Any 'A-ha!' learning moments or insights?*
    - *What values* underpin our work and motivate us? (*What do we judge to be important in life?)*

- Getting to know each other through 'Dialogue Interviews' (See Part 2)
- Setting our learning intentions
- Sharing stories from the field: Getting to know the case studies
- Re-visiting the 'Map of Learning' to elicit lessons from the case study stories
- 'Learning Journey' to Case 6: Karkloof farming area (See Part 2)
- Dinner and music evening to relax together

<u>Day 2:</u>
- Check-in and plan for the day
- 'Case clinics': small group discussions about key challenges practitioners experience in facilitating collaboration for stewardship (based on 'Case Clinic' approach, see Part 2)

    <u>Topics for case clinics: Three practitioners offered a 'case' from their work for discussion:</u>

    - *Topic 1: The challenges of working with unwilling stakeholders in a socially conflicted environment where stakeholders compete for resources and there are historical conflicts between farmers and environmental organisations.*
    - *Topic 2: Moving from individual to collective action – is it always necessary and how do you know when to do it? Working with individual farmers is often easier than bringing diverse stakeholders together, yet collective action is needed for large-scale change – how can this tension be managed.*

o *Topic 3: Difficulty in accessing funding for suitable incentives for the community i.e. the need to address farmers' basic needs as part of a holistic community-oriented approach to conservation when funders are only willing to pay for ecological actions.*

- Re-visit Map of Learning to distill lessons from small group discussions
- Reflections on learning (based on 'Guided Journalling', see Appendix 1, Part 2)
- 'Prototyping' and wrapping up: designing an ideal stakeholder engagement process to facilitate collaboration for stewardship to consolidate lessons learnt (See Appendix 1, Part 2 for more on 'Prototypes')

PART 2: THEORY U-TOOLS USED TO FACILITATE THE WORKSHOP

Source: https://www.presencing.org/#/resource/tools

Name of tool	Purpose of tool	How the tool was applied in the workshop
Dialogue interview	To initiate a generative dialogue that allows for reflection, thinking together and some sparks of collective creativity to happen.	The dialogue interview was used for workshop participants to get to know each other, to practice deep listening, and to begin reflecting on shared interests and experiences in their work.
Case clinics	To access the wisdom and experience of peers and to help a peer respond to an important and immediate leadership challenge in a better and more innovative way.	Case clinics were used for small-group discussions about specific challenges which participants faced in building collaboration for stewardship
Learning or sensing journeys	To allow participants to break-through existing patterns of seeing and listening by stepping into a different and relevant perspective and experience. Sensing Journeys can also help build relationships with key stakeholders, and gain a system perspective.	A short learning journey was conducted to visit one of the case studies which was near the workshop journey: it was a way for participants to get to know each other in a more informal setting, and to get deeper insight into one of the case studies in a more tangible way.
Guided journaling	Guided journaling leads practitioners through a process of self-reflection. This process allows participants to step into a deeper level of reflection than in an un-guided journaling process, and identify concrete action steps.	Guided journaling was used to support practitioners in reflecting on their learning and personal growth in the workshop, and to envisage commitments and actions they could take in their life and work after the workshop.
Prototype	Prototypes are an early draft of what the final result might look like, which means that they often go through several iterations based on the feedback generated from stakeholders. A prototype is a practical and tested mini version of what later could become a pilot project that can be shared and eventually scaled.	The workshop participants developed a prototype "Stakeholder Engagement Process" for a hypothetical landscape project. The prototype included actions, deliverables and outcomes. This activity served to crystallize some of the knowledge generated in the workshop and develop a practical guide for implementing the knowledge.

Appendix 9: Reflections on methods for knowledge co-production

The Learning Jar and the Story Cards were creative research methods employed intentionally to counteract potential research fatigue, which is a concern in transdisciplinary knowledge co-production processes, and to experiment with novel qualitative research methodologies.

The Learning Jar appears to have been a success: it had a positive influence in the data collection process on site visits in a number of ways (insights collated from research journal observations): It caught participants' interest and made the site visits fun and interactive (for both the researcher and the participants), it became a useful communication tool in emails to begin connecting case study participants with one another before the workshop, it was a visual, tangible illustration of the shared experiences across the case studies (despite their diversity in many other ways), and, finally, it acted as a connector between the site visits and the workshop. At the workshop, the contents of the Learning Jar were unpacked to make the 'Map of Stories', making a direct link between the site visits and the workshop. It also made tangible the emphasis on shared learning across sites, and the created a visible symbol of the value of each individual practitioners' stories and experiences for the whole process. Overall, the Learning Jar and Story Cards contributed positively to the data collection experiences during site visits, however on all site visits times was limited, and these tools could not be used to their full potential.

Most practitioners who participated in the workshop had a positive experience (Figure A9-1), and seven out of nine who responded to the feedback and evaluation survey said that they would like to participate in another workshop like this. The challenge of finding the balance between team-building and trust-building, and co-producing knowledge during the workshop, was something which many participants commented on, and this also comes through in participants' feedback about whether they achieved their learning intentions for the workshop: Most participants felt that they connected, learnt and shared together, but less felt that they gained new knowledge or skills or a new perspective (Figure A9-1). The Theory U tools were primarily employed to develop the feeling of belonging in the team and build trust, and the feedback indicates that these tools were used successfully. These quotes from participants illustrate this:

> "I think the workshop allowed space (in terms of both quality and quantity) to interact with one another and to gain an understanding of the different people's work and therefore really strongly helped build relationships and trust. Which is really valuable – especially considering that collaboration is about relationships and because you were bringing opposing (in terms of funding) organisations together."
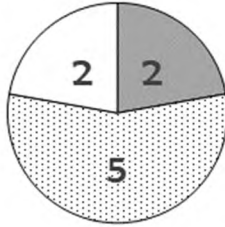
1. Gain knowledge or skills

Gain skills in social process facilitation

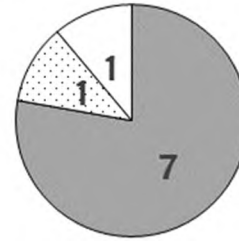3, 6
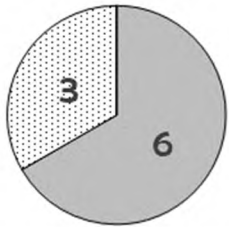
Learn about approaches to stakeholder engagement

1, 3, 5
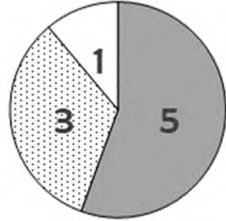
Explore benefits of stewardship to landowners

2, 2, 5

2. Connect

Find a common purpose

1, 1, 7

Develop new partnerships

1, 1, 7
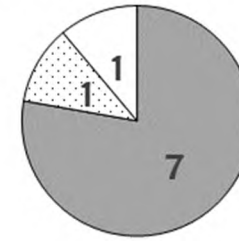
See emergence of a new community of practice

1, 3, 5
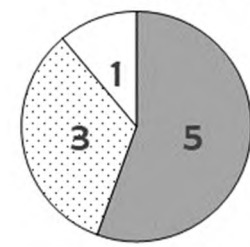
3. Share and learn together

Lesson sharing on successes and failure through having fun

1, 8

Share (generally)

9

Learn (generally)

2, 7
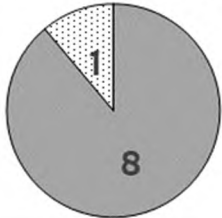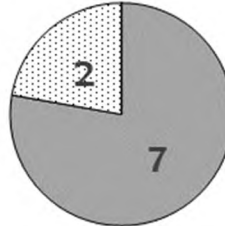
4. Gain new perspective

Be able to see new ways of dealing with old problems

1, 3, 5
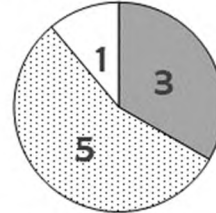
Do some 'horizon-scanning' (get fresh perspective, think big)

4, 5
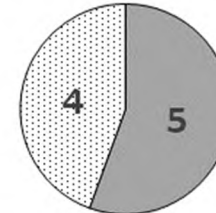
Find wisdom and insight

1, 1, 7
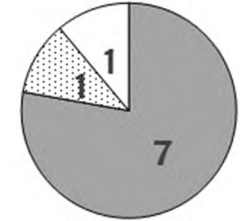
5. Be inspired and have fun

Find inspiration

9

Be free

4, 5

Have fun

2, 6
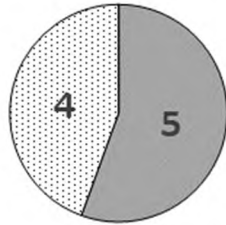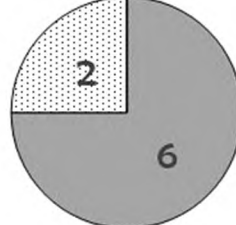
Key: *Did you achieve this learning intention in the workshop?*

- Yes
- Somewhat
- No
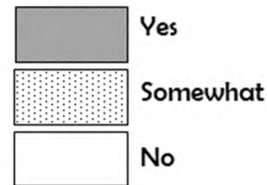
Figure A9-1: Workshop participants' feedback on their learning intentions for the workshop: The learning intentions were developed collectively at the start of the workshop, and participants were asked to provide feedback in an online survey as to whether they achieved their learning intentions.

"To network and have that chance to chat with like-minded people, our work is difficult to explain and understand for others, I felt a strong sense of community"

"The workshop was very valuable. The workshop approach was very different to what I have experienced before and made me stretch myself, but that was a good thing. The facilitators where all very good and I really enjoyed the entire experience."

However, not all participants felt that they benefited from the workshop, for example, one participant, after responding *"Nothing"* to the question 'What did you learn about facilitating stewardship and / or collaboration that you did not know before?' commented as follows:

"I'm at a stage where I need to work with other experienced practitioners in the work place on projects together in order to learn"

Although the team-building and personal development and reflection aspects of the workshop may have been more successful than the intended knowledge co-production (and some people even felt that they did not learn anything new), there was new knowledge developed (as shown in Chapter 7) and setting up a process and facilitating a 'safe space' for people to share their experiences, challenges and knowledge was valuable, and most participants appreciated this. For example:

"The workshop gave us a platform where we all shared our interest and challenges working in the conservation space"

"Learning how to better enable stewardship to work, by learning from projects that has shown success over long periods."

We reflected on the workshop as a facilitating team afterwards, and I captured some of the main thoughts from that discussion in Figure A9-2. We reflected both on the facilitation process itself (right hand side, blue text), and about the content i.e. about stewardship and collaboration (left hand side, orange text).

The lessons about the facilitation process included the importance of time management and the need for 'more time' for this kind of process to allow deeper thinking and learning. We learnt that one should prepare very carefully how to explain and facilitate the Theory-U tools. We also learnt that one needs a clear focus on objectives and intentions so that the workshop does not feel vague or go off track. I found it difficult to strike the balance between an open space in which the participants could direct the agenda to some extent according to their own learning needs and interests, versus a process that is focused on clear objectives and works towards achieving these in a focused manner.
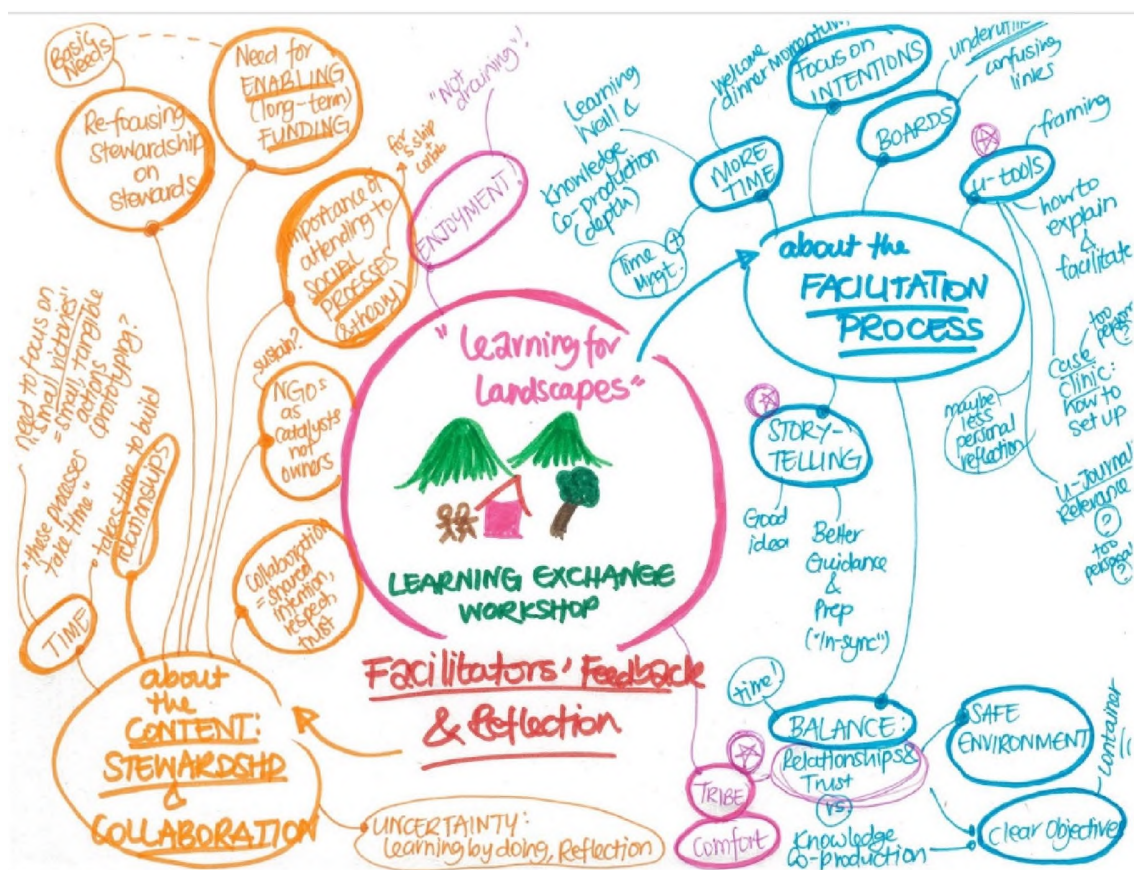
Figure A9-2: Facilitators' feedback and reflections on the knowledge co-production workshop

Although no clear 'community of practice' has emerged from this workshop yet, new relationships and partnerships did develop, for example a few months after the workshop, one of the participating practitioners invited someone from another case study to co-facilitate a workshop with stakeholders in her case study. The combination of the social process facilitation tools provided by Theory U, and the knowledge co-production tools which were used experimentally in this workshop (e.g. Map of Stories, Map of Learning) worked well, however in the short time frames of the workshop (2 days), it is difficult to build a sense of the team and create trusting relationships and expect there still to be time for in-depth engagement with the knowledge content as well.

REFERENCES

Adams, V. M., Pressey, R. L., & Stoeckl, N. (2014). Estimating landholders' probability of participating in a stewardship program, and the implications for spatial conservation priorities. *PLoS ONE, 9*(6), e97941.

Africa Research Institute. (2013). *Waiting for the green revolution: Land reform in South Africa: Briefing note 1301, May 2013*. London, United Kingdom: Africa Research Institute. Retrieved from https://www.africaresearchinstitute.org/newsite/wp-content/uploads/2013/05/BN1301-South-Africa-Land-Reform1.pdf

Agrawal, A. (2003). Sustainable governance of common-pool resources: Context, methods, and politics. *Annual Review of Anthropology, 32*(1), 243-262.

Ainslie, A. (1999). When 'community' is not enough: Managing common property natural resources in rural South Africa. *Development Southern Africa, 16*(3), 375-401.

Alexander, S. M., & Armitage, D. (2015). A social relational network perspective for MPA science. *Conservation Letters, 8*(1), 1-13.

Angelstam, P., Elbakidze, M., Axelsson, R., Dixelius, M., & Törnblom, J. (2013a). Knowledge production and learning for sustainable landscapes: Seven steps using social–ecological systems as laboratories. *AMBIO, 42*(2), 116-128.

Angelstam, P., Grodzynskyi, M., Andersson, K., Axelsson, R., Elbakidze, M., Khoroshev, A., Kruhlov, I., & Naumov, V. (2013b). Measurement, collaborative learning and research for sustainable use of ecosystem services: Landscape concepts and europe as laboratory. *AMBIO, 42*(2), 129-145.

Ansell, A. E. (2004). Two nations of discourse: Mapping racial ideologies in post-apartheid South Africa. *Politikon, 31*(1), 3-26.

Ansell, C., & Gash, A. (2007). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory, 18*, 543-571.

Archer, M., Bhaskar, R., Collier, A., Lawson, T., & Norrie, A. (Eds.). (1998). *Critical realism: Essential readings*. London, United Kingdom: Routledge.

Armitage, D. (2007). Building resilient livelihoods through adaptive co-management: The role of adaptive capacity. In D. Armitage, F. Berkes & N. Doubleday (Eds.), *Adaptive co-management: Collaboration, learning, and multi-level governance* (pp. 62-82). Vancouver, Canada: UBC Press.

Armitage, D., Berkes, F., & Doubleday, N. (2007a). Introduction: Moving beyond co-management. In D. Armitage, F. Berkes & N. Doubleday (Eds.), *Adaptive co-management: Collaboration, learning, and multi-level governance* (pp. 1-15). Vancouver, Canada: UBC Press.

Armitage, D., Berkes, F., & Doubleday, N. (Eds.). (2007b). *Adaptive co-management: Collaboration, learning, and multi-level governance*. Vancouver, Canada: UBC Press.

Armitage, D., Marschke, M., & Plummer, R. (2008). Adaptive co-management and the paradox of learning. *Global Environmental Change, 18*(1), 86-98.

Arts, B., Buizer, M., Horlings, L., Ingram, V., van Oosten, C., & Opdam, P. (2017). Landscape approaches: A state-of-the-art review. *Annual Review of Environment and Resources, 42*(1), 439-463.

Ashcroft, J., Childs, R., Myers, A., & Schluter, M. (2016). *The relational lens: Understanding, managing and measuring stakeholder relationships*. Cambridge, United Kingdom: Cambridge University Press.

Ashwell, A., Sandwith, T., Barnett, M., Parker, A., & Wisani, F. (2006). *Fynbos fynmense: People making biodiversity work. SANBI Biodiversity Series 4*. Pretoria, South Africa: South African National Biodiversity Institute. Retrieved from https://www.sanbi.org/sites/default/files/documents/documents/biodiversityseries4.pdf

Athayde, S., Silva-Lugo, J., Schmink, M., Kaiabi, A., & Heckenberger, M. (2017). Reconnecting art and science for sustainability: Learning from indigenous knowledge through participatory action-research in the Amazon. *Ecology and Society, 22*(2), 36.

Attfield, R. (2014). Stewardship. In H. ten Have (Ed.), *Encyclopedia of global bioethics* (pp. 1-11). Dordrecht, The Netherlands: Springer International Publishing.

Audouin, M., Preiser, R., Nienaber, S., Downsborough, L., Lanz, J., & Mavengahama, S. (2013). Exploring the implications of critical complexity for the study of social-ecological systems. *Ecology and Society, 18*(3), 12.

Babin, N., Mullendore, N. D., & Prokopy, L. S. (2016). Using social criteria to select watersheds for non-point source agricultural pollution abatement projects. *Land Use Policy, 55*, 327-333.

Baiphethi, M. N., & Jacobs, P. T. (2009). The contribution of subsistence farming to food security in South Africa. *Agrekon, 48*(4), 459-482.

Balée, W. (2006). The research program of historical ecology. *Annual Review of Anthropology, 35*(1), 75-98.

Balmford, A. (2003). Conservation planning in the real world: South Africa shows the way. *Trends in Ecology & Evolution, 18*(9), 435-438.

Bank, L., & Minkley, G. (2005). Going nowhere slowly? Land, livelihoods and rural development in the Eastern Cape. *Social Dynamics, 31*(1), 1-38.

Bardi, A., & Schwartz, S. H. (2003). Values and behavior: Strength and structure of relations. *Personality and Social Psychology Bulletin, 29*(10), 1207-1220.

Barendse, J., Roux, D., Currie, B., Wilson, N., & Fabricius, C. (2016). A broader view of stewardship to achieve conservation and sustainability goals in South Africa. *South African Journal of Science, 112*(5/6), #2015-0359.

Bazeley, P. (2007). *Qualitative data analysis with NVivo*. London, United Kingdom: SAGE Publications Ltd.

Bazeley, P. (2009). Analysing qualitative data: More than 'identifying themes'. *Malaysian Journal of Qualitative Research, 2*(2), 6-22.

Bazeley, P. (2011). Integrative analysis strategies for mixed data sources. *American Behavioral Scientist, 56*(6), 814-828.

Beinart, W. (2000). African history and environmental history. *African Affairs, 99*(395), 269-302.

Beinart, W., & Delius, P. (2014). The historical context and legacy of the Natives Land Act of 1913. *Journal of Southern African Studies, 40*(4), 667-688.

Bek, D., Nel, E., & Binns, T. (2017). Jobs, water or conservation? Deconstructing the green economy in South Africa's Working for Water programme. *Environmental Development, In Press.*

Bell, L. A. (2016). Theoretical foundations for social justice education. In L. A. Bell & M. Adams (Eds.), *Teaching for diversity and social justice* (pp. 3-26). New York, NY: Routledge.

Berbés-Blázquez, M. (2012). A participatory assessment of ecosystem services and human wellbeing in rural Costa Rica using photo-voice. *Environmental Management, 49*(4), 862-875.

Berkes, F. (2009). Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management, 90*(5), 1692-1702.

Berkes, F. (2010). Adaptive co-management and complexity: Exploring the many faces of co-management. In D. Armitage, F. Berkes & N. Doubleday (Eds.), *Adaptive co-management: Collaboration, learning, and multi-level governance* (pp. 17-37). Vancouver, Canada: UBC Press.

Berkes, F., Colding, J., & Folke, C. (2008). *Navigating social-ecological systems: Building resilience for complexity and change*. Cambridge, United Kingdom: Cambridge University Press.

Berkes, F., Doubleday, N., & Cumming, G. (2012). Aldo Leopold's land health from a resilience point of view: Self-renewal capacity of social–ecological systems. *EcoHealth, 9*(3), 278-287.

Berkes, F., & Folke, C. (1998). *Linking social and ecological systems: Management practices and social mechanisms for building resilience*. Cambridge, United Kingdom: Cambridge University Press.

Berry, R. J. (Ed.). (2006). *Environmental stewardship: Critical perspectives, past and present*. London, United Kingdom: T&T Clark.

Besada, H. (2007). *Fragile stability: Post-apartheid South Africa. Working Paper no.27*. Waterloo, Canada: The Centre for International Governance Innovation. Retrieved from https://www.cigionline.org/publications/fragile-stability-post-apartheid-south-africa

Bhaskar, R. (2010). Contexts of interdisciplinarity: Interdisciplinarity and climate change. In R. Bhaskar, C. Frank, K. G. Høyer, P. Næss & J. Parker (Eds.), *Interdisciplinarity and climate change: Transforming knowledge and practice for our global future* (pp. 1-24). Oxon, United Kingdom: Routledge.

Bhaskar, R. (2016). *Enlightened common sense: The philosophy of critical realism*. Oxon, United Kingdom: Routledge.

Bhaskar, R., & Danermark, B. (2006). Metatheory, interdisciplinarity and disability research: A critical realist perspective. *Scandinavian Journal of Disability Research, 8*(4), 278-297.

Bhaskar, R., Frank, C., Høyer, K. G., Næss, P., & Parker, J. (Eds.). (2010). *Interdisciplinarity and climate change: Transforming knowledge and practice for our global future*. Oxon, United Kingdom: Routledge.

Bhaskar, R., & Parker, J. (2010). Introduction. In R. Bhaskar, C. Frank, K. G. Høyer, P. Næss & J. Parker (Eds.), *Interdisciplinarity and climate change: Transforming knowledge and practice for our global future* (pp. vii-xiii). Oxon, United Kingdom: Routledge.

Bieling, C., & Plieninger, T. (2017). *The science and practice of landscape stewardship*. Cambridge, United Kingdom: Cambridge University Press.

Biesbroek, G. R., Klostermann, J. E. M., Termeer, C. J. A. M., & Kabat, P. (2013). On the nature of barriers to climate change adaptation. *Regional Environmental Change, 13*(5), 1119-1129.

Biesbroek, G. R., Termeer, C. J. A. M., Klostermann, J. E. M., & Kabat, P. (2014). Analytical lenses on barriers in the governance of climate change adaptation. *Mitigation and Adaptation Strategies for Global Change, 19*(7), 1011-1032.

Biggs, R., Schlüter, M., Biggs, D., Bohensky, E. L., Burnsilver, S., Cundill, G., Dakos, V., Daw, T. M., Evans, L. S., Kotschy, K., Leitch, A. M., Meek, C., Quinlan, A., Raudsepp-Hearne, C., Robards, M. D., Schoon, M. L., Schultz, L., & West, P. C. (2012). Toward principles for enhancing the resilience of ecosystem services. *Annual Review of Environment and Resources, 37*, 421-448.

Binder, C. R., Hinkel, J., Bots, P. W. G., & Pahl-Wostl, C. (2013). Comparison of frameworks for analyzing social-ecological systems. *Ecology and Society, 18*(4), 26.

Binneman, J. N. F. (1999). Mummified human remains from the Kouga mountains, Eastern Cape. *The Digging Stick, 16*(2), 1-2.

Binswanger, H. P., & Deininger, K. (1993). South African land policy: The legacy of history and current options. *World Development, 21*(9), 1451-1475.

Blackmore, A. (2015). The relationship between the NEMA and the public trust doctrine: The importance of the NEMA principles in safeguarding South Africa's biodiversity. *South African Journal of Environmental Law and Policy, 20*(2), 89-118.

Blomley, T., Pfliegner, K., Isango, J., Zahabu, E., Ahrends, A., & Burgess, N. (2008). Seeing the wood for the trees: An assessment of the impact of participatory forest management on forest condition in Tanzania. *Oryx, 42*(3), 380-391.

Blomquist, W., & Schlager, E. (2005). Political pitfalls of integrated watershed management. *Society & Natural Resources, 18*(2), 101-117.

Bodin, Ö., & Crona, B. I. (2009). The role of social networks in natural resource governance: What relational patterns make a difference? *Global Environmental Change, 19*(3), 366-374.

Bold, C. (2012). *Using narrative in research*. London, United Kingdom: SAGE Publications Ltd.

Bolton, G. (2010). *Reflective practice: Writing and professional development*. London, United Kingdom: Sage Publications Ltd.

Bond, P. (2001). *Elite transition: From apartheid to neoliberalism in South Africa*. London, United Kingdom: Pluto Press.

Bond, P. (2002). *Unsustainable South Africa: Environment, development and social protest*. Pietermaritzburg: University of Natal Press.

Bond, P. (2018). Equitable, just access to natural resources: Environmental narratives during worsening climate crises. In H. Lehmann (Ed.), *Factor X: Challenges, implementation strategies and examples for a sustainable use of natural resources* (pp. 93-111). Cham, Switzerland: Springer International Publishing.

Bond, P., & Ruiters, G. (2016). Uneven development and scale politics in Southern Africa: What we learn from Neil Smith. *Antipode, 49*(S1), 171-189.

Boonstra, W., & de Boer, F. (2014). The historical dynamics of social–ecological traps. *AMBIO, 43*(3), 260-274.

Bornman, S., Budlender, D., Clarke, Y., Manoek, S.-L., van der Westhuizen, C., Watson, J., Antunes, S., & Iqbal, N. (2013). *The state of the nation, government priorities and women in South Africa*. Cape Town, South Africa: Women's Legal Centre

Bornmann, L. (2013). What is societal impact of research and how can it be assessed? A literature survey. *Journal of the American Society for Information Science and Technology, 64*(2), 217-233.

Boshoff, A. F. (2005). *The Baviaanskloof Megareserve: An environmentally, socially and economically sustainable conservation and development initiative. Commissioned by: Baviaanskloof Megareserve project management unit*. Port Elizabeth, South Africa: Terrestrial Ecology Research Unit (TERU), Nelson Mandela Metropolitan University.

Bourke, B. (2014). Positionality: Reflecting on the research process. *The Qualitative Report, 19*(33), 1-9.

Bown, N. K., Gray, T. S., & Stead, S. M. (2013). Co-management and adaptive co-management: Two modes of governance in a Honduran marine protected area. *Marine Policy, 39*, 128-134.

Bracken, L. J., Bulkeley, H. A., & Whitman, G. (2015). Transdisciplinary research: Understanding the stakeholder perspective. *Journal of Environmental Planning and Management, 58*(7), 1291-1308.

Brandt, P., Ernst, A., Gralla, F., Luederitz, C., Lang, D. J., Newig, J., Reinert, F., Abson, D. J., & von Wehrden, H. (2013). A review of transdisciplinary research in sustainability science. *Ecological Economics, 92*, 1-15.

Brannstrom, C. (2009). South America's neoliberal agricultural frontiers: Places of environmental sacrifice or conservation opportunity. *AMBIO: A Journal of the Human Environment, 38*(3), 141-149.

Bromwich, B. (2014). *Relationships and resources: Environmental governance for peacebuilding and resilient livelihoods in Sudan*. Nairobi, Kenya: United Nations Environment Programme.

Brown, V. A., Keen, M., & Dyball, R. (2005). Lessons from the past, learning for the future. In M. Keen, V. A. Brown & R. Dyball (Eds.), *Social learning in environmental management: Towards a sustainable future* (pp. 247-265). London, United Kingdom: Earthscan.

Brussaard, L., Caron, P., Campbell, B., Lipper, L., Mainka, S., Rabbinge, R., Babin, D., & Pulleman, M. (2010). Reconciling biodiversity conservation and food security: Scientific challenges for a new agriculture. *Current Opinion in Environmental Sustainability, 2*(1), 34-42.

Bryceson, D. F. (1996). Deagrarianization and rural employment in sub-Saharan Africa: A sectoral perspective. *World Development, 24*(1), 97-111.

Buck, L. E., & Sherr, S. J. (2009). Building innovation systems for managing complex landscapes. In K. M. Moore (Ed.), *The sciences and art of adaptive management: Innovating for sustainable agriculture and natural resource management*. Ankeny, IA: Soil and Water Conservation Society.

Bürgi, M., Hersperger, A. M., & Schneeberger, N. (2005). Driving forces of landscape change - current and new directions. *Landscape Ecology, 19*(8), 857-868.

Burt, J. C. (2016). Bhaskar and collective action: Using laminations to structure a literature review of collective action and water management. In L. Price & H. Lotz-Sistka (Eds.), *Critical realism, environmental learning and social-ecological change* (pp. 98-115). New York, NY: Routledge.

Burt, J. C. (2017). *WWF's sugarcane work: Critical insights enabling sectoral transformative change*. Cape Town, South Africa: WWF-South Africa.

Burt, J. C., Cockburn, J., Fox, H., & Copteros, A. (2016). *Visit the exotic birthplaces of transdisciplinarity: Trans-disciplinarity: A journey in three stages. Unpublished background document developed for a postgraduate course on transdisciplinary research held at Rhodes University*. Retrieved from https://www.researchgate.net/publication/306119236_Visit_the_exotic_birthplaces_of_Transdisci plinarity

Büscher, B., Dressler, W., & Fletcher, R. (2014). *Nature™ Inc.: Environmental conservation in the neoliberal age* (B. Büscher, W. Dressler & R. Fletcher Eds.). Tucson, AZ: University of Arizona Press.

Butler, A. M. (2009). *Contemporary South Africa*. Basingstoke, United Kingdom: Palgrave Macmillan.

Cadman, M., Petersen, C., Driver, A., Sekhran, N., Maze, K., & Munzhedzi, S. (2010). *Biodiversity for development: South Africa's landscape approach to conserving biodiversity and promoting ecosystem resilience*. Pretoria: South African National Biodiversity Institute. Retrieved from http://www.sanbi.org/sites/default/files/documents/documents/biodiversity-development-primer.pdf

Campbell, B., Mandondo, A., Nemarundwe, N., Sithole, B., De JonG, W., Luckert, M., & Matose, F. (2001). Challenges to proponents of common property recource systems: Despairing voices from the social forests of Zimbabwe. *World Development, 29*(4), 589-600.

Campbell, B. M., & Sayer, J. (2003). *Integrated natural resource management: Linking productivity, the environment and development*. Wallington, United Kingdom: CABI Publishing.

Campbell, B. M., & Shackleton, S. (2001). The organizational structures for community-based natural resources management in Southern Africa. *African Studies Quarterly, 5*(3 | Fall 2001), 87-114.

Campbell, J. T., Koontz, T. M., & Bonnell, J. E. (2011). Does collaboration promote grass-roots behavior change? Farmer adoption of best management practices in two watersheds. *Society & Natural Resources, 24*(11), 1127-1141.

Carpenter, S. R., Folke, C., Norström, A., Olsson, O., Schultz, L., Agarwal, B., Balvanera, P., Campbell, B., Castilla, J. C., Cramer, W., DeFries, R., Eyzaguirre, P., Hughes, T. P., Polasky, S., Sanusi, Z., Scholes, R.,

& Spierenburg, M. (2012). Program on Ecosystem Change and Society: An international research strategy for integrated social–ecological systems. *Current Opinion in Environmental Sustainability, 4*(1), 134-138.

Carr, A. (2002). *Grass roots and green tape: Principles and practices of environmental stewardship.* Leichhardt, Australia: Federation Press.

Carruthers, J. (2007). 'South Africa: A world in one country': Land restitution in national parks and protected areas. *Conservation and Society, 5*(3), 292-306.

Carton, G., & Ungureanu, P. (2017). Bridging the research–practice divide. *Journal of Management Inquiry, In Press.*

Cary, J., & Webb, T. (2001). Landcare in Australia: Community participation and land management. *Journal of Soil and Water Conservation, 56*(4), 274-278.

Cash, D. W., Adger, W. N., Berkes, F., Garden, P., Lebel, L., Olsson, P., Pritchard, L., & Young, O. (2006). Scale and cross-scale dynamics: Governance and information in a multilevel world. *Ecology and Society, 11*(2), 8.

Castán Broto, V., Gislason, M., & Ehlers, M.-H. (2009). Practising interdisciplinarity in the interplay between disciplines: Experiences of established researchers. *Environmental Science and Policy, 12*(7), 922-933.

Chambers, R. (1994). The origins and practice of participatory rural appraisal. *World Development, 22*(7), 953-969.

Chan, K. M. A., Balvanera, P., Benessaiah, K., Chapman, M., Díaz, S., Gómez-Baggethun, E., Gould, R., Hannahs, N., Jax, K., Klain, S., Luck, G. W., Martín-López, B., Muraca, B., Norton, B., Ott, K., Pascual, U., Satterfield, T., Tadaki, M., Taggart, J., & Turner, N. (2016). Why protect nature? Rethinking values and the environment. *Proceedings of the National Academy of Sciences, 113*(6), 1462-1465.

Chapin, F. S., Chapin, C., Kofinas, G. P., & Folke, C. (2009a). *Principles of ecosystem stewardship: Resilience-based natural resource management in a changing world.* New York, NY: Springer.

Chapin, F. S., Folke, C., & Kofinas, G. P. (2009b). A framework for understanding change. In F. S. Chapin, G. P. Kofinas & C. Folke (Eds.), *Principles of ecosystem stewardship: Resilience-based natural resource management in a changing world* (pp. 3-28). New York, NY: Springer.

Chapin, F. S., III, Carpenter, S. R., Kofinas, G. P., Folke, C., Abel, N., Clark, W. C., Olsson, P., Smith, D. M. S., Walker, B., Young, O. R., Berkes, F., Biggs, R., Grove, J. M., Naylor, R. L., Pinkerton, E., Steffen, W., & Swanson, F. J. (2009c). Ecosystem stewardship: Sustainability strategies for a rapidly changing planet. *Trends in Ecology & Evolution, 25*(4), 241-249.

Chapin, F. S., III, Pickett, S. A., Power, M., Jackson, R., Carter, D., & Duke, C. (2011a). Earth stewardship: A strategy for social–ecological transformation to reverse planetary degradation. *Journal of Environmental Studies and Sciences, 1*(1), 44-53.

Chapin, F. S., & Knapp, C. N. (2015). Sense of place: A process for identifying and negotiating potentially contested visions of sustainability. *Environmental Science & Policy, 53*(Part A), 38-46.

Chapin, F. S., Kofinas, G. P., Folke, C., Carpenter, S. R., Olsson, P., Abel, N., Biggs, R., Naylor, R. L., Pinkerton, E., Stafford, D. M., Steffen, W., Walker, B., & Young, O. R. (2009d). Resilience-based stewardship: Strategies for navigating sustainable pathways in a changing world. In F. S. Chapin, G. P. Kofinas & C. Folke (Eds.), *Principles of ecosystem stewardship: Resilience-based natural resource management in a changing world* (pp. 319-337). New York, NY: Springer.

Chapin, F. S., Power, M. E., Pickett, S. T. A., Freitag, A., Reynolds, J. A., Jackson, R. B., Lodge, D. M., Duke, C., Collins, S. L., Power, A. G., & Bartuska, A. (2011b). Earth stewardship: Science for action to sustain the human-earth system. *Ecosphere, 2*(8), 89.

Chapin, F. S., Sommerkorn, M., Robards, M. D., & Hillmer-Pegram, K. (2015). Ecosystem stewardship: A resilience framework for arctic conservation. *Global Environmental Change, 34*, 207-217.

Cheng, A. S., Kruger, L. E., & Daniels, S. E. (2003). "Place" as an integrating concept in natural resource politics: Propositions for a social science research agenda. *Society & Natural Resources, 16*(2), 87-104.

Cheng, A. S., & Mattor, K. M. (2006). Why won't they come? Stakeholder perspectives on collaborative national forest planning by participation level. *Environmental Management, 38*(4), 545-561.

Cheng, A. S., & Randall-Parker, T. (2017). Examining the influence of positionality in evaluating collaborative progress in natural resource management: Reflections of an academic and a practitioner. *Society & Natural Resources, 30*(9), 1-11.

Child, B., & Barnes, G. (2010). The conceptual evolution and practice of community-based natural resource management in Southern Africa: Past, present and future. *Environmental Conservation, 37*(3), 283-295.

Church, S. P., & Prokopy, L. S. (2017). The influence of social criteria in mobilizing watershed conservation efforts: A case study of a successful watershed in the Midwestern U.S. *Land Use Policy, 61*, 353-367.

Cilliers, P. (2000). What can we learn from a theory of complexity? *Emergence, 2*(1), 23-33.

Cilliers, P. (2005). Complexity, deconstruction and relativism. *Theory, Culture & Society, 22*(5), 255-267.

Clay, J. (2004). *World agriculture and the environment: A commodity-by-commodity guide to impacts and practices*. Washington, DC: Island Press.

Cleaver, F. (2002). Reinventing institutions: Bricolage and the social embeddedness of natural resource management. *The European Journal of Development Research, 14*(2), 11-30.

Cleaver, F. (2007). Understanding agency in collective action. *Journal of Human Development, 8*(2), 223-244.

Cleaver, F. (2012). *Development through bricolage: Rethinking institutions for natural resource management*. Oxon, United Kingdom: Routledge.

Cleaver, F., & de Koning, J. (2015). Furthering critical institutionalism. *International Journal of the Commons, 9*(1), 1-18.

Clifford-Holmes, J. K. (2015). *Fire and water: A transdisciplinary investigation of water governance in the Lower Sundays River, South Africa. Unpublished PhD thesis*. Grahamstown, South Africa: Rhodes University.

Clover, J., & Eriksen, S. (2009). The effects of land tenure change on sustainability: Human security and environmental change in Southern African savannas. *Environmental Science & Policy, 12*(1), 53-70.

Cockburn, J. (2013). *Implementation of the push-pull strategy for Eldana saccharina control on sugarcane in KwaZulu-Natal, South Africa. Unpublished MSc thesis*. Potchefstroom, South Africa: North-West University.

Cockburn, J. (2017). Stewardship matters: For people, for the earth. *Conservation Matters, 2017*(3 - The Earth Edition), 5-6. Retrieved from: http://www.ewt.org.za/MAGAZINE/April%202017/Conservation%202020Matters%202020April-%202020Small%202020file.pdf.

Cockburn, J., & Cundill, G. (In Press). Ethics in transdisciplinary research: Reflections on the implications of 'science with society'. In C. Macleod, J. Marx, P. Mnyaka & G. Treharne (Eds.), *Handbook of ethics in critical research: Stories from the field*. London, United Kingdom: Palgrave Macmillan.

Cockburn, J., Koopman, V., Pereira, L. M., & Van Niekerk, J. (2018). Institutional bricolage to address sustainability challenges in the South African sugarcane industry: A case study of the SUSFARMS® initiative in the Midlands area of KwaZulu-Natal, South Africa. In L. M. Pereira, C. A. McElroy, A. Littaye & A. M. Girard (Eds.), *Food, energy and water sustainability: Emergent governance strategies*. Oxon, United Kingdom: Routledge.

Cockburn, J., Rouget, M., Slotow, R., Roberts, D., Boon, R., Douwes, E., O'Donoghue, S., Downs, C. T., Mukherjee, S., Musakwa, W., Mutanga, O., Mwabvu, T., Odindi, J., Odindo, A., Proche, erban, Ramdhani, S., Ray-Mukherjee, J., Sershen, Schoeman, M. C., Smit, A. J., Wale, E., & Willows-Munro, S. (2016). How to build science-action partnerships for local land-use planning and management: Lessons from Durban, South Africa. *Ecology and Society, 21*(1), 28.

Coetzer, K. L., Witkowski, E. T., & Erasmus, B. F. (2014). Reviewing Biosphere Reserves globally: Effective conservation action or bureaucratic label? *Biological Reviews, 89*(1), 82-104.

Colfer, C. J. P. (2005). *The complex forest: Communities, uncertainty, and adaptive collaborative management*. Washington, DC: RFF Press - Resources for the Future.

Colfer, C. J. P., & Pfund, J. L. (2012). *Collaborative governance of tropical landscapes*. London, United Kingdom: Earthscan.

Commonland Foundation. (2015). *Four returns from landscape restoration: A systemic and practical approach to restore degraded landscapes*. Amsterdam, Netherlands: Commonland Foundation. Retrieved from http://cmsdata.iucn.org/downloads/commonland_background_paper.pdf

Cornell, S. (2010). Climate change: Brokering interdisciplinarity across the phyisical and social sciences. In R. Bhaskar, C. Frank, K. G. Høyer, P. Næss & J. Parker (Eds.), *Interdisciplinarity and climate change: Transforming knowledge and practice for our global future* (pp. 116-134). Oxon, United Kingdom: Routledge.

Cornell, S., & Parker, J. (2010). Critical realist interdisciplinarity: A research agenda to support action on global warming. In R. Bhaskar, C. Frank, K. G. Høyer, P. Næss & J. Parker (Eds.), *Interdisciplinarity and climate change: Transforming knowledge and practice for our global future* (pp. 25-34). Oxon, United Kingdom: Routledge.

Cote, M., & Nightingale, A. J. (2011). Resilience thinking meets social theory: Situating change in socio-ecological systems (SES) research. *Progress in Human Geography, 36*(4), 475–489.

Cradock-Henry, N. A., Greenhalgh, S., Brown, P., & Sinner, J. (2017). Factors influencing successful collaboration for freshwater management in Aotearoa, New Zealand. *Ecology and Society, 22*(2), 14.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative and mixed methods approaches*. Thousand Oaks, CA: Sage Publications, Inc.

Crona, B., Ernstson, H., Prell, C., Reed, M., & Hubacek, K. (2011). Combining social network approaches with social theories to improve understanding of resource governance. In O. Bodin & C. Prell (Eds.), *Social networks and natural resource management: Uncovering the social fabric in environmental governance* (pp. 44-71). Cambridge, United Kingdom: Cambridge University Press.

Crona, B., & Hubacek, K. (2010). The right connections: How do social networks lubricate the machinery of natural resource governance? *Ecology and Society, 15*(4), 18.

Crossley, N. (2011). *Towards relational sociology*. Oxon, United Kingdom: Routledge.

Crutzen, P. J. (2002). Geology of mankind. *Nature, 415*(6867), 23.

Cumming, G. S., Cumming, D. H. M., & Redman, C. L. (2006). Scale mismatches in social-ecological systems: Causes, consequences, and solutions. *Ecology and Society, 11*(1), 14.

Cundill, G. (2010). Monitoring social learning processes in adaptive comanagement: Three case studies from South Africa. *Ecology and Society, 15*(3), 28.

Cundill, G., & Fabricius, C. (2008). Adaptive co-management under resource-poor conditions: Lessons from South Africa. In M. Burns & A. Weaver (Eds.), *Exploring sustainability science: A Southern African perspective* (pp. 537-567). Stellenbosch, South Africa: African Sun Media.

Cundill, G., & Fabricius, C. (2010). Monitoring the governance dimension of natural resource co-management. *Ecology and Society, 15*(1), 15.

Cundill, G., & Rodela, R. (2012). A review of assertions about the processes and outcomes of social learning in natural resource management. *Journal of Environmental Management, 113*, 7-14.

Cundill, G., Roux, D. J., & Parker, J. N. (2015). Nurturing communities of practice for transdisciplinary research. *Ecology and Society, 20*(2), 22.

Cundill, G., Thondhlana, G., Sisitka, L., Shackleton, S., & Blore, M. (2013). Land claims and the pursuit of co-management on four protected areas in South Africa. *Land Use Policy, 35*, 171-178.

Curtis, A., & Lacy, T. D. (1998). Landcare, stewardship and sustainable agriculture in Australia. *Environmental Values, 7*(1), 59-78.

Danermark, B., Ekström, M., Jakobson, L., & Karlson, J. C. (2005). *Explaining society: Critical realism in the social sciences*. London, United Kingdom: Routledge.

Davidson, C. (2009). Transcription: Imperatives for qualitative research. *International Journal of Qualitative Methods, 8*(2), 35-52.

Davidson, D. J. (2010). The applicability of the concept of resilience to social systems: Some sources of optimism and nagging doubts. *Society & Natural Resources, 23*(12), 1135-1149.

Daw, T., Brown, K., Rosendo, S., & Pomeroy, R. (2011). Applying the ecosystem services concept to poverty alleviation: The need to disaggregate human well-being. *Environmental Conservation, 38*(4), 370-379.

de Groot, R. S., Wilson, M. A., & Boumans, R. M. J. (2002). A typology for the classification, description and valuation of ecosystem functions, goods and services. *Ecological Economics, 41*, 393-408.

de Jong, S. P. L., Smit, J., & van Drooge, L. (2016). Scientists' response to societal impact policies: A policy paradox. *Science and Public Policy, 43*(1), 102-114.

de Jong, T. (2012). *Fragmentation as a collective interest: A case study about irrigating farmers, water scarcity, and collective action in the upper Kromme river catchment, South Africa. Unpublished MSc thesis*. Wageningen, The Netherlands: Wageningen University.

de Kock, C. (2015). *Farming in the Langkloof: Coping with and adapting to environmental shock and social stress. Unpublished MSc thesis*. Stellenbosch, South Africa: University of Stellenbosch.

de Koning, J. (2014). Unpredictable outcomes in forestry—governance institutions in practice. *Society & Natural Resources, 27*(4), 358-371.

de Laat, Z. (2017). *The presumed increase of access due to redistribution of property rights in rural South Africa an analysis of policies and daily practices on land reform farms in the Langkloof. Unpublished MSc thesis*. Wageningen: Wageningen University.

de Snoo, G. R., Herzon, I., Staats, H., Burton, R. J. F., Schindler, S., van Dijk, J., Lokhorst, A. M., Bullock, J. M., Lobley, M., Wrbka, T., Schwarz, G., & Musters, C. J. M. (2013). Toward effective nature conservation on farmland: Making farmers matter. *Conservation Letters, 6*(1), 66-72.

de Vente, J., Reed, M. S., Stringer, L. C., Valente, S., & Newig, J. (2016). How does the context and design of participatory decision making processes affect their outcomes? Evidence from sustainable land management in global drylands. *Ecology and Society, 21*(2), 24.

Denier, L., Scherr, S., Shames, S., Chatterton, P., Hovani, L., & Stam, N. (2015). *The little sustainable landscapes book*. Oxford: Global Canopy Programme.

Department of Agriculture. (2008). *National agricultural research and development strategy*. Pretoria, South Africa: Department of Agriculture, Government of South Africa. Retrieved from http://www.gov.za/documents/national-agricultural-research-and-development-strategy

Department of Agriculture Forestry and Fisheries. (2014). *Trends in the agricultural sector 2013*. Pretoria, South Africa: Department of Agriculture, Forestry and Fisheries (DAFF). Retrieved from http://www.econostatistics.co.za/TrendsinSAAgriculture13.pdf

Department of Agriculture: Province of the Western Cape. (2016). *Annual report: Financial year 2015/16*. Elsenburg, South Africa: Department of Agriculture, Province of the Western Cape. Retrieved from https://www.westerncape.gov.za/assets/departments/treasury/Documents/Annual-Report/2016/v03_pt_annual_report_2015_16_to_printers_updated_21_september_2016.pdf

Department of Environmental Affairs. (2010). *National Protected Area Expansion Strategy for South Africa 2008*. Pretoria, South Africa: Government of South Africa. Retrieved from https://www.environment.gov.za/sites/default/files/docs/nationalprotected_areasexpansion_strategy.pdf

Department of Environmental Affairs. (2012). *2nd South Africa Environment Outlook. A report on the state of the environment. Executive summary*. Pretoria, South Africa: Department of Environmental Affairs. Retrieved from https://www.environment.gov.za/sites/default/files/reports/environmentoutlook_executivesummary.pdf

Department of Environmental Affairs. (2015). *Media release: South Africa welcomes the designation of Magaliesberg and Gouritz Cluster as new South African Biosphere Reserves*. Retrieved from https://www.environment.gov.za/mediarelease/magaliesberggouritzcluster_newsouthafricanbiospherereserve

Dibden, J., Potter, C., & Cocklin, C. (2009). Contesting the neoliberal project for agriculture: Productivist and multifunctional trajectories in the European Union and Australia. *Journal of Rural Studies, 25*(3), 299-308.

Dobbs, T. L., & Pretty, J. N. (2004). Agri-environmental stewardship schemes and "multifunctionality". *Applied Economic Perspectives and Policy, 26*(2), 220-237.

Donaldson, L. P., & Daughtery, L. (2011). Introducing asset-based models of social justice into service learning: A social work approach. *Journal of Community Practice, 19*(1), 80-99.

Donati, P. (2011). *Relational sociology: A new paradigm for the social sciences*. Oxon, United Kingdom: Routledge.

Downsborough, L., Shackleton, C. M., & Knight, A. T. (2011). The potential for voluntary instruments to achieve conservation planning goals: The case of conservancies in South Africa. *Oryx, 45*(3), 357-364.

Draugelytė, E. (2012). *Dissonance in social learning: Towards maintenance of natural resources in the Kouga catchment, South Africa. Unpublished MSc thesis*. Wageningen, The Netherlands: Wageningen University.

Dredge, D., & Hales, R. (2012). Community case study research. In L. Dwyer, A. Gill & N. Seetaram (Eds.), *Handbook of research methods in tourism: Quantitative and qualitative approaches*. Cheltenham, United Kingdom: Edward Elgar Publishing Ltd.

Du Plessis, C. P., & Ranger, K. S. (2017). *Monitoring and evaluation of the WWF ZA2162 CapeNature stewardship project*. Paarl, South Africa: FOOTPRINT Environmental Services

du Toit, R. (1931). Farming in the Humansdorp and Langkloof areas. *Farming in South Africa, 6*(66), 235-238.

Duff, A. J., Zedler, P. H., Barzen, J. A., & Knuteson, D. L. (2017). The Capacity-Building Stewardship Model: Assessment of an agricultural network as a mechanism for improving regional agroecosystem sustainability. *Ecology and Society, 22*(2), 24.

Elder-Vass, D. (2005). Emergence and the realist account of cause. *Journal of Critical Realism, 4*(2), 315-338.

Enengel, B., Muhar, A., Penker, M., Freyer, B., Drlik, S., & Ritter, F. (2012). Co-production of knowledge in transdisciplinary doctoral theses on landscape development—an analysis of actor roles and knowledge types in different research phases. *Landscape and Urban Planning, 105*(1–2), 106-117.

Engel, P., & Salomon, M. (2002). Cognition, development and governance. In C. Leeuwis & R. Pyburn (Eds.), *Wheelbarrows full of frogs: Social learning in rural resource management: International research and reflections* (pp. 49-66). Assen, The Netherlands: Koninklijke Van Gorcum.

Erbaugh, J., & Agrawal, A. (2017). Clarifying the landscape approach: A letter to the editor on "integrated landscape approaches to managing social and environmental issues in the tropics". *Global Change Biology, In Press*.

Ernstson, H., Barthel, S., Andersson, E., & Borgström, S. T. (2010). Scale-crossing brokers and network governance of urban ecosystem services: The case of stockholm. *Ecology and Society, 15*(4), 28.

Evely, A. C., Fazey, I., Pinard, M., & Lambin, X. (2008). The influence of philosophical perspectives in integrative research: A conservation case study in the cairngorms national park. *Ecology and Society, 13*(2), 52.

Everard, M. (2011). *Common ground: The sharing of land and landscapes for sustainability*. London, United Kingdom: Zed Books Ltd.

Eweg, M. J. (2005). Changing fertiliser practices in the small-scale sector of the South African sugar industry: The role of extension. *Proceedings of the South African Sugar Technologists' Association, 78*, 393-402.

Fabinyi, M., Evans, L., & Foale, S. J. (2014). Social-ecological systems, social diversity, and power: Insights from anthropology and political ecology. *Ecology and Society, 19*(4), 28.

Fabricius, C., & de Wet, C. (2002). The influence of forced removals and land restitution on conservation in South Africa. In D. Chatty & M. Colchester (Eds.), *Conservation and mobile indigenous peoples: Displacement, forced settlement, and sustainable development* (pp. 142-157). Oxford, United Kingdom: Berghahn Books.

Fabricius, C., Folke, C., Cundill, G., & Schultz, L. (2007). Powerless spectators, coping actors, and adaptive co-managers: A synthesis of the role of communities in ecosystem management. *Ecology and Society, 12*(1), 29.

Fabricius, C., & Koch, E. (2004). *Rights, resources and rural development: Community-based natural resource management in Southern Africa*. London, United Kingdom: Earthscan.

Ferreyra, C. (2006). Practicality, positionality, and emancipation: Reflections on participatory action research with a watershed partnership. *Systemic Practice and Action Research, 19*(6), 577-598.

Ferreyra, C., & Beard, P. (2007). Participatory evaluation of collaborative and integrated water management: Insights from the field. *Journal of Environmental Planning and Management, 50*(2), 271-296.

Ferreyra, C., de Loë, R. C., & Kreutzwiser, R. D. (2008). Imagined communities, contested watersheds: Challenges to integrated water resources management in agricultural areas. *Journal of Rural Studies, 24*(3), 304-321.

Fink, A. (2009). *How to conduct surveys: A step-by-step guide*. Thousand Oaks, CA: Sage Publications, Inc.

Fischer, J., Lindenmayer, D. B., & Manning, A. D. (2006). Biodiversity, ecosystem function, and resilience: Ten guiding principles for commodity production landscapes. *Frontiers in Ecology and the Environment, 4*(2), 80-86.

Fischer, J., Meacham, M., & Queiroz, C. (2017). A plea for multifunctional landscapes. *Frontiers in Ecology and the Environment, 15*(2), 59-59.

Fletcher, A. J. (2016). Applying critical realism in qualitative research: Methodology meets method. *International Journal of Social Research Methodology, 20*(2), 181-194.

Fletcher, R., Dressler, W., & Büscher, B. (2015). Nature™ Inc.: Nature as neoliberal capitalist imaginary. In R. L. Bryant (Ed.), *The international handbook of political ecology* (pp. 359-372). Cheltenham, United Kingdom: Edward Elgar Publishing Ltd.

Flint, C. G., Kunze, I., Muhar, A., Yoshida, Y., & Penker, M. (2013). Exploring empirical typologies of human–nature relationships and linkages to the ecosystem services concept. *Landscape and Urban Planning, 120*, 208-217.

Flitcroft, R. L., Cerveny, L. K., Bormann, B. T., Smith, J. E., Asah, S. T., & Fischer, A. P. (2017). The emergence of watershed and forest collaborative. In D. H. Olson & B. Van Horne (Eds.), *People, forests, and change: Lessons from the Pacific Northwest* (pp. 116-130). Washington, DC: Island Press.

Floress, K., Akamani, K., Halvorsen, K. E., Kozich, A. T., & Davenport, M. (2015). The role of social science in successfully implementing watershed management strategies. *Journal of Contemporary Water Research & Education, 154*(1), 85-105.

Floress, K., García de Jalón, S., Church, S. P., Babin, N., Ulrich-Schad, J. D., & Prokopy, L. S. (2017). Toward a theory of farmer conservation attitudes: Dual interests and willingness to take action to protect water quality. *Journal of Environmental Psychology, 53*, 73-80.

Floress, K., Prokopy, L. S., & Allred, S. B. (2011). It's who you know: Social capital, social networks, and watershed groups. *Society & Natural Resources, 24*(9), 871-886.

Foley, J. A., DeFries, R., Asner, G. P., Barford, C., Gordon, B., Carpenter, S. R., Chapin, F. S., Coe, M. T., Daily, G. C., Gibbs, H. K., Helkowski, J. H., Holloway, T., Howard, E. A., Kucharik, C. J., Monfreda, C., Patz, J. A., Prentice, I. C., Ramankutty, N., & Snyder, P. K. (2005). Global consequences of land use. *Science, 309*(5734), 570-574.

Foley, J. A., Ramankutty, N., Brauman, K. A., Cassidy, E. S., Gerber, J. S., Johnston, M., Mueller, N. D., O/'Connell, C., Ray, D. K., West, P. C., Balzer, C., Bennett, E. M., Carpenter, S. R., Hill, J., Monfreda, C., Polasky, S., Rockstrom, J., Sheehan, J., Siebert, S., Tilman, D., & Zaks, D. P. M. (2011). Solutions for a cultivated planet. *Nature, 478*(7369), 337-342.

Folke, C. (2006). Resilience: The emergence of a perspective for social–ecological systems analyses. *Global Environmental Change, 16*(3), 253-267.

Folke, C., Biggs, R., Norström, A. V., Reyers, B., & Rockström, J. (2016). Social-ecological resilience and biosphere-based sustainability science. *Ecology and Society, 21*(3), 41.

Fox, H. (2014). *Social-ecological resilience for well-being: A critical realist case study of Boksburg Lake, South Africa. Unpublished PhD thesis.* Grahamstown: Rhodes University.

Franks, J. R., & Emery, S. B. (2013). Incentivising collaborative conservation: Lessons from existing environmental stewardship scheme options. *Land Use Policy, 30*(1), 847-862.

Freeman, O. E., Duguma, L. A., & Minang, P. A. (2015). Operationalizing the integrated landscape approach in practice. *Ecology and Society, 20*(1), 24.

Frick, L., McKenna, S., & Muthama, E. (2017). Death of the PhD: When industry partners determine doctoral outcomes. *Higher Education Research & Development, 36*(2), 444-447.

Frost, P., Campbell, B., Medina, G., & Usongo, L. (2006). Landscape-scale approaches for integrated natural resource management in tropical forest landscapes. *Ecology and Society, 11*(2), 30.

Gaffy, E. A. (2008). Meeting the challenges of policy-relevant science: Bridging theory and practice. *Public Administration Review, November | December 2008*, 1087-1100.

Galliers, C., & Barnes, G. (2013). Earth stewardship: A new approach to the protection of South Africa's natural capital. *Environment, 2013*, 62-64.

Gallo, J. A., Pasquini, L., Reyers, B., & Cowling, R. M. (2009). The role of private conservation areas in biodiversity representation and target achievement within the Little Karoo region, South Africa. *Biological Conservation, 142*(2), 446-454.

Garud, R., Kumaraswamy, A., & Karnøe, P. (2010). Path dependence or path creation? *Journal of Management Studies, 47*(4), 760-774.

Gibson, C. C., Ostrom, E., & Ahn, T. K. (2000). The concept of scale and the human dimensions of global change: A survey. *Ecological Economics, 32*(2), 217-239.

Goldman, R. L., Thompson, B. H., & Daily, G. C. (2007). Institutional incentives for managing the landscape: Inducing cooperation for the production of ecosystem services. *Ecological Economics, 64*(2), 333-343.

Gonzalez, C., Clemente, A., Nielsen, K. A., Branquinho, C., & Santos, R. F. d. (2009). Human-nature relationship in Mediterranean streams: Integrating different types of knowledge to improve water management. *Ecology and Society, 14*(2), 35.

Gordon, L. J., Finlayson, C. M., & Falkenmark, M. (2010). Managing water in agriculture for food production and other ecosystem services. *Agricultural Water Management, 97*(4), 512-519.

Gorski, P. S. (2013). What is critical realism? And why should you care? *Contemporary Sociology: A Journal of Reviews, 42*(5), 658-670.

Goudie, A. S. (2013). *The human impact on the natural environment: Past, present, and future.* Chichester, United Kingdom: Wiley-Blackwell.

Government of South Africa. (2010). *National Protected Area Expansion Strategy for South Africa 2008.* Pretoria: Government of South Africa.

Government of South Africa. (2012). *National development plan 2030: Our future - make it work. Executive summary.* Pretoria, South Africa: National Planning Commission, The Presidency, Government of South Africa. Retrieved from http://www.polity.org.za/attachment.php?aa_id=40914

Government of South Africa. (2015). *National biodiversity strategy and action plan.* Pretoria, South Africa: Department of Environmental Affairs. Retrieved from https://www.environment.gov.za/sites/default/files/docs/publications/SAsnationalbiodiversity_strategyandactionplan2015_2025.pdf

Gray, B. (1985). Conditions facilitating interorganizational collaboration. *Human Relations, 38*(10), 911-936.

Greeff, M. (2011). Information collection: Interviewing. In A. S. de Vos, H. Strydom, C. B. Fouché & C. S. L. Delport (Eds.), *Research at grass roots: For the social sciences and human service professions* (pp. 341-375). Pretoria, South Africa: Van Schaik Publishers.

Griggs, D., Stafford-Smith, M., Gaffney, O., Rockstrom, J., Ohman, M. C., Shyamsundar, P., Steffen, W., Glaser, G., Kanie, N., & Noble, I. (2013). Policy: Sustainable development goals for people and planet. *Nature, 495*(7441), 305-307.

Grimble, R., & Wellard, K. (1997). Stakeholder methodologies in natural resource management: A review of principles, contexts, experiences and opportunities. *Agricultural Systems, 55*(2), 173-193.

Guelke, L., & Shell, R. (1992). Landscape of conquest: Frontier water alienation and Khoikhoi strategies of survival, 1652–1780. *Journal of Southern African Studies, 18*(4), 803-824.

Guldberg, K., & Mackness, J. (2009). Foundations of communities of practice: Enablers and barriers to participation. *Journal of Computer Assisted Learning, 25*(6), 528-538.

Hahn, T., Olsson, P., Folke, C., & Johansson, K. (2006). Trust-building, knowledge generation and organizational innovations: The role of a bridging organization for adaptive comanagement of a wetland landscape around Kristianstad, Sweden. *Human Ecology, 34*(4), 573-592.

Haider, L. J., Hentati-Sundberg, J., Giusti, M., Goodness, J., Hamann, M., Masterson, V. A., Meacham, M., Merrie, A., Ospina, D., & Schill, C. (2017). The undisciplinary journey: Early-career perspectives in sustainability science. *Sustainability Science, In Press.*

Hails, R. S., & Ormerod, S. J. (2013). Editorial: Ecological science for ecosystem services and the stewardship of natural capital. *Journal of Applied Ecology, 50*(4), 807-810.

Hall, R. (2009). *Another countryside? Policy options for land and agrarian reform in South Africa.* Cape Town, South Africa: Institute for Poverty, Land and Agrarian Studies, School of Government, University of the Western Cape.

Hall, R., & Kepe, T. (2017). Elite capture and state neglect: New evidence on South Africa's land reform. *Review of African Political Economy, 44*(151), 122-130.

Hallowell, N., Lawton, J., & Gregory, S. (2005). *Reflections on research: The realities of doing research in the social sciences.* Maidenhead, United Kingdom: Open University Press.

Halse, C., & Mowbray, S. (2011). The impact of the doctorate. *Studies in Higher Education, 36*(5), 513-525.

Hamann, M., Biggs, R., & Reyers, B. (2015). Mapping social–ecological systems: Identifying 'green-loop' and 'red-loop' dynamics based on characteristic bundles of ecosystem service use. *Global Environmental Change, 34*(Supplement C), 218-226.

Hamann, M., & Tuinder, V. (2012). *Introducing the Eastern Cape: A quick guide to its history, diversity and future challenges.* Stockholm, Sweden: Stockholm Resilience Centre. Retrieved from http://www.sapecs.org/wp-content/uploads/2013/11/Eastern-Cape-Background-Report.pdf

Hammond, D. (2005). Philosophical and ethical foundations of systems thinking. *tripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society, 3*(2), 20-27.

Hansen, W. D. (2014). Generalizable principles for ecosystem stewardship-based management of social-ecological systems: Lessons learned from Alaska. *Ecology and Society, 19*(4), 13.

Haque, M. S. (2000). Environmental discourse and sustainable development: Linkages and limitations. *Ethics and the Environment, 5*(1), 3-21.

Harris, F., & Lyon, F. (2013). Transdisciplinary environmental research: Building trust across professional cultures. *Environmental Science and Policy, 31*, 109-119.

Hart, T., & Burgess, R. (2006). Across the divide: The impact of farmer-to-farmer linkages in the absence of extension services. *South African Journal of Agricultural Extension, 35*(1), 12-22.

Harvey, D. L. (2002). Agency and community: A critical realist paradigm. *Journal for the Theory of Social Behaviour, 32*(2), 163-194.

Hawe, P., Webster, C., & Shiell, A. (2004). A glossary of terms for navigating the field of social network analysis. *Journal of Epidemiology and Community Health, 58*(12), 971-975.

Held, V. (2006). *The ethics of care*. Oxford, United Kingdom: Oxford University Press.

Hinkel, J., Cox, M. E., Schlüter, M., Binder, C. R., & Falk, T. (2015). A diagnostic procedure for applying the social-ecological systems framework in diverse cases. *Ecology and Society, 20*(1), 32.

Hirsch Hadorn, G. H., Hoffmann-Riem, H., Biber-Klemm, S., Grossenbacher-Mansuy, W., Joye, D., Pohl, C., Wiesmann, U., & Zemp, E. (2007a). The emergence of transdisciplinarity as a form of research. In G. H. Hirsch Hadorn, H. Hoffmann-Riem, S. Biber-Klemm, W. Grossenbacher-Mansuy, D. Joye, C. Pohl, U. Wiesmann & E. Zemp (Eds.), *Handbook of transdisciplinary research* (pp. 19-39). Dordrecht, The Netherlands: Springer Science + Business Media B.V.

Hirsch Hadorn, G. H., Hoffmann-Riem, H., Biber-Klemm, S., Grossenbacher-Mansuy, W., Joye, D., Pohl, C., Wiesmann, U., & Zemp, E. (2007b). *Handbook of transdisciplinary research*. Dordrecht, The Netherlands: Springer Science + Business Media B.V.

Hoffman, M. T., & Todd, S. (2000). A national review of land degradation in South Africa: The influence of biophysical and socio-economic factors. *Journal of Southern African Studies, 26*(4), 743-758.

Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics, 4*(1), 1-23.

Holling, C. S. (2001). Understanding the complexity of economic, ecological, and social systems. *Ecosystems, 4*(5), 390-405.

Holmes, M. C. C., & Jampijinpa, W. (2013). Law for country: The structure of Warlpiri ecological knowledge and its application to natural resource management and ecosystem stewardship. *Ecology and Society, 18*(3), 19.

Horton, K., Knight, H., Galvin, K. A., Goldstein, J. H., & Herrington, J. (2017). An evaluation of landowners' conservation easements on their livelihoods and well-being. *Biological Conservation, 209*, 62-67.

Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277-1288.

IPCC. (2014). *Climate change 2014: Synthesis report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [core writing team, r.K. Pachauri and I.A. Meyer (eds.)]*. Geneva, Switzerland: Intergovernmental Panel on Climate Change.

IRR. (2017). *Race relations in South Africa: Reasons for hope*. Johannesburg, South Africa: South African Institute of Race Relations. Retrieved from http://irr.org.za/reports-and-publications/occasional-reports/files/race-relations-in-south-africa-2013-reasons-for-hope-2017/at_download/file

Ison, R., Collins, K., Colvin, J., Jiggins, J., Roggero, P. P., Seddaiu, G., Steyaert, P., Toderi, M., & Zanolla, C. (2011). Sustainable catchment managing in a climate changing world: New integrative modalities for connecting policy makers, scientists and other stakeholders. *Water Resources Management, 25*(15), 3977-3992.

ISSC and UNESCO. (2013). *World Social Science Report 2013, changing global environments*. Paris, France: OECD Publishing and UNESCO Publishing.

ISSC IDS and UNESCO. (2016). *World Social Science Report 2016, challenging inequalities: Pathways to a just world*. Paris, France: UNESCO Publishing.

Jahn, T., Bergmann, M., & Keil, F. (2012). Transdisciplinarity: Between mainstreaming and marginalization. *Ecological Economics, 79*, 1-10.

Jeffery, L. (2013). 'We are the true guardians of the environment': Human-environment relations and debates about the future of the Chagos Archipelago. *Journal of the Royal Anthropological Institute, 19*(2), 300-318.

Jellinek, S., Parris, K. M., Driscoll, D. A., & Dwyer, P. D. (2013). Are incentive programs working? Landowner attitudes to ecological restoration of agricultural landscapes. *Journal of Environmental Management, 127*, 69-76.

Jepson, W., Budds, J., Eichelberger, L., Harris, L., Norman, E., O'Reilly, K., Pearson, A., Shah, S., Shinn, J., Staddon, C., Stoler, J., Wutich, A., & Young, S. (2017). Advancing human capabilities for water security: A relational approach. *Water Security, 1*, 46-52.

Jones, N. A., Shaw, S., Ross, H., Witt, K., & Pinner, B. (2016). The study of human values in understanding and managing social-ecological systems. *Ecology and Society, 21*(1), 15.

Joubert, E., Joubert, M. E., Bester, C., de Beer, D., & De Lange, J. H. (2011). Honeybush (*Cyclopia* spp.): From local cottage industry to global markets — the catalytic and supporting role of research. *South African Journal of Botany, 77*(4), 887-907.

Kabii, T., & Horwitz, P. (2006). A review of landholder motivations and determinants for participation in conservation covenanting programmes. *Environmental Conservation, 33*(1), 11-20.

Kahui, V., & Richards, A. C. (2014). Lessons from resource management by indigenous Maori in New Zealand: Governing the ecosystems as a commons. *Ecological Economics, 102*, 1-7.

Kara, H. (2015). *Creative research methods in the social sciences: A practical guide*. Bristol, United Kingdom: Policy Press.

Karpouzoglou, T., Dewulf, A., & Clark, J. (2016). Advancing adaptive governance of social-ecological systems through theoretical multiplicity. *Environmental Science & Policy, 57*, 1-9.

Kates, R. W., Clark, W. C., Corell, R., Hall, J. M., Jaeger, C. C., Lowe, I., McCarthy, J. J., Schellnhuber, H. J., Bolin, B., Dickson, N. M., Faucheux, S., Gallopin, G. C., Grübler, A., Huntley, B., Jäger, J., Jodha, N. S., Kasperson, R. E., Mabogunje, A., Matson, P., Mooney, H., Moore, B., O'Riordan, T., & Svedin, U. (2001). Sustainability science. *Science, 292*(5517), 641-642.

Keeler, B. L., Chaplin-Kramer, R., Guerry, A. D., Addison, P. F. E., Bettigole, C., Burke, I. C., Gentry, B., Chambliss, L., Young, C., Travis, A. J., Darimont, C. T., Gordon, D. R., Hellmann, J., Kareiva, P., Monfort, S., Olander, L., Profeta, T., Possingham, H. P., Slotterback, C., Sterling, E., Ticktin, T., & Vira, B. (2017). Society is ready for a new kind of science—is academia? *BioScience, 67*(7), 591-592.

Keen, M., Brown, V. A., & Dyball, R. (2005). *Social learning in environmental management: Towards a sustainable future*. London, United Kingdom: Earthscan.

Kellert, S. R., Mehta, I. N., Ebbin, S. A., & Lichtenfeld, L. L. (2000). Community natural resource management: Promise, rhetoric, and reality. *Society & Natural Resources, 13*(8), 705-715.

Kemmis, S., & Grootenboer, P. (2008). Situating praxis in practice: Practice architectures and the cultural, social and material conditions for practice. In S. Kemmis & T. J. Smith (Eds.), *Enabling praxis: Challenges for education* (pp. 37–64). Rotterdam, The Netherlands: Sense Publishing.

Kemmis, S., & Mutton, R. (2012). Education for sustainability (efs): Practice and practice architectures. *Environmental Education Research, 18*(2), 187-207.

Kepe, T. (2009). Shaped by race: Why "race" still matters in the challenges facing biodiversity conservation in africa. *Local Environment, 14*(9), 871-878.

Kepe, T., Saruchera, M., & Webster, W. (2004). Poverty alleviation and biodiversity conservation: A South African perspective. *Oryx, 38*(2), 143–145.

Kerr, J. (2007). Watershed management: Lessons from common property theory. *International Journal of the Commons, 1*(1), 89-110.

Klein, N. (2014). *This changes everything: Capitalism vs. The climate*. London, United Kingdom: Penguin Books, Random House.

Klerkx, L., Hall, A., & Leeuwis, C. (2009). Strengthening agricultural innovation capacity: Are innovation brokers the answer? *International Journal of Agricultural Resources, Governance and Ecology, 8*(5-6), 409-438.

Klerkx, L., & Leeuwis, C. (2009). Establishment and embedding of innovation brokers at different innovation system levels: Insights from the dutch agricultural sector. *Technological Forecasting and Social Change, 76*(6), 849-860.

Klerkx, L., & Proctor, A. (2013). Beyond fragmentation and disconnect: Networks for knowledge exchange in the english land management advisory system. *Land Use Policy, 30*(1), 13-24.

Knight, A. T., Cowling, R., Boshoff, A. F., Wilson, S. L., & Pierce, S. M. (2011). Walking in STEP: Lessons for linking spatial prioritisations to implementation strategies. *Biological Conservation, 144*, 202-211.

Knight, A. T., Cowling, R. M., Rouget, M., Balmford, A., Lombard, A. T., & Campbell, B. M. (2008). Knowing but not doing: Selecting priority conservation areas and the research-implementation gap. *Conservation Biology, 22*(3), 610-617.

Koontz, T. M., & Thomas, C. W. (2006). What do we know and need to know about the environmental outcomes of collaborative management? *Public Administration Review, 66*, 111-121.

Kotze, I., & Rose, M. (2015). *Farming facts and futures: Reconnecting South Africa's food systems to its ecosystems*. Cape Town, South Africa: WWF-South Africa. Retrieved from http://www.wwf.org.za/media_room/publications/?13821/farming-facts-and-futures

Kotze, J. S., & Taylor, D. (2010). Ke nako: Service delivery as a key challenge for the Zuma administration : A developmental local government perspective. *Africa Insight, 40*(3), 198-212.

Kou-Kamma Local Municipality. (2009). *Kou-Kamma Local Municipality situation analysis: Local economic development strategy final report*. Port Elizabeth, South Africa: Urban-Econ Development Economists. Retrieved from http://www.koukammamun.co.za/wp-content/uploads/2012/07/Kou-Kamma-LM-LED.pdf

Kou-Kamma Local Municipality. (2012). *Kou-Kamma Local Municipality: Integrated local development plan: 2012-2017*. Kareedouw, South Africa: Kou-Kamma Local Municipality.

Kramer, D. B., Hartter, J., Boag, A. E., Jain, M., Stevens, K., Nicholas, K. A., McConnell, W. J., & Liu, J. (2017). Top 40 questions in coupled human and natural systems (CHANS) research. *Ecology and Society, 22*(2).

Kremen, C., & Miles, A. (2012). Ecosystem services in biologically diversified versus conventional farming systems: Benefits, externalities, and trade-offs. *Ecology and Society, 17*(4), 40.

Kumar, C. (2005). Revisiting 'community' in community-based natural resource management. *Community Development Journal, 40*(3), 275-285.

Lang, D. J., Wiek, A., Bergmann, M., Stauffacher, M., Martens, P., Moll, P., Swilling, M., & Thomas, C. J. (2012). Transdisciplinary research in sustainability science: Practice, principles, and challenges. *Sustainability Science, 7*(1), 25-43.

Lang, D. J., Wiek, A., & von Wehrden, H. (2017). Bridging divides in sustainability science. *Sustainability Science, 12*(6), 875-879.

Law, J. (2004). *After method: Mess in social science research*. Oxon, United Kingdom: Routledge.

Lawrence, R. J. (2015). Advances in transdisciplinarity: Epistemologies, methodologies and processes. *Futures, 65*(Supplement C), 1-9.

Leach, M., Raworth, K., & Rockström, J. (2013). Between social and planetary boundaries: Navigating pathways in the safe and just space for humanity. In ISSC and UNESCO (Ed.), *World Social Science Report 2013, changing global environments*. Paris, France: OECD Publishing and UNESCO Publishing.

Leach, M., Rockström, J., Raskin, P., Scoones, I., Stirling, A. C., Smith, A., Thompson, J., Millstone, E., Ely, A., Arond, E., Folke, C., & Olsson, P. (2012). Transforming innovation for sustainability. *Ecology and Society, 17*(2), 11.

Leach, M., Scoones, I., & Stirling, A. (2010). *Dynamic sustainabilities: Technology, environment, social justice*. London, United Kingdom: Earthscan.

Leeuwis, C., & Pyburn, R. (2002). *Wheelbarrows full of frogs: Social learning in rural resource management: International research and reflections*. Assen, The Netherlands: Koninklijke Van Gorcum.

Lenoble, J., & Maesschalck, M. (2010). *Democracy, law and governance*. Oxon, United Kingdom: Routledge.

Lescourret, F., Magda, D., Richard, G., Adam-Blondon, A.-F., Bardy, M., Baudry, J., Doussan, I., Dumont, B., Lefèvre, F., Litrico, I., Martin-Clouaire, R., Montuelle, B., Pellerin, S., Plantegenest, M., Tancoigne, E., Thomas, A., Guyomard, H., & Soussana, J.-F. (2015). A social–ecological approach to managing multiple agro-ecosystem services. *Current Opinion in Environmental Sustainability, 14*, 68-75.

Levin, S., Xepapadeas, T., Crépin, A.-S., Norberg, J., de Zeeuw, A., Folke, C., Hughes, T., Arrow, K., Barrett, S., Daily, G., Ehrlich, P., Kautsky, N., Mäler, K.-G., Polasky, S., Troell, M., Vincent, J. R., & Walker, B. (2012). Social-ecological systems as complex adaptive systems: Modeling and policy implications. *Environment and Development Economics, 18*(2), 111-132.

Ling, C., & Dale, A. (2013). Agency and social capital: Characteristics and dynamics. *Community Development Journal, 49*(1), 4-20.

Living Lands. (2017). *Eight years on the landscape: The current state of Living Lands*. Cape Town, South Africa: Living Lands. Retrieved from http://livinglands.co.za/wp-content/uploads/2017/05/Eight-Years-on-the-Landscape.pdf

Loader, R., & Amartya, L. (1999). Participatory rural appraisal: Extending the research methods base. *Agricultural Systems, 62*(2), 73-85.

Lockwood, M., Davidson, J., Curtis, A., Stratford, E., & Griffith, R. (2010). Governance principles for natural resource management. *Society & Natural Resources, 23*(10), 986-1001.

Lopez-Carr, D., & Ervin, D. (2017). Population-health-environment (PHE) synergies? Evidence from USAID-sponsored programs in African and Asian core conservation areas. *European Journal of Geography, 8*(3), 92-108.

Lotz-Sisitka, H., Mukute, M., & Belay, M. (2012). The 'social' and 'learning' in social learning research: Avoiding ontological collapse with antecedent literatures as starting points for research. In H. Lotz-Sisitka (Ed.), *(re)views on social learning literature: A monograph for social learning researchers in natural resources management and environmental education* (pp. 56-88). Grahamstown/Howick: Environmental Learning Research Centre, Rhodes University/EEASA/SADC REEP.

Lubchenco, J. (2017). Environmental science in a post-truth world. *Frontiers in Ecology and the Environment, 15*(1), 3-3.

Lubell, M. (2004). Collaborative watershed management: A view from the grassroots. *Policy Studies Journal, 32*(3), 341-361.

Lubell, M. (2015). Collaborative partnerships in complex institutional systems. *Current Opinion in Environmental Sustainability, 12*, 41-47.

Lyne, M. C., Jonas, N., & Ortmann, G. F. (2017). A quantitative assessment of an outsourced agricultural extension service in the Umzimkhulu District of KwaZulu-Natal, South Africa. *The Journal of Agricultural Education and Extension, In Press*.

MA. (2005). *Millenium Ecosystem Assessment: Ecosystems and human well-being: Current state and trends, vol. 1*. Washington, DC: Island Press.

Mander, M., Blignaut, J., Van Niekerk, M., Cowling, R., Horan, M., D., K., Mills, A., M., P., & Schulze, R. (2010). *Baviaanskloof-tsitsikamma payment for ecosystem services: A feasibility study synthesis report*. Durban, South Africa: Report submitted by Future Works Sustainability Consulting for SANBI, CAPE, Working for Water, and UNDP.

Manfredo, M. J., Bruskotter, J. T., Teel, T. L., Fulton, D., Schwartz, S. H., Arlinghaus, R., Oishi, S., Uskul, A. K., Redford, K., Kitayama, S., & Sullivan, L. (2017). Why social values cannot be changed for the sake of conservation. *Conservation Biology, 31*(4), 772-780.

Margerum, R. D. (2007). Overcoming locally based collaboration constraints. *Society & Natural Resources, 20*(2), 135-152.

Margerum, R. D. (2008). A typology of collaboration efforts in environmental management. *Environmental Management, 41*(4), 487-500.

Margerum, R. D., & Robinson, C. J. (2016a). *The challenges of collaboration in environmental governance: Barriers and responses*. Cheltenham, United Kingdom: Edward Elgar Publishing Ltd.

Margerum, R. D., & Robinson, C. J. (2016b). Introduction: The challenges of collaboration in environmental governance. In R. D. Margerum & C. J. Robinson (Eds.), *The challenges of collaboration in environmental governance: Barriers and responses* (pp. 1-24). Cheltenham, United Kingdom: Edward Elgar Publishing Ltd.

Martín-López, B., Palomo, I., García-Llorente, M., Iniesta-Arandia, I., Castro, A. J., García Del Amo, D., Gómez-Baggethun, E., & Montes, C. (2017). Delineating boundaries of social-ecological systems for landscape planning: A comprehensive spatial approach. *Land Use Policy, 66*, 90-104.

Masterson, V. A. (2016). *Sense of place and culture in the landscape of home: Understanding social-ecological dynamics on the Wild Coast, South Africa. Unpublished PhD thesis*. Stockholm, Sweden: Stockholm Resilience Centre, Stockholm University.

Masuku Van Damme, L. S., & Meskell, L. (2009). Producing conservation and community in South Africa. *Ethics, Place & Environment, 12*(1), 69-89.

Max-Neef, M. A. (2005). Foundations of transdisciplinarity. *Ecological Economics, 53*(1), 5-16.

Maxwell, J. A. (2012). *A realist approach for qualitative research*. Thousand Oaks, CA: SAGE Publications Inc.

Mbeki, T. (2004). Two worlds: Two economies. *South African Labour Bulletin, 28*(2), 10-11.

McArthur, M. (2012). *The meaning and practice of stewardship. Unpublished Masters thesis*. Alberta, Canada: Faculty of Environmental Design, University of Calgary.

McClure, A. (2012). *Opportunity and connectivity: Selecting land managers for involvement in a conservation corridor linking two protected areas in the Langkloof valley, South Africa. Unpublished MSc thesis*. Grahamstown, South Africa: Rhodes University.

McGinnis, M. D., & Ostrom, E. (2014). Social-ecological system framework: Initial changes and continuing challenges. *Ecology and Society, 19*(2), 30.

McNeill, J. R., & Engelke, P. (2016). *The great acceleration*. Cambridge, MA: Harvard University Press.

Merenlender, A. M., Huntsinger, L., Guthey, G., & Fairfax, S. K. (2004). Land trusts and conservation easements: Who is conserving what for whom? *Conservation Biology, 18*(1), 65-76.

Microsoft Corporation. (2016). *Microsoft® Excel® 2016*. Redmond, WA: Microsoft Corporation.

Milder, J. C., Buck, L. E., DeClerck, F., & Scherr, S. J. (2012). Landscape approaches to achieving food production, natural resource conservation, and the Millennium Development Goals. In J. C. Ingram, F. DeClerck & C. Rumbaitis del Rio (Eds.), *Integrating ecology and poverty reduction: Ecological dimensions* (pp. 77-108). New York, NY: Springer

Milder, J. C., Hart, A. K., Dobie, P., Minai, J., & Zaleski, C. (2014). Integrated landscape initiatives for African agriculture, development, and conservation: A region-wide assessment. *World Development, 54*, 68-80.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2013). *Qualitative data analysis*. Thousand Oaks, CA: SAGE Publications Inc.

Minang, P. A., van Noordwijk, M., Freeman, O. E., Duguma, L. A., Mbow, C., de Leeuw, J., & Catacutan, D. (2014a). Introduction and basic propositions. In P. A. Minang, M. van Noordwijk, O. E. Freeman, C. Mbow, J. de Leeuw & D. Catacutan (Eds.), *Climate-smart landscapes: Multifunctionality in practice* (pp. 3-17). Nairobi, Kenya: World Agroforestry Centre (ICRAF).

Minang, P. A., van Noordwijk, M., Freeman, O. E., Mbow, C., de Leeuw, J., & Catacutan, D. (2014b). *Climate-smart landscapes: Multifunctionality in practice*. Nairobi, Kenya: World Agroforestry Centre (ICRAF).

Mingers, J. (2004). Paradigm wars: Ceasefire announced who will set up the new administration? *Journal of Information Technology, 19*(3), 165-171.

Mingers, J. (2011). *Explanatory mechanisms: The contribution of critical realism and systems thinking/cybernetics. Working Paper no. 241*: Kent Business School.

Mitchell, C. A., & Willetts, J. R. (2009). *Quality criteria for inter- and trans-disciplinary doctoral research outcomes. Prepared for ALTC fellowship: Zen and the art of transdisciplinary postgraduate studies*. Sydney, Australia: Institute for Sustainable Futures, University of Technology.

Mittermeier, R. A., Robles-Gil, P., Hoffman, M., D., P. J., Brooks, T., Mittermeier, C. G., Lamoreux, J., & Da Fonesca, G. A. B. (Eds.). (2004). *Hotspots revisited: Earth's biologically richest and most endangered ecoregions*. Mexico City, Mexico: Cemex.

Moncur, W. (2013). *The emotional wellbeing of researchers: Considerations for practice.* Paper presented at the Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Paris, France.

Moodley, K., & Adam, H. (2000). Race and nation in post-apartheid South Africa. *Current Sociology, 48*(3), 51-69.

Moon, K., & Blackman, D. (2014). A guide to understanding social science research for natural scientists. *Conservation Biology, 28*(5), 1167-1177.

Moore, M.-L., & Westley, F. (2011). Surmountable chasms: Networks and social innovation for resilient systems. *Ecology and Society, 16*(1), 5.

Morgan, D. L. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research, 1*(1), 48-76.

Morse, W. C., Nielsen-Pincus, M., Force, J. E., & Wulfhorst, J. D. (2007). Bridges and barriers to developing and conducting interdisciplinary graduate-student team research. *Ecology and Society, 12*(2), 8.

Moser, S. C., & Ekstrom, J. A. (2010). A framework to diagnose barriers to climate change adaptation. *Proceedings of the National Academy of Sciences, 107*(51), 22026-22031.

Muhar, A., Visser, J., & van Breda, J. (2013). Experiences from establishing structured inter- and transdisciplinary doctoral programs in sustainability: A comparison of two cases in South Africa and Austria. *Journal of Cleaner Production, 61*, 122-129.

Mukute, M. (2016). Dialectical critical realism and cultural historical activity theory (chat): Exploring and expanding learning processes in sustainable agriculture workplace contexts. In L. Price & H. Lotz-Sistka (Eds.), *Critical realism, environmental learning and social-ecological change* (pp. 190-211). New York, NY: Routledge.

Mulder, J., & Brent, A. C. (2006). Selection of sustainable rural agriculture projects in South Africa: Case studies in the LandCare programme. *Journal of Sustainable Agriculture, 28*(2), 55-84.

Mulkerrins, J. (2015). *Scale framing in a landscape restoration process: The case of water in the Langkloof, South Africa. Unpublished Masters thesis*. Wageningen, The Netherlands: Wageningen University.

Mullins, G., & Kiley, M. (2002). 'It's a PhD, not a nobel prize': How experienced examiners assess research theses. *Studies in Higher Education, 27*(4), 369-386.

Murphree, M. W. (2009). The strategic pillars of communal natural resource management: Benefit, empowerment and conservation. *Biodiversity and Conservation, 18*(10), 2551-2562.

Musvoto, C., Nortje, K., De Wet, B., Mahumani, B. K., & Nahman, A. (2015). Imperatives for an agricultural green economy in South Africa. *South African Journal of Science, 111*(1-2), #2014-0026.

Mwango, N. C. (2013). *Perceptions of the conservancy concept, common pool resources and the challenge of collective action across private property boundaries: A case study of the Dargle Conservancy, South Africa. Unpublished PhD thesis* Pietermaritzburg: University of KwaZulu-Natal.

Myers, S. A., Blackmore, M. J., Smith, T. F., & Carter, R. W. B. (2012). Climate change and stewardship: Strategies to build community resilience in the Capricorn Coast. *Australasian Journal of Environmental Management, 19*(3), 164-181.

NACSA. (2003). *Conservancies handbook*. Johannesburg, South Africa: National Association of Conservancies of South Africa Retrieved from http://www.conservancies.org/Downloads/Condensed%20Conservancy%20Handbook.pdf

Neves, D., & du Toit, A. (2013). Rural livelihoods in South Africa: Complexity, vulnerability and differentiation. *Journal of Agrarian Change, 13*(1), 93-115.

Newig, J., Challies, E., Jager, N. W., Kochskaemper, E., & Adzersen, A. (2017). The environmental performance of participatory and collaborative governance: A framework of causal mechanisms. *Policy Studies Journal, In Press*.

Newing, H. (2011). *Conducting research in conservation: A social science perspective*. Oxon, United Kingdom: Routledge: Taylor & Francis Group.

Ngomane, T., Thomson, J. S., & Radhakrishna, R. B. (2002). Public sector agricultural extension system in the Northern Province of South Africa: A system undergoing transformation. *Journal of International Agricultural and Extension Education, 9*(3), 31-37.

Norström, A. V., Balvanera, P., Spierenburg, M., & Bouamrane, M. (2017). Programme on ecosystem change and society: Knowledge for sustainable stewardship of social-ecological systems. *Ecology and Society, 22*(1), 47.

Ntsebeza, L., & Hall, R. (2007). *The land question in South Africa: The challenge of transformation and redistribution*. Cape Town, South Africa: HSRC Press.

O'Farrell, P. J., & Anderson, P. M. L. (2010). Sustainable multifunctional landscapes: A review to implementation. *Current Opinion in Environmental Sustainability, 2*(1), 59-65.

O'Flynn, J., & Wanna, J. (2008). *Collaborative governance: A new era of public policy in Australia?* . Canberra, Australia: ANU E Press.

OECD. (2014). *Dac list of oda recipients: Effective for reporting on 2014, 2015 and 2016 flows*. Paris, France: Organisation for Economic Co-operation and Development (OECD). Retrieved from http://www.oecd.org/dac/stats/documentupload/DAC%20List%20of%20ODA%20Recipients%202020 14%20final.pdf

Ogden, L., Heynen, N., Oslender, U., West, P., Kassam, K.-A., & Robbins, P. (2013). Global assemblages, resilience, and earth stewardship in the Anthropocene. *Frontiers in Ecology and the Environment, 11*(7), 341-347.

Olsson, L., Jerneck, A., Thoren, H., Persson, J., & O'Byrne, D. (2015). Why resilience is unappealing to social science: Theoretical and empirical investigations of the scientific use of resilience. *Science Advances, 1*(4), e1400217.

Olsson, P., Folke, C., Galaz, V., Hahn, T., & Schultz, L. (2007). Enhancing the fit through adaptive co-management: Creating and maintaining bridging functions for matching scales in the Kristianstads Vattenrike biosphere reserve, Sweden. *Ecology and Society, 12*(1), 28.

Olsson, P., Folke, C., & Hahn, T. (2004). Social-ecological transformation for ecosystem management: The development of adaptive co-management of a wetland landscape in southern Sweden. *Ecology and Society, 9*(4), 2.

Osborne, P. (2015). Problematizing disciplinarity, transdisciplinary problematics. *Theory, Culture & Society, 32*(5-6), 3-35.

Ostrom, E. (1990). *Governing the commons. The evolution of institutions for collective action*. New York, NY: Cambridge University Press.

Ostrom, E. (2005). *Understanding institutional diversity*. Princeton, NJ: Princeton University Press.

Ostrom, E. (2009). A general framework for analyzing sustainability of social-ecological systems. *Science, 325*(5939), 419-422.

Ostrom, E., & Ahn, T. K. (2003). *Foundations of social capital*. Cheltenham, United Kingdom: Edward Elgar Publishing Ltd.

Ostrom, E., & Cox, M. (2010). Moving beyond panaceas: A multi-tiered diagnostic approach for social-ecological analysis. *Environmental Conservation, 37*(4), 451-463.

Oxford University Press. (2017). *English Oxford Living Dictionaries (website)*. New York, NY: Oxford University Press. Retrieved from https://en.oxforddictionaries.com/

Palmer, C. G., Biggs, R., & Cumming, G. S. (2015). Applied research for enhancing human well-being and environmental stewardship: Using complexity thinking in Southern Africa. *Ecology and Society, 20*(1), 53.

Park, P. (2006). Knowledge and participatory research. In P. Reason & H. Bradbury (Eds.), *Handbook of action research: Concise paperback edition* (pp. 83-93). London, United Kingdom: SAGE Publications Ltd.

Parker, J. (2010). Towards a dialectics of knowledge and care in the global system. In R. Bhaskar, C. Frank, K. G. Høyer, P. Næss & J. Parker (Eds.), *Interdisciplinarity and climate change: Transforming knowledge and practice for our global future* (pp. 205-226). Oxon, United Kingdom: Routledge.

Pasquini, L., Cowling, R. M., Twyman, C., & Wainwright, J. (2009). Devising appropriate policies and instruments in support of private conservation areas: Lessons learned from the Klein Karoo, South Africa. *Conservation Biology, 24*(2), 470-478.

Patterson, J. (2017). Purposeful collective action in ambiguous and contested situations: Exploring 'enabling capacities' and cross-level interplay. *International Journal of the Commons, 11*(1), 248-274.

Patterson, J. J., Smith, C., & Bellamy, J. (2015). Enabling and enacting 'practical action' in catchments: Responding to the 'wicked problem' of nonpoint source pollution in coastal subtropical Australia. *Environmental Management, 55*(2), 479-495.

Peden, M. I. (2005). Tackling 'the most avoided issue': Communal rangeland management in KwaZulu-Natal, South Africa. *African Journal of Range & Forage Science, 22*(3), 167-175.

Peterson, M. N., Peterson, T. R., Lopez, A., & Liu, J. (2010). Views of private-land stewardship among Latinos on the Texas–Tamaulipas border. *Environmental Communication, 4*(4), 406-421.

Pierce, S. M., & Mader, A. D. (2006). *The STEP handbook. Integrating the natural environment into land use decisions at the municipal level: Towards sustainable development. Centre for African Conservation Ecology (ACE). Report number 47 (second edition)*. Port Elizabeth: Nelson Mandela Metropolitan University, South Africa.

Pierson, P. (2000). Increasing returns, path dependence, and the study of politics. *American Political Science Review, 94*(2), 251-267.

Plieninger, T., Kizos, T., Bieling, C., Le Dû-Blayo, L., Budniok, M.-A., Bürgi, M., Crumley, C. L., Girod, G., Howard, P., Kolen, J., Kuemmerle, T., Milcinski, G., Palang, H., Trommler, K., & Verburg, P. H. (2015). Exploring ecosystem-change and society through a landscape lens: Recent progress in european landscape research. *Ecology and Society, 20*(2), 5.

Plummer, R., Crona, B., Armitage, D. R., Olsson, P., Tengö, M., & Yudina, O. (2012). Adaptive comanagement: A systematic review and analysis. *Ecology and Society, 17*(3), 11.

Plummer, R., & FitzGibbon, J. (2007). Connecting adaptive co-management, social learning and social capital through theory and practice. In D. Armitage, F. Berkes & N. Doubleday (Eds.), *Adaptive co-management: Collaboration, learning, and multi-level governance* (pp. 38-21). Vancouver, Canada: UBC Press.

Plummer, R., & FitzGibbon, J. (2010). Connecting adaptive co-management, social learning, and social capital through theory and practice. In D. Armitage, F. Berkes & N. Doubleday (Eds.), *Adaptive co-management: Collaboration, learning, and multi-level governance* (pp. 38-61). Vancouver: UBC Press.

Plummer, R., Spiers, A., Summer, R., & Fitzgibbon, J. (2008). The contributions of stewardship to managing agro-ecosystem environments. *Journal of Sustainable Agriculture, 31*(3), 55-84.

Pohl, C. (2011). What is progress in transdisciplinary research? *Futures, 43*(6), 618-626.

Pohl, C., Rist, S., Zimmermann, A., Fry, P., Gurung, G. S., Schneider, F., Speranza, C. I., Kiteme, B., Boillat, S., Serrano, E., Hadorn, G. H., & Wiesmann, U. (2010). Researchers' roles in knowledge co-production: Experience from sustainability research in Kenya, Switzerland, Bolivia and Nepal. *Science and Public Policy, 37*(4), 267-281.

Polfus, J. L., Simmons, D., Neyelle, M., Bayha, W., Andrew, F., Andrew, L., Merkle, B. G., Rice, K., & Manseau, M. (2017). Creative convergence: Exploring biocultural diversity through art. *Ecology and Society, 22*(2), 4.

Polk, M. (2015). Transdisciplinary co-production: Designing and testing a transdisciplinary research framework for societal problem solving. *Futures, 65*, 110-122.

Pool-Stanvliet, R. (2013). A history of the UNESCO Man and the Biosphere Programme in South Africa. *South African Journal of Science, 109*(9/10), #a0035.

Popa, F., Guillermin, M., & Dedeurwaerdere, T. (2015). A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science. *Futures, 65*, 45-56.

Poteete, A. R. (2012). Levels, scales, linkages, and other 'multiples' affecting natural resources. *International Journal of the Commons, 6*(2), 134-150.

Potter, C., & Tilzey, M. (2005). Agricultural policy discourses in the european post-Fordist transition: Neoliberalism, neomercantilism and multifunctionality. *Progress in Human Geography, 29*(5), 581-600.

Potts, T. A. (2016). *How do social and personal identity, sense of place, connectedness to nature and environmental understanding influence the implementation of collective, large-scale biodiversity stewardship initiatives in South Africa? Unpublished MSc thesis*. Grahamstown, South Africa: Rhodes University.

Power, A. G. (2010). Ecosystem services and agriculture: Tradeoffs and synergies. *Philosophical Transactions of the Royal Society B, 365*(1554), 2959-2971.

Power, M. E., & Chapin, F. S. (2009). Planetary stewardship. *Frontiers in Ecology and the Environment, 7*(8), 399-399.

Prager, K., Reed, M., & Scott, A. (2012). Encouraging collaboration for the provision of ecosystem services at a landscape scale—rethinking agri-environmental payments. *Land Use Policy, 29*(1), 244-249.

Preiser, R. (2012). *The problem of complexity. Re-thinking the role of critique. Unpublished PhD thesis*. Stellenbosch, South Africa: Department of Philosophy, Stellenbosch University.

Preiser, R., & Cilliers, P. (2010). Unpacking the ethics of complexity: Concluding reflections. In P. Cilliers & R. Preiser (Eds.), *Complexity, difference and identity. An ethical perspective* (pp. 265–287). Dordrecht, The Netherlands: Springer.

Presencing Institute - Otto Scharmer. (2015). *Three divides (webpage)*. Retrieved from https://www.presencing.com/ego-to-eco/3-divides

Presencing Institute - Otto Scharmer. (2017). *Presencing institute - resources - tools (webpage)*. Retrieved from https://www.presencing.org/#/resource/tools

Pretty, J., & Smith, D. (2004). Social capital in biodiversity conservation and management. *Conservation Biology, 18*(3), 631-638.

Pretty, J., & Ward, H. (2001). Social capital and the environment. *World Development, 29*(2), 209-227.

Price, L. (2014). Critical realist versus mainstream interdisciplinarity. *Journal of Critical Realism, 13*(1), 52-76.

Price, L. (2016). Using retroduction to address wicked problems. In P. Naess & L. Price (Eds.), *Crisis system: A critical realist and environmental critique of economics and the economy*. Oxon, United Kingdom: Routledge.

Putnam, R. D. (2001). *Bowling alone: The collapse and revival of American community.* New York, NY: Simon & Schuster.

Puzzolo, E., Pope, D., Stanistreet, D., Rehfuess, E. A., & Bruce, N. G. (2016). Clean fuels for resource-poor settings: A systematic review of barriers and enablers to adoption and sustained use. *Environmental Research, 146,* 218-234.

QSR International. (2017). *NVivo 11 for Windows. Edition: Pro.* Melbourne, Australia: QSR International, Pty Ltd.

Quinlan, M. (2005). Considerations for collecting freelists in the field: Examples from ethnobotany. *Field Methods, 17,* 219-234.

Quinn, N. (2012). Water governance, ecosystems and sustainability: A review of progress in South Africa. *Water international, 37*(7), 760-772.

Ransome, P. (2013). *Ethics and values in social research.* Basingstoke, United Kingdom: Palgrave Macmillan.

Raudsepp-Hearne, C., Peterson, G. D., & Bennett, E. M. (2010). Ecosystem service bundles for analyzing tradeoffs in diverse landscapes. *Proceedings of the National Academy of Sciences, 107*(11), 5242-5247.

Rawat, Y. S. (2017). Sustainable biodiversity stewardship and inclusive development in South Africa: A novel package for a sustainable future. *Current Opinion in Environmental Sustainability, 24,* 89-95.

Raworth, K. (2012). A safe and just space for humanity: Can we live within the doughnut. *Oxfam Policy and Practice: Climate Change and Resilience, 8*(1), 1-26.

Raworth, K. (2017). *Doughnut economics: Seven ways to think like a 21st-century economist.* London, United Kingdom: Random House Business Books.

Raymond, C., Reed, M. S., Bieling, C., Robinson, G., & Plieninger, T. (2016). Integrating different understandings of landscape stewardship into the design of agri-environmental schemes. *Environmental Conservation, 43*(4), 350-358.

Raymond, C. M., Singh, G. G., Benessaiah, K., Bernhardt, J. R., Levine, J., Nelson, H., Turner, N. J., Norton, B., Tam, J., & Chan, K. M. A. (2013). Ecosystem services and beyond: Using multiple metaphors to understand human-environment relationships. *BioScience, 63*(7), 536-546.

Rebelo, A. J. (2012). *An ecological and hydrological evaluation of the effects of restoration on ecosystem services in the Kromme river system, South Africa. Unpublished MSc thesis.* Stellenbosch, South Africa: Stellenbosch University.

Rebelo, A. J., le Maitre, D. C., Esler, K., & Cowling, R. (2013). Are we destroying our insurance policy? The effects of alien invasion and subsequent restoration: A case study of the Kromme river system, South Africa. In B. Fu & K. B. Jones (Eds.), *Landscape ecology for sustainable environment and culture.* Dordrecht, The Netherlands: Springer Science+Business Media.

Redford, K. H., Huntley, B. J., Roe, D., Hammond, T., Zimsky, M., Lovejoy, T. E., da Fonseca, G. A. B., Rodriguez, C. M., & Cowling, R. M. (2015). Mainstreaming biodiversity: Conservation for the twenty-first century. *Frontiers in Ecology and Evolution, 3,* 137.

Reed, J., van Vianen, J., Barlow, J., & Sunderland, T. (2017). Have integrated landscape approaches reconciled societal and environmental issues in the tropics? *Land Use Policy, 63,* 481-492.

Reed, J., Van Vianen, J., Deakin, E. L., Barlow, J., & Sunderland, T. (2016). Integrated landscape approaches to managing social and environmental issues in the tropics: Learning from the past to guide the future. *Global Change Biology, 22*(7), 2540-2554.

Reed, M. S., Evely, A. C., Cundill, G., Fazey, I., Glass, J., Laing, A., Newig, J., Parrish, B., Prell, C., Raymond, C., & Stringer, L. C. (2010). What is social learning? *Ecology and Society, 15*(4), 1.

Reenberg, A. (2011). *Toolbox options for conceptualizing change in human-environmental systems - pathways, path dependency, legacies, syndromes and scenarios. GLP report no. 2.* Copenhagen, Denmark: GLP-IPO (Global Land Project - International Project Office).

Reo, N. J., Whyte, K. P., McGregor, D., Smith, M., & Jenkins, J. F. (2017). Factors that support indigenous involvement in multi-actor environmental stewardship. *AlterNative: An International Journal of Indigenous Peoples, 13*(2), 58-68.

Reyers, B., Roux, D. J., Cowling, R. M., Ginsburg, A. E., Nel, J. L., & Farrell, P. O. (2010). Conservation planning as a transdisciplinary process. *Conservation Biology, 24*(4), 957-965.

Rhoodie, N., & Liebenberg, I. (1994). *Democratic nation-building in South Africa.* Pretoria, South Africa: Human Sciences Research Council.

Rice, M. (2013). Spanning disciplinary, sectoral and international boundaries: A sea change towards transdisciplinary global environmental change research? *Current Opinion in Environmental Sustainability, 5*(3–4), 409-419.

Ridings, P. (2017). Redefining environmental stewardship to deliver governance frameworks for marine biodiversity beyond national jurisdiction. *ICES Journal of Marine Science, In Press*.

Robertson, G. P., & Swinton, S. M. (2005). Reconciling agricultural productivity and environmental integrity: A grand challenge for agriculture. *Frontiers in Ecology and the Environment, 3*(1), 38-46.

Robinson, F. (2010). After liberalism in world politics? Towards an international political theory of care. *Ethics and Social Welfare, 4*(2), 130-144.

Robinson, L. W., Ontiri, E., Alemu, T., & Moiko, S. S. (2017). Transcending landscapes: Working across scales and levels in pastoralist rangeland governance. *Environmental Management, 60*, 185-199.

Rockstrom, J., Steffen, W., Noone, K., Persson, A., Chapin, F. S., Lambin, E. F., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist, B., de Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sorlin, S., Snyder, P. K., Costanza, R., Svedin, U., Falkenmark, M., Karlberg, L., Corell, R. W., Fabry, V. J., Hansen, J., Walker, B., Liverman, D., Richardson, K., Crutzen, P., & Foley, J. A. (2009). A safe operating space for humanity. *Nature, 461*(7263), 472-475.

Rodríguez, J. P., Beard, J. T. D., Bennett, E. M., Cumming, G. S., Cork, S. J., Agard, J., Dobson, A. P., & Peterson, G. D. (2006). Trade-offs across space, time, and ecosystem services. *Ecology and Society, 11*(1), 28.

Rogers, K. H., Luton, R., Biggs, H., Biggs, R., Blignaut, S., Choles, A. G., Palmer, C., & Tangwe, P. (2013). Fostering complexity thinking in action research for change in social-ecological systems. *Ecology and Society, 18*(2), 31.

Rosenberg, E., Rosenberg, G., Lotz-Sisitka, H. B., & Ramsarup, P. (2016). *Green economy learning assessment South Africa. Critical competence for driving a green transition*. Johannesburg, South Africa: PAGE: Partnership for Action on Green Economy.

Ross, R. (1983). The first two centuries of colonial agriculture in the Cape Colony: A historiographical review. *Social Dynamics, 9*(1), 30-49.

Ross, R. (1986). The origins of capitalist agriculture in the Cape Colony: A survey. In W. Beinart, P. Delius & S. Trapido (Eds.), *Putting a plough to the ground: Accumulation and dispossession in rural South Africa, 1850-1930* (pp. 56-100). Indiana University, Bloomington: Ravan University.

Ross, R. (1997). The Kat River Rebellion and Khoikhoi nationalism: The fate of an ethnic identification. *Kronos, 24*(November 1997), 91-105.

Roux, D. J., Rogers, K. H., Biggs, H. C., Ashton, P. J., & Sergeant, A. (2006). Bridging the science-management divide: Moving from unidirectional knowledge transfer to knowledge interfacing and sharing. *Ecology and Society, 11*(1), 4.

Sachs, J. D. (2012). From Millennium Development Goals to Sustainable Development Goals. *The Lancet, 379*(9832), 2206-2211.

Sadler, G. R., Lee, H.-C., Lim, R. S.-H., & Fullerton, J. (2010). Research article: Recruitment of hard-to-reach population subgroups via adaptations of the snowball sampling strategy. *Nursing & Health Sciences, 12*(3), 369-374.

Saldaña, J. (2013). *The coding manual for qualitative researchers*. Thousand Oaks, CA: SAGE Publications Inc.

SANBI. (2009). *Background on biodiversity stewardship and land reform in South Africa*. Pretoria, South Africa: South African National Biodiversity Institute. Retrieved from http://www.sanbi.org/sites/default/files/documents/documents/microsoft-word-background-land-reform-and-stewardship.pdf

SANBI. (2015a). *The business case for biodiversity stewardship. A report produced for the Department of Environmental Affairs*. Pretoria, South Africa: South African National Biodiversity Institute. Retrieved from http://biodiversityadvisor.sanbi.org/wp-content/uploads/2017/07/Biodiversity-Stewardship-Business-Case-FINAL-June-2015.pdf

SANBI. (2015b). *Factsheet on Biodiversity Stewardship, second edition*. Pretoria, South Africa: South African National Biodiversity Institute. Retrieved from http://biodiversityadvisor.sanbi.org/wp-content/uploads/2017/03/Biodiversity-Stewardship-Factsheet-Oct-2015-2nd-edition.pdf

SANBI. (2016). *Lexicon of biodiversity planning in South Africa. Beta version, june 2016*. Pretoria, South Africa: South African National Biodiversity Institute. Retrieved from http://biodiversityadvisor.sanbi.org/wp-content/uploads/2016/06/2016_06_02-Lexicon.pdf

Sandwith, T., Maze, K., Barnett, M., Frazee, S., & Cadman, M. (2005). Mainstreaming biodiversity through South Africa's bioregional conservation programs: Top-down and bottom-up. In C. Petersen & B. Huntley (Eds.), *Mainstreaming biodiversity in production landscapes* (pp. 78-88). Washington, DC: Global Environment Facility.

Saunders, F. (2014). The promise of common pool resource theory and the reality of commons projects. *International Journal of the Commons, 8*(2), 636-656.

Sayer, J., Sunderland, T., Ghazoul, J., Pfund, J.-L., Sheil, D., Meijaard, E., Venter, M., Boedhihartono, A. K., Day, M., Garcia, C., van Oosten, C., & Buck, L. E. (2013). Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. *Proceedings of the National Academy of Sciences, 110*(21), 8349-8356.

Sayre, N. F., Kelty, R., Simmons, M., Clayton, S., Kassam, K.-A., Pickett, S. T., & Chapin, F. S. (2013). Invitation to earth stewardship: Guest editorial. *Frontiers in Ecology and the Environment, 11*(7), 339.

Schafer, P. (2014). The peaks and troughs of Langkloof land reform. *Finweek, 11 September 2014*, 22-25.

Scharmer, C. O. (2009a). *Leadership development is not about filling a gap but about igniting a field of inspired connection and action*. Washington, DC: Paper prepared for: Round Table Meeting On Leadership For Development Impact. The World Bank, The World Bank Institute. September 27- 28, 2009 Retrieved from http://www.ottoscharmer.com/sites/default/files/2009_FieldBasedLeadDev.pdf

Scharmer, C. O. (2009b). *Theory u: Learning from the future as it emerges*. San Francisco, CA: Berrett-Koehler Publishers.

Scharmer, C. O., & Kaufer, K. (2013). *Leading from the emerging future: From ego-system to eco-system economies*. San Francisco, CA: Berrett-Koehler Publishers.

Scherr, S. J., & McNeely, J. A. (2008). Biodiversity conservation and agricultural sustainability: Towards a new paradigm of 'ecoagriculture' landscapes. *Philosophical Transactions of the Royal Society B, 363*(1491), 477-494.

Schultz, L., Folke, C., & Olsson, P. (2007). Enhancing ecosystem management through social-ecological inventories: Lessons from Kristianstads Vattenrike, Sweden. *Environmental Conservation, 34*(2), 140-152.

Schuttenberg, H. Z., & Guth, H. K. (2015). Seeking our shared wisdom: A framework for understanding knowledge coproduction and coproductive capacities. *Ecology and Society, 20*(1), 15.

Schwartz, S. H., Melech, G., Lehmann, A., Burgess, S., Harris, M., & Owens, V. (2001). Extending the cross-cultural validity of the theory of basic human values with a different method of measurement. *Journal of Cross-Cultural Psychology, 32*(5), 519-542.

Scotcher, J. S. B. (2009). *The Green Choice Living Farms Reference 2009/2010 version*: A. Goldblatt (ed.). Unpublished report to Green Choice Alliance (A World Wide Fund for Nature and Conservation International partnership). Retrieved from http://www.botanicalsociety.org.za/ProjectsAndActivities/Conservation%20Downloads/Greenchoice%20Living%20Farms%20Reference%202009-2010.pdf

Scott, K., Park, J., & Cocklin, C. (2000). From `sustainable rural communities' to `social sustainability': Giving voice to diversity in Mangakahia Valley, New Zealand. *Journal of Rural Studies, 16*(4), 433-446.

Seekings, J. (2008). The continuing salience of race: Discrimination and diversity in South Africa. *Journal of Contemporary African Studies, 26*(1), 1-25.

Seidel, S., Recker, J. C., Pimmer, C., & vom Brocke, J. (2010). *Enablers and barriers to the organizational adoption of sustainable business practices*: Proceedings of the 16th Americas Conference on Information Systems: Sustainable IT Collaboration around the Globe, 12-15 August 2010, Lima, Peru.

Selinske, M. J., Coetzee, J., Purnell, K., & Knight, A. T. (2015). Understanding the motivations, satisfaction, and retention of landowners in private land conservation programs. *Conservation Letters, 8*(4), 282–289.

Shackleton, C. (2009). Will the real custodian of natural resource management please stand up. *South African Journal of Science, 105*, 91-93.

Shackleton, C. M., Shackleton, S. E., & Cousins, B. (2001). The role of land-based strategies in rural livelihoods: The contribution of arable production, animal husbandry and natural resource harvesting in communal areas in South Africa. *Development Southern Africa, 18*(5), 581-604.

Shackleton, R., Shackleton, C., Shackleton, S., & Gambiza, J. (2013). Deagrarianisation and forest revegetation in a biodiversity hotspot on the Wild Coast, South Africa. *PLoS ONE, 8*(10), e76939.

Shackleton, R. T., Le Maitre, D. C., van Wilgen, B. W., & Richardson, D. M. (2016). Identifying barriers to effective management of widespread invasive alien trees: Prosopis species (mesquite) in South Africa as a case study. *Global Environmental Change, 38*, 183-194.

Shackleton, S., & Luckert, M. (2015). Changing livelihoods and landscapes in the rural Eastern Cape, South Africa: Past influences and future trajectories. *Land, 2015*(4), 1060-1089.

Shackleton, S., & Shackleton, C. (2011). Exploring the role of wild natural resources in poverty alleviation with an emphasis on South Africa. In P. Hebinck & C. Shackleton (Eds.), *Reforming land and resource use in South Africa: Impact on livelihoods* (pp. 209-234). Oxon, United Kingdom: Routledge.

Shackleton, S., Ziervogel, G., Sallu, S., Gill, T., & Tschakert, P. (2015). Why is socially-just climate change adaptation in sub-Saharan Africa so challenging? A review of barriers identified from empirical cases. *Wiley Interdisciplinary Reviews: Climate Change, 6*(3), 321-344.

Shannon-Baker, P. (2016). Making paradigms meaningful in mixed methods research. *Journal of Mixed Methods Research, 10*(4), 319-334.

Shilling, J. D., & Osha, J. (2003). *Paying for environmental stewardship*. Washington, DC: WWF Macroeconomics Program. Retrieved from http://awsassets.panda.org/downloads/2003_paying_for_environmental_stewardship.pdf

Sick, D. (2008). Social contexts and consequences of institutional change in common-pool resource management. *Society & Natural Resources, 21*(2), 94-105.

Sitas, N., Prozesky, H., Esler, K., & Reyers, B. (2014). Exploring the gap between ecosystem service research and management in development planning. *Sustainability, 6*(6), 3802-3824.

SKEP. (2003). *SKEP 20-year strategy: Biodiversity conservation and sustainable land use in the Succulent Karoo*. Cape Town, South Africa: The Botanical Society of South Africa.

Snape, D., & Spencer, L. (2013). The foundations of qualitative research. In J. Ritchie, J. Lewis, P. S. P. J. Lewis, C. M. N. Nicholls & R. Ormston (Eds.), *Qualitative research practice: A guide for social science students and researchers* (pp. 1-23). Thousand Oaks, CA: SAGE Publications Inc.

South African Water Caucus. (2017). *Report on the state of the Department of Water Affairs and Sanitation. Prepared by the South African water caucus dws task team based on publicly available information*. Cape Town: South African Water Caucus and Environmental Monitoring Group. Retrieved from http://emg.org.za/images/downloads/water_cl_ch/SAWC_State-of-DWS-Report.pdf

Spires, M. H. (2015). *Barriers to and enablers of climate change adaptation in four South African municipalities, and implications for community based adaptation. Unpublished PhD thesis*. Grahamstown, South Africa: Rhodes University.

Stake, R. E. (2005). Qualitative case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE handbook of qualitative research* (pp. 443-466). Thousand Oaks, CA: Sage Publications Inc.

Stallman, H. R. (2011). Ecosystem services in agriculture: Determining suitability for provision by collective management. *Ecological Economics, 71*, 131-139.

Statistics South Africa. (2012). *Census 2011 Municipal Report - Eastern Cape. Report no. 03-01-50*. Pretoria, South Africa: Statistics South Africa. Retrieved from http://www.statssa.gov.za/census/census_2011/census_products/EC_Municipal_Report.pdf

Statistics South Africa. (2013). *Census 2011 Agricultural Households*. Pretoria, South Africa: Statistics South Africa. Retrieved from http://www.statssa.gov.za/publications/Report-03-11-01/Report-03-11-012011.pdf

Statistics South Africa. (2017). *Poverty trends in South Africa: An examination of absolute poverty between 2006 and 2015*. Pretoria, South Africa: Statistics South Africa. Retrieved from http://www.statssa.gov.za/publications/Report-03-10-06/Report-03-10-062015.pdf

Steffen, W., Broadgate, W., Deutsch, L., Gaffney, O., & Ludwig, C. (2015). The trajectory of the Anthropocene: The great acceleration. *The Anthropocene Review, 2*(1), 81-98.

Steffen, W., Persson, Å., Deutsch, L., Zalasiewicz, J., Williams, M., Richardson, K., Crumley, C., Crutzen, P., Folke, C., Gordon, L., Molina, M., Ramanathan, V., Rockström, J., Scheffer, M., Schellnhuber, H., & Svedin, U. (2011). The Anthropocene: From global change to planetary stewardship. *AMBIO, 40*(7), 739-761.

Stirzaker, R., Biggs, H., Roux, D., & Cilliers, P. (2010). Requisite simplicities to help negotiate complex problems. *AMBIO, 39*(8), 600-607.

Stokols, D. (2006). Toward a science of transdisciplinary action research. *American Journal of Community Psychology, 38*(1-2), 63-77.

Stone-Jovicich, S. (2015). Probing the interfaces between the social sciences and social-ecological resilience: Insights from integrative and hybrid perspectives in the social sciences. *Ecology and Society, 20*(2), 25.

Stuart, D. (2016). Crossing the 'great divide' in practice: Theoretical approaches for sociology in interdisciplinary environmental research. *Environmental Sociology, 2*(2), 118-131.

Sulemana, I., & James, H. S. (2014). Farmer identity, ethical attitudes and environmental practices. *Ecological Economics, 98*(Supplement C), 49-61.

Swiegers, J. J. (1994). *Die geskiedenis van die Langkloof tot 1795. Unpublished Masters thesis*. Stellenbosch, South Africa: University of Stellenbosch.

Swilling, M. (2014). Rethinking the science-policy interface in South Africa: Experiments in knowledge co-production. *South African Journal of Science, 110*(5/6), #2013-0265.

Tai, H.-S. (2015). Cross-scale and cross-level dynamics: Governance and capacity for resilience in a social-ecological system in taiwan. *Sustainability, 7*(2), 2045-2065.

Talbot, M. (2012). *Improving Algoa's water security through restoration, sustainable land uses and investments in ecosystem services (ies): Action plan. Commissioned by GIZ*. Cape Town, South Africa: GIZ Mpumalanga Rural Development Programme (MRDP) and Living Lands.

Talbot, M., & van den Broeck, D. (2016). Shifting from individual to collective action: Living Lands' experience in the Baviaanskloof, South Africa. In M. Frick & J. Helgeson (Eds.), *Land restoration* (pp. 521-531). Boston, MA: Academic Press.

Taljaard, L. (2015). *Kouga and Krom catchments situational analysis. Prepared by Talmar Sustainable Developments*. Cape Town, South Africa: Living Lands.

Tanentzap, A. J., Lamb, A., Walker, S., & Farmer, A. (2015). Resolving conflicts between agriculture and the natural environment. *PLoS Biology, 13*(9), e1002242.

Tashakkori, A., & Teddlie, C. (2003). *Handbook of mixed methods in social & behavioral research*. Thousand Oaks, CA: SAGE Publications Inc.

Tassone, V. C., O'Mahony, C., McKenna, E., Eppink, H. J., & Wals, A. E. J. (2017). (re-)designing higher education curricula in times of systemic dysfunction: A responsible research and innovation perspective. *Higher Education, In Press*.

Taylor, R. (2009). Community based natural resource management in Zimbabwe: The experience of campfire. *Biodiversity and Conservation, 18*(10), 2563-2583.

Tengö, M., Brondizio, E. S., Elmqvist, T., Pernilla Malmer, & Spierenburg, M. (2014). Connecting diverse knowledge systems for enhanced ecosystem governance: The multiple evidence base approach. *AMBIO, 43*(5), 579-591.

The World Bank. (2014). *South Africa economic update: Fiscal policy and redistribution in an unequal society*. Washington, DC: The International Bank for Reconstruction and Development/The World Bank. Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/10/30/000470435_20141030130616/Rendered/PDF/921670WP0P131400SAEU60for0web01029b.pdf

Thompson, M. A., Owen, S., Lindsay, J. M., Leonard, G. S., & Cronin, S. J. (2017). Scientist and stakeholder perspectives of transdisciplinary research: Early attitudes, expectations, and tensions. *Environmental Science & Policy, 74*, 30-39.

Thrupp, L. A. (2000). Linking agricultural biodiversity and food security: The valuable role of agrobiodiversity for sustainable agriculture. *International Affairs, 76*(2), 283-297.

Toomey, A. H. (2016). What happens at the gap between knowledge and practice? Spaces of encounter and misencounter between environmental scientists and local people. *Ecology and Society, 21*(2), 28.

Torquebiau, E. (2015). Whither landscapes? Compiling requirements of the landscape approach. In P. A. Minang, van Noordwijk, M., Freeman, O. E., Mbow, C., de Leeuw, J., Catacutan, D. (Ed.), *Climate-smart landscapes: Multifunctionality in practice*. Nairobi, Kenya: World Agroforestry Centre (ICRAF).

Torquebiau, E., & Taylor, R. (2009). Natural resource management by rural citizens in developing countries: Innovations still required. *Biodiversity and Conservation, 18*(10), 2537-2550.

Trell, E.-M., & van Hoven, B. (2010). Making sense of place: Exploring creative and (inter)active research methods with young people. *Fennia - International Journal of Geography, 188*(1), 91-104.

Tronto, J. C. (1993). *Moral boundaries: A political argument for an ethic of care*. New York, NY: Routledge.

Tscharntke, T., Clough, Y., Wanger, T. C., Jackson, L., Motzke, I., Perfecto, I., Vandermeer, J., & Whitbread, A. (2012). Global food security, biodiversity conservation and the future of agricultural intensification. *Biological Conservation, 151*(1), 53-59.

Tscharntke, T., Klein, A. M., Kruess, A., Steffan-Dewenter, I., & Thies, C. (2005). Landscape perspectives on agricultural intensification and biodiversity – ecosystem service management. *Ecology Letters, 8*(8), 857-874.

Turner, S. (2004). Community-based natural resource management and rural livelihoods. In C. Fabricius & E. Koch (Eds.), *Rights, resources and rural development: Community-based natural resource management in Southern Africa* (pp. 44-65). London, United Kingdom: Earthscan.

UCPP. (2016). *Rangeland restoration model summary and toolkit guide: For landscapes and livelihoods* Matatiele, South Africa: Umzimvubu Catchment Partnership Programme. Retrieved from https://umzimvubu.org/rangeland-toolkit/

van Breda, J., Musango, J., & Brent, A. (2016). Undertaking individual transdisciplinary PhD research for sustainable development: Case studies from South Africa. *International Journal of Sustainability in Higher Education, 17*(2), 150-166.

van de Witte, Y. (2015). *Kouga catchment: Towards a clearing strategy for black wattle. Internal report*. Cape Town, South Africa: Living Lands.

van der Laan, M., Bristow, K. L., Stirzaker, R. J., & Annandale, J. G. (2017). Towards ecologically sustainable crop production: A South African perspective. *Agriculture, Ecosystems & Environment, 236*, 108-119.

Van Huyssteen, A. (2008). *Die storie van Langkloof*. Melkbosstrand, Cape Town: DANISTA.

van Kerkhoff, L. (2014). Developing integrative research for sustainability science through a complexity principles-based approach. *Sustainability Science, 9*(2), 143-155.

van Kerkhoff, L., & Lebel, L. (2006). Linking knowledge and action for sustainable development. *Annual Review of Environment and Resources, 31*(1), 445-477.

van Koppen, B., & Schreiner, B. (2014). Moving beyond integrated water resource management: Developmental water management in South Africa. *International Journal of Water Resources Development, 30*(3), 543-558.

Van Oosten, C. (2013). Forest landscape restoration: Who decides? A governance approach to forest landscape restoration. *Natureza & Conservação, 1*(2), 119-126.

van Oudenhoven, A. P. E., Veerkamp, C. J., Alkemade, R., & Leemans, R. (2015). Effects of different management regimes on soil erosion and surface runoff in semi-arid to sub-humid rangelands. *Journal of Arid Environments, 121*, 100-111.

Van Vuuren, L. (2011). Kouga dam – serving the fertile Gamtoos valley. *The Water Wheel, January/February 2011*, 20-24.

van Wilgen, B. W., & Wannenburgh, A. (2016). Co-facilitating invasive species control, water conservation and poverty relief: Achievements and challenges in South Africa's Working for Water programme. *Current Opinion in Environmental Sustainability, 19*(Supplement C), 7-17.

Veerkamp, C. (2013). *Agriculture and biodiversity conservation in the South African water-stressed Kouga catchment: An inventory and integrated assessment relating land management and ecosystem services. Unpublished MSc thesis*. Wageningen, The Netherlands: Wageningen University.

Vejre, H., Abildtrup, J., Kærgaard, N., Fritzbøger, B., Busck, A. G., & Olsen, S. B. (2012). Revitalisation of common use in management of modern multifunctional landscapes. *Landscape Research, 37*(6), 637-657.

Villasante, S., & Österblom, H. (2015). The role of cooperation for improved stewardship of marine social-ecological systems in Latin America. *Ecology and Society, 20*(1), 8.

Vindrola-Padros, C., Pape, T., Utley, M., & Fulop, N. J. (2017). The role of embedded research in quality improvement: A narrative review. *BMJ Quality and Safety, 26*(1), 70-80.

Von Hase, A., Rouget, M., & Cowling, R. M. (2010). Evaluating private land conservation in the Cape Lowlands, South Africa. *Conservation Biology, 24*(5), 1182–1189.

Walker, B., Carpenter, S., Anderies, J., Abel, N., Cumming, G. S., Janssen, M., Lebel, L., Norberg, J., Peterson, G. D., & Pritchard, R. (2002). Resilience management in social-ecological systems: A working hypothesis for a participatory approach. *Conservation Ecology, 6*(1), 14.

Walker, B., Holling, C. S., Carpenter, S. R., & Kinzig, A. P. (2004). Resilience, adaptability and transformability in social–ecological systems. *Ecology and Society, 9*(2), 5.

Walpole, E. H., Toman, E., Wilson, R. S., & Stidham, M. (2017). Shared visions, future challenges: A case study of three collaborative forest landscape restoration program locations. *Ecology and Society, 22*(2), 35.

Wambugu, S. W., Chomba, S. W., & Atela, J. (2014). Institutional arrangements for climate-smart landscapes. In P. A. Minang, M. van Noordwijk, O. E. Freeman, C. Mbow, J. de Leeuw & D. Catacutan (Eds.), *Climate-smart landscapes: Multifunctionality in practice* (pp. 257-274). Nairobi, Kenya: World Agroforestry Centre (ICRAF).

Weaver, M., O'Keeffe, J., Hamer, N., & Palmer, C. (2017). Water service delivery challenges in a small South African municipality: Identifying and exploring key elements and relationships in a complex social-ecological system. *Water SA, 43*(3), 398-408.

Weber, E. P., Belsky, J. M., Lach, D., & Cheng, A. S. (2014). The value of practice-based knowledge. *Society & Natural Resources, 27*(10), 1074-1088.

Welchman, J. (2012). A defence of environmental stewardship. *Environmental Values, 21*(3), 297-316.

Welchman, J. (2015). Environmental versus natural heritage stewardship: Nova scotia's annapolis river and the canadian heritage river system. In M. Hourdequin & D. G. Havlick (Eds.), *Restoring layered landscapes: History, ecology, and culture* (pp. 112-132). New York, NY: Oxford University Press.

West, S., Haider, J., Sinare, H., & Karpouzoglou, T. (2014). *Beyond divides: Prospects for synergy between resilience and pathways approaches to sustainability, STEPS Working Paper 65*. Brighton, United Kingdom: STEPS Centre.

West, S., Schultz, L., & Bekessy, S. (2016). Rethinking social barriers to effective adaptive management. *Environmental Management, 58*(3), 399-416.

Westley, F. R., Tjornbo, O., Schultz, L., Olsson, P., Folke, C., Crona, B., & Bodin, Ö. (2013). A theory of transformative agency in linked social-ecological systems. *Ecology and Society, 18*(3), 27.

Whaley, L., & Weatherhead, E. K. (2015). Using the politicized institutional analysis and development framework to analyze (adaptive) comanagement: Farming and water resources in England. *Ecology and Society, 20*(3), 43.

Wiek, A., Withycombe, L., & Redman, C. L. (2011). Key competencies in sustainability: A reference framework for academic program development. *Sustainability Science, 6*(2), 203-218.

Wily, L. A. (2002). *Participatory forest management in africa: An overview of progress and issues*. Proceedings of the Second International Workshop on Participatory Forestry in Africa. Defining the way forward: sustainable livelihoods and sustainable forest management through participatory forestry, Arusha, United Republic of Tanzania.

Wittmayer, J. M., & Schäpke, N. (2014). Action, research and participation: Roles of researchers in sustainability transitions. *Sustainability Science, 9*(4), 483-496.

Wollenberg, E., Anderson, J., & Edmunds, D. (2001). Pluralism and the less powerful: Accommodating multiple interests in local forest management. *International Journal of Agricultural Resources, Governance and Ecology, 1*(3-4), 199-222.

Wollenberg, E., López, C., & Anderson, J. (2005). *Though all things differ: Pluralism as a basis for cooperation in forests*. Bogor, Indonesia: CIFOR.

Wondolleck, J. M., & Yaffee, S. L. (2000). *Making collaboration work: Lessons from innovation in natural resource managment*. Washington, DC: Island Press.

World Conservation Monitoring Centre. (1992). *Global biodiversity: Status of the earth's living resources*. London, United Kingdom: Chapman & Hall.

Worrell, R., & Appleby, M. (2000). Stewardship of natural resources: Definition, ethical and practical aspects. *Journal of Agricultural and Environmental Ethics, 12*(3), 263-277.

Worth, S. H. (2006). Agriflection: A learning model for agricultural extension in South Africa. *Journal of Agricultural Education and Extension, 12*(3), 179-193.

WWF-SA. (2015). *The resilient landscapes approach: Facilitating social learning across sectors and scales to create shared value*. Cape Town, South Africa: WWF-South Africa. Retrieved from http://awsassets.wwf.org.za/downloads/resilient_landscapes_approach.pdf

Wynberg, R. (2002). A decade of biodiversity conservation and use in South Africa: Tracking progress from the Rio Earth Summit to the Johannesburg World Summit on Sustainable Development. *South African Journal of Science, 98*, 233-243.

Yin, R. K. (2009). *Case study research: Design and methods*. Thousand Oaks, CA: Sage Publications Inc.

Zhang, W., Ricketts, T. H., Kremen, C., Carney, K., & Swinton, S. M. (2007). Ecosystem services and dis-services to agriculture. *Ecological Economics, 64*(2), 253-260.

Zheng, Y., Byg, A., Thorsen, B. J., & Strange, N. (2014). A temporal dimension of household vulnerability in three rural communities in Lijiang, China. *Human Ecology, 42*(2), 283-295.

Zylstra, M. (2014). *Exploring meaningful nature experience connectedness with nature and the revitalization of transformative education for sustainability. Unpublished PhD thesis*. Stellenbosch, South Africa: Stellenbosch University.