

***Ongediertes: A critical qualitative study of farmer–black-backed
jackal conflict and its management around the Square Kilometre
Array core site in the Northern Cape, South Africa***

by

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Dissertation presented for the degree of Doctor of Sociology in the Faculty of
Arts and Social Sciences at Stellenbosch University

The financial assistance of the National Research Foundation (NRF) towards
this research is hereby acknowledged. Opinions expressed and conclusions
arrived at, are those of the author and are not necessarily to be attributed to
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March 2020

Declaration

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Abstract

This dissertation explores farmer–jackal conflict and the most effective way to manage this relationship in the context of the Square Kilometre Array (SKA) radio telescope in the Karoo and the human–human conflict surrounding it locally.

The erection of the SKA radio telescope has drawn international attention to South Africa’s semi-arid Karoo region because of the astronomical significance of its science agenda. To ensure the optimal functionality of the Array, the South African state has purchased farms totalling approximately 130 000ha, which have been withdrawn from sheep production and placed under conservation management. Commercial farmers neighbouring the SKA core site have voiced concerns that this is threatening their livelihoods and the local economy; a major concern is that the park will become a haven for black-backed jackals which predate on their sheep.

Using critical realism and political ecology for my theoretical framework, and drawing on the literature on human–wildlife conflict and social capital, I explore farmer–jackal conflict around the SKA core site and the proposed nature reserve. My primary research findings reveal the different understandings of jackals among the actors involved in jackal management, as well as the significance of the characterisation of jackals as *ongediertes* (literally, non-animals) in popular culture. I also show how power relations around knowledge production in jackal management are exercised, in particular the dominance of scientific knowledge over local knowledge, and consider the role of jackal management in collective action.

My research methodology was qualitative, including semi-structured interviews with a variety of individual actors as well as extensive participant observation over a period of four years and documentary analysis, including on the history of sheep farming and conservation in the Karoo. My findings show that farmers’ perceptions of themselves as losing their autonomy and struggling to control jackal predation have been exacerbated by the arrival of the SKA; their struggles against the SKA and the jackal have thus become fused in complex ways, lending support to the idea of the jackal as a trope for the larger developments around the SKA. In this unequal relationship, the farmers find themselves dictated to not only by the professional scientific elites involved in jackal ecology but also by those involved in the yet more powerful science of radio astronomy. Both jackals and the SKA contravene farmers’ understanding of the ‘natural’ order in the Karoo, in which man controls nature (i.e. non-humans) to serve his needs, and undermine their former dominance. Farmers in the Kareeberg are struggling to re-assert their authority; in this context jackals are the one thing in their immediate environment which they feel they still have agency over and, as a result, the jackal has become the focus of farmers’ frustrations.

This dissertation concludes that effective management of human–jackal conflict around the SKA core site (and thereby of the human–human conflict to which it is linked) requires an investment in building interpersonal and institutional trust as well as drawing on the resources of both scientific and local knowledge.

Opsomming

Hierdie proefskrif ondersoek boer–jakkals konflik en die doeltreffendste manier om hierdie verhouding te bestuur in die konteks van die *Square Kilometre Array* (SKA) radioteleskoop in die Karoo asook die plaaslike mens–mens konflik geassosieer met dit.

Die oprigting van die SKA radioteleskoop het internasionale aandag gevestig op Suid-Afrika se half-dor Karoo streek vanweë die astronomiese beduidenis van sy wetenskaplike agenda. Om die optimale funksionering van die *Array* te verseker, het die Suid-Afrikaanse regering plase aangekoop van om-en-by 130 000ha, wat van skaapproduksie af onttrek is en onder bewaringsbestuur geplaas is. Kommersiële boere aangrensend aan die SKA-kernterrein het kommer uitgespreek dat dit hul lewensbestaan en die plaaslike ekonomie bedreig; ‘n groot kommer is dat die park ‘n toevlugsoord sal word vir rooijakkalse wat hulle skape vreet.

Met behulp van kritiese realisme en politieke ekologie as my teoretiese raamwerk, en die literatuur oor mens–wildlewe konflik en sosiale kapitaal, ondersoek ek boer–jakkals konflik rondom die SKA-kernterrein en die voorgestelde natuurreservaat. My primêre navorsingsbevindinge openbaar die verskillende begrippe van jakkalse tussen die akteurs wat by jakkalsbestuur betrokke is, asook die beduidenis van jakkalse se karakterisering as ongediertes (letterlik, nie-diere) in populêre kultuur. Ek wys ook hoe magsverhoudinge rondom kennisproduksie in jakkalsbestuur uitgeoefen word, veral die oorheersing van wetenskaplike kennis oor plaaslike kennis én beskou die rol van jakkalsbestuur in kollektiewe optrede.

My navorsingsmetodologie was kwalitatief, insluitend semi-gestruktureerde onderhoude met ‘n verskeidenheid individuele akteurs, sowel as omvangryke deelnemer waarneming oor ‘n tydperk van vier jaar én dokumentêre analise, insluitend die geskiedenis van skaapboerdery en bewaring in die Karoo. My bevindings toon dat boere se persepsie van hulself as iemand wat hul outonomie verloor en sukkel om jakkals-predasie te beheer, vererger het met die koms van die SKA; hulle stryd teen die SKA en die jakkals het dus op ‘n ingewikkelde manier saamgesmelt, wat die idee van die jakkals as ‘n figuurlike uitdrukking vir ontwikkelings rondom die SKA, versterk het. In hierdie ongelyke verhouding vind die boere hulself voorgesê, nie net deur die professionele wetenskaplike elite betrokke by jakkalsekologie nie, maar ook deur diegene wat betrokke is by die nóg magtiger wetenskap van radio astronomie. Beide jakkalse en die SKA oortree boere se begrip van die ‘natuurlike’ orde in die Karoo, waarin die mens die natuur (d.w.s. nie-mense) beheer om in sy behoeftes te voorsien, en sy eertydse oorheersing ondermyn. Boere in die Kareeberg sukkel om hul gesag weer te laat geld; in hierdie konteks is jakkalse die een ding in hul onmiddellike omgewing wat hulle voel, hul nog agentskap oor beskik, en gevolglik het jakkalse die fokus van boere se frustrasies geword.

Hierdie proefskrif kom tot die gevolgtrekking dat effektiewe bestuur van mens–jakkals konflik rondom die SKA-kernterrein (en daarmee saam die mens–mens konflik waaraan dit gekoppel is) ‘n belegging benodig in die opbou van interpersoonlike en institusionele vertroue, asook om gebruik te maak van bronne van beide wetenskaplike en plaaslike kennis.

Acknowledgements

That this dissertation ever came to see the light, I owe to my supervisor, Prof Cheryl Walker. Thank you for your guidance and mentoring throughout my PhD and for inviting me to explore the Karoo as part of your research endeavours. I hope your introduction to black-backed jackals has been a joyful experience.

I would also like to thank the staff and my fellow postgraduate students in the Department of Sociology and Social Anthropology at Stellenbosch University. While all of you deserve praise, I wish to individually thank Genay, Nwabisa, Melissa, Keziah, Neil, Cassey, Lindy and Jan. Your constant words of motivation and encouragement made me believe in myself. A special thank you to my co-Karoosters of Prof Walker's DST/NRF SARChI Research Chair in The Sociology of Land, Environment and Sustainable Development whose support, friendship, laughter, upliftment, and insightful and academic conversations made this journey exceptional.

Carnarvon became my home away from home and I owe thanks to numerous individuals and families who welcomed me as one of their own. This dissertation would not have been possible without you. Thank you for sharing your jackal (and human) encounters with me. I value every insight you shared with me and hope you enjoy and find meaning in this dissertation.

Finally, this work is based on the research supported wholly by the National Research Foundation of South Africa. I acknowledge that opinions, findings and conclusions or recommendations expressed in this dissertation generated by the NRF supported research is that of myself, and that the NRF accepts no liability whatsoever in this regard.

Dedications

I dedicate this dissertation, firstly, to my parents and foremost supporters, *mamma* Ilda and *pappa* Etienne Terblanche. Since my first holiday in the Kruger National Park at a young age, they have instilled a love and passion of South African wildlife in me, as well as travelling throughout South Africa. I know my frequent and long journeys to the Northern Cape made you worry about your only child, but you also came to understand and witness that the Karoo's *agterpaaie* made me a greater and stronger woman. My biggest achievement would be to make you proud and I hope that this PhD contributes to that.

Secondly, I dedicate this dissertation to another member of our small family: our border collie, Tinnie. After losing our previous two border collies, you were adopted just in time to start my PhD journey with me. Besides for being my “study buddy”, you also filled an emptiness in our hearts that only a border collie can fill.

Thirdly, I dedicate this dissertation to my own *jakkals*, Morné Gericke. You have only been part of my PhD journey for the last year, but I value your love, support and encouragement tremendously. You made the last stretch towards gaining this degree much more bearable and pushed me harder and further than I ever thought could be possible. Thank you for reminding me that there is a life to live beyond the screen of my laptop. You managed to occupy my heart while I was occupied with writing. *Ek is meer lief vir jou as wat woorde ooit sal kan beskryf.*

Lastly, I dedicate this dissertation to my research participants, especially the Karoo locals. Being accepted into your worlds has been an invaluable experience. I have given it my best to write about your lives and perspectives in an honest and considerate manner. Hopefully, this writing does justice to the complex ways in which you belong in the Karoo.

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List of abbreviations

ARMSCOR	Arnaments Corporation of South Africa
CSIR	Council for Scientific and Industrial Research
DST	Department of Science and Technology
HSRC	Human Sciences Research Council
IEMP	Integrated Environmental Management Plan
IUCN	International Union for Conservation of Nature
KAT-7	Seven-dish Karoo Array Telescope
LAG	Landbou Aksie Groep
NEMPA	National Environmental Management: Protected Areas Act
NPAES	National Protection Areas Expansion Strategy
NPAPC	National Problem Animal Policy Committee
NRF	National Research Foundation
NWGA	National Woolgrowers Association
PMF	Predation Management Forum
PMiC	Predation Management information Centre
RPO	Red Meat Producer's Organisation
SAEON	South African Environmental Observation Network
SANParks	South African National Parks
SARAO	South African Radio Astronomy Observatory
SARChI	South African Research Chairs Initiative
SEA	Strategic Environmental Assessment
SKA	Square Kilometre Array
SKA SA	Square Kilometre Array South Africa
SKAO	Square Kilometre Array Organisation

CHAPTER 1: INTRODUCTION

1.1 Setting the scene

As the sun rises over the Karoo koppies one winter's morning in 2017, Reynold, one of my key informants, and I arrive at Stiaan's farm gate approximately 20 kilometres outside of Carnarvon.¹ Located within the Kareeberg Local Municipality in South Africa's Northern Cape Province, this secluded rural town relies primarily on farming and social grants to sustain its local economy. Approximately 22% of Kareeberg households (685 out of 3 222) are involved in agricultural activities at different scales; livestock farming is the dominant practice, along with some poultry production and very minor levels of vegetable production and cultivation of other crops (Statistics South Africa, 2011a). Even though the importance of sheep farming has declined since the mid-20th century, the sector continues to play an important social role by sustaining the livelihoods of farmers, farmworkers and their extended families, providing employment and promoting involvement in agriculture. Now, however, the Square Kilometre Array (SKA) radio astronomy development – located approximately 90km from Carnarvon – is seen to be threatening the “lifeline” [*voedingsaar*] of the small towns (Ivan, interview, 28 June 2017) and this is why I am visiting Stiaan's farm.

In 2017 SKA South Africa (SKA SA) was in the middle of a major land acquisition process so as to “make the SKA a reality” (LAP: SKA SA Land Acquisition Programme, n.d.). Although all efforts were being made to follow a fair process that would avoid the state having to resort to land expropriation (see Chapter 2), uncertainty around future land management among farmers – including the management of black-backed jackals (*Canis mesomelas*),² the main culprits in livestock losses in the Kareeberg region³ – was at a very high level.

¹ The following account is based on my field notes taken after spending the day with Reynold and Stiaan in the field. Both names are pseudonyms; as discussed in Chapter 4, most research participants have been assigned first-name pseudonyms to preserve their anonymity. Those research participants who are public players in the jackal management debate, and have given me permission to do so, are identified by their real names.

² Three species of jackal occur throughout Africa: the side-striped jackal (*Canis adustus*), the golden jackal (*Canis aureus*) and the black-backed jackal (Sillero-Zubiri, Hoffman & Macdonald, 2004). Since the black-backed jackal is the only jackal that occurs in South Africa's Karoo region, I will henceforth refer to it solely as “jackal”.

³ The SKA core site (i.e. my research site), is located primarily within the Kareeberg Local Municipality, which derives its name from the mountain range nearby Carnarvon; the site also extends into the Karoo Hoogland and Hantam local municipalities in South Africa's Northern Cape province. For ease of communication, I refer to my study area as the Kareeberg region throughout my dissertation unless the context requires more precise geographical specificity.

Stiaan has learnt most of what he knows about sheep farming from his father who still farms alongside him. The family has a handful of farms around Carnarvon on which their herd of Dorper sheep (*Ovis aries*) is dispersed, mainly as a way of coping with the region’s ongoing drought. Reynold and Stiaan, both in their early thirties, greet each other with firm handshakes. As soon as Reynold has introduced me and my research interest – farmer–jackal conflict on the farmlands bordering the SKA core site – Stiaan wants clarity on my position: “Are you for or against jackals?” [*Is jy vir of teen die jakkalse?*]. This, I had already learned, was a test question regularly posed to me as soon as I entered the lives of livestock farmers. Jackals, along with the SKA, have earned the vehement opposition of livestock farmers in the Kareeberg region and throughout my fieldwork I had to subdue farmer prejudices that I was a “greenie”⁴ and/or a representative from SKA SA.

After discussing my research topic and interest in wildlife conservation over a cup of coffee, we head into the veld. A few kilometres from the dilapidated farmhouse, Stiaan points to, in his words, the “murder scene” [*moordtoneel*]: a young Dorper lamb, dead (Figure 1.1). After analysing the bite marks and the spoor around the carcass, Stiaan concludes that the perpetrator is



Figure 1.1 A predated Dorper lamb (Source: Terblanche, 2017).

a jackal. Two metres away lies a secondary kill: a Southern Pale Chanting Goshawk (*Melierax canorus*). Visibly upset, Stiaan says it breaks his heart when this happens: “We (me and my father) have tried everything. Poison is our last hope. We hate killing innocent animals, but the jackals don’t seem to mind!” [*Ons (ek en my pa) het al alles probeer. Gif is ons laaste hoop. Ons haat dit om onskuldige diere dood te maak, maar dit lyk nie asof die jakkalse gepla is daarmee nie!*].

⁴ Often used as an informal, derogatory term describing people who campaign for the protection of the environment (such as animal rights activists and anti-hunting movements), the term “greenies” will be used throughout this dissertation to refer to people who are adamant that the lives of animals, in this instance jackals, are “no less valuable than that of a human and that animals [such as jackals] have inherent rights that humans have a responsibility to protect” (Jackson, 1989:37; see also see Oxford South African concise dictionary, 2010, s.v. ‘greenie’).

Farmers' concern about livestock predation by jackals in the Karoo region, along with its complex intersections with their struggles with the SKA, had already been brought to my attention a year before. On the morning of 17 May 2016, Carnarvon was the location for a public communication meeting held between personnel of the Department of Science and Technology (DST)⁵ and SKA SA as well as the Kareeberg Farmers' Forum (see Figure 1.2). This forum was formed at the time of SKA SA's land acquisition negotiations with farmers for its radio astronomy project, and at the time of this meeting, represented 16 of the 22 farmers whose farms had been earmarked for purchase/expropriation. Even though the Forum ceased to exist after this process, it played an important role as a "united negotiating body" [*verenigte onderhandelingsliggaam*] during the negotiations around the SKA SA's land acquisition process in 2016 and 2017 (when I was carrying out my core fieldwork); it voiced the concerns of its members about the future of their farmworkers and the delays in the conducting of an environmental impact study on the SKA development (Genis, 2016).



Figure 1.2 Carnarvon farmers and townsfolk settling in for the public meeting held between DST and SKA SA personnel as well as the Kareeberg Farmers' Forum on 17 May 2016 (Source: Terblanche, 2016).

Reflecting local residents' deep religiosity and strong ties to Christianity, Freek – a local farmer and employee of Carnarvon's National Wool Growers Association (NWGA) branch – opened the meeting with a prayer. While DST and SKA SA personnel had come prepared to discuss presentations ranging over the progress of the SKA project, the Land Acquisition Programme and the project's corporate social investments in the region, the approximately 100 farmers and townsfolk in attendance were more interested in having their questions answered regarding the impact of the SKA on their livelihoods. Concerns raised during this meeting included the impact the SKA would have on the local, agriculture-based economy; the future of farmworkers; the security of land ownership; trespassing on farmers' property; whether SKA SA also pays local tax rates, and if not, what were the tax implications thereof for local communities; restrictions on telecommunications in the local area; disparities between promises made in the past and the current reality which farmers experience

⁵ In mid-2019 the DST became the Department of Science and Innovation but since I conducted my fieldwork and data analysis before then, I continue to use the name of the Department as it was during this period.

and, very prominently, that the SKA's core site would become a haven for mesocarnivores such as jackals and caracals (*Caracal caracal*). It became clear to me that the farmers felt overwhelmed by the high levels of uncertainty they were facing and that levels of trust between themselves and the representatives of the radio astronomy development were very low.

Strongly evident in both vignettes presented above is the adversarial relationship between livestock farmers and jackals. The adaptability and dietary flexibility of the jackal places it as the main culprit in livestock losses. While it is difficult to quantify the total costs of livestock losses due to depredation, it is perceived by farmers and some researchers as a growing threat to the financial sustainability of farmers and the small-livestock industry as a whole. All farmers and professional vermin hunters I interviewed for this dissertation were adamant that predator numbers have increased over the years. In the words of one farmer, their fathers only came to know of jackals (and caracals) when they were adults and it was only an animal that you “saw in the zoo or in the *Landbouweekblad*” [*jy't hom net in die dieretuin gesien of in die Landbouweekblad*] (Fourie, interview, 6 July 2017).⁶ In his master's thesis investigating the cost of predation on small-livestock by mesopredators in South Africa, van Niekerk (2010) reported that the Northern Cape suffered the highest predation losses in relation to the country's other major small-livestock producing provinces (Eastern Cape, Free State, Mpumalanga and the Western Cape). The 426 farmers he surveyed across the Northern Cape lost just over 6% of their total small-livestock to predation, along with 13% of their production animals (lambs between 0–6 months) (van Niekerk, 2010:59). Without a doubt, the jackal was the main culprit, accounting for 65% of total livestock losses, with the caracal, stock theft and vagrant dogs trailing at 30%, 3% and 1% respectively (van Niekerk, 2010:59).

In the case of the Kareeberg, however, as my second vignette shows, farmers' battles with the jackal have become caught up in another battle around land ownership, autonomy and identity, one that has pitted farmers against the state and 'scientific' against 'local' knowledge. On top of the other challenges placing pressure on their livelihoods and way of life, such as lack of state support, stock theft, disease and drought, livestock farmers around the SKA core site have been caught up in disputes not only with astrophysicists and the project managers of SKA SA but also with life scientists working on jackal ecology and biodiversity management. As will become evident in this dissertation, a strong alliance has formed between astrophysicists and ecologists in relation to the SKA core site, because

⁶ The *Landbouweekblad* is one of South Africa's biggest agricultural magazines. Reaching approximately 86% of farmers and other agricultural industry role players in the country (Agri24 se [sensor]us verskuif, 2002), it is no doubt very influential.

it is set to become a protected area. As a result, in addition to advancing astronomical research, the SKA core site is expected to contribute to the collection of environmental baseline data as well as promote the conservation of various species and the local ecosystem. From the perspective of most scientists (i.e. astrophysicists and ecologists), the majority of farmers who are unhappy with and unsupportive of this new land-use in their midst are deemed to be unprogressive in their thinking and nostalgic for ‘the old days’ in their understanding of how the Karoo should look and what it should be used for – for commercial farming, under their undisputed authority on their farms.

Thus in the Kareeberg region, old farming tropes around the jackal are being reworked in relation to the SKA. This is complicating effective jackal management as antagonism among jackal management constituents remains high, particularly between farmers and the personnel responsible for driving the SKA project, now grouped under the South African Radio Astronomy Observatory (SARAO).⁷ Because jackals, “dare to compete with humans” (Bough, 2006:394), in this case predominantly white, male commercial farmers and their economic interests and aesthetic values, they have been classified as *ongediertes* in Afrikaans. While the English translation of this term, vermin, conveys farmers’ views of jackals as “agents of degradation and the enemy of other, more proper and desirable forms of nature” (Holm, 2012:77), the Afrikaans term also conveys the idea of the jackal as an aberration, literally a “non-animal or de-animalised creature” (Beinart, 2003:207). In this vein the jackal is seen as taking on human qualities; anthropomorphic characteristics commonly attached to jackals include, for example, that they are “stealthy” (Beinart, 2003:205), “cunning” (Palmer, 1966:179; Cillié, 1987:19; Beinart, 2003:206; Wittenberg, 2014:593), “hardy” (Palmer, 1966:179), and “cowardly, treacherous and secretive” (Beinart, 2003:205). These contemporary characterisations are also echoed in San and Khoekhoen folktales from the region. For the San in particular, jackals “served as a metaphor for malign powers or for ecological and social relationships that farmers could not control” (Beinart, 2003:207).⁸

In the contemporary Karoo jackals continue to be represented as opponents of livestock farmers – as “public enemy no.1” (Hey, 1964:58) and “evil incarnate” (van Sittert, 1998:340). According to Natrass and Conradie (2015:3), categorising the jackal as an *ongedierte* highlights farmers’ dissatisfaction not only with jackal predation as an agent of economic hardship but also with their

⁷ In 2017 it was announced that SKA SA would from then on be amalgamated with other South African radio astronomy projects to form SARAO (see Chapter 2). For clarity, I am using “SARAO” throughout my dissertation, rather than SKA SA, except where the sense dictates otherwise.

⁸ In Chapter 5 I discuss the jackal’s symbolism in South African and Afrikaans culture. Furthermore, in the same manner that the jackal is used as a metaphor in Khoekhoen and |Xam orature, I argue that for white, commercial farmers on the boundary of the SKA core site, the jackal also serves as a trope for the SKA.

political and economic marginalisation. I agree with their analysis and argue that over and above the jackal, the SKA radio astronomy development is also being seen by white, commercial farmers as a symbol of their political and economic marginalisation in current day South Africa.⁹ In other words, the jackal and the SKA have become fused as problems for farmers in the Kareeberg region. Here, farmers do not only need to find ways to co-exist with jackals, but also with a new land-use in the form of the SKA. Of course, the reverse is also true, i.e. the jackal and the SKA need to take into consideration livestock farmers as actors.

In the rest of this introductory chapter, I briefly introduce the three main actors in my research project – the jackal, the science community (encompassing both radio astronomy and the life sciences), and livestock farmers neighbouring the SKA core site – and set out my research problem and research questions. My primary research focus, which is farmer–jackal conflict and the most effective way to manage this relationship, is also about human–human conflict in the context of the SKA core site. As will become evident throughout my dissertation, what makes this specific context so interesting is the way the jackal has become a stand-in for the SKA among farmers. At the same time, parallels can also be drawn between jackals and the SKA among the environmentalists who are “defending” this mesopredator (see Chapter 5). In sections 1.3.3 and 1.4, I also consider the value of my research and my positionality within it and provide an overview of the chapter layout of this dissertation.

1.2 The main actors

1.2.1 The black-backed jackal

Weighing between 6.5 and 8.5 kilograms, the black-backed jackal is a slender, long-legged mesopredator that derives its name from the characteristic dark saddle of black and white hair along its back down to its bushy tail. Another distinguishing characteristic, from which it derives its Afrikaans name, *rooijakkals*, is its reddish, tan coat (see Figure 1.3 below). There are two distinct populations in sub-Saharan Africa: the east African population, found in Tanzania, Kenya, Somalia and Ethiopia, and the southern African population, found in Namibia, Botswana, Zimbabwe, and South Africa (Hoffman, 2014). In southern Africa, jackals occur across a wide range of habitats, such as the arid coastal deserts in the west, the Nama- and Succulent Karoo in the south-west, and the montane grasslands and open savannahs in the east (Loveridge & Nel, 2004:163; Bothma, 2012:5;

⁹ As will be discussed in my research findings chapters, other constituents involved in jackal management also experience some marginalisation – especially ecologists, academics and vermin hunters.

Hoffman, 2014; Humphries, Hill & Downs, 2015:541). Within these habitats, jackals are also drawn to farmlands due to the availability and abundance of potential prey (Jansen, 2016:18).

This omnipresence can be ascribed primarily to the jackal's adaptability to environmental changes which, according to Brassine (2011:18), "allows them to expand their ranges and sustain high and stable population sizes in areas where other large predators [such as lions (*Panthera leo*), spotted hyenas (*Crocuta crocuta*) and cheetahs (*Acinonyx jubatus*)] succumbed to changes in their habitats" as well as to human–carnivore



Figure 1.3 The black-backed jackal with its distinguishing characteristics (Source: Terblanche, 2016).

conflict. Even though leopards (*Panthera pardus*) still roam in parts of the Karoo, they occur mainly in mountainous regions and at low densities (Minnie, 2016:7). Due to their large range and abundance, the International Union for Conservation of Nature (IUCN) has classified jackals under their "least concern" category in their Red List of Threatened Species (Hoffman, 2014).¹⁰

This mesocarnivore's adaptability is linked to its dietary flexibility. Jackals are opportunistic omnivores with a diet ranging from plant material to insects, carrion, human refuse, invertebrates, reptiles, birds, and small- to medium-sized mammals (Apps, 2000:85; Walton & Joly, 2003:3–4; Loveridge & Nel, 2004:164; Davies-Mostert, Hodgkinson, Komen & Snow, 2007:10; Brassine, 2011:10; Bothma, 2012:31; Kamler, Klare & MacDonald, 2012:299; van de Ven, Tambling & Kerley, 2013:23; Minnie, 2016). The diet of jackals that live along the coastline is known to also include marine organisms, such as beached marine mammals, seals, fish and mussels (Loveridge & Nel, 2004:164). In farmland areas jackals are deemed to be the main culprits in livestock losses, especially of sheep, and lambs in particular. This becomes particularly evident when considering the financial impact of livestock losses: in 2018, predation losses on South Africa's commercial farms were estimated at R2.8 billion per annum, with small-livestock farmers bearing the brunt of almost

¹⁰ For a structure and explanation of the IUCN's red list categories and criteria:
http://www.iucnredlist.org/static/categories_criteria_3_1.

84% of these costs (Turpie & Akinyemi, 2018:71; du Toit, interview, 3 April 2019; RSG Geldsake, 2019). To put this into perspective, Guillau du Toit, the national chairperson of the NWGA and the Predation Management Forum (PMF), emphasises that stock theft in South Africa amounts to less than half that amount, at approximately R1.2 billion per annum (RSG Geldsake, 2019). More recently, game farmers have expressed concern about jackals, as high-value ungulate species on their properties are also victims of predation (Minnie, 2016:8).

Even though jackals are considered the main culprits behind livestock losses, relatively little detailed information is available on the diets of jackals on livestock farms in the Karoo and South Africa more generally. Calls for more ecological studies (e.g. du Plessis, Avenant & de Waal, 2015; Natrass, Conradie, Drouilly & O’Riain, 2017) are, however, beginning to be met, with an upsurge in recent studies.

In their study on a private small-livestock farm in the Free State, Kamler *et al.* (2012:299) found that jackals consistently selected wild prey over sheep throughout the year, but livestock predation peaked during lambing seasons. They warn, however that research results are likely to be biased towards “‘problem’ jackals because control operations tended to focus in areas with high livestock losses” (Kamler *et al.*, 2012:300). In reviewing other studies that examined the stomach contents of jackals killed in predator control operations, Kamler *et al.* (2012:300) note that the percentage of small-livestock in jackal diets ranged between 21% and 72%, with sheep almost always the dominant food item. In his review of the ecology and management of both jackal and caracal in South Africa, Bothma (2012:31) indicates that sheep formed 35% of jackals’ diet in a sheep-farming area in Kwa-Zulu Natal and 14.9% of their diet in the Northern Cape. In a more recent study, Jansen (2016) analysed the diets of jackals, leopard and caracal in the Namaqualand region of South Africa’s Northern Cape Province. The diet of each of these species found in the Namaqua National Park were compared with those in the surrounding farmlands in order to comprehend the species’ feeding ecology and role in livestock predation (Jansen, 2016:167). Her study confirms findings from other studies of jackals and their diet, that these canids prey on the “most abundant and easy-to-catch prey source” (Jansen, 2016:185). According to Jansen (2016:163), the “high percentage occurrence of sheep (9.6%) in black-backed jackal diet on farmlands, relative to other prey items, suggest that jackals may contribute to livestock losses in Namaqualand”.

Similarly, in a recent empirical dietary study of jackals, Drouilly, Natrass and O’Riain (2017) conducted research on two contrasting land-use types in the Karoo, to determine the diet of jackal, caracal and leopard and whether there is a difference in diet preference among the sites and the species. With regards to jackal, the research results show a clear dietary difference between the study

sites. Thus, on farmlands in the Central Karoo region, domestic ungulates dominated the scats of jackals (as well as that of caracals) while in the Anysberg Nature Reserve (an 82 300ha protected area situated approximately 40km southwest of the farmland research sites), jackals ate fruit and small micromammals. Significantly, no trace of sheep remains were evident in the scat collected in Anysberg Nature Reserve (Drouilly *et al.*, 2017:10). While this study received some backlash on social media from livestock farmers and professional vermin hunters (discussed further in Chapter 7), it confirms that the type of land-use influences prey availability and that the “ability of medium-sized predators to adapt their diet” allows the jackal to persist outside protected areas, despite heavy persecution (Drouilly *et al.*, 2017:10).

Against the grain of farmers’ perceptions as well as previous research, the authors found that predators did not leave Anysberg Nature Reserve to predate sheep on farmland (Drouilly *et al.*, 2017:10). As a result, a farm’s distance to a protected area does not have a “significant impact on the reported presence of serious predator problems” (Drouilly, Tafani, Natrass & O’Riain, 2018:252; see also Natrass, Conradie, Stephens & Drouilly, 2019). Nevertheless, Drouilly *et al.* (2017:10) concede that protected areas may serve as a source for “dispersing predators to recolonise territories rendered vacant on farmland by culling efforts”. Needless to say, this has led to heated discussions among farmers with Drouilly *et al.*’s (2018) participants echoing the sentiments I found among Kareeberg farmers, who are of the opinion that jackal numbers will escalate in the SKA core site and spill over to their properties.

In 2018, Drouilly *et al.* published data gathered from 77 interviews with small-livestock farmers in the Central Karoo in 2014 and 2015. According to the interviewees, even though they reported jackal sightings on their land across all time periods (pre-1994, pre-2004 and by 2014), predation problems related to jackal, caracal and chacma baboons (*Papio ursinus*) had increased since the 1990s (Drouilly *et al.*, 2018:245). In 2014 95% of interviewees believed that jackal predation is a problem, with 82% considering it a threat to the viability of their farm (Drouilly *et al.*, 2018:249). This contrasts with the situation 10 years earlier, when only 35% of farmers had seen jackals on their farms and 26% had thought they were a problem.

My research in the Kareeberg region is consistent with these studies and confirms that Karoo farmers perceive predator numbers (particularly jackal) to be increasing. The reasons given for this increase (discussed further in Chapter 2) include declining government support for predator management, reduced lethal control, dilapidated (jackal-proof) fencing, reduced human presence on farms, changes in farming practices and the associated increase in suitable predator habitat (including the presence of protected areas, game farms, empty farmlands, and development properties such as the SKA core

site) (Drouilly *et al.*, 2018:250; see also de Waal, 2018:105; Nattrass & Conradie, 2018:777; RSG Geldsake, 2019). In the words of du Toit (interview, 3 April 2019), “the proportion of areas where it [jackals] is not controlled is actually getting too large in comparison to the areas where it is controlled” [*die verhouding van areas waar dit [jakkalse] nie beheer word nie raak eintlik te groot teenoor die areas wat dit beheer word*].

Throughout the history of human–jackal conflict, numerous control measures have been tried to reduce livestock losses. Non-lethal control methods include jackal-proof fencing; electric fencing; shepherding; the use of guard animals such as donkeys, llamas and/or Anatolian sheepdogs; and technology such as the King collar,¹¹ lights, sirens and most recently, crystals¹² (Snow, 2006:53; Bagniewska & Macdonald, 2010:8; Henderson, 2015:19; Pathare, 2015:5; de Wet, 2016:17; Jansen, 2016:242; Bremner, 2019; see also Davies-Mostert *et al.*, 2007:30–33; PMF, 2016). Lethal control mechanisms still deemed to be the dominant means to reduce livestock predation (Minnie, Gaylard & Kerley, 2016:379) include shooting; calling-and-shooting;¹³ active hunting; hunting with dogs; poisoning; and trapping (Walton & Joly, 2003:5; Snow, 2006:53; Kamler *et al.*, 2012:300; Smith, 2012; Botha, 2015; Pathare, 2015; PMF, 2016; Jansen, 2016:242).¹⁴ According to Pathare (2015:7), the last-mentioned methods have earned “vehement opposition from certain sectors of society, such as environmentalist and animal-welfare associations” as they do not necessarily differentiate between species and often kill harmless animals, such as bat-eared foxes (*Otocyon megalotis*) and the Southern Pale Chanting Goshawk found on Stiaan and his father’s farm (see Section 1.1). Furthermore, most of these control methods are reactive in nature. In other words, they focus on controlling the problem after livestock losses have already occurred.

Consequently, and regardless of these various control methods, management efforts have remained largely unsuccessful (Bothma, 2012; Smith, 2012; du Plessis *et al.*, 2015:138; Minnie *et al.*,

¹¹ Developed in South Africa, the King Collar is an example of a collar which prevents jackals (and other predators) from gripping the cheek and biting the trachea of the sheep.

¹² Agri Frequencies, which started in 2017, uses photographs of livestock predators to capture their frequency and in turn, develops an “anti-frequency” [*teenfrekwensie*] which can control those specific species (Bremner, 2019). As Bremner (2019) explains further, “these photographs are copied by a quantum scanner into crystal powder where it is stored for later use” [*hierdie foto’s word deur ‘n kwantumafaster gekopieer in kristalpoeier, waar dit geberg word vir latere gebruik*]. These frequencies can be transmitted anywhere via a quantum transmitter.

¹³ Commencing during the 1990s, calling-and-shooting is a relatively new practice in South Africa (Funck, n.d.). It entails hunting, predominantly at night, and luring in predators with animal sounds using either an electronic call and/or a hand call.

¹⁴ A challenge regarding predator control in South Africa is that regulations vary amongst provinces (Henderson, 2015:19; du Toit, interview, 3 April 2019). In the Northern Cape certain lethal methods are permitted, such as trap cages, gin traps, spring-guns, poison collars and poison-firing apparatus’, as long as the necessary permit(s) are in place and/or with certain limitations (see Republic of South Africa, 2009).

2016:380) and jackals remain “more resilient than ever” (Dugmore, 2016). According to Beinart (2003:232), the capacity of jackals to modify their behaviour allowed them to adapt to the colonial agrarian economy that emerged in the Karoo during the 19th and 20th centuries. At the same time, as will become evident in Chapter 2, the jackal has also played a role in agrarian change and, consequently, has actively shaped human society (Beinart, 2003). In this regard, the jackal also features prominently in popular culture. In pre-colonial times, jackals featured in Khoekhoen and |Xam tales and, thereafter, continued to make their presence felt in Afrikaans culture, in fiction, folktales, and comic strips (see Chapter 5 for more detail).

1.2.2 The science community: Radio astronomers and life scientists

The second set of actors in my study encompasses what I have termed here ‘the science community’, embracing both the SKA as a complex radio astronomy ‘assemblage’ (Walker & Chinigò, 2018) of science managers and astronomers, and life scientists involved in biodiversity research in the Karoo and/or environmental management in general and jackal management in particular.

The SKA Organisation (SKAO) is an international project to design and construct the world’s largest radio telescope. Once finally completed, the full array (also known as an interferometer) will consist of hundreds of dishes and thousands of antennas, across the African¹⁵ and Australasian continents (SKA SA, n.d.a.; see also SKA, 2019a). In 2012, the SKAO chose both South Africa’s Karoo region and Australia’s Murchison Shire in Western Australia to co-host the radio telescope array. According to the SKA (2019a), due to the “remote locations” of these sites, both are ideal for radio astronomy (see Chapter 2). While Australia will host the low-frequency aperture arrays of the telescope, South Africa, which received the larger share of the project, will host the medium- and high-frequency aperture arrays (Wild, 2012:95; Council for Scientific and Industrial Research [CSIR], 2016:3; Gaea Enviro (Pty) Ltd, 2018:4; see Appendix A).¹⁶ The core site of SKA SA, which will host the “highest concentration of receivers” (197 dishes in total), stretches over a total of 37 farms (roughly 130 000ha) approximately 90km from Carnarvon in the Northern Cape (SKA SA, n.d.b.; see also Gaea Enviro (Pty) Ltd, 2018:8). The towns of Brandvlei, Vanwyksvlei and Williston also lie adjacent to the core site (see Figure 1.4 below). In addition to the core site, SKA infrastructure will also extend

¹⁵ While the majority of the array will be based in South Africa, the interferometer will also extend into Botswana, Ghana, Kenya, Madagascar, Mauritius, Mozambique, Namibia and Zambia (Naidoo, 2014; SKA SA, n.d.a).

¹⁶ The low-frequency aperture arrays of the telescope in Western Australia will cover the frequency band between 50 and 350 megahertz. The medium- and high-frequency aperture arrays of the telescope in South Africa’s Northern Cape province (and its partner African countries) will cover the frequency bands from 350 megahertz upwards (see Appendix A).

beyond this site onto 71 farm portions along three ‘spiral arms’ totalling approximately 1 700ha. The radio dishes will be much less concentrated than in the core site with seven dish-antennas to be erected per spiral arm (Gaea Enviro (Pty) Ltd, 2018:8; see also Appendix B).

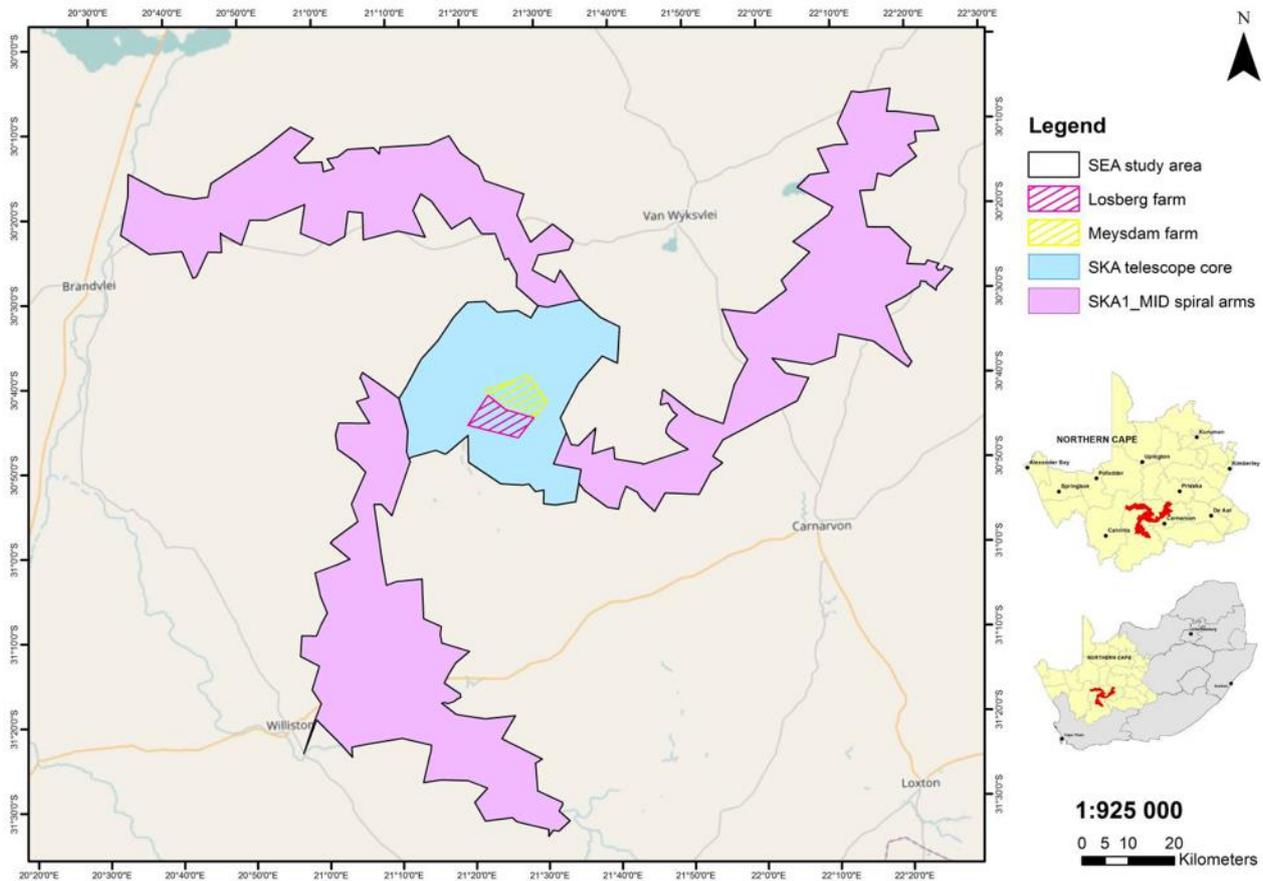


Figure 1.4 A cartographic representation of the SKA core site. The map also indicates the two original farms that were bought for the project, the spiral arms extending from the core site and the four major towns surrounding the core site (Source: CSIR, 2016:2).

The SKAO plans to connect all its individual dishes and antennas in order to collate portions of one square kilometre of the sky (SKA SA, n.d.a.; see also Naidoo, 2014; Walker & Chinigò, 2018:2). Along with a larger collecting area, more antennae also equate to greater sensitivity which is needed to detect weak cosmic radio signals, and finer resolution, capable of producing the “sharpest pictures of the sky of any current telescope” (SKA SA, n.d.c.). Foretasting the abilities of the SKA, the SKA radio telescope’s precursor, MeerKAT,¹⁷ joined the ranks of the world’s “great scientific instruments” when it produced its First Light image in 2016 (SKA SA, 2016a; see also Twidle, 2019). Operating at a quarter of its eventual capacity, the MeerKAT was pointed to a “small path of sky covering less

¹⁷ Expanding from seven receptors to 64 receptors, SKA SA decided to re-name the expanded development “MeerKAT” or “more of KAT” in Afrikaans. Meerkat (*Suricata Suricata*) is also the name of a small mammal that occurs in the Karoo region (SKA SA, n.d.d.; Wild, 2018).

than 0.01 percent of the entire celestial sphere” and in comparison to the 70 galaxies identified in this small patch in the past, it was able to detect “more than 1 300 galaxies” (SKA SA, 2016a; see also Twidle, 2019). In 2019, a year after its inauguration, MeerKAT’s first major result running at full capacity was that of “two giant ‘radio bubbles’ above and below the central region of the Milky Way” (Castelvecchi, 2019; see also Brits, 2019; SKA SA, 2019).



Figure 1.5 An aerial view of the SKA astronomy development in South Africa’s Northern Cape Province (Source: SKA SA, 2017a:1).

According to the SKAO, their priority areas include giving astronomers “insight into the formation and evolution of the first stars and galaxies after the Big Bang, the role of cosmic magnetism, the nature of gravity, and possibly even life beyond Earth” (SKA, 2019b; see also Wild, 2012:156). Scientists also expect that the SKA will make discoveries and answer questions that humans have not yet imagined (Brits, 2016:6; SKA SA, n.d.c.).

Over and above scientific research and advances, the SKAO has identified that mega-science projects, such as the SKA, have the “potential to seed or boost significant technological development, enhance capabilities and efficiencies across myriad industrial and educational sectors, as well as generate economic and social benefits to society” (SKA, 2019c). Specific examples of development benefits for South Africa include, amongst others, new data processing techniques; new communication strategies; inspiring future generations to become engineers, scientists, technicians and/or artisans; developing human capacities and capabilities; and, enhancing “global and transcultural collaboration

in the advancement of knowledge for the benefit of mankind” (SKA, 2019c). In South Africa the SKA project is being heralded as central to state ambitions to solidify the country’s reputation as a “sought-after science destination” (SKA SA, n.d.c.). In celebrating South Africa’s successful bid to co-host the SKA, then President Jacob Zuma emphasised the merit of the project when visiting the core site: “The SKA has put Carnarvon on the world map! Let’s continue using it to make South Africans proud and to inspire young people about a future in science and technology” (SKA SA, n.d.e.; see also Chinigò, 2019:760). He added that “the SKA will propel our continent to the frontline of radio astronomy and it will open many doors for Africa in decades to come” (SKA SA, n.d.e.; see also Chinigò, 2019:760). The loosely defined notions of ‘development’ in these claims have, however, been seen as problematic by some analysts (e.g. Walker & Chinigò, 2018; Atkinson, 2019; Chinigò, 2019; Gastrow & Oppelt, 2019; Parkington, Morris & de Prada-Samper, 2019; Walker, 2019). As Walker and Chinigò (2018) have argued, the development impacts are not equally distributed across scales, with international and national ambitions triumphing over local aspirations.

For life scientists in South Africa the designation of the SKA core site in South Africa brings several positive spin-offs. The purchased land, which comprises approximately 130 000ha, has been withdrawn from agricultural production and will be managed as a natural ecosystem, and more specifically a special nature reserve – the “highest state of formal protection afforded to any natural area under South African law” (CSIR, 2016:56). Formally protecting the SKA core site will contribute significantly to the protection of the Name Karoo biome which up until now, has been largely under-protected (see Chapter 2). Furthermore, the South African Environmental Observation Network (SAEON), which is tasked to implement the Integrated Environmental Management Plan (IEMP)¹⁸ of the SKA in South Africa (SKA SA, 2017c), has deemed this a rare opportunity to conduct earth observation science in order to address “some of the most pressing environmental issues facing man in the 21st century” (Todd & Henschel, 2016). Examples of such issues include identifying, observing and predicting the impacts of climate change on both humans and the environment, as well as monitoring the long-term effects of land-use (e.g. extensive farming) on biodiversity and ecosystems.

As part of the IEMP’s commitment to long-term environmental research and monitoring, the National Research Foundation (NRF) also plans to conduct long term research regarding the presence and abundance of mesocarnivores, and their prey, within the core area (Gaea Enviro (Pty) Ltd, 2018:4).

¹⁸ The IEMP is a result of the SKA project’s integrated Strategic Environmental Assessment (SEA) and includes various guidelines for the SKA, such as minimum requirements for construction and operation, environmental management outcomes, and long-term environmental research and monitoring programme to be implemented by the land manager (SKA SA, n.d.f.).

Such evidence, it is argued, will allow the land manager of the core site to make informed decisions around the management of wildlife in the site, including that of jackals as, the authors of the IEMP state, assumptions that the “lethal control of predators on the SKA land core area will provide a solution to livestock losses on neighbouring farms” cannot be made (Gaea Enviro (Pty) Ltd, 2018:48). At the time of finalising this dissertation (mid-2019), it was still unclear how the management of the SKA core site, its wildlife, and possible predation around its boundary would unfold. The declaration of the protected area was still in progress and the NRF had not yet officially appointed a land management authority specifically related to environmental aspects for the SKA core site area. It was, however, their stated intention to appoint South African National Parks (SANParks) as the land management authority (Gaea Enviro (Pty) Ltd, 2018:2; see also Chapter 2). The new version (2018) of the IEMP is, however, a “living document”, to be “adapted every five years according to changing requirements of the region itself and its users” (SKA SA, 2017c); hence the importance of ongoing research on the relationships between the new managers of the core site and their neighbours who, for the foreseeable future, will be livestock farmers.

1.2.3 Livestock farmers neighbouring the SKA core site

Despite the SKA core site’s potentially positive contribution to environmental research and conservation in an under-protected biome, the 16 white, Afrikaans-speaking, mostly middle-aged male farmers¹⁹ on the 31 privately-owned properties²⁰ neighbouring this site, as well as those affected by the three spiral arms extending from the core site, have grown increasingly concerned about the impact of the SKA on their livelihoods and that of the wider district. Amongst these many pressing concerns which I outlined in Section 1.1, another major concern, which is central to this dissertation, is that the SKA’s buffer zone will become a haven for mesocarnivores such as jackals and caracals. As mentioned earlier, this concern was raised strongly by several Kareeberg farmers in the two public meetings held in Carnarvon in May 2016 which I attended.²¹ The first meeting was held between the DST, SKA SA and the Kareeberg Farmers’ Forum. The second, a public communication meeting, was presented by the DST and SKA SA to the Carnarvon community.

¹⁹ Information on the age, gender, race and interest group(s) of the research participants I interviewed and/or from whom I received written responses are outlined in Appendix C.

²⁰ Although no official number of properties that surround the SKA core site can be found, this number was mentioned by SARAO’s land acquisition process manager at a public communication meeting, presented by the DST and SKA SA, in Vanwyksvlei held in May 2016 which I attended.

²¹ See also Gaea Enviro (Pty) Ltd (2018), and Todd (n.d.).

According to a 2016 study by agricultural economist Johan Kirsten that was commissioned for the SEA that fed into the IEMP, Kareeberg farmers were concerned that jackal numbers in the periphery of the SKA core site would escalate due to less drinking water, as artificial farm water points were expected to be closed within the SKA core site, and the reduced prey biomass with the removal of livestock from the SKA core site (Gaea Enviro (Pty) Ltd, 2018:33). While scientific research for this potential problem is scarce, in recent research by Drouilly *et al.* (2018), livestock farmers in the Central Karoo have echoed the concern that the resurgence of predators in the Karoo – particularly jackal, caracal and baboon – is a result of changes in farming practices, i.e. shifting from livestock to game farming and the emergence of ‘lifestyle’ or ‘weekend’ farmers, as well as the increase in land with protected area status (see Section 1.2.1). In his report to the CSIR on the estimation of SKA Phase 1’s agricultural economic and local economic impact, Kirsten (2016:16) noted that the cessation of farming activities on Alkantpan²² after 1987 had seen farmers neighbouring this site incurring livestock losses. In addition to the “rapid increase” of Alkantpan’s predator population, weaning percentages had dropped from between 90 and 100% to as low as 60% (Kirsten, 2016:16).

Farmers’ concerns should, therefore, not be taken lightly as the land-use change from agriculture to conservation not only affects the land in question (i.e. the core site) but is likely to negatively affect production on the neighbouring farms. Although not confirmed, farmers bordering land bought by the NRF have claimed that they have already started experiencing an increase in jackal (and caracal) predation after the land was vacated by its owners and/or tenants. This concern was again highlighted by several neighbouring farmers in a closed meeting held in May 2018 at SKA SA’s Karoo support base Klerefontein, about 20 kilometres outside of Carnarvon, which I attended. This was the first meeting held between SARAO and the SKA core site’s neighbours.

Farmers’ concerns are also highlighted in a Memorandum of Understanding signed between SARAO and Agri SA²³ in February 2017. According to the Memorandum of Understanding, both SARAO and Agri SA “commit to continuously explore ways where affected agricultural land is optimised to accommodate ongoing farming activities where possible, as long as the functioning of the radio observatory is not compromised” (SKA SA, 2017d). The Memorandum of Understanding (2017) encourages collaboration in a number of areas, including, amongst other, socioeconomic

²² Armaments Corporation of South Africa’s (ARMSCOR’s) Alkantpan ballistic test range, just outside of the small Northern Cape town of Copperton, allows local and international munitions manufacturers to test and evaluate their artillery ammunition (Helfrich, 2017). Currently, it is the biggest employer in the area, with 72 permanent staff and an additional 28 contract staff who are mostly from Prieska (Atkinson, Wolpe & Kotze, 2017:87).

²³ As a voice for South African farmers, Agri SA is a federation of agricultural organisations and represents a diverse grouping of individual farmers “regardless of gender, colour or creed” (Agri SA, 2018). The larger organisation comprises of nine provincial organisations, 26 commodity organisation and 44 corporate members (Agri SA, 2018).

opportunities and investment projects; establishing alternative (communication) technologies that comply with the Astronomy Geographic Advantage Act (which I discuss in Chapter 2); identifying socioeconomic and environmental research opportunities; and effective communication protocols. Of particular interest for this dissertation, solving environmental problems, including predator and predation management, was another area identified for collaboration.

As will become evident throughout this dissertation, neighbouring farmers are uneasy regarding what they perceive as the apparent indecisiveness of SKA SA and its inability to listen to local opinions, even though SKA SA has formally recognised the local farming community's "expertise" and the need to work together with farmers (and townsfolk) to "build a sustainable future for this part of the Karoo" (Adam, cited in SKA SA, 2017d). The voices of farmers are indeed important, given the knowledge that they have developed around farming at a commercial scale in a very testing environment. According to numerous farmers to whom I spoke, by the time that research on mesocarnivores and their impact has been concluded, it will be too late to initiate a management plan as they would already have suffered considerable losses because of jackal predation. The apparent indecisiveness of SKA SA has also led to a deficit of trust (see Chapter 7) which reinforces neighbouring farmers' feelings of marginalisation and their lack of autonomy and lack of authority. As experienced during my fieldwork and mentioned in Walker and Chinigò's (2018:14) article in which they "disassemble" the SKA, feelings of marginalisation are not unique to farmers neighbouring the SKA's core site. Rather, it is widespread among the locals mainly due to "hopes of new job opportunities and improved services as a result of the construction of the SKA" failing to materialise (Walker & Chinigò, 2018:14; see also Gastrow & Oppelt, 2019). In summary, the promise of positive development sits at odds with the reality currently experienced by most farmers and many townsfolk.

1.3 Research problem statement and research questions

Human-wildlife conflict, the central concern of my dissertation, describes a "subset of human-wildlife interactions that lead to negative outcomes for either wildlife or people" (Hudenko, 2012:16) and emerge in particularly acute form between livestock farmers and (meso)predators. At the same time the concept 'human-wildlife conflict' refers not only to negative interactions between humans and wildlife, but also to conflictual interactions among humans, because of competing interests and/or value clashes in relation to animals, as well as to conflicts in which both are involved, i.e. both human-wildlife and human-human conflict in which relationships with wildlife are implicated

(Decker & Chase, 1997:789; see also Madden, 2004; Redpath, Gutiérrez, Wood, Sidaway & Young, 2015; Terblanche, 2015). Furthermore, both types of conflict have the potential to escalate “when local people feel that the needs or values of wildlife are given priority over their own needs, or when local institutions and people are inadequately empowered to deal with the conflict” (Madden, 2004:248). These dynamics are present in a particularly intense and complex way in and around the SKA core site which has disrupted – and still threatens to do so – livestock farming but also the unfolding of this radio astronomy project.

Conducting my research in the shadow of the SKA, between February 2016 and July 2019, has added a new twist to the study of farmer–jackal conflict as an example of human–wildlife conflict. SARAQ, and state decisions made regarding the promotion of astronomy in South Africa through the SKA, have prioritised ‘scientific’ knowledge over local institutions and/or ‘local’ knowledge, as was clearly evident in the public meeting in 2016 described above. The SKA development is not only prioritising the pursuit of astronomy above local agricultural livelihoods in the Kareeberg area; it is also building an alliance between the physical and the life sciences in relation to the management of the SKA core site (see also Chapter 2). Attending public meetings organised by SKA SA in the Kareeberg region made me realise how misunderstood farmers feel with regard to the significance of the farmer–jackal conflict issue in the region and how deep the gulf between scientists (i.e. both SARAQ and ecologists) and local people is. These meetings also allowed me to identify a practical problem: the local farmers who bear the brunt of the conflict with the jackal were not being included in jackal management decisions and policymaking at local, provincial and national levels, for reasons that seemed important to unpack. They and the residents of local towns were also being excluded from the decision-making process to proceed with the SKA development, despite their being directly affected by this development (Walker & Chinigò, 2018; Atkinson, 2019; Parkington *et al.*, 2019). In the words of Freek, one of the farmers at the public meeting of 17 May 2016, the relationship between the towns surrounding the SKA core site and SARAQ is “like an arranged, forced marriage such as in the East” [*dit is soos ‘n gereëelde, geforseerde huwelik soos in die Ooste*].

As will become evident throughout this dissertation, the arrival of the SKA in this Karoo farming community has not only brought the struggle regarding appropriate and successful jackal management strategies to the fore, but also the struggle over land and power. This is accompanied by struggles over meaning, nostalgia, belonging, autonomy and authority. According to Brandt (2013:24), those who are established in a society find social change undesirable as they “perceive the past as a time of stability, integration and cohesion”. In this light, the majority of farmers in the region surrounding the SKA core site find the presence of the astronomy installation to be deeply disruptive, as it is shifting local power dynamics away from themselves.

In unpacking these power relations, I have drawn on political ecology in my conceptual framework, because of its recognition that “ecological systems are political” and that our ideas about these systems are defined and delimited by wider cultural, political and economic factors (Robbins, 2012:20; see also Greenberg & Park, 1994). While used predominantly to examine the politics surrounding the control of and access to natural resources, more recently political ecology has also been valued as an approach in analysing wildlife conservation practices and its development in Africa (Jones, 2006:483), as well as in viewing animals as political subjects (Hobson, 2007:251).

In order to understand the political ecology of jackals, their management and farmer–jackal conflict in the context of the SKA core site, it is necessary to incorporate and understand the various positions of the constituents involved in jackal management at this specific site and to ask questions about “who has power, how it’s negotiated, [and] what structures in society reinforce the current distribution of power” (Merriam, 2002:9). The exploration of the meanings that people – and jackals – make of their lives in their natural settings requires a qualitative research strategy. The critical qualitative research design that I have adopted has allowed me to look beyond individuals and jackals to the broader social, cultural and political context in which they find themselves, and to see how this influences the ways in which they construct their reality (Merriam, 2002:4; Hardcastle, Usher & Holmes, 2006:152). While the practical problem of ineffective jackal management is an ongoing one, there is evidence that the different constituencies have become consolidated around their different understandings of the jackal and that while this acts as a source of social capital within the group, it impedes collective action across groups (see Chapter 7).

1.3.1 Research questions

When I first embarked on my research, I had not realised quite how many themes and issues relating to jackals and their management would arise in relation to the SKA and the development of its core site. My preliminary research questions thus shifted as developments in my research site unfolded. Over time the theme of the jackal as a symbol of marginalisation for farmers on the privately-owned land neighbouring the SKA core site emerged strongly.

My overarching research question can be described as follows:

What are the dynamics shaping farmer–jackal conflict on the farmlands bordering the SKA core site in the Karoo region of South Africa’s Northern Cape province and what can we learn from this about jackal management and human–wildlife conflict?

The subsidiary research questions flowing from this link very closely to one another. While directing attention to farmers' perceptions of their increasing lack of autonomy and authority in post-apartheid South Africa and a changing Karoo region, they also point to the power relations around conflicting knowledge systems and the subsequent effect on collective action and social capital. The specific research questions which have guided my research project are:

1. What are the attitudes of farmers neighbouring the SKA core site regarding the land-use change from agriculture to astronomy and the establishment of the core site as a special nature reserve/protected area?
2. What are the different understandings of jackals among the actors involved in jackal management in the SKA core site region, including ecologists, SKA SA managers and farmers?
 - a. What resources do the various jackal management actors draw on to justify their positions/understandings?
 - b. What are the roots of the understanding of jackals as *ongediertes* and how has this understanding found expression in popular culture over time? Does this understanding of the jackal take on additional symbolic meaning for farmers in the context of the SKA?
 - c. How are power relations around knowledge production rendered in jackal management?
3. Does the management and/or persecution of jackals contribute to collective action among jackal management constituents? If so, in what way(s) does it influence collective action? What is the role of trust in jackal management?
4. What are the prospects for effective jackal management in and around the SKA core site/protected area?

1.3.2 Research methods

In answering these research questions I have developed a qualitative research methodology. In addition to enabling the development of an in-depth understanding of the issues addressed by my research questions, such a strategy allows me to contribute meaningfully to the existing empirical

knowledge on farmer–jackal conflict in South Africa’s Karoo region; it is also well-suited to my use of political ecology in developing my theoretical framework.

In order to increase the trustworthiness of my data and to gain an enhanced understanding of the complex social interactions, practices and belief systems which are embedded within farmer–jackal conflict, I have made use of three main data collection methods: semi-structured interviews with a variety of individual constituents who are involved in the political ecology of jackals in different ways; participant observation which allowed me to directly observe, participate in and contextually interpret those meanings that emerged from these semi-structured interviews; and documentary analysis of numerous forms of documentation that refer to jackals, farmer–jackal conflict, jackal management, the SKA, and the broader local context within which the SKA finds itself, including the history of farming and conservation in the Karoo. Together, these sources of qualitative data have allowed me to consider both the broader context of farmer–jackal conflict as well as the practices and ideas shaping the positions of the different constituencies while also deepening my insight on the strained relationships between these constituencies.

1.3.3 Significance of this research

With no broadly agreed-upon solution to farmer–jackal conflict as yet in sight, nor institutional mechanisms to manage the differences between farmers and scientists (whether physicists [*viz.* the SKA] or ecologists and zoologists [*viz.* jackals]), this research project is both topical and timely. Todd and Henschel (2016) are of the view that very little is known about the ecology of the SKA core site and the surrounding area (see Chapter 2). What is equally clear is that the ecology of the region cannot be understood in isolation from the social relationships that are impacting upon and interacting with the environment; in this context it is apparent that very little is known about farmer–jackal interactions in this area, despite the social and the ecological significance of this conflict. My study will thus contribute to a deeper understanding of farmer–jackal conflict in an under-researched location. By highlighting the social dimensions of farmer–jackal conflict in a context of significant and politically contested land-use change, my research project deepens the analysis of human–wildlife conflict, and underscores the importance of the social sciences in analysing such conflict.

A review of the literature indicates that only a relatively small number of qualitative studies with a political ecology approach to human–wildlife conflict have been conducted internationally (see Chapter 3). Even fewer qualitative studies on human–wildlife conflict have been executed in the South African context (Legendijk & Gusset, 2008; Natrass & Conradie, 2015), with studies that focus on human–jackal conflict even more rare. By situating my study around the SKA core site, I

have included an additional actor on the stage of jackal management. In this specific context, old tropes around the jackal are being reworked in relation to the SKA. While white, commercial farmers already perceive themselves to have a lack of autonomy and authority in jackal management, this feeling is being further enhanced by the presence of the SKA. On top of the South African government's shift to a knowledge-based economy,²⁴ thereby supporting the astronomy development full-heartedly, farmers no longer receive government support for predation management.²⁵ By discussing farmers' perceptions, decision-making processes and challenges, I reveal the ways their claims around identity and belonging are being asserted but also reworked in a contemporary commercial-farming landscape filled with uncertainty in the Karoo. As will become evident in this dissertation, jackals are the one thing in their environment over which farmers feel they have some agency and, as a result thereof, I argue that jackals bear the brunt of farmers' frustrations. This knowledge may also be valuable for the SKA core site's management in general and their IEMP.

This research project was motivated by my academic and personal interest in wildlife conservation and builds on my master's thesis, which investigated human–baboon conflict on the Cape Peninsula and the extent to which human–human conflict underlies human–wildlife conflict (Terblanche, 2015). My biography helped me to understand the challenges faced by livestock farmers, such as Stiaan (see Section 1.1), in the Karoo. Although I grew up in a family that does not hunt and often visits national parks where we have been pleased to observe jackals as protected wildlife, my grandfather and uncle were sheep farmers who had to protect their livestock against jackals (and caracals). In addition, my identity as a white Afrikaans-speaking student from Stellenbosch University facilitated my entry into the farming community (see Chapter 4 for more detail). As a result, I found I could relatively easily reconcile my feelings and ideas concerning animals and nature with those of the farmers I met in the field.

1.4 Chapter outline

This dissertation is presented in eight chapters. In Chapter 2 I elaborate on the contextual issues already introduced in this first chapter by situating my research topic historically and geographically,

²⁴ Discussing the role of the SKA in South Africa's economic development strategy, Bhogal (2018:78) defines a knowledge-based economy as an "economy in which knowledge creation and its communication are the major engine for wealth generation and employment creation". Co-hosting this astronomy development with Australia is one knowledge-based economy initiative the South African government has embarked on for sustained economic growth.

²⁵ For a detailed discussion of the history of jackal management in South Africa, including the state's waning support over the years, see Chapter 2.

with an overview of the history of sheep farming and human–jackal interactions in the Karoo region. In addition, this chapter introduces the municipalities and towns surrounding the SKA core site and expands on the SKA radio astronomy development and the measures taken to secure its core site. All of these developments have an impact on the neighbouring farmers’ choice of jackal management techniques and their interactions with SARAO staff.

Chapter 3 sets out the primary theories and concepts which have guided me throughout my research. The underlying metatheory shaping my research is critical realism, with political ecology central to the development of my conceptual framework because of the way it theorises the relationships between ecology and power. Political ecology allows one to analyse how the environment shapes human actions and possibilities while at the same time is acted upon and shaped by human behaviour in which unequal access to power and resources are significant. After this discussion, the chapter addresses the concepts of social capital, collective action, trust and the differentiation between ‘local’ and ‘scientific’ knowledge systems and the power relationships associated with them.²⁶ These all proved to be valuable conceptual tools for studying power dynamics and people’s sense of belonging.

Chapter 4 reviews my research methodology and the procedures I followed in order to answer the research questions outlined in Section 1.3.1 above. Details of my sampling methods are provided as well as those of my data collection techniques. Here I also justify why I have chosen a critical qualitative research design, discuss the ethical considerations that arose and reflect on the strengths and limitations of my research methodology in practice.

In Chapter 5 I address the notion of the jackal as *ongedierte* and the symbolism of the jackal, both in popular (primarily Afrikaans) culture and in the way in which it serves as a more or less explicit trope for the SKA for farmers in the Kareeberg region. Here I present my findings on how my research participants’ descriptions of these mesopredators resonate not only with depictions in contemporary popular culture but also with elements of pre-colonial and colonial accounts of this animal. At the same time, both the jackal and the SKA development contravene white, commercial farmers’ understanding of the ‘natural’ order in the Karoo: both question farmers’ dominance and undermine their capacity to control nature (i.e. non-humans) to serve their needs, by manipulating nature to farm more productively. I also draw parallels between how the science community view jackals and the

²⁶ As highlighted in Chapter 3, I make specific use of the term ‘local knowledge’, instead of ‘indigenous knowledge’ and/or ‘traditional ecological knowledge’ in order to highlight all nonprofessional knowledge that is rooted in a particular place (Geertz, 1983:75, cited in Corburn, 2003:421; see also Kloppenburg, 1991:537). This category is less specific than indigenous knowledge which refers to ‘local’ knowledge that is “unique to a given culture or society” (Agrawal, 1995:416) and traditional ecological knowledge which places emphasis on “traditionality” (Green, 2008:149).

SKA core site, focusing specifically on the environmental benefits they attribute to both and how farmers should learn to live with both.

Chapters 6 and 7 are where I present the bulk of my field-based research findings, here making extensive use of vignettes drawn from the rich material generated by my fieldwork to illustrate major themes and ground my discussion in an appreciation of the social-ecological context in which developments around the SKA are unfolding. Chapter 6 explores the power relations in knowledge production around jackal management and shows how the dominance of scientists, whether physicists or ecologists, has contributed to farmers' sense of marginalisation and the disregard shown for their experientially-based local knowledge. This chapter also identifies who the various jackal management interest groups consider to be the experts in jackal management and how these experts are defined. In Chapter 7 I examine jackal management, collective action among livestock farmers and the role of trust as the "core link between social capital and collective action" (Ostrom & Ahn, 2003:5). While both jackals and the SKA have contributed to group mobilisation among the farmers in my research site, the lack of trust between farmers, townsfolk and SARAO personnel is significant in negatively affecting knowledge sharing and problem-solving. As a result, not only is successful collective action in jackal management thwarted, but top-down management approaches to the development of the SKA's core site as a special nature reserve are reinforced – to the detriment of effective jackal management.

In concluding, I review my key findings and present the conclusions that can be drawn in relation to my research questions on the basis of these findings, reflect on the contribution to knowledge of my dissertation and offer recommendations for further work in Chapter 8.

CHAPTER 2: THE RESEARCH SITE AND AN ENVIRONMENTAL HISTORY OF THE KAROO

This chapter provides important background and contextual information on the Karoo region and my specific research site, i.e. the SKA core site and surrounding farmland, beginning, in Section 2.1, with an overview of the current context before turning to a brief history of sheep farming and human–jackal conflict in this region in Section 2.2. Extensive commercial livestock production transformed the ecology and social history of the region during the 19th and 20th centuries and, as will become evident in Section 2.2 below, jackal management was not immune to broader social, economic and political changes. In Section 2.3 I review the history of the SKA project and the measures taken to protect its core site in the Karoo. Given the scope of this development and the extent of the measures taken by the state to secure the site, the SKA can be seen as a major new driver of transformation of the landscape, ecology and socio-economic dynamics in the Karoo, impacting profoundly on the social, economic and environmental landscape of the Kareeberg region.

2.1 My research site

Spanning approximately 427 000km² across the western interior of South Africa, the arid and semi-arid Karoo region is renowned for its vastness, remoteness and seeming emptiness (Milton & Dean, 2015; Atkinson, 2016). It comprises two biomes: the Succulent Karoo in the west and south-west, and the Nama Karoo, which is where my study site is located, stretching eastwards across the interior plateau (see Figure 2.1 below). Although the Nama Karoo is not as rich in plant species or endemism as the Succulent Karoo,²⁷ both Karoo biomes are characterised by ecological sensitivity. Rainfall is very low, ranging from 100mm per annum in the west to 500mm per annum in the east (Esler, Milton & Dean, 2010:6; Hoffman, 2015:58; Atkinson, 2016:200; McManus, Goets, Bond, Henschel, Smuts & Milton, 2018:311). An added pressure is the current ongoing drought already in its seventh year, which some Northern Cape livestock farmers have deemed to be the “worst drought in over a century”.²⁸ Due to global climate change, these conditions will likely be exacerbated and place added

²⁷ Milton and Dean (2015:127) have nevertheless stated that the Nama Karoo’s biodiversity is vulnerable since less than 1% of the area is formally protected.

²⁸ For a report on the impact of the drought on the agricultural sector conducted by Agri SA in 2018 and 2019: file:///Users/renelleterblanche/Desktop/Agri%20SA_Drought%20Survey%20Report%202018-19_V4%20MT.pdf.

pressure on sustainable sheep farming (at different scales) as well as conservation (see, for example, Esler *et al.*, 2010:87; Walker *et al.*, 2018:171).



Figure 2.1 Cartographic representation of South Africa's Succulent Karoo (dark grey) and Nama Karoo (light grey) biomes. The map also depicts provincial (bold) and local municipality (light grey) borders. The SKA core site straddles the Kareeberg, Karoo Hoogland and Hantam local municipalities (i.e. the Kareeberg region) (Source: Walker *et al.*, 2018:158).

Because of the low rainfall and consequent low productivity, the Karoo is sparsely populated,²⁹ with its towns few and far between. With a declining farming economy, the viability of the Karoo's small service towns has also been impacted. Important services, such as schools and hospitals, are dwindling and/or deteriorating and towns are characterised by high poverty and unemployment rates. These high rates exacerbate social problems that feature strongly in most Karoo towns, such as high rates of teenage pregnancy, foetal alcohol syndrome, drug and alcohol abuse, and indebtedness. Social grants are often the main lifeline for many inhabitants (Atkinson *et al.*, 2017; see also Walker, Milton, O'Connor, Maguire & Dean, 2018:166; Gastrow & Oppelt, 2019). However, even though the towns

²⁹ With less than a million people, the region is home to approximately 1.9% of South Africa's population (Henschel, Hoffman & Walker, 2018:152).

face “typical rural problems of poverty, unemployment and social inequality” (Atkinson *et al.*, 2017:26), they continue to provide administrative, commercial and social services (including religious) to the dispersed farming community (Nel, Taylor, Hill & Atkinson, 2011:399).

The SKA core site falls primarily within the Kareeberg Local Municipality but also extends into the adjoining Karoo Hoogland and Hantam local municipalities to the west. The Kareeberg Local Municipality, which derives its name from the mountain range nearby Carnarvon, had a population of 11 673 people in 2011, with the majority of the population classified as coloured (85.1%)³⁰ (Statistics South Africa, 2011a).³¹ As in the rest of South Africa, the municipality has an extremely high formal unemployment rate, calculated at 25% and with a youth unemployment rate of 32.1% in 2011 (Statistics South Africa, 2011a) – among the highest rates in the Northern Cape Province. The decline in rural employment opportunities is associated with changes in commercial agriculture, with farmers requiring smaller permanent labour forces, generally unfavourable economic conditions and consolidation of land ownership.

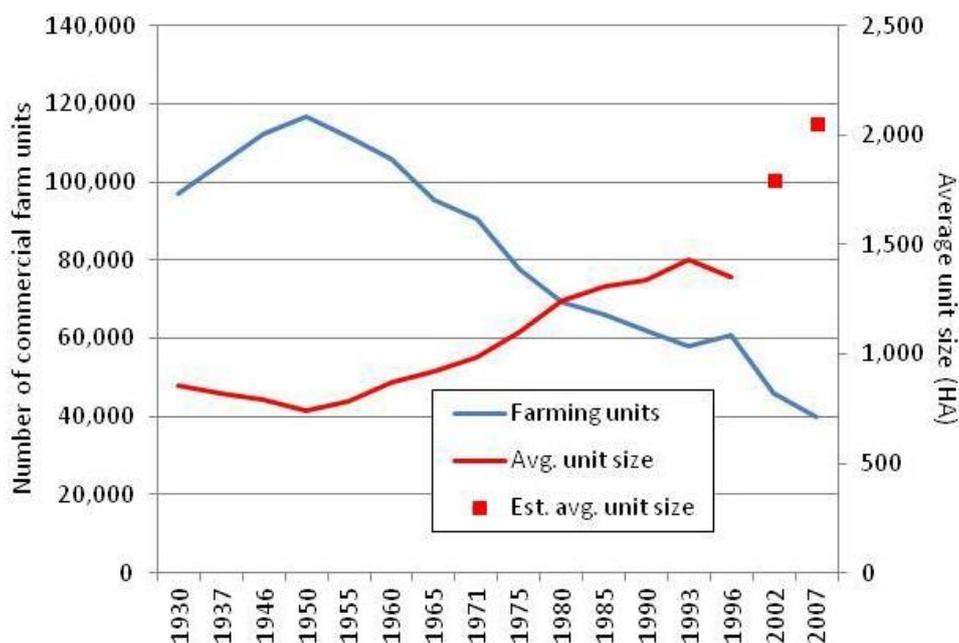


Figure 2.2 As illustrated in this graph which is available in the Commissioned Report on Agrarian Reform, there is a clear trend in South Africa between the decrease in the number of farm units and an increase in the average size of farm units between 1930 and 2007 (Source: Aliber, Mabhera & Chikwanha, n.d.:2).

³⁰ Deriving from the old apartheid classificatory system, this term was used to label people of mixed ethnicity. As will become evident in the discussion, the term continues to shape social identities today.

³¹ The most recent national census was conducted in 2011.

The consolidation of land ownership has been an ongoing trend in agriculture across South Africa since the late 1940s and has accelerated since the advent of democracy (see Figure 2.2 above; Hall, 2009:123). Larger ownership and production units result from neighbours collaborating (e.g. sharing grazing pastures and marketing sheep together) or agribusinesses buying up farms. The farming units do not necessarily have to border one another but are operated as a single unit. This accounts for why, in the case of the SKA's Land Acquisition Programme, the number of commercial farming units that were finally acquired (32 farms) exceeded the number of commercial farmers who were bought out (26 owners) (SARAO stakeholder engagement officer, written response, 17 July 2019). This pattern of consolidating land ownership is also true for the commercial farms adjacent to the SKA core site.

A low level of education is present in the region with a mere 7.4% of residents of all ages indicating that they have completed secondary education (Statistics South Africa, 2011a). This has proved a challenge for the SKA's efforts to recruit skilled labour locally. Another characteristic of the municipality is the strong presence of Afrikaans as the first language of residents (93.7%) (Statistics South Africa, 2011a). According to Walker and Chinigò (2018:7), Afrikaans and a strong commitment to conservative variants of Christianity are "cultural resources shared by the overwhelming majority of residents". These cultural resources serve to mediate the "deeply racialised social hierarchy" in which whites still dominate other races in everyday life (Walker & Chinigò, 2018:6; see also Walker *et al.*, 2018:162).³²

Whites have dominated the region's commercial agriculture sectors since the 19th century. As a result of this, white commercial farmers have laid a "particular claim to land and 'nativeness' in the area" (Brandt, 2013:98), seemingly erasing the histories of other groups, such as the |Xam, Basters, Khoekhoen, Korana and Xhosas who have also inhabited the Karoo. As the next section on the history of sheep farming and jackal management in the Cape Province³³ shows, white commercial farmers were supported in this by the colonial state and later the institutionalisation of apartheid. However, with the retraction of state support from agriculture since the 1980s, their established position has become less stable. With looming threats of land reform and the loss of state support, farmers now feel threatened as their sense of belonging is challenged. According to Dodds (1998:264), losing ownership, control and use of land means "deprivation of political sovereignty and consequently loss of cultural integrity, language and cultural connections". As will be discussed further in my findings

³² Although unexpected, this is a topic that emerged during my fieldwork. I discuss the hierarchy of farmers (*viz.* whites) and farmworkers (*viz.* coloureds) in Chapter 7 which addresses collective action. My argument in Chapter 7 is that farmers use this to build group mobilisation.

³³ Before being restructured with South Africa's changeover from apartheid to democracy in 1994, the Eastern, Northern and Western Cape provinces were collectively known as the Cape Province.

chapters, jackals also challenge Karoo farmers' sense of autonomy and authority. Nevertheless, farmers consider themselves still very much in control over what happens on their specific property, including in terms of the asymmetric power relations between white and black on farms where quintessentially paternalistic relationships persist between farmers and their workers (see chapters 4 and 7).

With the arrival of the SKA, 0.26% of the Northern Cape's grazing capacity will be taken out of production as farming activities cease in the core area (Lanz, 2016:13). From a national and even provincial perspective, this percentage may not seem significant. It is, however, at the local level that the impacts will be strongly felt, especially if one considers the losses due to livestock predation already indicated in Chapter 1. In his report to the CSIR on the estimated impact of the SKA development on the local economy, Johan Kirsten (2016:14) stated that the "loss of a large number of slaughter animals caused by the cessation of farming activities [due to land acquisition for the SKA core site] is equivalent to 8.24% of the average annual slaughter volumes" of the Carnarvon and Williston abattoirs, noting that the consequences are not limited to farmers but also influence the economies of the towns. The actual percentage is likely to be higher as the farmers I interviewed are of the opinion that they will face increased livestock losses due to predator pressure because of the SKA core site becoming a protected area. As already noted, in May 2018 farmers bordering the vacant farmland that had been bought by SARAO raised concerns during a closed meeting with SARAO personnel at Klerefontein, Carnarvon, that they had started experiencing an increase in jackal (and caracal) predation.

Not only do these figures highlight the economic vulnerability of many residents of the region; they also signal the importance of the presence of commercial agriculture locally. Even though the national importance of sheep farming has declined through the years, the sector continues to play an important social as well as economic role in sustaining local livelihoods in the Karoo. Against this background, some sectors of the economy in the greater Karoo region are also proving more resilient. Although it has a stratified impact, tourism development, some retail growth and agricultural diversification are breathing new life into some areas. At the same time, both national and international attention on prospects for shale-gas (hydraulic fracturing) and uranium mining, along with significant investment in renewable energy projects, are drawing attention to the Karoo in terms of the "new role of desert ecosystems as power factories" (Milton & Dean, 2015:127). In their socio-economic assessment of the impact of the SKA, Atkinson *et al.* (2017:86) noted that Carnarvon had experienced some immigration and economic growth in relation to the SKA (see also Gaea Enviro (Pty) Ltd, 2018:66). As will become evident throughout this dissertation, while these new land-uses promise positive returns,

especially at the international and national levels, they are not without controversy locally, and many local people have strong reservations about these projects and their associated uncertainties.³⁴

2.2 An overview of sheep farming and human–jackal conflict in South Africa’s Cape Province

2.2.1 The pre-colonial period

Before the onset of colonialism (i.e. pre-1652), the Karoo was home to |Xam San hunter-gatherers and Khoekhoe herders, the latter transhumant pastoralists who had entered present-day western South Africa some 2 000 years ago with their fat-tailed sheep (Milton & Dean, 2015:128; Walker *et al.*, 2018:161). Already in pre-colonial South Africa, the pastoralist Khoekhoen faced negative impacts from livestock predation (Carruthers & Nattrass, 2018:30). According to Elphick (1985, cited in Carruthers & Nattrass, 2018:33), predators followed the Khoekhoen and did not hesitate to attack their livestock. Aware of this, the Khoekhoen managed their herds closely by means of shepherding and stock outposts. In other words, their livestock was under constant supervision.

As will become evident in Chapter 5, the jackal features in Khoekhoen tales as an “attractive, roguish figure” (Wittenberg, 2014:593). In admiring the “individual heroic action” of the jackal (Wittenberg, 2014:602), the Khoekhoen used the jackal as a proxy for a triumphant underdog, a theme which continues to be in circulation in local Karoo stories today. In contrast, the |Xam attach more negative views to the jackal, which they associate with cunning, cowardice and selfishness – qualities which they denounce. The jackal is therefore not allowed to be a “figure of identification” (Wittenberg, 2014:593; see Chapter 5).

2.2.2 The colonial period

While livestock predation was thus a concern before colonialism, it was only highlighted as a serious problem for human livelihoods during the 19th and early 20th centuries as settled farming and production for the market took root within the colony. As a result, the relationship between economics and the environment was brought into sharper focus in the Karoo.

³⁴ Other publications that highlight the uncertainties bought on by these crosscutting projects, specifically the SKA, include Butler (2018), Walker and Chinigò (2018) and Gastrow and Oppelt (2019).

During the 18th and 19th centuries, first Boer emigrants and later British settlers occupied what they deemed to be “empty” lands suitable for farming and turned most of the Karoo into “prime sheep-farming country” (Brandt, 2013:3; see also Smuts, 2012 & Chinigò, 2019). Relying on herders and kraaling, these new settlers moved sheep over large areas to secure sufficient grazing. As they penetrated South Africa’s interior, larger, apex predators were decimated in order to suppress heavy losses suffered from stock depredation. At the same time, intensive hunting of large herds of antelope occurred, also to reduce competition with livestock, and for food and recreational purposes (see Figure 2.3). According to Carruthers and Natrass (2018:36), firearms played a great role in exterminating most of the free-roaming wildlife by the late 1700s, to the extent that already by the 1830s one had to trek deep into the Karoo to see any large mammals at all. As a result, smaller mesocarnivores, such as the

jackal and the caracal, started to thrive, evolving into the primary predators of livestock and wildlife in the Cape Colony (Hey, 1964:59; Brown, 2002:85; Stadler, 2006:11; Brassine, 2011:13; Bergman, de Waal, Avenant, Bodencuk, Marlow & Nolte, 2013:87; Carruthers & Natrass, 2018:37; Natrass *et al.*, 2017:5).

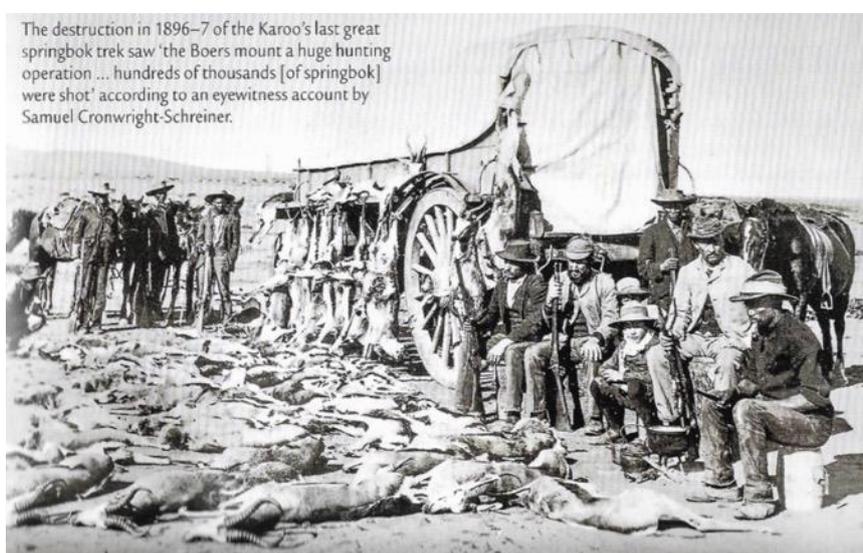


Figure 2.3 An example of an intensive springbok (*Antidorcas maurusipialis*) hunt by Boers in the late 1800s (Source: Reardon, 2018:79).

In time, technological developments, especially wire fencing and the construction of artificial water sources during the 1870s, allowed farmers to concentrate ownership and consolidate land as properties were enclosed (discussed further below). Enclosing farms with fences not only altered the practice of sheep farming (and hence jackal management), but also altered social relations among those who traversed the Karoo. According to Brandt and Spierenburg (2014:224), “fencing was believed to ‘civilise’ the country, and it improved farmers’ methods of surveillance and control” – over their sheep and “others” including slaves, farmworkers, labour tenants, *bywoners*, and, I argue, livestock predators such as jackals. Along with the growing wool markets in Europe, these technological and social developments led to a further upsurge in sheep farming.

Another profoundly important development in the history of farming in the Karoo was the introduction of the Merino breed in South Africa at the very end of the 18th century. Over the next

century, their numbers steadily grew until they exceeded the (traditional) fat-tailed sheep (the Ronderib Afrikaner, the Namaqua Afrikaner and the imported fat-rumped Blackhead Persian) of the Khoekhoen, peaking in 1891 at 12 million Merino sheep. According to Beinart (2018:192), the growing reliance on wool as an agricultural product led to an “extraordinary expansion that transformed the Cape economy, society and the environment”, with the Karoo and Cape midlands central to the growth of the Cape’s economy.

The South African war between 1899 and 1902, along with drought and disease, led to a sharp decline in the Cape Colony’s goat and sheep population, which dropped from 23 million small-livestock in the early 1890s to less than 15 million by 1902 (van Sittert, 1998:334). By 1904, the Cape’s Merino sheep population amounted to only 6.5 million sheep (Beinart, 2018:192).

During the early 20th century, according to Beinart (2003:232), “progressive farmers and officials put a specific construction on the linkages between predators, production, disease, and veld conservation”. The growing importance of Merino wool in both export revenues and as an impetus for wider economic development, as well as the increasing price of wool and mutton between 1914 and 1920 (Natrass & Conradie, 2015:4), meant that jackal predation became a serious concern for farmers and government officials alike, with Sir Frederic de Waal, who served as Administrator of the Cape between 1911 and 1925, particularly active in this regard. Sir de Waal was known to take on the jackal issue with enthusiasm, by prioritising the interests of livestock farmers over those of crop farmers and urban dwellers (Natrass & Conradie, 2015:5; see also Beinart, 2003:224; Carruthers & Natrass, 2018:47). As a result, coordinated approaches to combat jackals and other mesocarnivores were established which “attracted significant amounts of public funding and political support” (Beinart, 2003:232). The national government subsidised predator control strategies for the larger part of the 19th and 20th centuries, by providing resources for bounties (discussed in the next section), expanding and subsidising hunting clubs, subsidising hunting hound packs, as well as supplying poison (Natrass & Conradie, 2015:5; de Waal, 2018:2; Natrass *et al.*, 2019). While support was given to white landowners, African farmers, on the other hand, received no such support.

Moving to the technological innovations during the colonial period, the development of vermin-proof fencing in the 1890s was a critical technical innovation that contributed to predator control in the Cape Colony, specifically the Karoo (Beinart, 2003:220). Ultimately, it was the widespread installation and use of vermin-proof fences on privately-owned, white, commercial farmland in addition to coordinated hunting efforts, that “turned the tide against the jackal” (Natrass & Conradie, 2015:5). Over and above being hailed as a “salvation”, “ultimate hope”, “principal solution” and a “necessity” to address livestock depredation, fencing also yielded other indirect benefits such as the

“eradication of scab; improved wool, meat, and lamb yields; resilience to drought and disease; and recovery in the carrying capacity of farms” (van Sittert, 1998:348–350; see also Archer, 2000:686). Van Sittert (1998:350) argues that fencing reduced not only stock thefts but also labour costs. With the increasing use of fencing and the resultant enclosure of property, the need for herders gradually diminished (Beinart, 2003:232; see also Brandt, 2013:68). As privileged farmers no



Figure 2.4 Properly maintained jackal-proof fencing has played a central role in jackal management since the 1890s and continues to do so (Source: du Plessis, Avenant, Botha, Mkhize, Müller, Mzileni, O’Riain, Parker, Potgieter, Richardson, Rode, Viljoen, Hawkins & Tafani, 2019:144).

longer had use for large numbers of farmworkers and *bywoners*, many of them were required to move off the farms and into the small towns of the Karoo.

Overall, fencing, along with windmills which were introduced to pump underground water for consumption by humans and livestock, radically changed farming practices in the Karoo. New methods of production involved the enclosure of farm boundaries, the division of farms into numerous grazing camps within which livestock could range freely, as well as the provision of artificial watering points, through windmills, to provide adequate amounts of drinking water for livestock (Archer, 2000:675). All of these developments also allowed for rotational grazing. According to Beinart (2003:221; 2018:196), the value of fencing lay not only in its enabling of the free range of livestock and more intensive grazing within camps. It also greatly assisted the control of ‘problem animals’, such as jackals, as it inhibited the animals’ mobility. Even though the contemporary Karoo landscape faces changes, with developments such as the SKA altering its appearance, the Karoo is still “visually defined by fences and windmills as major marks of human control” (Beinart, 2018:196).

The Fencing Act of 1912, which was amended ten years later, was crucial in providing loans and mechanisms to facilitate joint action by neighbouring farmers and the government in constructing fences (Beinart, 2003:224; Bergman *et al.*, 2013:87; Nattrass & Conradie, 2015:5). The Act did

nevertheless have its drawbacks which related particularly to the cost of erecting fences.³⁵ Even though the Act compelled neighbouring landowners to share the cost of boundary fences, the type of fence to be erected was never clearly specified (van Sittert, 1998:350). Consequently, farmers complained about the injustice of individual farmers carrying the expense of erecting vermin-proof fencing while others merely benefitted without contributing financially. Due to continuous pressure from various farmers' associations, the law was amended in 1922 to include the specificity of vermin-proof fencing (van Sittert, 1998:350). However, while progressive farmers welcomed this specification, the new law had "potentially disastrous implications" for poorer farmers (van Sittert, 1998:350).

2.2.3 The 20th century: developments after Union

Another integral part of controlling jackals and other vermin was the bounty system which allowed rural 'divisional' councils to apply to the provincial authorities to declare a species as 'vermin' and "place a bounty on its head" (Hey, 1964:60). In addition to jackal, other animal species that were included on the vermin list included leopard, caracal, chacma baboon and even crows (*Corvus*) and ravens (*Corvus corax*). With the adoption of the 1917 Vermin Extermination Ordinance, the bounty system came to benefit the poor, on top of controlling vermin. According to Beinart (2003:232), during the 1910s and 1920s the revived bounty system "provided a valuable source of income for some African and coloured farm-workers, as well as for poor whites and *bywoners*" and helped curtail (white) depopulation. In responding to the opportunities of vermin control in earnest, some even became professional vermin hunters and trappers. This trend was already visible in the Karoo in the late 1890s when, as noted by van Sittert (1998:344), 'Natives' and 'Bastards' were reported to be making a living from bounties, with some farmers even allowing "squatters on their farms for the sole purpose of destroying vermin" – having vermin hunters based on one's land is an act that still continues today in the Kareeberg region. During the late 1890s, the Member of the Legislative Assembly for Carnarvon was even quoted as saying that by earning better wages while hunting, "[farm] labourers will be scarcer than ever" (van Sittert, 1998:344).

According to van Sittert (1998), the bounty system was also helpful in building cohesion amongst white farmers and facilitated the establishment of farmers' associations (see also Carruthers &

³⁵ According to van Sittert (1998:350), the "cheapest vermin-proof fence cost twice as much as a traditional wire-netting fence". As a result, farmers relied predominantly on generous state subsidies to "fence the jackal out" (van Sittert, 2016:118). State subsidies contributed mainly to the cost of fence installation, but also assisted farmers with fence maintenance.

Nattrass, 2018:38) – an early example of social capital.³⁶ As van Sittert (2016:114) states in his article on the politics and practice of vermin extermination in the Cape from the late 19th century onwards, the state wished to “consolidate and stabilise settler unity and hegemony in the countryside threatened by ethnic antagonisms between Anglo and Afrikaner”. It could thus be said that over and above supporting livestock farmers and pastoral production, the 1917 Vermin Extermination Ordinance also contributed to political patronage. The system did, however, face difficulties with the greatest concern evolving around rumours of fraudulent claims, along with an increased support for fencing, economic depression, and concerns regarding the effectiveness of the system (van Sittert, 1998; Beinart, 2003; van Sittert, 2016).

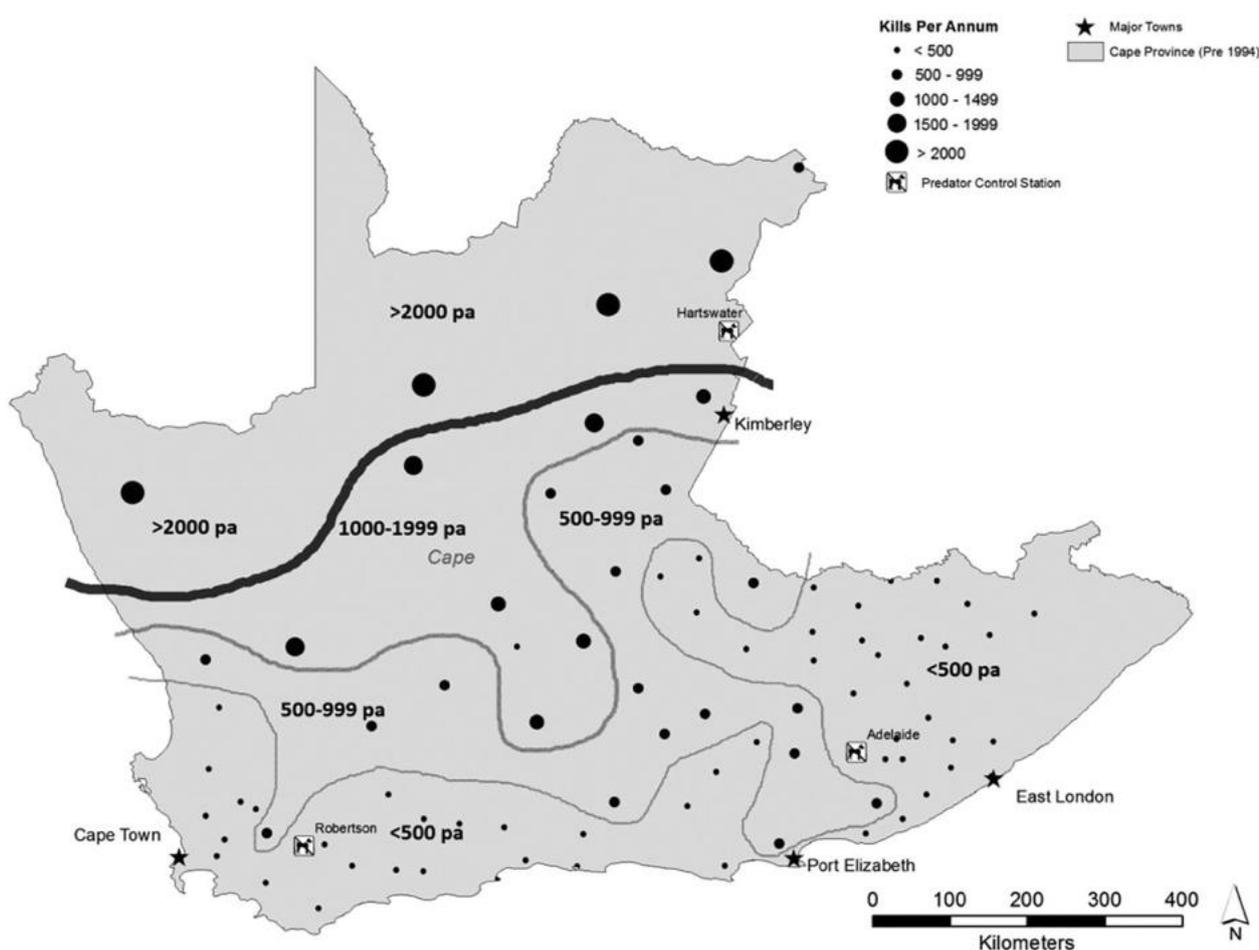


Figure 2.5 Cartographic representation of the number of vermin killed in South Africa’s Cape Province between 1917 and 1957 (Source: van Sittert, 2016:117). The Kareeberg region falls in the second band of most affected areas, that of 1 000–1 999 kills per annum.

³⁶ Here the conflict between farmers and jackals promoted social cohesion rather than conflict among jackal management interest groups. This topic is also the focus of Chapter 7.

With the appointment of Dr Douglas Hey as director of the Cape Province's Department of Nature Conservation in 1952, a "significant change in philosophy and management took place" (Carruthers & Natrass, 2018:42). As a pragmatic conservationist, Hey argued that blanket targeting of an entire species was "inefficient and ecologically unsound" (Natrass & Conradie, 2015:6). With his "new environmental thinking" emphasising ecological systems as holistic systems, Hey was responsible in altering the discourse around jackals from "vermin" to "problem animals", and, "extermination" to "control" (Carruthers & Natrass, 2018:42; de Waal, 2018:41). Between 1951 and 1957 the Provincial Administration of the Cape phased out the bounty system (Bergman *et al.*, 2013:87; Carruthers & Natrass, 2018:42) and, following a Commission of Inquiry, reduced the list of vermin from 14 species to only five in 1956: jackal, caracal, rock hyrax (*Procavia capensis*), chacma baboon and the bush pig (*Potamochoerus larvatus*) (Natrass & Conradie, 2015:6). In place of the bounty system a policy was introduced that aimed at providing financial and technical aid to farmers and hunt clubs,³⁷ thus allowing landowners to take control of predators on their own farms (Hey, 1964:61; Hey, 1967:158; Stadler, 2006; de Klerk, 2015; Carruthers & Natrass, 2018:42).

The new technical aid system encompassed registration and improved funding to hunt clubs; training courses for hunters, for example in ethical nature conservation, trapping and translocating problem animals; field assistance for hunters; supply of materials and equipment to hunt clubs; the breeding and training of dogs to hunt vermin;³⁸ as well as an investment in research on predator and problem animal control (Hey, 1964:61; Stadler, 2006:14; Bergman *et al.*, 2013:87; Carruthers & Natrass, 2018:42; de Waal, 2018). According to Hey, "who understood selective predator control as part of a broader strategy to protect biodiversity through gaining the co-operation of farmers", the technical aid system only targeted nuisance animals and was therefore very effective in controlling problem animals (Natrass & Conradie, 2015:6). Already in 1963, he emphasised that "assisting farmers to

³⁷ Since the early 20th century, hunt clubs, which consisted of a group of farmers joining forces and resources to combat predators, were established across South Africa at the request of local farmers (Stadler, 2006:12). The most popular hunting club in South African history is *Oranjejag*. The notorious *Oranjejag* was in operation between 1966 and 1993 in the sheep-farming districts of the Orange Free State and the western Transvaal. All livestock farmers were expected to be members (peaking in 1970 at 15 904 members) but due to the withdrawal of government subsidies and less revenue generated from a declining membership, *Oranjejag* came to an end (de Waal, 2018:45). Its most successful year was in 1991 with the killing of 1 452 jackals, showing that the jackal population was a far cry from being under control (Bothma, 2012:40). Not as popular today, only a few private hunt clubs continue to operate, such as Williston's *ongedierte* club.

³⁸ Hound breeding and research stations were particularly established and supported by the Cape and Transvaal governments (Bergman *et al.*, 2013:87; de Waal, 2018:24). Examples of such facilities in the Cape Province include Vrolijkheid (near McGregor), Adelaide and Hartswater established in 1958, 1966 and 1973 respectively (see also Figure 2.5).

deal with predation was an essential component of a wider conservation agenda” (Nattrass & Conradie, 2015:6).

In the first half of the 20th century woolled sheep numbers climbed again to approximately 23 million sheep by 1930 (Beinart, 2018:192; Walker *et al.*, 2018:164). While “merino wool remained the prime agricultural product of the Karoo into the late 1950s, culminating in the ‘wool boom’ of 1951” (Walker *et al.*, 2018:164), farmers started converting to mutton breeds as well as goats and ostriches as the ‘wool boom’ started wearing off. This conversion was mainly a result of the Merino breed reaching a surplus (i.e. an excess in supply), a need for a less labour-intensive breed, and a breed which was more suitable to the Karoo’s harsh, arid grazing conditions (see, for example, South African Wool Board, 1971:113; Roux, Vorster, Zeeman & Wentzel, 1981:33; Nel, 1993:21; de Waal & Combrinck, 2000:104; Walker *et al.*, 2018:164).

As stated earlier, South Africa (and specifically the Karoo) was home to the indigenous fat-tailed Ronderib Afrikaner and Namaqua Afrikaner as well as the imported fat-rumped Blackhead Persian. These mutton breeds “produced slaughter lambs with poor carcass conformation and localised fat depots” (de Waal & Combrinck, 2000:104; see also Nel, 1993). While this was acceptable to South African consumers, they could not compete on the international market with the high-quality slaughter lambs produced elsewhere. As a result, research was supported into achieving the development of a hardy, mutton sheep, with a top-quality carcass, the ability to produce lambs at a young age and adaptable to South Africa’s drier western region.

In the 1930s, South Africa’s Department of Agriculture crossed a Dorset Horn ram with Blackhead Persian ewes, successfully developing a locally bred composite meat breed, the Dorper. As with many crossbreeds, the Dorper concentrated the best qualities of each breed. According to Garman (2019), the Dorset Horn ram is highly fertile, adaptable to hot conditions, a non-seasonal breeder, well-muscled and an easy grazer. The Blackhead Persian ewes are also known for their hardiness, high



Figure 2.6 The Dorper with its distinctive black head and white body (Source: Terblanche, 2017).

fertility and non-picky grazing, along with good lambing and mothering traits (see, for example, Nel, 1993; de Waal & Combrinck, 2000:115; Milne, 2000:99; Schutte, 2013:165; Snyman, 2014). Without a doubt, these characteristics in the Dorper, recognisable by its distinctive black head and white body³⁹ (see Figure 2.6), made it highly suitable to the Karoo environment as well as internationally. Confirming its success, the Dorper was officially proclaimed as a mutton sheep breed in South Africa in 1987 (Nel, 1993:230). Its numbers grew significantly, from a mere 2.6 million in the 1960s to 6.6 million in 1990 (Milne, 2000:101). According to the Dorper Sheep Breeders' Society of South Africa (2018), there are currently over 7 million head of Dorsers in the country, making it one of South Africa's major sheep breeds, along with the Merino.

Today, some farmers are shifting from the Dorper breed to Meatmasters, a cross between the Dorper and the indigenous fat-tailed Damara, so as to compensate for the Dorper's poor flocking instincts which, according to Natrass and Conradie (2018:780), makes it "more susceptible to predation". According to Schutte (2013:169), Meatmasters, which were formally recognised and registered as a breed in 2007, "excel as a maternal breed" and "their high fertility and the rapid growth of lambs" make them popular in South Africa's traditional sheep areas. In the harshness of the Karoo, the Meatmaster is also lauded for being "an easy care sheep" (Meatmaster Society of South Africa, 2020).

2.2.4 Developments since the early 1990s

Today, extensive sheep farming – especially with Dorper and Merino sheep – continues to be strongly associated with the Karoo, its contribution to the South African agricultural sector including products such as meat, wool, skin and milk.⁴⁰ 'Karoo Lamb' has been developed as South Africa's first Geographical Indication product in the food industry (Kirsten, 2016:2). Over and above confirming 'Karoo Lamb' products as originating from the Karoo region (including the Kareeberg), the Certified Karoo Meat of Origin scheme also prides itself in producing and marketing lamb and mutton that is free-range, wholesome and has a "pristine identity" (Karoo Development Foundation, 2019). The contribution of sheep farming in the Karoo to South Africa's total gross agricultural output has nevertheless decreased from 15.2% in 1948 to 3.7% in 2011 (Pathare, 2015:1). Instrumental in this decline are international trends, such as a decline in wool prices and widespread economic recession,

³⁹ While there are White Dorsers as well, the black head and white body was traditionally preferred by breeders. A breeders' association for White Dorsers was only established later in 1959 (South African Wool Board, 1971:115).

⁴⁰ While South Africa has a dual agricultural economy consisting of commercial and small-scale communal farming, I focus on the former throughout this dissertation.

along with local challenges, including declining production,⁴¹ lack of government support, rising input costs, stock theft, tenure insecurity, disease and drought, and livestock predation by predators. On a positive note, improved rangeland management (i.e. better veld condition for sheep) and improved meat quality can also be associated with a decline in the total value (Meissner, Scholtz & Palmer, 2013; Hoffman, Skowno, Bell & Mashele, 2018). The proportionate decline in sheep farming could also be a result of the development of other agricultural sectors, such as field crops (including sugar cane, sunflower and soya) and horticulture (including apples, apricots, grapes, etc.) (Hall, 2009:125).

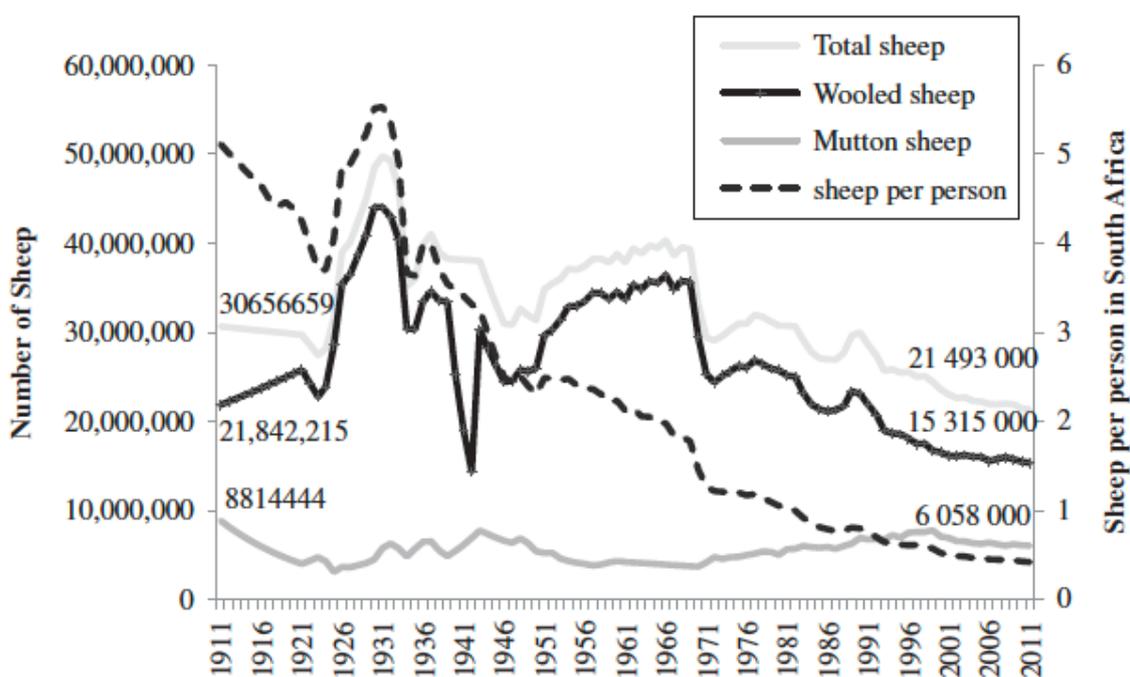


Figure 2.7 The declining number of sheep in South Africa between 1911 and 2011. This continuous downward trend also reflects the decrease of agriculture's contribution to the South African economy (Source: Natrass & Conradie, 2015:3).

Despite the significant decrease in agriculture's proportionate contribution to the country's Gross Domestic Product as the manufacturing and service sectors grew (from 21% in 1911 to 2.4% in 2011, according to Natrass & Conradie, 2015:2), it remains an important sector of the economy. Many South Africans – especially those in non-metropolitan towns and rural communities – depend on it for their livelihoods and it is important in terms of supporting social welfare in the rural areas, earning foreign exchange, encouraging agri- and ecotourism, and providing raw materials for agri-linked

⁴¹ In their article on long-term land-use, land cover and vegetation changes in the Karoo, Hoffman *et al.* (2018:213) identify that the number of sheep in both Karoo biomes dropped significantly from 11 million in 1939 to just over 4 million in 2007. The Succulent Karoo shows a 70% decline in sheep while the Nama Karoo, where my research site is located, shows a slightly less, but still significant, decrease of 60% (Hoffman *et al.*, 2018:213).

manufacturing and processing (Jansen, 2016; Kotze & Rose, 2015; Hall, 2009). In the Karoo specifically, it remains the backbone of the economy and a major employer despite the steady decline in agricultural employment since 2000 due to less intensive livestock management systems, generally unfavourable economic conditions, farmers' concerns around land reform after 1994 and the new debate on expropriation without compensation as of 2018, the serious and ongoing drought since 2012, legislated increases in the minimum wages for farmworkers, fewer commercial farmers with larger properties,⁴² casualisation of the labour force and changes in land-use from agriculture to game farming (Hall, 2009; Meissner *et al.*, 2013; Henschel *et al.*, 2018:154; Walker *et al.*, 2018:167). On top of these stresses, Kareeberg farmers also had to face the possibility of being expropriated if discussions between the SKA SA's land acquisition process team members and a farm owner failed to come to an agreed-upon acceptable offer (to be discussed further in Section 2.3.2).

Although state-supported co-operative hunting and vermin-proof fencing contributed greatly to lower predation rates by jackal and other vermin, these support systems failed and by the early 1990s official government subsidisation of predator control had been completely phased out (Bergman *et al.*, 2013:88). This was part of a larger process of phasing out support for agriculture by the central state – mostly in the form of drought aid and other “disaster payments” – which already got underway in the 1980s (Vink, Kirsten & van Zyl, 2000:29; Natrass & Conradie, 2015:2). In other words, phasing out subsidies was not just a function of post-apartheid land reform; fiscal pressures that predate South Africa's democratic transition in 1994 were also responsible. During the 1980s alone, direct financial assistance to farmers amounted to R1.73 billion and subsidies to R2.35 billion (Vink *et al.*, 2000:43).

According to Natrass and Conradie (2015), three broad developments led to the withdrawal of government support for predator control in particular. Firstly, understandings of the ecological role of predators, such as jackal, greatly improved. Environmentalists and ecologists have, for example, highlighted the positive role of these species, for instance in controlling rodent and insect populations on farmlands (Davies-Mostert *et al.*, 2007:10; Bothma, 2012:6; CapeNature, 2015:6; Natrass & Conradie, 2015:15). Another argument against persecuting jackals is that this is counter-productive as it disturbs the social system of the species as well as the ecosystem as a whole (Natrass & Conradie, 2015:10). Secondly, with the increasingly influential role of animal rights groups, greater urbanisation, and (environmental) education, support for conservation efforts and initiatives has grown substantially since the late 20th century and continues to do so. Lastly, and perhaps the most important reason for the withdrawal of government support, has been the declining political-economic

⁴² This concentration in commercial agriculture is clearly evident in statistics: in 1996, the Agricultural Census recorded 6 730 commercial farming units in the Northern Cape which dropped to 5 128 in 2007 (Directorate Statistics and Economic Analysis, 2013:6).

importance of sheep farming, as the South African economy has become increasingly orientated towards manufacturing and services and, in recent years, state-supported aspirations around a knowledge-based economy have moved to the fore.

Linked to this has been the newly elected post-apartheid government's focus on emerging black farmers, in line with its commitment to land and agrarian reform (in contrast to the apartheid government's focus on, and support for, white, commercial farmers). South Africa's post-apartheid agricultural policy also exposed farmers to a neo-liberal macro-economic framework. Since 1994, the macro-economic policy framework of South Africa's post-apartheid African National Congress government has been strongly influenced by neo-liberal policy thinking which requires the state to interfere as little as possible with the economy and development in deference to the private sector. In the agricultural sector this has translated into the "reduction in or removal of subsidies, subsidised credit and bail-out programmes, state marketing boards, trade protection, and other related reforms including water and labour regulation" (Hall, 2009:122). As a result of this, coupled to the emphasis on the urgency of land and agrarian reform in favour of black small-scale farmers, rather than the beneficiaries of apartheid, commercial farmers were largely left to fend for themselves in the national and international markets while the state focused on maintaining law and order, security and collection of taxes.

These developments, along with the contraction of on-farm employment and the expansion of less intensive sheep farming, protected areas, game farms and 'lifestyle' or 'weekend' farmers, have allowed the jackal to "recolonise the old sheep-farming districts" in the Karoo (Nattrass & Conradie, 2015:7; see also Beinart, 2003:231; van Sittert, 2016:122–123; Drouilly *et al.*, 2018:246; Nattrass & Conradie, 2018:777; Nattrass *et al.*, 2019). In the process, I argue, the technologies and methods farmers and vermin hunters rely on to exterminate the jackal have become increasingly individualised. In contrast to the "public hunting, mass killing and post-mortem display, sale and immolation of animal stock predator proofs" of the past (van Sittert, 2016:113), which greatly contributed to collective action among farmers and vermin hunters, jackal management today is mostly an individual endeavour. At the same time, as I discuss in Chapter 7 where I consider the issue of social capital in Kareeberg farmers' lives in some detail, technology has also brought interest groups together through means which were previously not available and/or popularly engaged, such as on online platforms.

In response to the cessation of state subsidies for predator control in the early 1990s, a loose consultative structure known as the National Problem Animal Policy Committee (NPAPC) was established by members of executive committees responsible for nature conservation of South

Africa's (then) four provinces and representatives of organised agriculture to provide a central meeting point for nature conservation government officials, the Regional Services Councils then responsible for district-level local government, vermin hunters, as well as industry partners such as the Red Meat Producer's Organisation (RPO) and the NWGA (Carruthers & Natrass, 2018:43; de Waal, 2018:47). In 1993 the NPAPC highlighted the need for ongoing government support regarding predator control at a Problem Animal Control Forum. The NPAPC was also seen as central in providing invaluable information to all jackal management interest groups and increasing the understanding of different constituents' viewpoints. Nevertheless, the issue was overshadowed by South Africa's transition to democracy in 1994, a dramatic constitutional restructuring, geopolitical reorganisation, and a suite of new issues coming onto the agenda for state agricultural policy, such as land reform and security of tenure of farmworkers (Carruthers & Natrass, 2018:44; de Waal, 2018:62).

To shed some light on predators and predator management in current day South Africa, the RPO, NWGA, South African Mohair Growers Association and Wildlife Ranching South Africa formed the PMF in 2009. The PMF acts as an important, national platform for liaison and coordination of activities among the different jackal management interest groups while also aiming to find practical, ecologically and ethically acceptable solutions to reduce livestock predation (de Waal, 2018:153). According to Carruthers and Natrass (2018:44), it "remains a powerful lobby for the industry, providing advice online and over the phone, and most recently, producing a booklet on how to identify predators and what methods can be used to control them" (see Figure 2.8). The booklet also provides an overview of key national legislation, relevant provincial legislation and related ordinances concerned with predator management.

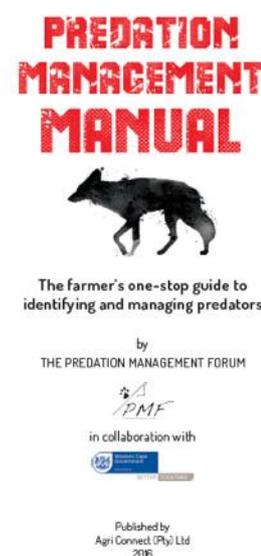


Figure 2.8 The cover page of PMF's predation management manual (Source: PMF, 2016).

In 2004 the African Large Predator Research Unit at the University of the Free State, which played a scientific advisory role for the PMF, launched its Canis-Caracal Programme. Later changing its name to the Predation Management information Centre (PMiC) in 2017, this programme has focused on sourcing, processing and archiving information that is relevant for predation management in South Africa. Outlining the historical milestones of predation management in South Africa, de Waal (2018:3) argues that the "large volume of factual information contained in this historical timeline is intended to broaden the South African institutional memory and to inform and enable the

establishment of a system of coordinated predation management”. The lack of institutional memory highlights the fragmented and uncoordinated predation management approaches since the advent of democracy. The PMiC also calls attention to what it regards as a fundamental error in current day South Africa: that livestock predation is not “viewed and managed as a national priority” (Bergman *et al.*, 2013:91).

Predation management still remains a contentious issue, which continues to hinder the development of policy and legislation. In order to address these issues, the Centre for African Conservation Ecology at Nelson Mandela University recently completed a scientific assessment on the issue of livestock predation in South Africa – “the first in the world” [*die eerste in die wêreld*] (du Toit, interview, 3 April 2019). Officially launched in June 2016, PredSA addresses the nature and extent of livestock predation, as well as the existing knowledge around livestock predation at a national level (Nelson Mandela University, 2017; see also Drouilly *et al.*, 2017:2; Kerley, Behrens, Carruthers, Diemont, du Plessis, Minnie, Somers, Tambling, Turpie, Wilson & Balfour, 2019:1). Its main aims can be summarised as follows: to conduct research; take into consideration the problems and needs of the livestock industry as well as environmental and ecological requirements; supply the livestock industry and policymakers with scientifically-based guidelines; mitigate the problems caused by livestock predation and identify knowledge gaps (de Waal, 2018:150).

After completing the scientific assessment in November 2018, PredSA provided a few key messages to policymakers which are summarised here. In the first place, legislation regarding livestock predation and its management in South Africa urgently requires updating and standardisation, given the economic costs of livestock predation which its scientific assessment has placed into perspective; the predation management challenges, furthermore, are faced by both communal and commercial farmers. Secondly, there is no “silver bullet solution” to livestock predation, given that removing mesopredators (and apex predators) will have negative

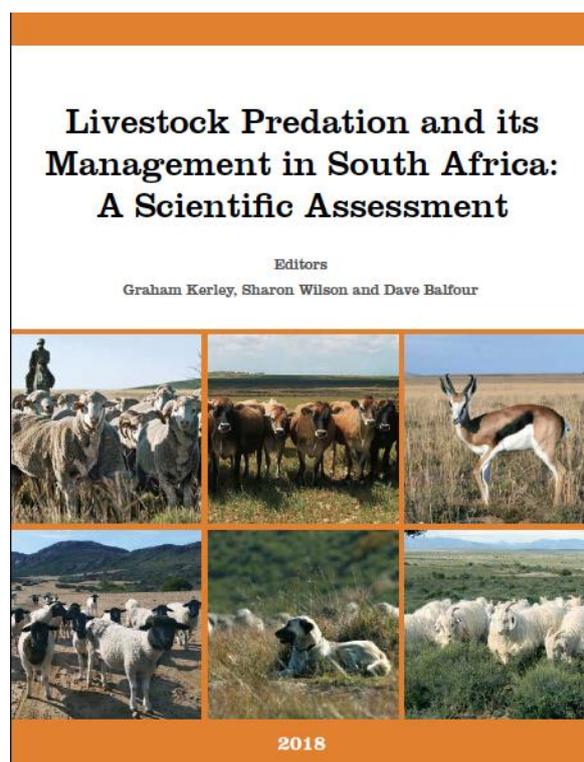


Figure 2.9 The cover page of PredSA’s scientific assessment on livestock predation and its management in South Africa (Source: Kerley, Wilson & Balfour, 2018).

consequences for biodiversity. Gaps in knowledge need to be addressed by research in the fields of livestock predation and management; here there is a great need for transdisciplinary scientific assessments (Kerley *et al.*, 2019:2). These do not only require the collaboration of researchers across various disciplines but also the involvement of policymakers and livestock managers. In contrast to past methods, the PMF, PMiC and PredSA should dedicate their attention to the prevention of livestock predation rather than adopt a reactive approach that focuses on the treatment of the problem.

2.3 Background on the SKA project

The SKA is a major intervention in the Kareeberg region that is unlike any that sheep farmers in other areas have had to deal with. It has come at a time when farmers are already under immense pressure and having to adapt to changing conditions in the market, the state and in the environment.

2.3.1 The establishment of the SKA

The origins of the SKAO can be traced back to 1993 when the International Union of Radio Science's Large Telescope Working Group was established with the aim of developing a "next generation radio observatory" (SKA, 2019d; see also Ekers, 2012:5). Officially established as a legal entity in 2011, the SKAO, headquartered at the Jodrell Bank Observatory close to Manchester in the United Kingdom, formalises the relationships among the various international partners (including Australia, Canada, China, France, Germany, India, Italy, New Zealand, South Africa, Spain, Sweden, the Netherlands and the United Kingdom) involved in this endeavour while also providing centralised leadership to build the "world's largest radio telescope" (SKA SA, n.d.a.; see also SKA, 2019a). In March 2019 seven of the countries (Australia, China, Italy, Portugal, South Africa, the Netherlands and the United Kingdom) signed an intergovernmental treaty stipulating how the SKA project will be run and to establish the intergovernmental organisation that will oversee this (SKA, 2019e). The SKA will be developed over a phased timeline. Based in South Africa and Australia (see Chapter 1), Phase 1 will allow SKA radio astronomers to conduct science observations with a partial array (i.e. the infrastructure already available) by mid-2020 (SKA, 2019a). The next development phase, Phase 2, will extend the SKA's baseline by building outstations in the other African partner countries outlined in Chapter 1, with the component in Australia also being expanded between 2023 and 2030 (Gaea Enviro (Pty) Ltd, 2018:4).

SKA SA has developed under the auspices of the DST and the NRF while also being part of the international SKA consortium. While the DST's main role is formulating policies and strategies with regards to the SKA, the NRF's responsibility lies with managing the project (Gastrow, 2014:90). As already noted in Chapter 1, in 2017 it was announced that SKA SA would from then on be incorporated alongside other South African radio astronomy projects to form the SRAO. In addition to the SKA radio telescope, SRAO also incorporates the seven-dish Karoo Array Telescope (KAT-7) and 64 receptor array known as MeerKAT in the Karoo (the precursor to the SKA radio telescope), the Hartebeesthoek Radio Astronomy Observatory in Gauteng, and the African Very Long Baseline Interferometry – a part of building and developing the SKA in eight other African countries (SKA SA, n.d.g.; see Chapter 1).

As described in Chapter 1, the SKA's core site in South Africa's Karoo will host the "highest concentration of receivers" (SKA SA, n.d.b.). According to SKA officials, the Karoo region is an ideal site for radio astronomy as it provides "good atmospheric conditions, radio quietness, geotechnical stability, good security and good infrastructure" (SKA SA, 2016b; see also Erasmus, 2012; Wild, 2012). The area between Brandvlei, Williston, Vanwyksvlei and Carnarvon was specifically chosen for the core site as the topography of the area provides natural buffers that will enhance the functioning of the telescope, which is intended to be operational for the next 50 years (SKA SA, n.d.h; see also Burger, 2016). The area forms part of the Karoo Radio Astronomy Reserve⁴³ (see Figure 2.10 below) which was declared under South Africa's Astronomy Geographic Advantage Act 21 of 2007. This piece of legislation allows the Minister of Science and Technology to protect, preserve and properly maintain geographic areas in South Africa that are of "strategic national importance for astronomy and related scientific endeavours" (SKA SA, 2016b; see also Republic of South Africa, 2008:10; Gottschalk, 2010:40; Erasmus, 2012; Gastrow, 2014:91–92; defenceWeb, 2016; Gaea Enviro (Pty) Ltd, 2018:2; Walker & Chinigò, 2018:4–5; Walker *et al.*, 2018:168; Chinigò, 2019:762; Walker, 2019:643). The Karoo Radio Astronomy Reserve consists of the SKA core site (known as the Karoo Core Astronomy Advantage Area) which was declared in 2010 and the three Advantage Areas (i.e. the Karoo Central Astronomy Advantage Areas) which were declared in 2014 (Gaea Enviro (Pty) Ltd, 2018:2–3).

⁴³ The Reserve falls entirely within the Northern Cape (excluding the Sol Plaatje municipality) and consists of three partly overlapping areas (over and above the SKA core site) with the outermost area comprising approximately 123 500 km². Their boundaries depend on the "applicable propagation conditions for the different frequency bands specified, and other practical reasons" (Republic of South Africa, 2014:6).

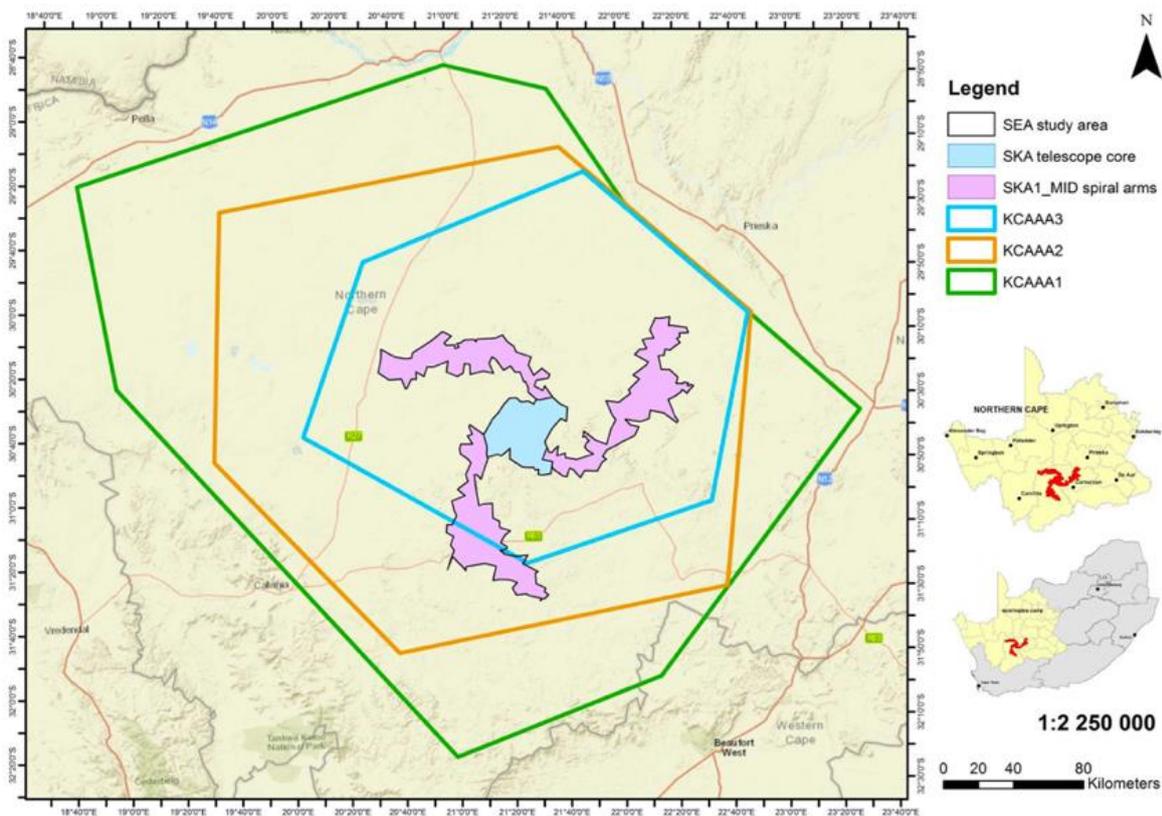


Figure 2.10 The Karoo Radio Astronomy Reserve with its three different Advantage Areas (i.e. the Karoo Central Astronomy Advantage Areas) within which the SKA core site (i.e. the Karoo Core Astronomy Advantage Area) and its three ‘spiral arms’ fall (Source: CSIR, 2016:4).

A primary purpose of the Act is to “enhance the existing geographic advantage” of areas that are considered highly suitable for the development of astronomy and other related scientific endeavours, by restricting activities that cause or could cause interferences (Republic of South Africa, 2008:10). These features include low population density, atmospheric transparency, and minimal light pollution and/or radio frequency interference (Republic of South Africa, 2008:10). Examples of interfering activities include radio frequency interference from objects such as cell phones, electric fences, microwaves and petrol-powered vehicles. Lastly, the Act also allows the Minister of Science and Technology to take precautions for the management of the Reserve to ensure that this is done in the interest of the greater public and in accordance with national and international practices (Republic of South Africa, 2008:10). Different from optical astronomy, these far-reaching requirements for a radio-quiet environment that is a prerequisite for radio astronomy make co-existence with other land-uses (such as sheep farming), far less conducive (SKA SA, 2017b; Walker & Chinigò, 2018:5). As will become evident in the subsequent section and my findings chapters, this came to be a contested issue and left farmers disillusioned as the initial communication with SKA SA personnel was that livestock farming would be able to continue alongside the radio astronomy development (see, for example, *Save the Karoo*, 2017; Butler, 2018:27).

2.3.2 The establishment of “the Game Reserve of the Stars”

In 2008 the NRF purchased the first of its farms in the Kareeberg area, Losberg and Meysdam, together having a total area of approximately 14 000ha. Here the two precursors of the SKA (KAT-7 and MeerKAT) were developed to prove South Africa’s scientific and engineering competencies. Initially, local people were under the impression that these two land parcels would be sufficient for the entire first phase of the SKA project and that livestock



Figure 2.11 The impression Kareeberg farmers had about the SKA project is that they would be able to continue farming alongside the radio telescopes; this image shows Dorper sheep sheltering under one of the KAT-7 dishes (Source: Chinigò, 2020).

farming would be able to co-exist with the radio telescopes (Butler, 2018:27; see also Save the Karoo, 2017); an image in circulation at the time seemed to suggest that this was possible/envisaged (see Figure 2.11). However, a few years later, farmers were disillusioned when SKA SA announced that a further 32 farms (approximately 120 000ha) needed to be acquired to safeguard their instruments against radio frequency interferences caused by human activity (CSIR, 2016:7).⁴⁴ Over and above the Astronomy Geographic Advantage Act, these 32 additional farms around the “original” core site of Losberg and Meysdam act as a “buffer zone” to preserve the radio-quiet features of the area already mentioned.

Even though my research does not focus directly on SKA SA’s land acquisition process, it impacted on the wider context of this dissertation as a major cause of uncertainty, mistrust, anger and anxiety among local farmers during my fieldwork. The land acquisition process information brochure outlined five steps for this process: after a notice is given to affected landowners, property valuations and environmental impact studies are conducted which in effect shapes the provisional offer presented to the specific landowner (LAP: SKA SA Land Acquisition Programme, n.d.). If a landowner refuses

⁴⁴ Initially earmarked at 36 properties, SKA SA’s Land Acquisition Programme only bought 32 farms as alternative arrangements were made with the owners of the other four properties (Kirsten, 2016:1).

the provisional offer, discussions between the land acquisition process team members and the owner will ensue until an acceptable offer is agreed upon. However, if this process fails, SKA SA reserved the right to expropriate properties (under the Expropriation Act 63 of 1975; Republic of South Africa, 1975), feeding into farmers' existing fears around land reform. The Land Acquisition Programme was running at a time of heightened tensions around a national debate concerning land expropriation without compensation and uncertainties over how this might play out on the ground (see, for example, Crosby, 2018:5). Taking into account that the SKA anticipates having a presence in the Karoo for at least the next 50 years, the programme manager for SARAQ's land acquisition process was at pains to emphasise at various public meetings held in Brandvlei, Carnarvon, Vanwyksvlei and Williston that land expropriation would be SKA SA's last resort, as this would without a doubt affect their standing within these communities negatively.

In 2017 van der Hoef noted that the land acquisition process is "indicative of the very different sets of interest of the various actors involved", causing a number of tensions between the SKA and the local communities (2017:16). These tensions were apparent throughout my fieldwork. As will become evident in the following section, the land acquisition process did not only affect those individual families who had to sell their farm(s), but it was also deemed as a threat to those neighbouring farmers who would remain (see also Walker & Chinigò, 2018:14). While the SKA's powers around land expropriation were never formally invoked, the finalisation of land purchases through the negotiated process being wrapped up by October 2017 (before the deadline of December 2017; SARAQ land acquisition process manager, public communication meeting, 17 October 2017), many local residents believed that it was, in the words of Freek already quoted in Chapter 1, "like an arranged, forced marriage". With the Astronomy Geographic Advantage Act on the side of the SKA, farmers had no option but to agree to sell their farms.

The IEMP (which was formally adopted by the Minister of Environmental Affairs in March 2019; Republic of South Africa, 2019) recommends that the site be managed as a natural ecosystem, and more specifically a special nature reserve.⁴⁵ According to the National Environmental Management: Protected Areas (NEMPA) Act 57 of 2003 (Republic of South Africa, 2004:20), a special nature reserve is a protected area intended to "protect highly sensitive, outstanding ecosystems, species or

⁴⁵ As mentioned in Chapter 1, the IEMP is a result of the SKA project's integrated SEA and includes various guidelines for the SKA, such as minimum requirements for construction and operation, environmental management outcomes, and long-term environmental research and monitoring programme to be implemented by the land manager (SKA SA, n.d.f.). As part of the IEMP, the CSIR also assessed the opportunities and constraints brought on by the mid-frequency component of SKA Phase 1. Study areas included local agriculture, heritage (i.e. archaeology, palaeontology, cultural heritage and visual/landscape aspects), terrestrial ecology and biodiversity, and the socio-economy of the local region (SKA SA, n.d.i.).

geological or physical features in the area”, and to “make the area primarily available for scientific research or environmental monitoring”. The Act also clearly delineates who may and may not enter a special nature reserve. Those who are allowed into this type of protected area are predominantly restricted to conservation management, state officials and researchers who have been granted exemption from the Minister of Environmental Affairs (Republic of South Africa, 2004:36). In other words, general public visits and hence commercial eco-tourism is prohibited which has resulted in many local residents deeming this protected area to be a ‘white elephant’ as it will merely protect the stars (Walker *et al.*, 2018:168) – hence the title of this subsection.

According to the IEMP, declaring the SKA core site as a protected area also holds great promise for advancing the limited environmental research and knowledge base around the Central Karoo (Gaea Enviro (Pty) Ltd, 2018:70). There are currently no other protected areas in the Nama Karoo that are representative of the species, habitats and ecosystems present within the SKA core site (Todd, n.d.). In 2010 the Department of Environmental Affairs noted in its National Protection Areas Expansion Strategy (NPAES) that both Karoo biomes were under-protected (Republic of South Africa, 2010:18). Since then there have been gains in the Succulent Karoo biome where, as of 2018, some 7.7% (404 508ha) fell under some form of protected area; however a mere 1.6% (668 430ha) of the Nama Karoo is protected (Hoffman *et al.*, 2018:213). Formally protecting this site will thus contribute significantly to the Department of Environmental Affairs’ NPAES by adding some 130 000ha, or approximately 41%, of its Upper Karoo target (Todd, n.d.), to the conservation estate in this region. The only other large areas occurring within a 100km radius of the SKA core site include Alkantpan and SANParks’ Karoo National Park at 85 900ha and 76 620ha respectively (CSIR, 2016:53).

As of mid-2019, the NRF had not yet officially appointed a land management authority specifically related to environmental aspects for the SKA core site area. It is, however, their intention to appoint SANParks as the land management authority (Gaea Enviro (Pty) Ltd, 2018:2) and a contract between the parties was being finalised (SARAO’s stakeholder engagement officer, written response, 17 July 2019). SANParks will thereafter be tasked with ensuring compliance with the requirements for a special nature reserve set out in the NEMPA Act 57 of 2003. With this responsibility, SANParks is also required to develop a management plan for the special nature reserve. Engaging in a co-management agreement with SKA SA, SANParks’ responsibilities would include wildlife management, biodiversity conservation, resource management, administrative tasks related to the development and implementation of the management plan, stakeholder engagement, conducting long-term environmental research and monitoring programmes with external parties such as SAEON and universities or research institutes, and of particular importance in this dissertation, predator control (SKA SA, 2017b).

To commence with this management plan, public communication meetings, presented by SANParks and SARA O, were held in Williston, Brandvlei and Carnarvon in April 2018 to source information from interest groups and local residents to be incorporated in the management plan. During these workshops, Williston and Carnarvon farmers raised their concerns about the fence specifications for the SKA core site (discussed further in Chapter 7).⁴⁶ I attended all three workshops which were structured around three discussion objectives: the identification of challenges and risks raised by the local communities; the identification and discussion of the area's special (i.e. unique) features; and, local communities' desired outcomes from the proposed protected area, including aspirations around astro-tourism. According to Gerhardt (2018:5), these public communication meetings also served a broader purpose of "forming and sustaining relationships with the public so as to secure mutual understanding and ongoing support". This is an especially important objective in the Kareeberg region, where tensions remain high between farmers and SARA O personnel, and disputes – including about jackals – have been a common occurrence at public meetings called to discuss the unfolding of the SKA project in the region.

Although ecologists, conservationists and physicists alike all applauded the decision to establish a special nature reserve, the core site's neighbouring farmers were caught off guard by the establishment of a national park in their midst and the proposed involvement of SANParks to manage it.⁴⁷ As will become evident below and in my findings chapters, "the change in land use from livestock farming to conservation has important consequences, not only for the biota but also for the people living adjacent to the protected areas" (Hoffman, Walker & Henschel, 2018:389).

2.4 Conclusion

The extensive literature review of the Karoo's history as well as past jackal management practices and the emergence of the SKA that has been presented in this chapter, shows clearly how the region's environmental, social, economic and political histories have been intertwined. The legacy that this has left for environmental and especially jackal management in the context of the SKA is complex. This chapter thus provides important background for the rest of this dissertation. Just as commercial livestock farming disrupted and then destroyed previous relationships to the Karoo environment, with

⁴⁶ A month later, at a closed meeting involving neighbouring farmers and SARA O, discussions on the fence specifications continued (concerning its height and the height of droppers, and whether the fence would be electrified and new fences erected), with the farmers expressing scepticism around SARA O's commitment to investing in a fixed boundary.

⁴⁷ For a detailed discussion on this, see Chapter 6.

settled, privatised livestock farming under white ownership replacing herding by indigenous people on communal rangeland, astronomy is now seen to be playing a similar role by farmers around the SKA core site. Now, however, it is not commercial farming that is emerging as victorious, but a “new” land-use in the form of radio astronomy. In the process, the long antagonistic relationship between farmers and jackals is being reconfigured.

CHAPTER 3: THEORETICAL AND CONCEPTUAL FRAMEWORK

This chapter elaborates on the theoretical and conceptual framework which has guided me through my research process. In Section 3.1 I discuss critical realism as the central metatheory informing my research and understanding, *inter alia*, of knowledge systems. While critical realists recognise the existence of a biophysical world, they acknowledge that nature is a socio-cultural realm as well. Critical realism has thus assisted me in looking at my various informants' views on jackal management and the SKA core site as neither inherently objective nor simply subjective. Rather, their knowledge is the "result of interaction between subject and object" (Proctor, 1998:361). In other words, there is no disembodied "God's eye view" of the world. While the objective existence of the biophysical world is a "starting assumption" within critical realism, one that can be partially excavated through the study of it, humans also build their understandings about actors such as animals (and, indeed, the SKA or farmers) through their experiential encounters with them, as well as the value and knowledge systems they bring with them to these encounters. With regard to the knowledge systems at work in farmer–jackal conflict I have found the distinction between 'scientific' and 'local' knowledges useful (see Section 3.4); critical realism provides a basis for an appreciation of both forms of knowledge.

In Section 3.2 I discuss political ecology as a further important element of my underlying theoretical framework because of the way it draws attention to the power relations in environmental (including wildlife) management and the importance of understanding ecological concepts as products of a myriad of cultural and political activities. Political ecology has been a particularly useful resource in my unravelling of farmer–jackal conflict and the challenges of jackal management in the context of the SKA. As I have come to see through my research, the political ecology of jackals is as intricate as life in the Karoo itself. In this section I also delve into the comparative literature on the political ecology of human–wildlife relations, given the centrality of the latter set of issues in my dissertation. Circumventing the distinction between humans as actors imbued with subjectivity and non-humans as not, this sub-section addresses the 'other', i.e. the animal, as an actor in its own right. According to Braun (2004:1354, cited in Notzke, 2013:393), all beings are "imbued with the capacity for affect – the capacity to be acted upon, and the capacity to act". In other words, while humans have the capacity to act and act upon non-human 'others', these 'others' also possess the ability to affect people

through these encounters and, consequently, “may also effect policies determining their future” (Notzke, 2013:402).⁴⁸

To address my second and third research questions (on the power relations around knowledge production in jackal management and collective action among jackal management constituents), I proceed to unpack the concepts of social capital, collective action and trust in Section 3.3 as well as the distinction between, and the hierarchy of, ‘scientific’ and ‘local’ knowledges in Section 3.4. In Section 3.3 the work of Ostrom (2009) and Ostrom and Ahn (2003) on social capital is particularly relevant as they point to the importance of collective action for successful wildlife and, as in my case, predator management in agricultural communities. Given that Ostrom and Ahn (2003:5) see trust as the “core link between social capital and collective action”, I also engage with Khodyakov’s (2007) analysis of trust in terms of the distinctions between ‘thick’ and ‘thin’ interpersonal trust and institutional trust. As will become evident in this chapter and throughout this dissertation, the lack of trust and collective action in wildlife (and predator) management continues to be influenced by the bias towards ‘scientific’ over ‘local’ knowledge among powerful institutions, to which I turn in Section 3.4.

3.1 Critical realism

Critical realism, a distinctive philosophical approach typically associated with the work of Roy Bhaskar (1944–2014), has been defended and promoted since the 1980s, alongside the advance of postmodernism and the increasingly widespread dismissal of positivism in the social sciences (Proctor, 1998). According to Bhaskar (2008:14), an adequate philosophy of science must be able to sustain and reconcile two aspects: firstly, that science is a ‘transitive’ process, dependent on knowledge and action (i.e. it is socially constructed) and secondly, that it has ‘intransitive’, independent objects (see also Forsyth, 2003:15–16). In other words, while science has a social character, specifically in the production of knowledge, it also needs to be seen as a realm of human behaviour that is independent from the “objects of scientific thought” themselves (Bhaskar, 2008:14). Thus, while both the physical world and human knowledge thereof are structured, differentiated and changing, they exist independently of one another (Bhaskar, 2008:15; see also Danermark, Ekström,

⁴⁸ Here it is important to take note that the capacity to act and be acted upon is different from being sentient or not. While the precise meaning of sentience continues to be contested in scientific and philosophical fields, Hobson-West and Davies (2018:673) summarise it as the “ability to experience pleasure and pain”.

Jakobsen & Karlsson, 2002). The one cannot be read off directly from the other; in particular, the biophysical world is more than a social construction.

Critical realism thus straddles two dimensions. As already noted, its claim to realism comes from its acknowledgement that knowledge-producing actions are only possible and make sense with the recognition of the existence of an “independent material reality” (Carolan, 2005:396). However, the crux of critical realism, what makes this approach critical, is that it “does not assume a one-to-one correlation between knowledge claims and reality” (Carolan, 2005:396). Rather, in emphasising that science is an ongoing process, knowledge claims remain open to criticism, testing, development, discernment, and adjustment, as relationships and processes are questioned (Dickens, 2003:99). Another important aspect of critical realism is its ability to identify and appeal to the “real ontological distinctions between the various layers or ‘strata’ in the natural and social worlds” (Gorksi, 2013:659; see Figure 3.1 below). By synthesising the philosophies of natural and various social sciences, critical realism aims to bridge the traditional divide between the natural and social worlds which has come to reflect distinctions in and of reality. Drawing from constructionism, critical realism acknowledges that in addition to the reality of nature in terms of the biophysical world, there is “no single privileged voice that dictates our understanding of nature” (Newton, Deetz & Reed, 2011:11; see also Kidner, 2000). As argued by Carolan (2005), in addition to the reality of ‘Nature’ (i.e. the biophysical realm), critical realism acknowledges that there is also a socio-cultural realm of nature (i.e. our discursive constructions of what is natural or unnatural). In shaping our realities, we draw on both these realms to form a “causally dynamic ecological whole” (Carolan, 2005:401). While critical realism rejects the idea that there are multiple realities, it does recognise that there are different, hence multiple, approaches to and perspectives on what constitutes reality.

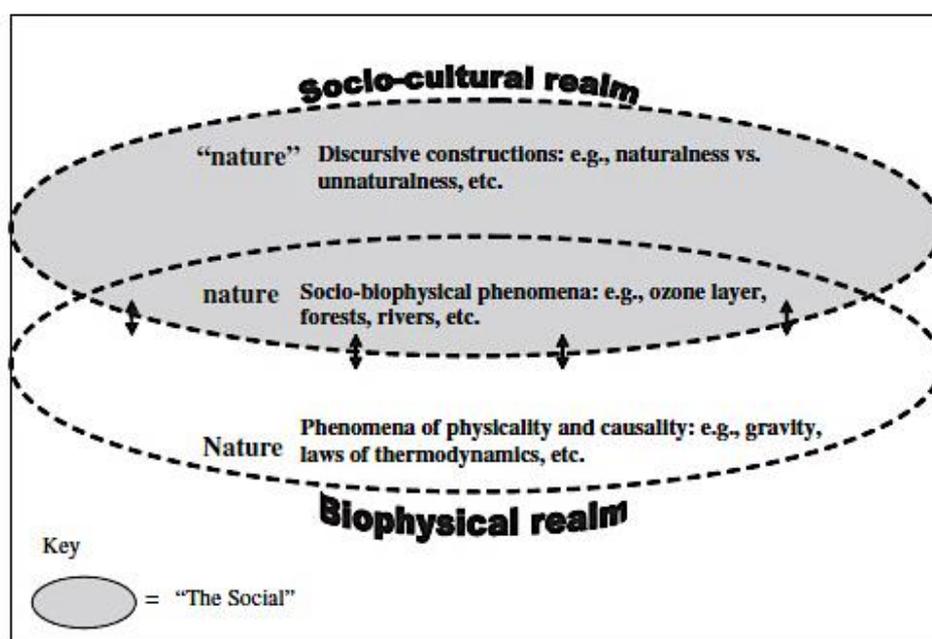


Figure 3.1 Schematic representation of the relationship between nature’s socio-cultural and biophysical realms (Source: Carolan, 2005:401).

This understanding is central to this dissertation, as numerous interest groups are involved in jackal management, each with their own understanding of jackals and their own, often strongly held views on which management type is the most successful. As already described, among livestock farmers jackals have earned negative reputations such as “enemy” (Beinart, 2003:195), “vermin” (Humphries *et al.*, 2015:541; Pathare, 2015:4) and “problem animal” (Avenant, de Waal & Combrinck, 2006:23; Pathare, 2015), because of the farmers’ livestock losses and the brutality of livestock predation that farmers have witnessed.⁴⁹ In contrast to the farmers, life scientists have highlighted the positive role of jackals in the Karoo ecology, for instance, that they assist in controlling rodent and insect populations on farmlands (Davies-Mostert *et al.*, 2007:10; Bothma, 2012:6; CapeNature, 2015:6; Natrass & Conradie, 2015:15) and that they are part of ‘Nature’. Another argument in support of humans learning to coexist with jackals is that persecuting them is counter-productive as it disturbs their social system and the ecosystem as a whole (Natrass & Conradie, 2015:10; Minnie *et al.*, 2016:385; Natrass & Conradie, 2018; Natrass *et al.*, 2019). These two competing ‘narratives’, as Natrass and Conradie (2015) have framed them, are elaborated on in Section 3.4; they clearly illustrate that over and above the physical, independent object (i.e. the jackal), human knowledge of them is relative and draws on people’s different experiences as well as on different priorities and interests in jackals.

In other words, the jackal management knowledge claims of different constituents are the “result of interaction between subject and object” (Proctor, 1998:361), in which the external world is only partially knowable through scientific methods. As will become evident throughout my dissertation, the reality experienced by each of the interest groups involved in jackal management is shaped by their worldviews and social position. My discussion in Chapter 6, which focuses on the power relations in jackal management in the Kareeberg region and the hierarchy of ‘scientific’ over ‘local’ knowledge in decision-making around jackal management policies and practices, makes it evident that the perspectives on the reality of the jackal of the different groups that are involved do not all enjoy equal treatment.

In addition to the above, critical realism also organises the world in a stratified manner (Proctor, 1998:361; Dickens, 2003:98; Carolan, 2005:397). In other words, not only does this philosophical approach allow us to distinguish between the physical world and our experience thereof, but it also allows us to distinguish amongst what Bhaskar (2008) identifies as ‘the real’, ‘the actual’, and ‘the empirical’. According to Sayer (2000:11), ‘the real’ does not aim to “claim privileged knowledge”.

⁴⁹ Chapter 5 is specifically devoted to analysing the history of the negative terms that are attached to jackals and their continuous implementation that has come to shape farmers relationship with jackals and, I argue, the SKA.

Rather, it refers to the existence of either natural or social objects and whether we have an adequate understanding of the nature of these objects. In other words, ‘the real’ refers to the “underlying ontology and structures that give rise to events and experiences” (Forsyth, 2003:16). Each real object, whether physical or social, has “certain structures and causal powers, that is, capacities to behave in particular ways, and causal liabilities or passive powers, that is, specific susceptibilities to certain kinds of change” (Sayer, 2000:11). Through the ‘transitive’ process of science (one of Bhaskar’s key components of an adequate philosophy of science, as identified earlier) we try to identify those structures and their powers to influence and shape knowledge. ‘The actual’, in turn, refers to what happens when those powers are enacted, who is influenced by the power, and what eventuates from such actions (Sayer, 2000:12). Lastly, ‘the empirical’ comprises our experiences and/or observations of the world around us. According to Bhaskar (2008:5), it is in relation to ‘the empirical’ where the risk of what he terms a “metaphysical dogma” is greatest, i.e. an ‘epistemic fallacy’ that confuses epistemology with ontology. In other words, in answering questions about ontology (i.e. about the nature of ‘the real’), “statements about being can always be transposed into statements about our knowledge of being” (i.e. epistemology, the theory of knowledge, pertaining to ‘the actual’ and ‘the empirical’) (Bhaskar, 2008:5; see also Collier, 1994:76). For York and Longo (2015:4), both elements are required to examine animals and, I argue, other non-human actors such as the SKA.

Distinguishing among ‘the real’, ‘the actual’ and ‘the empirical’ in my research has been analytically challenging but useful as it assists in recognising that the biophysical environment affects social behaviour and vice versa. While accepting the objective existence of the biophysical jackal (i.e. ‘the real’) as my starting point,⁵⁰ I focus on the social dynamics around jackal management, to analyse who enacts the power in management decisions, who is enacted upon and what the outcomes of these hierarchies and actions are for the different constituencies. As York and Longo (2015:4) state in their article arguing for an incorporation of animal studies into the domain of sociology, by taking a realist approach we emphasise that people’s understandings of and opinions about animal behaviour are not the characteristics of the animals themselves but, rather, “characteristics of human culture” which “may be either factually valid or invalid in the scientific-realist sense”. As will become evident throughout my dissertation, while the jackal as an independent actor influences the opinions of people about the species (and vice versa), power structures within human society play a critical role in determining the authority of those opinions.

⁵⁰ Here it is important to keep in mind that I do not wish to merely reduce the jackal to what humans think about them but that the jackal also exists over and above social constructions. See York and Longo (2015:6) for an in-depth discussion on how “the animals in our heads and the animals in the world, and the interaction between the two, may affect human societies and animals”.

3.2 Political ecology

3.2.1 Core features of political ecology

In combining ecology and political economy,⁵¹ “political ecology has become a popular approach for examining modern environmental conflicts” since the 1970s (Bidwell, 2010:19; see also Akama, Lant & Burnett, 1996:337; Watts & Peet, 2004:6). Its popularity is a result not only of its highlighting of ecological concerns but also its insistence that “ecological systems are political” and that our ideas about these systems, as well as our access to and control over them, are defined and delimited by wider cultural, political and economic factors (Robbins, 2012:20; see also Greenberg & Park, 1994; Akama *et al.*, 1996:337; Neumann, 2005:5). In exploring the relationship between political ecology and human geography, for instance, Neumann (2011:843) argues that landscapes are produced, interpreted, experienced and altered by numerous actors engaged in struggles over “contested property rights, [...] meaning, land use change, and the cultural production of nature under capitalism”. Landscapes thus exemplify “applications or expressions of power that have significant material consequences for people’s everyday lives, including where and how they manage individual and collective livelihoods” (Neumann, 2011:848). This is certainly the case in my research site where the shift from livestock farming to radio astronomy is impacting unevenly on livelihoods and social relationships in the surrounding communities.

In its attention to the politics surrounding the control of and access to natural resources, political ecology has been validated as an approach to the analysis of wildlife conservation practices in Africa (Jones, 2006:483) and to viewing animals as political subjects (Hobson, 2007:251). In deconstructing political ecology as political economy with an ecological perspective, one can identify certain concepts and analytics that are central to its approach to explaining human–environment relations. While there are various definitions and applications of political ecology, the four features identified below are evident in most, if not all, variations.

Firstly, by incorporating a political economy viewpoint, political ecology emphasises the fact that environmental conflicts and transformations “cannot be understood without consideration of the political and economic structures and institutions within which the transformations are embedded” (Neumann, 2005:9). As already indicated in Chapter 1, viewing ecological systems as political is central to my dissertation. Such an approach places jackal management around the SKA core site

⁵¹ Deriving from Marxism, political economy is concerned with continuous changes within society at both local and global levels and the effects thereof on people and their productive activities (Blaikie & Brookfield, 1987:21, cited in Watts & Peet, 2004:8).

within the broader political, economic and cultural context of the Karoo. In combining ecology with political economy, political ecology is also able to address the deficiencies in the respective approaches of each, i.e. ecology's generally apolitical approach and lack of attention to power, and political economy's lack of attention to "nature" (Escobar, 2010:91; see also Walker, 2006 & 2007).

Political ecology can thus be seen to offer a holistic approach since it assists us in reformulating the relationship between the social and the natural worlds (Atkinson, 1991:3). This is further enabled by the second important feature of political ecology, which is its commitment to an inter- and transdisciplinary approach. Transdisciplinarity refers to collaborations that involve and integrate the experience and worldviews of various stakeholders and/or disciplines, "commonly seek[ing] to establish priorities and then foster research that helps different parties move towards commonly sought outcomes" (Allen, Ogilvie, Blackie, Smith, Sam, Doherty, McKenzie, Ataria, Shapiro, MacKay, Murphy, Jacobson & Eason, 2014:433–434). In addition, Reyers, Roux, Cowling, Ginsburg, Nel and O'Farrell (2010:960) identify transdisciplinarity as embracing the "ultimate coordination between horizontal and vertical levels of the knowledge hierarchy". In contrast, interdisciplinary collaborations involve a "unified problem formulation", the sharing of methods and data, as well as the establishment of new questions that require attention (Allen *et al.*, 2014:434). The latter is particularly valuable as it feeds back into multidisciplinary knowledge (Reyers *et al.*, 2010:959).⁵² According to Escobar (2008 & 2010; see also Walker, 1998:132; Robbins, 2012:13), political ecology draws on various disciplines, such as geography, anthropology, sociology, ecology, environmental history, and science studies, as well as several bodies of theory, such as poststructuralism, phenomenology and conservation biology, in addition to its roots in political economy.

A third important feature of political ecology is that most political ecologists adopt a critical realist approach, inasmuch as they recognise that the environment is an ontological agent in its own right but also that the agency of nature is experienced in a socially mediated way (see for example Zimmerer & Bassett, 2003; Neumann, 2005; Benjaminsen, Rohde, Sjaastad, Wisborg & Lebert, 2006; Escobar, 2010; Notzke, 2013). Political ecologists differ in where they place the emphasis here, but generally they acknowledge that ecological concepts are the product of a myriad of cultural and political activity and that the ecosystems that are analysed "are significantly but not always entirely socially constructed" (Greenberg & Park, 1994:1). At the same time, they generally recognise that these social constructions, which are often highly politicised, are only partial reflections of the

⁵² According to Reyers *et al.* (2010:959), multidisciplinary differs from inter- and transdisciplinarity; even though cooperation does occur, there is "little exchange between [...] disciplines".

ontological object. It is because political ecology draws on critical realism, which identifies both real structures in the world (i.e. the biophysical realm) and people's experience thereof (i.e. the socio-cultural realm), that it is able to offer a more holistic theoretical framework.

Finally, historical analysis is also integral to political ecology, as it allows one to understand contemporary situations more fully in relation to past dynamics (Moore, 1993:381; Neumann, 2005:6). According to Jones (2006:483), this is certainly the case in contemporary wildlife management, biodiversity, and habitat use across Africa, as management approaches have been "shaped historically by views of nature, or ways of 'seeing' the environment, by powerful groups in society". A historical analysis provides perspective on how and why people's relationships and interpretations of the environment have changed (or not) "over time and space, and the significance of those interpretations for improving social justice and nature conservation today" (Offen, 2004:21, cited in Davis, 2009:285). In my study, a historical analysis has allowed me to reflect on the larger macro-economic circumstances and the history behind the power dynamics currently evident amongst the jackal management parties in the Karoo (as already shown in Chapter 2).

The contribution of political ecology to my conceptual framework has been twofold: firstly, it has assisted me in identifying the symbolic significance of the jackal in a changing Karoo region as a relevant issue to address, and, secondly, it has underscored the importance of analysing the power relations involved in the knowledge production around jackal management around the SKA core site. Using the jackal as *ongedierte* as a trope for the SKA allows me to illustrate how both jackals and this astronomy development contravene white, commercial farmers' sense of the 'natural' order in the Karoo, in which man controls nature (i.e. non-humans) to serve his needs (i.e. manipulating nature to farm more productively). The combination of jackals and astronomy challenges their nostalgia for the 'old days' when commercial farmers dominated both the social and the natural spheres.

By situating my study around the SKA core site, I include an additional actor in jackal management which brings out even more clearly the significance of social, political and economic factors in environmental conflicts. White, commercial farmers' perceptions of themselves as losing authority in general, and control over the jackals on their farms specifically, predate the advent of the SKA, but these feelings have been exacerbated by the presence of the SKA, hence the fusing of the two struggles in various ways. On top of no longer receiving government support for predation management, the threat of land reform plus the drought, the South African government's shift to a knowledge-based economy and wholehearted support for astronomy in their region appears to be a further marginalisation of agriculture. The actual presence of a protected area and support for the conservationist agenda of life scientists and environmentalists over farmers is a further blow. My

discussion of commercial farmers' perceptions, decision-making processes and challenges shows how their sense of place and belonging in the contemporary Karoo is filled with uncertainty, with implications not only for them but also for the future of commercial agriculture in the region and the local economies it underpins.

It is possible that, as a result of competing claims or constructions of constituents, those who find themselves in powerful positions use their positions to “negate other constructions or delegitimize opposing stakeholders” (Harker & Bates, 2007:331). As Harker and Bates (2007:330) identified in their study on the differing social constructions of black bear (*Ursus americanus*) hunts in the United States of America, the lethal management of jackals “signals growing intractability between animal rights advocates and those who hold more anthropocentric values, such as the priority of human safety” or, as in my case, the security of their livestock. Such disparate perceptions of the importance of wildlife and wildlife conservation (particularly, I would argue, in relation to human rights) can lead to conflict between wildlife managers, other interest groups and the community at large (Miller & McGee, 2001). This comes as no surprise in a country such as South Africa, which faces numerous socio-political issues that supersede human-wildlife and especially human-jackal conflict in importance on the agenda of both government and major groupings in civil society. Here the negative views of commercial farmers as at best paternalists, at worst racists who are opposed to land reform and social change (e.g. Mkhize, 2012; Brandt, 2013; Brandt & Spierenburg, 2014; Mkhize, 2014; Kheswa, 2015), serve to further erode the legitimacy of farmers' concerns around jackal management.

Political ecology reminds sociologists to look beyond the most vocal and powerful interest groups, so as to “document and highlight the existence of local or indigenous knowledge and practices in the area of wildlife management and control” (Knight, 2000:5; see also Hannigan, 2006:55; Teel & Manfredi, 2010:137). According to Forsyth (2003:9), such a critical approach “might contribute to new forms of environmental explanation by providing more inclusive means to acknowledge local environmental concerns”. This point relates to my second research question about the power relations involved in the knowledge production around jackal management, which is discussed further below in Section 3.4: environmentalists and life scientists regard “their” science as more valid than ‘local’ environmental knowledge. Consequently, the supporters of the ‘farmer jackal narrative’ (as described by Natrass and Conradie, 2015), who draw on what may be termed ‘citizen science’ and/or applied expertise, tend to be marginalised by the professional scientists. Lending support to the idea of the jackal as a complex trope for developments around the SKA, in this unequal relationship the farmers neighbouring the SKA core site find themselves dictated not only by the professional scientific elites involved in the study of jackal ecology, but also by those involved in the yet more powerful science of radio astronomy (*viz.* the SKA).

3.2.2 Human–wildlife relations in political ecology

Human–wildlife conflict occurs worldwide across a wide array of species (see Terblanche, 2015:26–27). In Africa, human–wildlife conflict encompasses a startlingly broad range of situations, from the less severe, e.g. crop raiding by primates and African elephants (*Loxodonta africana*) (Hill, 1998; Saj, Sicotte & Paterson, 2001; Dublin & Hoare, 2004; Hill & Wallace, 2012; McLennan & Hill, 2012), through livestock losses to the most severe: human injuries and deaths (Holmern, Nyahongo & Røskoft, 2007; Kissui, 2008; Selebatso, Moe & Swenson, 2008). Most of the studies of human–wildlife conflict in Africa in relation to protected areas, concern small-scale farmers and threats to their livelihoods and the challenges of governance (see, for example, Hill, 2004; Okello, 2005; Lagendijk & Gusset, 2008; Atickem, Williams, Bekele & Thirgood, 2010). While there are interesting resonances between these studies and my research findings, the context is very different, inasmuch as my study centres on white, commercial farmers in post-apartheid South Africa, in relation to a mega-science project.

Despite the significant role that animals play in human societies, hence the importance of human–animal relations, human–wildlife conflict has, until fairly recently, been largely overlooked by sociology (Bekoff, 2007; Joseph, 2010). According to Hobson-West (2007:24), this can be ascribed to three main reasons. Firstly, “sociologists have traditionally focused their efforts on discussing relations between humans” (Hobson-West, 2007:24). As a result of this anthropocentric approach, human–animal relationships have been brushed aside. Secondly, sociologists and social scientists in general may be “wary of attracting charges of paternalism” if they are seen to be “speaking for animals” (Munro, 2005, cited in Hobson-West, 2007:24). This also links to Hobson-West’s third explanation for the absence of animals in sociology, which is the broader tendency within the discipline to “narrowly equate the social world with living humans”. What is often described as a form of Cartesian dualism in the distinctions drawn between humans and animals is ingrained in western culture, norms and behaviour (Johansson, 2008:66–67; Robbins, 2012:3); here I concur with Strang (2009) that this dualism also structures the conceptual frameworks of both social and natural scientists. The reification of humans and animals as separate categories acts as a significant conceptual barrier that prevents scholars from producing a “genuinely ‘integrated’ analyses of environmental issues” (Strang, 2009:5). Nevertheless, sociology does have the potential to “explore the unique and often paradoxical relationships that humans share with other animals in a holistic manner” (Joseph, 2010:299). Political ecology, in particular, offers a noteworthy approach to addressing human–animal relationships because its inter- and transdisciplinary approach assists in breaking away from an “image of a world where the human and the non-human are disconnected”

(Robbins, 2012:3). Important recent studies investigating the political ecology of human–animal relationships include Notzke (2013), Barua (2014) and Massé (2016).

Notzke’s (2013) research on divergent perceptions of wild horses (*Equus ferus*) in western Canada clearly demonstrates the power of political ecology in analysing human–wildlife conflict. As with jackals, the discourse regarding wild horses in western Canada “features profound differences in the social construction” of these animals, which results in “politically polarised positions” regarding their management (Notzke, 2013:408). In her investigation of these divergent perceptions, Notzke (2013:392) includes the horses as “subjective” agents, thereby overcoming the abovementioned distinction between humans and non-humans, i.e. animals. According to Braun (2004:1354, cited in Notzke, 2013:393), all beings are “imbued with the capacity for affect – the capacity to be acted upon, and the capacity to act”, including wild horses. In other words, while humans have the capacity to act upon animals (in ways which are influenced by politics and culture), animals also possess the ability to affect people through their encounters, and this, consequently, “may also effect policies determining their future” (Notzke, 2013:402). This is equally true in jackal management where the development of policies affecting the jackal has come in response to jackals affecting people.

Studying human–elephant relations in northeast India, Barua (2014:915) develops what she describes as a “dwelt political ecology” that reanimates landscapes as a “dwelt achievement whilst remaining sensitive to postcolonial histories and subaltern concerns”. According to Barua (2014:916), even though political ecology has investigated human–animal relations and how such relations are influenced by broader political and social scales, it tells us “very little about the nonhumans with whom humans cohabit and the part they play in coproducing landscapes”. Rather, when animals do occur in political ecology studies, they tend to surface as “animated cultural constructs” (Barua, 2014:927) instead of active, lively participants in environmental conflicts. I consider this an important point, consistent with Hobson’s assessment that because animals are marginalised as characters without individuality, knowledge, subjectivity or experience, they “come to exist only as objects of political wrangling rather than also subjected to uneven power relations; and subjects whose ecology, behaviour and welfare are an implicit part of the uneven social and economic outcomes that concern political ecologists” (2007:255). From this perspective animals should not be viewed as “co-oppressors of the world”, but, rather, as “subjects of and in spatially uneven practices” (Hobson, 2007:253). As part of the heterogeneous networks that constitute political and social life, animals should be seen as an “explicit part of the encounters and negotiations of the everyday that need to be dissected in and of themselves” (Hobson, 2007:258).

In order to address one of the major criticisms levelled at political ecology – the neglect of ecological dynamics by ascribing passiveness to animals and nature in general – Barua (2014:927) allows the Asian elephants (*Elephas maximus*) in his study to be “qualitatively present”. This enables the study of landscapes as “dwelt achievements of people and animals rather than as surfaces upon which human meanings are inscribed” (Barua, 2014:916). In other words, both humans and animals, in this instance Asian elephants, make the landscapes in which they find themselves. Landscapes should, therefore, not be seen as “closed perimeters” which mirror nature/culture, human/animal dichotomies but, rather, as the canvass on which human–animal relations unfold. Barua (2014:922) makes the thought-provoking statement that while “we might designate specific forest reserves for elephants, [...] this is very different from the ways in which the elephants think of their habitat”. The implication of this is that just as animals have to become attuned to the movements and activities of people, so people should adjust their lives to the movements and activities of animals – an argument which has profound consequences for the management of ‘problem’ animals like the jackal (and, as we shall see, is one with which Kareeberg farmers have little sympathy).

Closer to home, Massé (2016) uses a political ecology approach to analyse human–wildlife conflict in Mozambique’s Limpopo National Park. While he does not deny that an increase in wildlife (and, I might add, human) populations leads to human–wildlife conflict, he places more emphasis on the “changing relations between wildlife and people and the power and authority to manage conflict between them” (Massé, 2016:101). As already stated in Chapter 1, the concept of ‘human–wildlife conflict’ encompasses not only negative interactions between humans and wildlife, but also conflictual interactions among humans. In summary, the human–wildlife conflict found in the Limpopo National Park is not simply a ‘natural’ phenomena, but also “the result of political decisions to create a particular type of conservation landscape” (Massé, 2016:100). This conclusion resonates strongly with the situation in my research site, where livestock farmers have been displaced to make way for the SKA core site and those who continue to reside in the region have to do so with restrictions on their livelihoods emanating not simply from its status as a site for radio astronomy but also its designation as a special nature reserve, hence site of conflict with jackals.

Vesic’s (2011) study on the environmental conflict surrounding white-tailed deer (*Odocoileus virginianus*) in southern Ontario, Canada describes a similar process of marginalisation, one also embedded in the hierarchy of experts and their knowledge over non-experts already discussed above. While in southern Ontario “lay people” who have an interest in deer management, such as residents, hunters and animal activists, are considered “least informed and most biased and emotional”, constituents who are deemed to be experts, such as life scientists and wildlife managers, are depicted as “knowledgeable, unbiased and unemotional” (Vesic, 2011:4). By making use of political ecology,

Vesic (2011:37) is able to illustrate how deer management, and wildlife management in general, is “linked to power, authority, and, ultimately, decision-making control”.

In her study of the political ecology of sea turtle (*Chelonioida*) conservation, Campbell (2007) addresses issues of scale in conservation management and its consequences for ‘local’ knowledge. Because sea turtles are a migratory species, they defy national boundaries and move across various social and political scales (Campbell, 2007:314). Consequently, the debate on their conservation occurs across local, national and international scales, a context which adds to the authority of life scientists as the experts on this issue, because of their position as members of a “powerful elite” (Campbell, 2007:328) that is internationally networked and able to work across these different scales. Since local people generally lack the ability to cross scales as readily, they are marginalised in conservation debates that take place in international fora and media. At the same time, as is discussed further below in Section 3.4, the idea of ‘indigenous’, ‘local’ or ‘traditional’ knowledge as constituting a single and coherent body of knowledge is often problematic as “most knowledges are not simply local but complex hybrids drawing upon all manner of knowledges” (Watts & Peet, 2004:19). In this regard, the strength of political ecology, according to Watts and Peet (2004:18), is its critical engagement with the social construction of ‘local’ environmental knowledge in the following respects:

First, a recognition that environmental knowledge is unevenly distributed within local societies; second, that it is not necessarily right or best just because it exists (i.e. it can be often wrong or inappropriate); and third, that traditional or indigenous knowledge may often be of relatively recent invention (which is to say these knowledges are not static or stable [...]).

This inseparability of the social construction of a species and people’s construction of place is evident in my research. In order to secure the geographic area of the SKA core site, as well as ensure compliance with the requirements for a special nature reserve set out in the NEMPA Act 57 of 2003, the new park management (SANParks⁵³) is reverting to a “fences and fines” approach to conservation that has been widely criticised (e.g. Siurua, 2006; Spierenburg & Wels, 2006; Holmes, 2007). However, as with the wildlife studied by Barua (2014) and Massé (2016), jackals do not adhere to fixed boundaries and limit their movements to stay within a protected area. Yet even though the Karoo region is the natural habitat of jackals, they are deemed to have no place on farmland and those that are found on farms are villainised (see chapters 5 and 6). Farmers consider jackals who live on

⁵³ While the NRF has not yet officially appointed a land management authority specifically related to environmental aspects for the SKA core site area, it was indicated at the end of 2017 that SANParks will fulfil this role (see Chapter 2).

farmlands to be ‘unnatural’ as they do not act in the same way as jackals in protected areas, which predate almost exclusively on wild animals. Rather, they predate on what is seen to be easier prey: i.e. domestic animals such as sheep. Thus land-use conflicts between farmers and the SKA fuse with the conflicts between farmers and jackals.

In summary, whether referring to wild horses, elephants, deer, sea turtles or jackals – or, indeed, domestic animals such as dogs (see Haraway, 2003; 2008) – animals are not simply passive objects, socially constructed by humans. Rather, they are “companion species” which have coevolved with humans. As Dempsey argues in her article on the grizzly bear’s (*Ursus arctos*) influence on environmental politics in British Columbia, animals influence the “‘state of affairs’, helping give shape to new political economic geographies” (2010:1142).

3.3 Social capital and collective action

3.3.1 The relationship between social capital and collective action

The concept of social capital has generated a very large literature with divergent views and applications. In working with it as part of my conceptual framework, I have drawn on the work of Bourdieu (1986), Coleman (1988), Putnam (2000) and Ostrom and Ahn (2003) to assist me in my analysis of the social networks that are involved with the management of jackals.

While linked to classical sociologists such as Durkheim and Marx, the idea of social capital was significantly developed by Bourdieu in the 1970s. In his theorisation of class and social hierarchy, Bourdieu (1986) identified four, interrelated subtypes of capital: economic, cultural, symbolic and social. While economic capital refers to material and financial wealth, cultural capital includes one’s educational qualifications and familiarity with the creative and artistic aspects of a particular culture (i.e. with cultural goods). While linked to both, symbolic capital in this typology is more intangible than either economic or cultural capital, as it concerns issues of status, prestige and reputation. Bourdieu (1986:47) argues that cultural capital can exist in an “embodied state” in which long-lasting dispositions are incorporated into one’s *habitus*. In other words, society’s dispositions and structures are “disposed” within individuals and act as principles, generating and organising individuals’ practices and representations (Bourdieu, 1990:53). According to Wacquant (2006:318), a student and close collaborator of Bourdieu, the concept of *habitus* encapsulates the “internalisation of externality [i.e. the embodiment of social worlds within the individual] and the externalisation of internality [i.e. how social worlds are reproduced]”. While I focused on social capital in my research, it also became evident through my fieldwork and data analysis that the farmers in my study rely heavily on cultural

capital in its “embodied state” in their lives and relationships with others. As will become evident in my findings chapters, Karoo farmers are fearful about the loss of not only their economic capital but their cultural and symbolic capital as well.

For Bourdieu (1986:51) social capital is the aggregate of an individual or group’s actual and/or probable resources in a “durable network of more or less institutionalised relationships of mutual acquaintance and recognition” (see also Bourdieu & Wacquant, 1992:119). Thus, according to Halpern (2005:3), Bourdieu emphasises that “societies are not composed of atomised individuals”. Rather, individuals and/or groups are connected via social networks. These networks are not, however, a natural given. Rather, they are, in Bourdieu’s words, the “product of investment strategies” that are aimed at establishing social relationships and networks that can be used, over either the shorter or the longer term, to accrue certain benefits (1986:52; see also Portes, 1998:3). In other words, social networks, and consequently social capital, require continuous work, affirmation, time and energy (Bourdieu, 1986:52; Field, 2003:15).

Bourdieu viewed social capital explicitly as an asset that is used by elite groups to advance their own interests, that can also be used simultaneously as an “exclusionary tool” to maintain their power (Gauntlett, 2011:256). Coleman, on the other hand, portrays social capital as a public good which is not only limited to the powerful but can also benefit those who are powerless and in marginalised positions (Wall, Ferrazzi & Schryer, 1998:309; Field, 2003; Gauntlett, 2011:257). In his analysis of the role social capital plays in the creation of human capital, Coleman (1988:98) emphasises that social capital is not present in an individual and/or a group, but, rather, “inheres in the structure of relations between actors and among actors”, in which the following dimensions are particularly useful: obligations, expectations and trustworthiness; the inherent potential for information, and norms that are accompanied by sanctions (Coleman, 1988:119; see also Wall *et al.*, 1998:308–309; Field, 2003:24; Rostila, 2010:309–310). In other words, social capital cannot be found in a specific entity, but is, rather, defined by its function; social relations are central to social capital which “facilitate certain actions of actors” within the network (Coleman, 1988:98). Closed social networks are particularly important for social capital because of their stability and common, shared ideologies (Field, 2003:24). Nevertheless, as will be discussed below (and will become evident in Chapter 7 which discusses social capital, collective action and trust in jackal management), the exclusivity of closed social networks can also yield negative consequences.

Another prominent theorist of social capital is Putnam who has worked with this concept since the 1990s. Social capital, as defined by Putnam, refers to the social networks and relationships in society that facilitate co-operative action among individuals and groups (1993:167; see also Kearns &

Forrest, 2000:1000; Ishihara & Pascual, 2009:1553). This not only highlights the important role of social networks, but also that of social values such as reciprocity and trust. These attributes are central to Putnam's notion of social capital. In his book, *Bowling alone: The collapse and revival of American community* (Putnam, 2000), league bowling is used as a metaphor for associational activities in the United States of America that bring "relative strangers together on a routine and frequent basis, helping to build and sustain a wider set of networks and values that foster general reciprocity and trust, and in turn facilitate mutual collaboration" (Field, 2003:32). As a result, social capital is highlighted as both a private and a public good (Putnam, 2000:20). While individuals benefit from social networks and advance their own interests, social networks also possess the ability to "improve the efficiency of society by facilitating coordinated actions" (Field, 2003:31; see also Rostila, 2010:311).

Prolonged networks and relationships can be divided into what Putnam has termed bonding, bridging and linking activities (2000:22; see also Field, 2003:32; Ragland, Bernacchi & Peterson, 2015:690). Bonding, which occurs within social groups, refers to "co-operative and trusting relations between members of a network who see themselves as similar in terms of their shared social identity" (Rostila, 2010:312; see also Gómez-Limón, Vera-Toscano & Garrido-Fernández, 2014:385). This is particularly evident in jackal management, where advocates of each of the two (opposing) 'jackal narratives' described by Natrass and Conradie (2015) (discussed further in Section 3.4 below) forge a common identity by supporting those who concur with their specific viewpoint and dismissing those who are seen to support the opposing viewpoint. Around the SKA core site, bonding activities amongst the region's farming families, the majority of whom have been farming in this region for generations, contribute significantly to maintaining the social fabric of the Kareeberg farming community. As my discussion in Chapter 7 shows, vermin hunting plays a central role in social interactions which serve to maintain heritage and identity. Similar to what Arnett and Southwick (2015:735) found in their research on the economic and social benefits of hunting in North America, hunting vermin in the Karoo can be seen as "provid[ing] an avenue for social interaction and maintenance of cultural traditions, while it fosters connections within families and communities". While life scientists who share similar views on jackal management also participate in bonding activities, a lack of trust and heightened competition among academics can be seen to limit collective action within this group (see Chapter 7).

Conversely, bonds can also be restricting. By forging closed social networks and maintaining homogeneity, exclusiveness can yield negative consequences, such as "strong out-group antagonism" (Putnam, 2000:23; see also Field, 2003:32). Closed social networks are "also at greater risk of producing or maintaining negative norms and behaviours within the network" as they "facilitate

submission to norms, behaviours and attitudes among network members” (Rostila, 2010:321). More significantly, closed social networks limit the capacity of individuals to enhance their understanding by learning from other networks, and ultimately, limit their engagement with other groups. Closed networks, therefore, result in a lack of what Putnam identifies as bridging activities. In my study, while some bridging between individual scientists and farmers could be seen to occur (see Chapter 6), a lack of trust and the increasing individuality of jackal management served to limit cooperation and the sharing of knowledge and information.

In contrast to bonding, bridging networks are “outward-looking” (Putnam, 2000:22; Rostila, 2010:312) and occur between members of disparate groups (Field, 2003:32; Gómez-Limón *et al.*, 2014:385). Bridging connections, in particular, provide links to external resources and allow for the opportunity to share information (Putnam, 2000:39; Rostila, 2010:312). Closely linked to bridging networks are linking networks which I also found to be a valuable concept with which to work in the context of the SKA core site. According to Woolcock (2001, cited in Field, 2003:42), linking networks allow people to reach out to others who are unlike themselves, in dissimilar situations, thereby “enabling members to leverage a far wider range of resources than are available within the community”. In other words, constructive interaction occurs among people who find themselves along different power or authority gradients (Rostila, 2010:313). Relying on my observer-as-participant fieldworker role allowed me to observe some interactions among farmers and SARAo personnel (and in some instances with DST staff and/or SANParks officials) that was consistent with this description, at public communication meetings, information sessions, workshops, and one closed meeting. While including or incorporating powerful ‘outsiders’ may threaten a marginalised group’s cultural capital, such as that of the farmers in the Kareeberg region, engaging vertically with external agencies (such as SARAo) can position them to influence policies and/or draw on useful resources in advancing their concerns (e.g. Pretty & Smith, 2004:633).

Ostrom and Ahn (2003:5) take Putnam’s discussion of social capital a step further and identify trust as the “core link between social capital and collective action”. In their focus on collective action, Ostrom (2009) and Ostrom and Ahn’s (2003) work on social capital is specifically relevant to my dissertation as collective action is central to successful wildlife, and in this instance, predator management. Ostrom (2009:21) defines social capital as a “set of relationships among members of a group and the values that they share that enable them to solve collective problems in the present and future” (see also Ostrom & Ahn, 2003:4; Ragland *et al.*, 2015:690). In other words, in order to solve collective problems, the sharing and/or challenging of knowledge is key. In their analysis of the linkages between social capital, collective action and common property resource management, Ishihara and Pascual (2009:1550) include a discussion on bonding and bridging social capital where

the former contributes to the “creation of common knowledge” and the latter promotes the sharing of this common knowledge.

In drawing on a larger pool of knowledge and valuable external resources, communities are better able to become involved in natural resource management and, as a result, to contribute towards collective action. At the same time, the incorporation of communities in natural resource management decision-making processes means they are more likely to be supported over the long term (Pretty & Smith, 2004:632; see also Plummer & FitzGibbon, 2006:59). According to Schoon, Robards, Meek and Galaz (2015:227), a polycentric governance system is “uniquely qualified to facilitate collective action”. In contrast to monocentric governance strategies, polycentricity highlights numerous characteristics that are central to collective action, such as resilience, adaptability, participation, connectivity and diversity (Schoon *et al.*, 2015:231; Simonsen, Biggs, Schlüter, Schoon, Bohensky, Cundill, Dakos, Daw, Kotschy, Leitch, Quinlan, Peterson & Moberg, n.d.:16). According to Simonsen *et al.* (n.d.:16), this type of governance is also better suited for the governance of social-ecological systems and ecosystem services as “traditional and local knowledge stands a much better chance of being considered” (see also Section 3.4). Nevertheless, problems can arise as individuals are required to choose between a long-term action that suits all, or at least most, and “short-term self-regarding choices” (Ostrom & Ahn, 2003:4).

3.3.2 The importance of trust

As already mentioned, for Ostrom and Ahn trust is essential for successful collective action. While trust can be built through collaboration, institutional development, and social learning, it is also required for making the initial establishment of relationships possible. In investigating the social dimensions which enable adaptive ecosystem-based management, Folke, Hahn, Olsson and Norberg (2005:451) note that trust does not only enable people to work together; it also “creates a sense of community” and forms the basis of social institutions. Without trust, groups struggle to identify the values that they share and, as a result, to solve collective problems (Ostrom, 2009:21). Trust, reciprocity and civic engagement can therefore all be seen as mutually reinforcing.

In refining the definition of trust, Khodyakov (2007:127) identifies three types of trust that “better explain the multifaceted nature of trust in a modern society” (see Figure 3.2 below). The first is thick interpersonal trust that operates among members of the same background and produces tight-knit networks (Putnam, 2000:136; Khodyakov, 2007:120). This form of trust is generally restricted to one’s family members, relatives and/or people from the same background. Based on “familiarity and similarity” (Khodyakov, 2007:120), thick interpersonal trust corresponds with Putnam’s bonding

activities. Corresponding with bridging activities, Khodyakov (2007:122) also identifies thin interpersonal trust, which is trust that is “created through interacting with people whom we don’t know well and depends on the reputation of either a potential trustee or a trust intermediary” (see also Putnam, 2000:136). Building thin interpersonal trust is a process. Without prior engagement with one another and/or information of the other’s reputation, Nooteboom (2007:43) explains that “risky relationships start on the basis of control, to achieve reliance, and then develop into trust, with the growth of empathy and next, perhaps, identification”. As will be discussed below, Khodyakov (2007:124) also highlights and recognises the agentic nature of trust.

Khodyakov’s (2007) third dimension of trust is that of institutional trust, or trust in institutions. Because of its “impersonal nature” (Khodyakov, 2007:123) the creation of this type of trust is particularly difficult, which Khodyakov ascribes to the fact that it is “more problematic to trust some abstract principles or anonymous others who do not express any feelings and emotions” (2007:123) than to trust those with whom one is in contact. As a result, trust in institutions relies solely on the said institution’s “perceived legitimacy, technical competence, and ability to perform assigned duties efficiently” (Khodyakov, 2007:123). As will become evident in my findings chapters, levels of institutional trust among farmers in the Kareeberg region are low and this plays out in their interactions with the SKA. With a lack of institutional trust, people revert to personalised relationships (i.e. thick interpersonal trust) which, in turn, may increase bonding activities but impact negatively on the prospects for collective action outside of the known group.

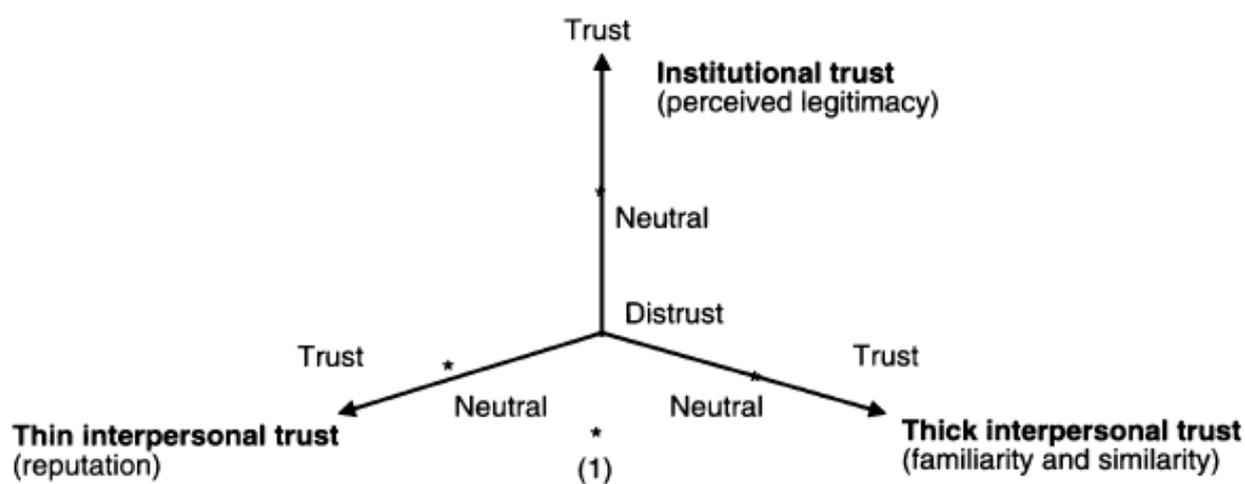


Figure 3.2 A schematic representation of Khodyakov’s (2007) three-dimensional approach to trust.

Further adding to the complexity of the three-dimensional approach to trust, Khodyakov (2007:124) also highlights that trust should not be viewed and treated as a “variable with different levels of

strength”. Rather, its agentic nature should be taken into account based on the “process of its creation, development, and maintenance” (Khodyakov, 2007:124).

The work of Emirbayer and Mische (1998) has addressed the issue of agency in relation to trust in terms of three elements. The first two elements derive from the distinction they draw between agency shaped by past behaviours that influence current levels of trust (the first element) and agency based on ‘projectivity’, that takes the future into consideration (the second element). Here, the anticipation of what will transpire in the future is based on what Khodyakov (2007:126) describes as actors’ “hopes, fears, anxieties, aspirations, desires, and calculations” (see also Emirbayer & Mische, 1998:971). Emirbayer and Mische’s (1998:971) third element of agency is the practical-evaluative dimension, which refers to the “capacity of actors to judge the applicability of alternative options for action according to existing information as well as behavioural norms and moral standards”. In deciding to trust someone or an institution, one weighs up the costs and benefits of that decision based on the informational but also normative resources one has.

As will be discussed further in Chapter 7, Karoo farmers have a strong sense of autonomy; while they are willing to collaborate with one another (i.e. they demonstrate bonding social capital), they are highly selective about the ‘outsiders’ with whom they will collaborate (which limits the reach of bridging and linking social capital). They are also, as a group, suspicious of government (national, provincial and local) and its programmes. This community thus demonstrates high levels of interpersonal trust but restricted (thin) levels of interpersonal and institutional trust. In Chapter 7 I argue that the lack of trust amongst interest groups involved in jackal management around the SKA core site is a cause of the failure to establish collective action that could lead to the successful management of jackals. Farmers are uncertain about their future with the SKA because of its potential and accrued impacts. Simultaneously, they also do not believe there is a fool-proof solution to livestock predation. As a result of increased anxieties and fears (instead of hopes and aspirations), it is difficult to establish both thin interpersonal and institutional trust.

Taking all of the above into consideration, I find Khodyakov’s (2007:126) definition of trust, which incorporates his three dimensions of trust as well as its agentic nature, analytically useful:

Trust is a process of constant imaginative anticipation of the reliability of the other party’s actions based on (1) the reputation of the partner and the actor, (2) the evaluation of current circumstances of action, (3) assumptions about the partner’s actions, and (4) the belief in the honesty and morality of the other side.

Viewing trust as a dynamic process, emphasises that even if trust is not present at a particular moment, it can yet be established. At the same time, if trust is present, it needs to be maintained, otherwise it is in danger of being lost. Importantly, “trust as a social practice and process [...] involves the responsibility of both parties, commitment to the relationship, and the possibility of social change” (Khodyakov, 2007:125). Even though useful social networks can be established, without trust strong and effective relationships will not be woven. At the same time, conflict does not necessarily lead to the breakdown of trust. Rather, when people feel that they can raise their concerns in conflict-ridden situations, trust may be deepened (Nooteboom, 2007:43).

As can be seen from the above discussion on social capital, both structural (i.e. social networks) and cognitive (i.e. trust, reciprocity, etc.) dimensions of social capital are central in producing trustworthy relationships and, consequently, collective action. While social networks and relations are necessary to establish trust, trust is also “considered the foundation for the exchange of social resources in social networks (both informal and formal)” (Rostila, 2010:317; see also Koutsou, Partalidou & Ragkos, 2014:210). Whereas the structural dimension facilitates action via social networks, the cognitive dimension provides the “context for successful participation through shared values, attitudes, reciprocity, and trust” (Ragland *et al.*, 2015:691).

Within a political ecology framework, social capital is a useful concept in the analysis of environmental problems and associated social and political relationships in that it “contributes to a greater understanding of how various dimensions and levels of social relationships are related” (Rostila, 2010:323). Applying the notions of thick and thin interpersonal as well as institutional trust to jackal management in and around the SKA core site helps illuminate the nature of the connections between the different actors and the prospects for collective action. As noted by Ragland *et al.* (2015:691) with regard to their research on the role of social capital in the management of the whooping crane (*Grus Americana*) in the United States of America, “reciprocity and trust are essential elements of successful natural resource management” – including the management of jackals.

3.4 ‘Local’ versus ‘scientific’ knowledges

3.4.1 Defining ‘local’ and ‘scientific’ knowledge

In understanding the tensions between farmers and the SKA in relation to jackal management, an understanding of the very different knowledge systems that they mobilised in support of their views also emerged as significant. As highlighted in previous sections, wildlife management stakeholders often rely on accepted scientific practices and are biased against local knowledge. According to

Taylor and de L oe (2012:1207), this bias “highlights the critical relationship between knowledge and power in collaborative processes”. Distinguishing conceptually between ‘local’ and ‘scientific’ knowledge is thus an important component of my overall conceptual framework.

The attraction of scientific knowledge lies mostly in its (assumed) objectivity, verifiability, professionalism and expertise (Pedynowski, 2003:743; Sundberg, 1998:86; Taylor & de L oe, 2012:1208). According to Pedynowski (2003:745–746), what distinguishes ‘scientific’ from other types knowledges that are “of a more personal or revelatory origin” is that, generally speaking,

scientific claims have the qualities of testability, reproducibility (or collaboration by other methods/studies, as in qualitative social research), relative transparency, contestability and revision in light of new findings. These qualities, while varying and evolving in their application, are arbitrated by peer (and increasingly, external) review [...].

Linking to the ‘realism’ dimension of critical realism, ‘scientific’ knowledge acknowledges that knowledge-producing actions are only possible and make sense with the recognition of the existence of an “independent material reality” (Carolan, 2005:396). In other words, ‘scientific’ knowledge relies largely on natural science disciplines which view nature as an external given that can be more and more fully known through systematic observation, measurement and experimentation. Furthermore, those who possess this type of knowledge are seen to “possess the truth about the natural world and how humans should interact with it” (Sundberg, 1998:86). In my research site, this form of knowledge was doubly present: first in the astronomy community that was driving the SKA project and second in the life scientists whom the SARA0 had enlisted to assist with the management of their land as a protected area.

In contrast to this elite approach which is considered to be “the best and the only consistent way of producing reliable knowledge of the world” (Kloppenburger, 1991:529), ‘local’ knowledge is defined as a “culturally generated and transmitted body of information that is context-dependent, experiential and garnered over generations” (Lute & Gore, 2014:1063; see also Corburn, 2003:421). Agrawal (1995, cited in Knapp & Fernandez-Gimenez, 2009:511) adds that ‘local’ knowledge is “integrally linked with the lives of people, always produced in dynamic interactions among humans and between humans and nature” while also continuously changing. In using the term ‘local knowledge’, instead of ‘indigenous knowledge’ and/or ‘traditional ecological knowledge’, I am referring to all nonprofessional knowledge that is rooted in a particular place (Geertz, 1983:75, cited in Corburn, 2003:421; see also Kloppenburger, 1991). This category is less specific than ‘indigenous knowledge’ which refers to local knowledge that is “unique to a given culture or society” (Agrawal, 1995:416) and ‘traditional ecological knowledge’ which places emphasis on “traditionality” (Green, 2008:149).

In the South African context, indigenous knowledge is often infused with an implicit sense of traditionality as it is generally seen as the preserve of people whose indigeneity is expressed in terms of behaviours seen as traditional (see, for example, Green, 2008). But, as Chapter 5 shows, what is considered ‘traditional’ is often the result of cultural mixing, borrowing and impositions in the past, so more understood in terms of its hybridity rather than its purity. An example of this can be found in the mixed origins of the ‘Jackal-and-Wolf’ literature that is discussed in Chapter 5.

In his article on local knowledge for an alternative agriculture and the resultant need for a de/reconstruction of agricultural science, Kloppenburg (1991) identifies farmers and their workers as the epitome of local knowledge producers, reproducers and carriers. As with farmers elsewhere, the farming practices that have evolved in the Kareeberg region, including local jackal management strategies, have been influenced and delimited by the Karoo’s unique social and physical environment. According to Berry (1977:44, cited in Kloppenburg, 1991:528–529), without local knowledge, the competent farmer would not be able to master the “intricate formal patterns in ordering his work within the overlapping cycles – human and natural, controllable and uncontrollable – of the life of a farm”. At the same time, not all contemporary farmers dismiss scientific knowledge; instead many rely on a holistic farming approach in which they draw on both types of knowledges. The adoption of the Dorper sheep in the 1930s would be a significant example of this. This links to Kloppenburg’s (1991:531) insistence on the importance of incorporating the local knowledge of farmers and farmworkers into the formal knowledge systems of agricultural science:

The route to solutions to problems at the whole-farm level – at the local system level – runs not through agricultural scientists, but through those who think in terms of whole farms, those whose experiences are of whole farms, and whose knowledge has been developed by the integration of hand, brain, and heart in caring labour on whole farms – that is, through farmers.

However, as will also become evident in the discussion of Nattrass and Conradie’s (2015) research with Central Karoo farmers below, the integration of agricultural science and farming practice is difficult as it entails “the identification and legitimation of alternative sources of knowledge production for agriculture – sources which now have no voice, or speak without authority, or simply are not heard in contemporary agroscientific discourse” (Kloppenburg, 1991:520). This is a theme that emerged strongly in my research and features throughout my dissertation.

In analysing how local knowledge is able to improve communities’ environmental planning in order to address health and environmental risks, such as human–wildlife conflict, Corburn (2003:427) identifies four ways in which local knowledge can contribute. Firstly, there is a need to incorporate local knowledge within conventional, scientific knowledge. According to Sutherland, Gardner,

Haider and Dicks (2013:1), “local and traditional knowledge can provide complementary perspectives, borne from long periods of shared observation and experimentation that are often lacking in conventional scientific knowledge”. Scientific knowledge, in contrast, is known to provide a “more analytical and abstract representation of the world” (Agrawal, 1995:422) and while this is valuable for general explanations, localised, contextually appropriate solutions are often lacking. Returning to Kloppenburg’s (1991:540) discussion of farmers and farmworkers’ knowledge, recognising the importance of local knowledge does not mean forcing its combination with scientific knowledge. Instead, the aim should be to allow mutually beneficial dialogues among constituents (e.g. farmers, astrophysicists, ecologists, zoologists, etc.) in which greater mutual understanding and trust can be built. In other words, “the problem is not one of choosing between scientific knowledge or local knowledge, but of creating conditions in which these separate realities can inform each other” (Kloppenburg, 1991:540).

Secondly, local knowledge allows for additional, often marginalised, voices to be heard which can “promote wider acceptance of decisions by fostering a ‘hybridising’ of professional discourse with local experience” (Corburn, 2003:427). In their analysis of Michigan wolf (*Canis lupus*) management, Lute and Gore (2014:1066) acknowledge that “exploring local knowledge may contribute to more effective and sustainable wildlife management by empowering stakeholders and connecting individual-level values with institutional-level policies”. This links with the third contribution of paying attention to local knowledge identified by Corburn: effectiveness. If locals’ voices are heard and allowed to be involved in natural resource management, such management approaches are more likely to be effective, not least because of heightened levels of trust (Lute & Gore, 2014:1065). This has been identified as crucial to the effective co-production of knowledge. According to Davidson-Hunt and O’Flaherty (2007:293; cited in Berkes, 2009:1695), co-production of knowledge looks at knowledge as a “dynamic process”; it is continuously formed, validated and adapted to suit the changing, local circumstances. Corburn’s (2003:427) last point states that local knowledge has the ability to raise “previously unacknowledged distributive justice concerns facing disadvantaged communities”.

However, since both scientific and local knowledges “develop within culturally distinct spheres of beliefs and values” (Weiss, Hamann & Marsh, 2013:287; see also Walker, 1998:140), effective integration of these two types of knowledges in practice continues to be precarious. Effective integration is further thwarted by the fact that ‘scientific’ knowledge continues to be regarded as the primary knowledge source in wildlife management because of its assumed objectivity and the authority of scientific methods. By excluding what Taylor and de Løe (2012:1207) refer to as “contextualised knowledge”, i.e. ‘local’ knowledge, conservationists and wildlife managers continue

to reinforce a top-down approach in wildlife management. In asserting the authority of their legitimate knowledge over “lay people”, life scientists and wildlife managers proclaim their power which may result in less powerful stakeholders feeling disenfranchised, sceptical and apathetic towards collective action.

3.4.2 Competing ‘jackal narratives’ in the Karoo

Addressing the origins of conservation philosophy, Glacken (1965:159) argued that “two trends, one, aesthetic, philosophical, and religious [i.e. affective social action], the other, practical and technical [i.e. rationalism], [...] have characterised ideas of conservation throughout its history”. Whereas an objective, rationalist approach to jackal management, and to wildlife management in general, refers to opinions and actions based on “reason and knowledge rather than on religious belief or emotional response” (Oxford South African concise dictionary, 2010, *s.v.* ‘rationalism’), those that follow what Weber (1947:115) termed an affective approach rely more on personal, subjective emotions and values. Biocentrism, according to Taylor (1986, cited in Curry, 2006:75; see also Stewart & Zaaiman, 2014:554), is the view or belief that the rights and needs of humans are not more important than those of other living things. On the other hand, anthropocentrism means “human-centeredness” (Curry, 2006:54; see also Woodward, 2008:6; Nimmo, 2011:61) and rests on a value system that regards humankind as the most important element of existence, with nature existing “primarily for human use” (Stewart & Zaaiman, 2014:553). In other words, rationalism and affective social action, as well as biocentrism and anthropocentrism, represent the different knowledge bases, understandings, preconceptions and priorities of wildlife and jackal management constituencies (Adams, Brockington, Dyson & Vira, 2003:1915). The intractability between these opposing viewpoints has meant that each supports different management objectives. For Marshall, White and Fischer (2007:3129), this lies at the core of human–human conflict.

In their sociological research on jackal ecology and management in the Central Karoo District Municipality, Natrass and Conradie (2015) identified two rival ‘jackal narratives’ in which the tensions between ‘scientific’ and ‘local’ knowledge systems were clearly present: the ‘environmental jackal narrative’, rooted in ‘scientific’ knowledge, biocentrism and an objective, rationalist approach to jackal management, and the ‘farmer jackal narrative’, rooted in ‘local’ knowledge, anthropocentrism and an affective approach to jackal management. I found this account very useful in my own fieldwork and, as will be seen, draw on the two narratives in presenting my findings.

The ‘environmental jackal narrative’ is predominately associated with ecologists and animal activists, and is “supported by the science of predator ecology” (Natrass & Conradie, 2015:1) – it is thus an

expression of the ‘scientific’ knowledge system described above. The ecological sciences which underpin this narrative have produced evidence to show that persecuting jackals in the name of predation management is not simply cruel, but it is also counter-productive as “hunting disrupts the mutually exclusive territorial structure of jackal populations by creating vacant territories on farms” (Minnie *et al.*, 2016:385; see also Natrass & Conradie, 2018; Natrass *et al.*, 2019). In other words, “where breeding is usually limited to the alpha pair, with subordinate animals either dispersing to new territories or staying to help their parents raise pups”, human persecution contributes to polygamy as jackals try and compensate for high mortality (Natrass & Conradie, 2015:10; see also Minnie *et al.*, 2016; Reardon, 2018:48). With a higher reproduction rate, jackals (such as Leroy in Figure 3.3) more readily move across properties in order to find vacant territories.

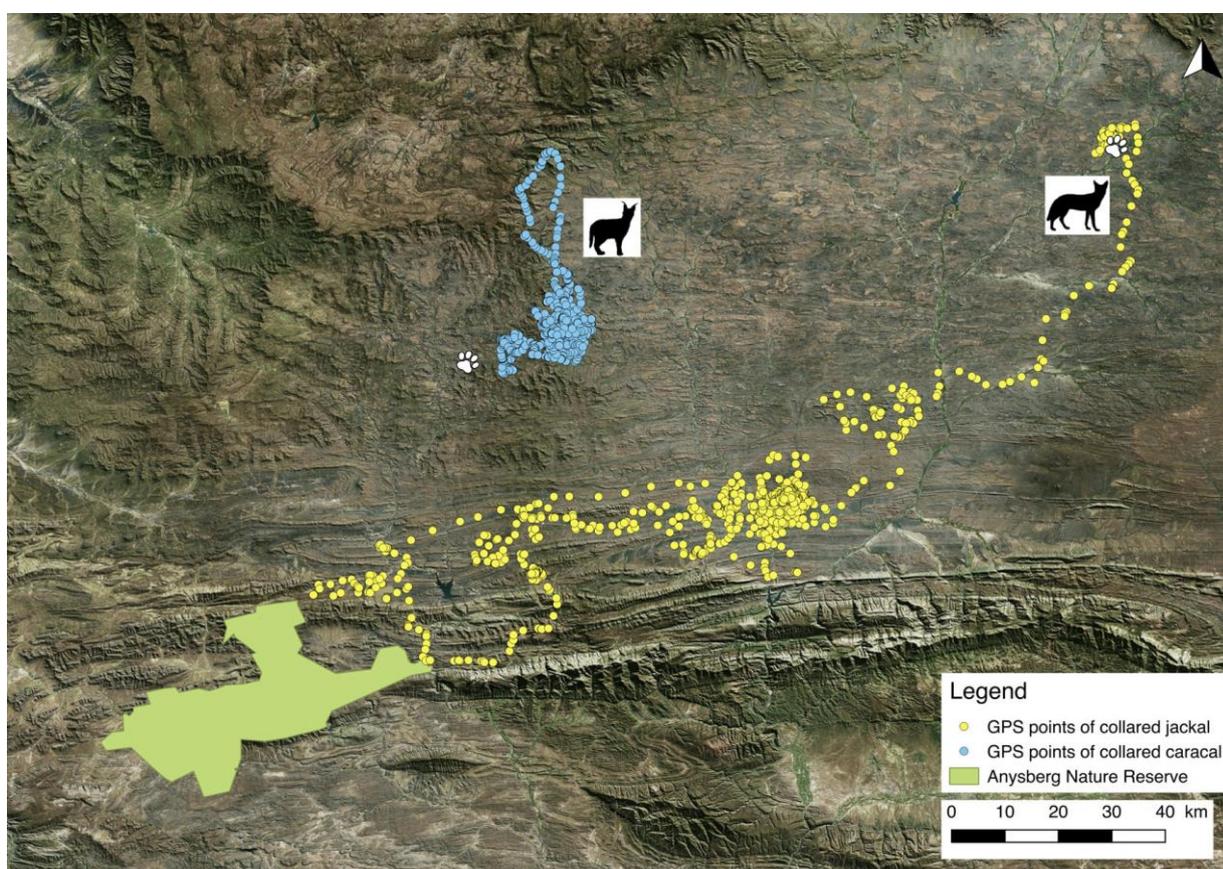


Figure 3.3 One of the four collared male jackals who are researched under The Karoo Predator Project, Leroy, is a well-known example of jackals’ ability to traverse boundaries. This map provides a general view of Leroy’s journey between the Central and Klein Karoo, travelling over more than 2 000km and crossing more than 110 farms in four months. Although not covering quite as much distance as Leroy, the collared female caracal travelled 400km and crossed over 20 farms in three months (Source: Natrass *et al.*, 2019; see also The Karoo Predator Project, 2016).

In order to manage jackals effectively, those subscribing to the ‘environmental jackal narrative’ argue that farmers should rather make use of non-lethal control methods to protect their livestock and also “learn to live with the jackal” (Natrass & Conradie, 2015:10). As pointed out in Chapter 1, non-lethal methods of control include jackal-proof fencing; electric fencing; shepherding; the use of guard

animals such as donkeys, llamas and/or Anatolian sheepdogs; and technology such as the King collar, lights, sirens and most recently, crystals (Snow, 2006:53; Bagniewska & Macdonald, 2010:8; Henderson, 2015:19; Pathare, 2015:5; de Wet, 2016:17; Jansen, 2016:242; Bremner, 2019; see also Davies-Mostert *et al.*, 2007:30–33; PMF, 2016).

In contrast, the ‘farmer jackal narrative’ supports and justifies the lethal control of jackals. It bases its competing understanding of jackal ecology and management on the “historical experience in the area, on discussions with older farmers, and from the insights peddled by professional hunters” (Natrass & Conradie, 2015:12). Natrass and Conradie (2015:13) also found that the ‘farmer jackal narrative’, which draws mostly on citizen science and/or applied expertise, is often “brushed aside by environmentalists, who construct farmers as ignorant of ‘the science’ and academic research as the only valid store of knowledge”. This results in conflict between the various parties involved in and/or affected by jackals, in their case in the Central Karoo district of the Western Cape. In contrast to the ‘environmental jackal narrative’ which focuses on jackal populations and their role in broader ecological systems, the ‘farmer jackal narrative’ mostly concentrates on individual jackals – particularly those that are ‘problem’ animals – and operate from the “local and historical perspective of a farm” (Natrass & Conradie, 2015:15).

Interestingly, some of the scientific claims of jackal ecologists support elements of the ‘farmer jackal narrative’, for instance, that litter size increases with greater food supply and that jackals “tolerate overlapping territories” with other jackals when there are clumped, abundant resources (Natrass & Conradie, 2015:14). This shows how ‘scientific’ and ‘local’ knowledge are not always in competition with each other and that farmers may incorporate scientific data that backs up their local knowledge into their ‘narrative’; equally the proponents of the ‘environmental jackal narrative’ prioritise scientific work that endorses their views. As Robbins has argued, the discourses surrounding nature, the environment and, I would add, animals, “cannot be seen as simple rhetoric or ideology, but rather as more deeply contested truths, that people form and defend based on highly variable personal, idiosyncratic, experiences” (2004:198, cited in Bidwell, 2010:18). Nevertheless, as will be illustrated in Chapter 7, in my study site the distinction between the two narratives is not absolute and conversations do occur among the advocates of each.

In many instances people who are seen to take an affective stance towards animals and the environment (by emphasising humans’ responsibilities for compassion/care for the fate of non-human species and landscapes) are variously labelled and stereotyped as “animal rightists”, “activists”, “greenies”, “bunny-huggers”, etc., and criticised by self-styled rationalists for ignoring the logic and objectivity associated with science. In jackal management, however, these stereotypes are reversed,

with the life scientists associated with the pro-animal stance of the ‘environmental jackal narrative’ drawing upon rationalist predator ecology science to make their case for a “strong and public stand against the use of inhumane means of predator controls in livestock production” such as that commonly practised by most South African (and Kareeberg) farmers (Smuts, n.d.:8). Around the SKA core site, and in jackal management in general, it is those following the rationalist approach (i.e. the ‘environmental jackal narrative’) who are condemned by farmers as “greenies” because of their “incongruous” position and “undesired differentness” (Goffman, 1963) from the ‘affectavists’ (i.e. the farmers promoting the ‘farmer jackal narrative’: who yet defend their understanding of the jackal as derived not from emotions but from hard experience and sober (rationalist) calculations around the costs and benefits of jackal management. I agree with Cox (1993:91) that more often than not, “stereotyping means not only acknowledging differences of other groups but also judging them as somehow inferior or undesirable” to the conventional. What is clear is that the two opposing ‘jackal narratives’ that Natrass and Conradie describe for the Central Karoo are strongly present in the Kareeberg, but here with the added dynamic of the SKA and the authority it brings to bear on the case for science and through that for astronomy as the preferred land-use in the region.

3.5 Conclusion

This chapter has set out my underlying theoretical framework and the key concepts that I have used in my exploration of the dynamics shaping human–jackal conflict in and around the SKA core site. The value of critical realism as my metatheory lies in its foundational ontological realism, in acknowledging the existence of an external world which is independent of “our perceptions, theories, and constructions”, while at the same time incorporating epistemological constructionism and relativism which argues that “our understanding of this world is inevitably a construction from our own perspectives and standpoint” (Maxwell, 2012:5). Relating specifically to my study, while I recognise that an external world exists independently of subjective experiences and understandings, I am also concerned with the “dimension which includes our socially determined knowledge about reality” (Danermark *et al.*, 2002:6). Such socially determined knowledge is created and applied by various actors in an attempt to “grasp the world, relate to it, and manipulate it through concepts, knowledge, and acts” (Maxwell, 2012:6). And as jackal management constituents around the SKA core site interact with jackals, the SKA core site and other jackal management interest groups, they transform what is real into what they want and require it to be.

Building on critical realism, the inter- and transdisciplinarity of political ecology has been important for the deeper insight it allows into human–wildlife relationships (in my case, human–jackal relationships) and its emphasis on the contextual specificity but also heterogeneity of environmental conflicts. Drawing on political ecology for my conceptual framework has allowed me to recognise the importance of both the wider political and economic context in which such conflicts occur and the role of history, while exploring the social construction of the environment and the role of power relations in environmental conflict (Matheka, 2001:14; Jones, 2006:483).

Given the diversity of interest groups and the increasing individualisation of societies involved in human–wildlife conflict issues (Patterson, Montag & Williams, 2003), it is not surprising that this conflict often involves conflict between people (i.e. human–human conflict). This conflict can take a range of forms, including interpersonal disputes and disputes about the meanings attached to the animals themselves and how they are managed (Conover, 2001). The overwhelming majority of researchers who address environmental conflicts, however, attribute their occurrence to the diversity of values, attitudes, and beliefs among the constituents that are involved (Messmer, 2000:100; see also Young, Marzano, White, McCracken, Redpath, Carss, Quine & Watt, 2010). It is in this regard that political ecology is valuable as it accords social perceptions a central status in wildlife management and environmental conflict in general.

This chapter has also described the complementary relationship between the structural and cognitive dimensions of social capital (Rostila, 2010:317). While social networks and relations (i.e. the structural dimensions) are necessary to establish trust (i.e. the cognitive dimensions), the reverse is also true. It is important to establish thick interpersonal trust through bonding activities but also thin interpersonal and institutional trust through bridging and linking activities. Not only can bonds be restricting but it can also reinforce the mistrust of others and consequently block collective action in jackal and wildlife management.

CHAPTER 4: RESEARCH METHODOLOGY

While methodological rigour is an imperative in all social science research, Browne-Nuñez and Jonker (2008:67) have argued that it is particularly important for social scientists working in the field of human–wildlife conflict, in order to convince natural scientists of the value of their work and to strengthen and build the inclusion of social scientists in the field. With this in mind, this chapter reviews my research methodology and the process followed in order to answer the research questions outlined in Chapter 1. Firstly, I justify my critical qualitative research design. Secondly, I provide details on my sampling strategy and preparation for data collection. Thirdly, I discuss the data collection techniques that I adopted, i.e. semi-structured interviews, participant observation and documentary analysis. Thereafter I provide details on the processes of data gathering and analysis. Lastly, I reflect upon the ethical and other dilemmas that were posed by the research, with the aim of assisting in the planning of future projects on a similar topic and/or in a similar environment.

4.1 Methodological approach

A “critical qualitative research design”,⁵⁴ as defined by Merriam (2002:9), is appropriate for my research, given the centrality of political ecology in my theoretical framework and my concern to uncover and interpret farmer–jackal conflict and the multiple understandings of jackals in relation to jackal management around the SKA’s core site. A critical qualitative research design is also appropriate for a study involving an examination of the power dynamics in jackal management. According to Merriam (2009:35), a critical inquiry allows one to ask questions about “who has power, how it’s negotiated, [and] what structures in society reinforce the current distribution of power”. It directs one to look beyond individuals to the broader social, cultural and political context in which they find themselves, to see how this influences the ways in which they construct their reality (Merriam, 2002:4; Hardcastle *et al.*, 2006:152).

According to Patton (2002:131, cited in Merriam, 2009:34), central to critical qualitative research is the commitment not just to identify power relations and the possible oppression of certain groups by others, “but rather to critique and change society” (see also Carspecken, 1996:8; Holmes & Smyth, 2011). While the thrust of my research is not to “change” jackal management as such, I do evaluate

⁵⁴ Originally termed “critical ethnography”, Carspecken (1996) prefers to use the encompassing term of “critical qualitative research” to give equal status to all qualitative research designs (Hardcastle *et al.*, 2006:151).

the power relations that are evident in jackal management and thereby contribute to the understanding of human–jackal conflict that is essential for more sustainable and inclusive jackal management decision-making. I regard this dissertation as a contribution to positive change in this decision-making.

Qualitative research designs have been criticised for their limitations in terms of generalisability or external validity (Bryman, 2008:391; Merriam, 2009:223). However, as Yin (2009:15) argues, one’s goal should be to “expand and generalise theories (analytic generalisation) and not to [merely] enumerate frequencies (statistical generalisation)”. While I focus on the important aspects of context to “discover and understand a phenomenon, a process, the perspectives and worldviews of the people involved” (Merriam, 2002:6), my study has relevance to human–wildlife conflict in contexts elsewhere.

I also found the flexibility associated with a qualitative research strategy particularly useful. As will become evident throughout this chapter, it allowed me to identify and explore novel issues that I had not foreseen at the outset of this research, as well as to take the social context of each research participant into consideration.

4.2 Preparation for data collection: Selecting research participants

In qualitative research, purposive sampling is often used to identify potential research participants and/or cases that have a relevance to the research questions, or, in the words of Devers and Frankel (2000:264), are “information rich”. In order to include as many perspectives as possible on jackals and farmer–jackal conflict in the Karoo and around the SKA core site, and thereby to broaden my “scope of understanding” (Bradley, 1993:438), I aimed to select potential research participants from a range of pre-defined constituencies implicated in the political ecology of jackals in different ways, i.e. individual farmers, ecologists, other academics, predation management experts,⁵⁵ professional vermin hunters and members of institutions such as government departments (e.g. the national Department of Agriculture, Forestry and Fisheries), the SARAO, the PMF, the NWGA, the RPO and

⁵⁵ According to the PMF’s contact list, certain predation management experts also farm across various regions in South Africa. Interviewing three of these predation management experts (one of which can also be classified as a farmer), allowed me to contextualise the specificities of the SKA core site.

local farmers' associations such as Williston's *ongedierte club*.⁵⁶ By analysing official documents⁵⁷ and mass-media outputs I was able to identify numerous constituents, in particular those who appeared repeatedly, together with their contact details. These records were complemented by using a cadastral map of the Kareeberg municipality district in the Northern Cape to identify the farms bordering the proposed SKA core site.

Contacting potential research participants was an ongoing process from May 2016 to July 2019 by when I had contacted a total of 22 research participants from across the above defined interest groups. Once I entered the field, I made use of snowball sampling to broaden the range of potential research participants whom I could interview.⁵⁸ Most participants were willing to assist and in this way I was able to identify another 14 research participants. A further two farmers were approached via "respondent-driven sampling" (Newing, 2011:74) in which one of my interviewees organised the interviews for me (with one of her neighbours and with another farmer whose property was targeted in SKA SA's land acquisition process). As discussed further in Section 4.5.1, all interviews were conducted on the basis of informed consent (see Appendices F and G); informants were also assured that unless they were responding in their official/professional capacity or gave me express permission to use their actual names, I would use pseudonyms for them.

While snowball and purposive samples are unlikely to be representative of a population (Bryman, 2008:185), in this study a probability sample was rendered unfeasible as there is no sampling frame, nor was I likely to draw up such a list (Babbie, 2010:192). It also did not suit my explorative and in-depth study. In order to simplify what could become a complex process of locating potential, relevant research participants, it makes more sense, according to Silverman (2013:215), to draw upon one's "existing circle of contacts", as I did. This can also counteract "time-consuming negotiations [... which] may end in failure, particularly if you want to research an ethically sensitive area" (Silverman, 2013:215). As the erection of the SKA infrastructure, SKA SA's Land Acquisition Programme and predator management were all contested issues within the communities surrounding the core site, I was indeed researching an ethically sensitive area. However, the extent to which farmer–jackal conflict in the Karoo is a sensitive topic only emerged after I had conducted a handful of interviews and attended several meetings held by SARA O and was able to hear directly from farmers about the

⁵⁶ See Table 4.1 below for a summary of the represented interest groups in my study and Appendix D for a schematic representation of the various constituencies with an express interest in jackal management in and around the SKA core site.

⁵⁷ The member list of Carnarvon's Dutch Reformed Church proved to be particularly helpful in this instance as a number of farmers whose farms border the SKA core site, are church members.

⁵⁸ See Appendix E for a schematic representation of my research participants, their interest groups, and how snowball sampling unfolded.

emotional and financial impact of livestock predation on them and its entanglement with the development of the SKA as well as to observe the tensions between the different interest groups playing out in public.

In total, I conducted 32 semi-structured interviews with 36 individuals.⁵⁹ Although I found it difficult to place most research participants in single, pre-defined categories, Table 4.1 below provides an overview of the primary occupation of my research participants.⁶⁰

<i>Interest group</i>	<i>Number</i>
Small-livestock farmers	23
SARAO representative ⁶¹	1
Ecologists (of whom 2 are SAEON representatives)	5
Social scientist	1
Predation management experts	3
Professional vermin hunters ⁶²	8
National Department of Agriculture, Forestry and Fisheries official	1
RPO representative	1
NWGA representative	1
PMF representative	1
Alkantpan employees (past and current)	2

Of the 36 individuals interviewed, the majority (just over 52%) were individual farmers. Of these 19 farmers, one borders ARMSCOR's Alkantpan test range; two farmed on properties that were bought through SKA SA's Land Acquisition Programme; six farm in the region and 10 farm on properties bordering the SKA core site (see Appendices C and E for a more detailed representation). The remainder of the 36 individuals were interviewed in their official or professional capacity. Of these 17 individuals, five are ecologists; one is a social scientist; three are predation management experts and professional vermin hunters; four are professional vermin hunters (of which one is also employed by the National Department of Agriculture, Forestry and Fisheries); one is an employee at ARMSCOR's Alkantpan test range; one is a representative of the RPO; and one is a representative of the NWGA and the PMF. Over and above a brief telephonic interview, one SARAO representative also submitted a written response to my interview schedule for SARAO representatives, in lieu of being interviewed in person (see Appendix H). This written response complemented numerous

⁵⁹ In four instances, two individuals were interviewed simultaneously.

⁶⁰ The total equates to more than 36 individuals as some individuals represent more than one category.

⁶¹ Even though I contacted more SARAO personnel requesting interviews, they all referred me back to two representatives, SARAO's stakeholder engagement officer and land acquisition process manager, whom they deemed were best positioned to answer questions related to my research topic. I also received a written response from SARAO's stakeholder engagement officer.

⁶² While formal semi-structured interviews were not conducted with *voetjagters*, I did have "informal interviews" with them during some participant observation activities (see Section 4.3.2).

research encounters I had with SARAQ representatives in the field, at public meetings, information sessions, workshops and a closed meeting with farmers (see Section 4.3.2).

Reflecting upon the categorisation of research participants, I am confident that sufficient data were gathered to “give an accurate understanding of the issues under investigation and the different perspectives that are present in the study population” (Newing, 2011:75). Figure 4.1 below shows the distribution of my interviews.

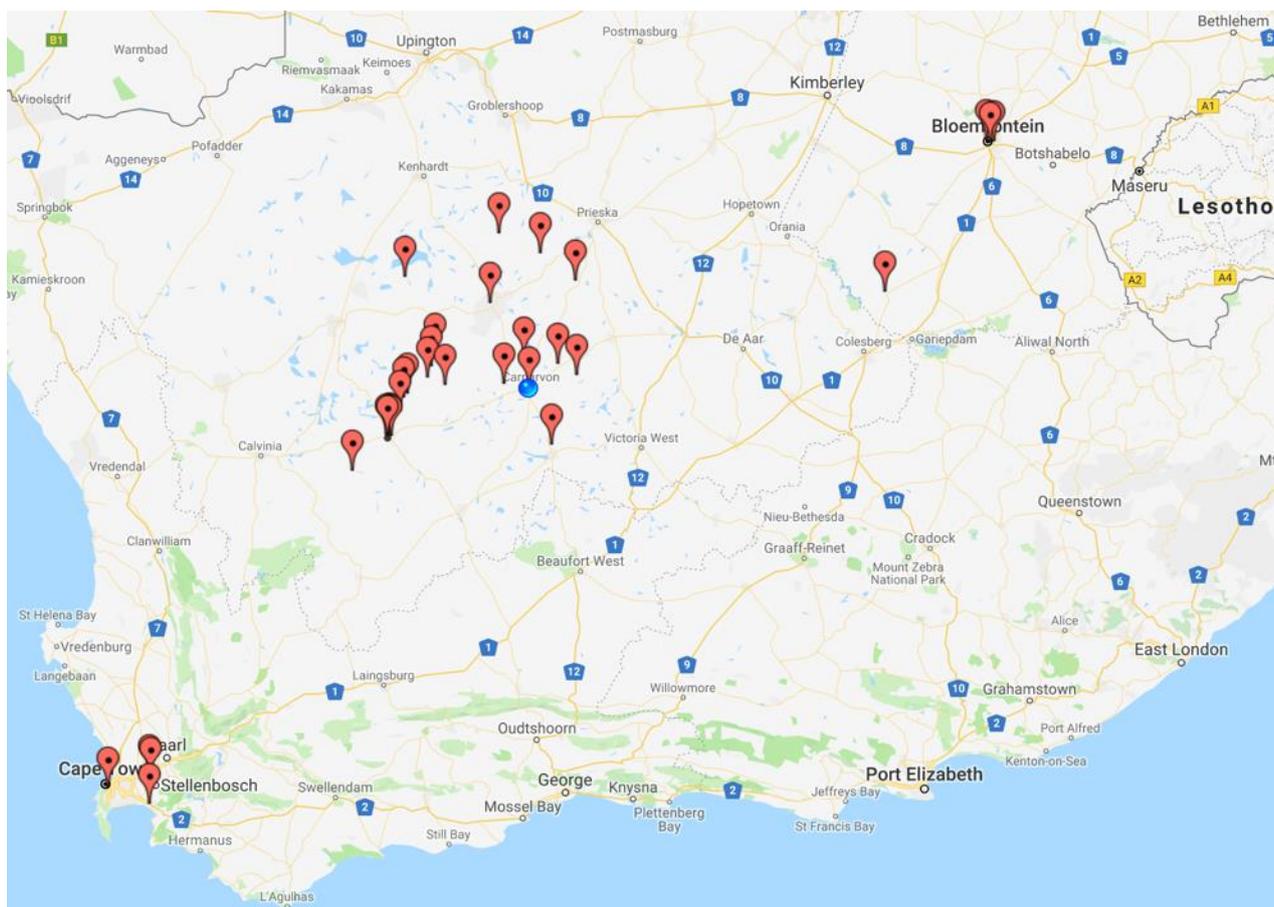


Figure 4.1 Location of interviews conducted with research participants (Source: Zeemaps, 2019a).

My decision to cease data collection was primarily informed by the fact that I found I had reached a degree of data and theoretical saturation (Strauss & Corbin, 1998, cited in Bryman, 2008:416) during my later interviews. Transcribing the interviews myself as they happened (see Section 4.4) helped me become familiar with and understand the emerging themes during my fieldwork so that I was confident after 36 interviews that no themes that would diverge significantly from what had already emerged would be forthcoming in additional interviews. Regarding my research questions, I considered that I had explored the social meanings attached to jackals, the power relations around knowledge production in jackal management, and how the management and/or persecution of jackals contributes to collective action sufficiently. As will become evident in the discussion of my findings,

the golden thread of a lack of autonomy and authority on the part of the farmers, as well as a lack of trust among the human actors in my study, weaves these issues together.

4.3 Data collection

My main data collection methods were semi-structured interviews,⁶³ participant observation and documentary analysis. The combination of these three research methods was aimed at increasing the trustworthiness of my data by providing a “well-rounded collection of information for analyses” (Turner, 2010:754). In addition to this methodological triangulation, more than one research method was used to gain a “rich, three-dimensional picture” (Biggam, 2015:292) of the topics at hand.

4.3.1 The interview process

Although provision was made to conduct interviews in either Afrikaans or English, the majority of participants (33 out of 36) chose to be interviewed in Afrikaans. All interviews were digitally voice-recorded, with the permission of the research participants, which provided me with the freedom to concentrate on the interview and contributed to the collection of rich, accurate, qualitative data. In instances where interesting and relevant information was mentioned before or after the recorded interviews, I made notes on the interview schedule during the conversation. Three research participants expressed discomfort regarding being voice-recorded which I addressed by reiterating my reasons for voice-recording and the steps to be taken to ensure confidentiality of the data collected and anonymity in the reporting of results.⁶⁴ I also respected participants’ wishes when they asked me to switch off the voice-recorder during certain sections of the interview and always stated clearly when I wanted to switch the voice-recorder on again. One of the research participant’s uneasiness about being voice-recorded stemmed from his concern that I would indiscreetly reveal information about his vermin hunting activities to those whom he defined as “greenies”. His apprehension subsided when I emphasised that I was an independent researcher, with no affiliation to any conservation organisation, and thereafter he allowed me to record the rest of our conversation.

⁶³ One telephonic interview was also conducted with a predation management expert. This mode of interviewing was suggested by the interviewee as our locations are geographically dispersed, thus saving on travel costs and time commitments. Another brief telephonic interview was conducted with SARA O’s stakeholder engagement officer to discuss and clarify some of the answers in his written response.

⁶⁴ For a more detailed discussion regarding research ethics and the ethical considerations of my research project, see Section 4.5.

None of the other research participants had concerns about being voice-recorded, which I ascribe to three reasons. First, all the research participants, including those who had doubts about being voice-recorded, were extremely passionate about issues concerning farmer–jackal conflict. This was especially so with individual farmers who have suffered economic hardships as a result of livestock predation. Second, farmers also highlighted that they appreciated being interviewed about the social dimensions of farmer–jackal conflict and, consequently, having their voices and opinions validated. Third, the scientists, predation management experts and organisational representatives I interviewed were all familiar with speaking publicly about jackals and human–jackal conflict.

Before commencing with the questions on my interview schedule (see Appendices I and J), I took time to establish rapport with my research participants by describing my affiliation with Stellenbosch University and going over the aims of my research and the research protocols informing it. Silverman (2013:161) is of the opinion that by assuring research participants of one’s affiliation with a university, one enhances their confidence in oneself as a trained researcher, and this could “address any reservations people might have about answering your questions or sharing their private lives with you”. With some research participants (especially individual farmers and professional vermin hunters), I had to emphasise that I have no affiliation to SARAo and/or a conservation organisation. Some time was also spent on casual conversation in which participants were particularly interested in how I found my travels to them and sounding me out on my personal stance on jackals, as well as my opinion of the SKA and the proposed national park. Here I had to be careful to explain that my opinions were not relevant and to adopt a position of formal neutrality on some of the more contested points on which individuals wished to press me.

Although the interviews were initially scheduled to last an hour, in 18 cases my research participants’ familiarity with and passion for the topic meant they exceeded that. Overall, close to 40 hours were recorded. In some instances the conversation flowed from the outset. In those few instances where the discussion with an individual farmer needed an initial stimulus, I commenced with broad and uncontroversial questions, for example asking for basic descriptive information about the farm, including the landowner’s farming history, type and number of livestock as well as livestock management techniques, and the interviewee’s history with jackals/jackal management. While I relied on the interview schedule to ensure I covered all relevant issues, interviews were allowed to flow naturally, as I wished to follow an informal and non-threatening approach, more akin to conversations in which research participants could “demonstrate the meanings that [... they] attribute to this world and their experiences of it” (Harding, 2013:22). As a result, questions were seldom asked in the precise words of the interview schedule. The value of the more informal approach, according to Birke and Mills (2011:75, cited in Koutstaal, 2013:108), is that it allows one to “see what kind of ‘hot

issues' emerged" and, indeed, many relevant topics which I had not anticipated, came to the fore during the interviews. Examples of these topics include the importance of collaboration with one's neighbour and good neighbourly relations; social pressure amongst farmers to pursue jackals; the seeming disappearance of *voetjagters* [literally: foot hunters] and their knowledge; and the depopulation of farms in the Karoo (which was tied up with farmers' expressions of nostalgia). I noted emergent issues which I considered relevant to my research in my fieldwork journal (see Section 4.3.4) and pursued them in interviews that followed.

In addition to the requirement of being flexible and "responding to the direction in which interviewees take the interview" (Bryman, 2008:437), I also had to recognise and adjust to the fact that the different interview schedules I had constructed for each interest group were not mutually exclusive. It was, nevertheless, useful to have different interview schedules for each group (see Appendices F, G and H), to ensure I covered the issues with particular relevance to each of the groups. However, in practice I combined questions from different interview schedules to adapt to the location of the individual research participant's within the interest group to which I had assigned him/her.

Certain key questions were posed to all research participants, namely:

- 1) What are the main causes of human–jackal conflict?
- 2) Do you think coexisting with jackals is possible?
- 3) What is your attitude towards jackals?
- 4) What sources do you draw on to justify your position/understanding of jackals and jackal management?
- 5) How would you describe the politics of jackal management?
- 6) Does the management and/or persecution of jackals contribute to group mobilisation?
- 7) What is your opinion about the SKA core site in relation to jackals?

By presenting these as well as my other questions in an open-ended format, I aimed to "minimise the influence of the questions on the response" (Wengraf, 2001, cited in Liu, McShea, Garshelis, Zhu, Wang & Shao, 2011:540). For the majority of the questions, topical probes were also formulated in advance (see Appendices I and J). My original interview schedules were eventually employed only as a "memory aid – a checklist you look at from time to time to see if there is anything that has not

been covered yet” (Newing 2011:102), to ensure that the same general areas of information were collected from each research participant.

4.3.2 Participant observation

I deemed participant observation appropriate for this study in order to contribute to a deeper social-ecological understanding of farmer–jackal conflict in an under-researched location. While I initiated my research in an observer-as-participant role which allowed me to “observe and interact closely enough with members to establish an insider’s identity without participating in those activities constituting the core of group membership” (Adler & Adler, 1994:380, cited in Kawulich, 2005), I learnt throughout my research that fieldworker roles are not fixed. As I developed relationships with key informants (especially individual farmers) over time, I found myself increasingly in a participant-as-observer role, “spend[ing] more time and energy participating than observing” (Gold, 1958:220). As will become evident in this section, acquiring membership allows the researcher a privileged point of view (Jorgensen, 1989), although – as I reflect on in sections 4.5 and 4.6 – issues of objectivity and relational ethics also arise in situations where one finds oneself forming strong friendship bonds with some informants.

An observer-as-participant role allowed me to observe interactions between farmers and SARAO staff at various public meetings as well as in one closed meeting I was allowed to attend, and to engage informally with farmers and SARAO personnel about their experiences of the meetings and the opinions of those present. This setting was also important to identify key informants, establish rapport with them and request interviews with them. During the meetings, I took handwritten notes on the demographics of those who attended, the content of the meeting, issues raised by the community, as well as the format of the meetings. Table 4.2 below provides an overview of the 16 meetings, information sessions and workshops I attended over three years between May 2016 and May 2018.

<i>Event</i>	<i>Location</i>	<i>Date</i>	<i>Notes</i>
1. Brandvlei public communication meeting	Brandvlei	16 May 2016	DST also present
2. Vanwyksvlei public communication meeting	Vanwyksvlei	17 May 2016	DST also present
3. Carnarvon public communication meeting	Carnarvon	17 May 2016	Meeting specifically organised by and for the Kareeberg Farmers’ Forum; DST also present

Table 4.2 Summary of meetings, information sessions and workshops attended			
<i>Event</i>	<i>Location</i>	<i>Date</i>	<i>Notes</i>
4. Carnarvon public communication meeting	Carnarvon	18 May 2016	DST also present
5. Carnarvon public communication meeting	Carnarvon	9 November 2016	Farmers and other community members had withdrawn from the meeting before I arrived at the venue.
6. Williston public communication meeting	Williston	10 November 2016	
7. Carnarvon public communication meeting	Carnarvon	8 May 2017	
8. Vanwyksvlei public communication meeting	Vanwyksvlei	9 May 2017	
9. SARAO Land Acquisition Programme: Information session	Williston	16 October 2017	Information session specifically with regards to the three 'spiral arms' that will extend from the core site. Three ecologists also attended the meeting to provide clarity on SAEON's interest in and working relationship with the SKA core site.
10. SARAO Land Acquisition Programme: Information session	Brandvlei	17 October 2017	Information session specifically with regards to the three 'spiral arms' that will extend from the core site. Three ecologists also attended the meeting to provide clarity on SAEON's interest in and working relationship with the SKA core site.
11. SARAO Land Acquisition Programme: Information session	Carnarvon	18 October 2017	Information session specifically with regards to the three 'spiral arms' that will extend from the core site. Three ecologists also attended the meeting to provide clarity on SAEON's interest in and working relationship with the SKA core site.
12. Engagement and inclusive development: Building the interactive capabilities of universities and science councils 2017–2019	Carnarvon	14 March 2018	Workshop organised by the Human Sciences Research Council (HSRC); wide variety of stakeholders present including community members, social researchers, SARAO personnel, municipality representatives, and university staff.
13. Developing the SARAO National Park Management Plan: Workshop	Williston	24 April 2018	Workshop held by SANParks and SARAO to discuss the development of the SARAO National Park Management Plan. Key issues emerging at this meeting included the need for a strong, intact boundary fence around the SKA core site and that the core site will become a 'national park'.
14. Developing the SARAO National Park Management Plan: Workshop	Brandvlei	25 April 2018	Workshop held by SANParks and SARAO to discuss the development of the SARAO National Park Management Plan.

Table 4.2 Summary of meetings, information sessions and workshops attended			
<i>Event</i>	<i>Location</i>	<i>Date</i>	<i>Notes</i>
15. Developing the SARAO National Park Management Plan: Workshop	Carnarvon	26 April 2018	Workshop held by SANParks and SARAO to discuss the development of the SARAO National Park Management Plan. Although this meeting went ahead, SANParks and SARAO personnel agreed to schedule another meeting in Carnarvon in June 2018 as many audience members were unhappy with the “workshop” format since the meeting had been advertised as an “information session”.
16. Closed meeting held between SARAO personnel and core site neighbours	Klerfontein	18 May 2018	Discussions on the fence specifications continued (concerning its height and the height of droppers, and whether the fence would be electrified and new fences erected). The issue of personal safety/security on farms also emerged.

When engaging with potential research participants I had to address prejudices, especially from some farmers, that I was a representative from SARAO. In the initial stages of my fieldwork, I also had to address prejudices from SARAO personnel that I was siding with the farmers and that “I enjoy getting together with the farmers” [*jy kuier lekker saam met die boere*].⁶⁵ However, as SARAO personnel came to know me better during the course of my fieldwork, I found I was able to engage in constructive and insightful discussions with some of them before and after public meetings, during which they asked for my insights from a social science perspective and I could engage with them on issues and concerns that were raised during the meetings. Some key informants whom I had already met prior to these meetings, assisted me in some instances in establishing my position as a student from Stellenbosch University, conducting legitimate research towards her doctoral degree. Challenging to navigate, the mistrust that I encountered from all sides reflected the charged environment in which my research was located.

My observer-as-participant role also involved my going along on hunting excursions with farmers and/or their foremen as well as with professional vermin hunters. Overall, I spent 15 nights in the veld hunting for “problem animals” (see Table 4.3 below for more detail). As vermin hunting is an expert undertaking, I did not participate in the calling-and-shooting itself. Nevertheless, accompanying the hunters and their drivers allowed me to gain an insight into the strenuous task and responsibilities associated with vermin hunting. During the long, mostly icy cold, winter Karoo nights, during which my main task was to provide company and hand out snacks and drinks, I gained

⁶⁵ After SARAO’s public communication meeting in Vanwyksvlei on 9 May 2017, SARAO’s land acquisition process manager made this comment in a sarcastic manner. While I did divulge that I enjoy visiting and interviewing farmers, I refrained from giving specifics and made it pertinent that interviewing farmers is central to my research.

‘local knowledge’ of jackals and got the chance to see jackals and other nocturnal animals at close hand. On two instances I witnessed the meticulousness with which *voetjagters* go about setting up gin traps for jackals (and caracal). While looking for spoor, excrement, urine, etc., the men would also elaborate on their feelings toward jackals, explain what they were doing and why it is done in a particular way, and discuss why they chose this vocation (see Figure 4.2).



Figure 4.2 Daniel and Titus, two *voetjagters* in the Carnarvon region, illustrate how to set up a gin trap (Terblanche, 2019).

Switching to a participant-as-observer role enabled me to accompany some of my research participants (mostly farmers) in the veld and both observe and participate in their interactions with jackal, e.g. setting up traps, patrolling the farm, working with and examining sheep, hunting, etc.. This was very valuable in contextualising the stories and experiences they presented during my semi-structured interviews with them. Although time-consuming and emotionally draining, participant observation enabled me to come “closer to understanding the participants’ point of view; and achieving understanding of people and their behaviours” (Dewalt, Dewalt & Wayland, 1998:261; see also Gibson & Brown, 2009:102; Takyi, 2015:864). For example, even though the lethal control of jackals by means of poison has earned “vehement opposition from certain sectors of society, such as environmentalist and animal-welfare associations” (Pathare, 2015:7), witnessing first-hand the damage predators cause to sheep allowed me to “gain a personal sense of what it feels like” for farmers to lose livestock and, to a certain extent, to empathise with them (Newing, 2011:87). The experience of coming across a predated lamb or ewe in the veld was central to my understanding of the emotional and financial impacts of livestock predation on farmers. At such a find, farmers would often also share their knowledge on how to identify which predator was responsible for the damage. In addition, walking in the veld (see Figure 4.3) and/or driving around with



Figure 4.3 A farm walk. This particular property was acquired as part of SKA SA’s land acquisition process (Source: Terblanche, 2017).

farmers allowed me to experience their deep love for their livestock, land, the Karoo, and farming. Difficulties with labourers were also often brought up and in some instances, their reflections on the secrecy and/or untrustworthiness surrounding the SKA development.

Lastly, participant observation by means of watching, listening, and casual talk, enabled me to establish rapport and get “closer to life” (Payne & Payne, 2004:157) in and around Carnarvon. Over the duration of 41 months between February 2016 and July 2019, I travelled to Carnarvon 15 times, spending a total of approximately 14 weeks based in the town. In addition to my base in Carnarvon, I spent eight weeks on farms across the region (around Carnarvon, Williston, Vanwyksvlei and Loxton). In this time I was also asked to assist the Endangered Wildlife Trust’s Drylands Conservation Programme with their Blacksheep Project, which is aimed at identifying the problems and challenges facing black emerging farmers from the Krom Rivier area (Western Cape) and Loxton, after they have received land from the Department of Rural Development and Land Reform. This and other volunteering opportunities made it possible for me to spend approximately one month in Loxton, while also exposing me to the challenges faced by new land-reform entrants to sheep farming in the Karoo. Figure 4.4 below maps the spatial extent of my participant observation activities in my research site.

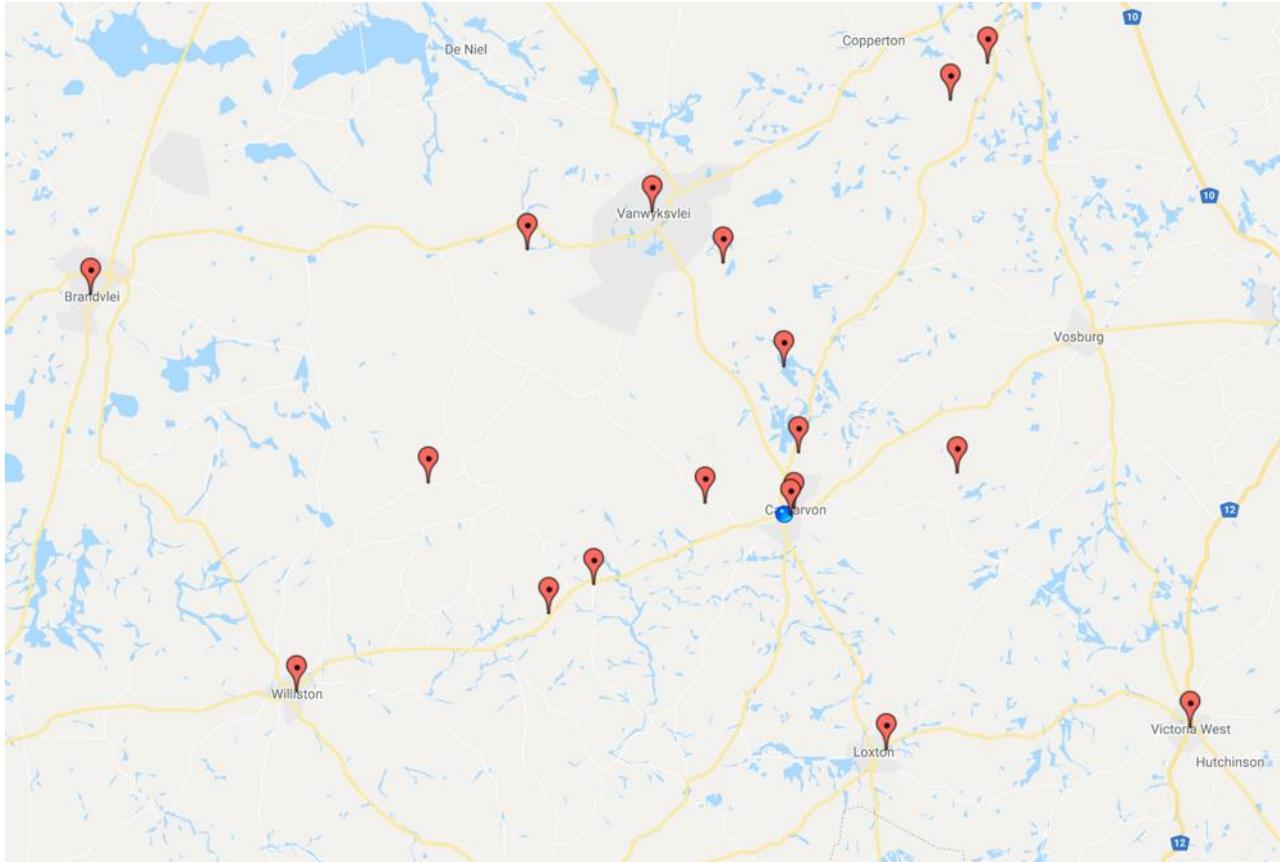


Figure 4.4 Locations where participant observation activities occurred (Source: Zeemaps, 2019b).

Loxton (in 2017) and Vanwyksvlei (in 2018) also served as my “escape” over weekends while I was conducting fieldwork, a distancing of myself from the demands of the field that is recommended by Bray “in order to take a step back and reflect efficiently on the situation under study” (2008:304). Nevertheless, my affiliation with jackals continued to follow me around as local residents were very interested to know why I was in their town⁶⁶ and as soon as jackals were mentioned, it was hard to stop talking. Even back home in Stellenbosch it was difficult for me to leave the field. Key informants continued to inform me about their hunting activities and/or livestock losses, their messages often accompanied by photos and/or videos.

<i>Activity</i>	<i>Location</i>	<i>Date</i>	<i>Notes</i>
South African Research Chairs Initiative (SARChI) Research Chair inception fieldtrip	Williston, Carnarvon and Vanwyksvlei	10–12 February 2016	Initial scoping trip by the SARChI research team to introduce students to the areas in which they would be conducting research.
Victoria West’s annual game auction	Victoria West	23–25 June 2016	
Farm patrolling	Farm located ±30km outside Carnarvon	10 November 2016	Accompanied farmer and his foot soldier who was setting up traps for vermin.
Carnarvon abattoir	Carnarvon	18 November 2016	
Carnarvon fly-in	Carnarvon	12–13 May 2017	Carnarvon’s annual livestock show combined with the Flying Club’s fly-in
Farm stay	Farm located ±5km outside Loxton	14–15 June 2017	Evenings were dedicated to hunting.
Farm stay	Farm located ±5km outside Loxton	22–25 June 2017	During the day, I participated in activities on the farm while evenings were dedicated to hunting.
Farm patrolling	Farm located ±20km outside Carnarvon	29 June 2017	Accompanied two farmers who showed the damage vermin cause on the farm.
Victoria West’s annual game auction	Victoria West	30 June 2017	
Farm stay	Farm located ±5km outside Loxton	1–3 July 2017	During the day, I participated in activities on the farm, such as assisting in the goat milk factory, patrolling the farm, etc.
Farm stay	Farm located ±70km outside Williston	3–6 July 2017	

⁶⁶ With a population of just over 1 000 and 1 700 residents (Statistics South Africa, 2011b&c), respectively, Loxton and Vanwyksvlei are small communities which made it easy for local residents to identify me as an “*inkomeling*” (newcomer).

Table 4.3 Summary of immersion activities in and around Carnarvon			
<i>Activity</i>	<i>Location</i>	<i>Date</i>	<i>Notes</i>
Farm stay	Farm located ± 5 km outside Loxton	7–9 July 2017	During the day, I participated in activities on the farm while evenings were dedicated to hunting.
Farm stay	Farm located ± 5 km outside Loxton	18–23 August 2017	During the day, I participated in activities on the farm, such as assisting in the goat milk factory, patrolling the farm, etc.
Farm stay	Farm located ± 80 km outside Carnarvon	2–6 October 2017	During the day, I participated in activities on the farm, such as working and dosing sheep, transporting sheep to the abattoir, fixing windmills, patrolling the farm, etc. One evening was also dedicated to hunting.
Vermin hunting	On farms located between Carnarvon and Vanwyksvlei and between Vanwyksvlei and Brandvlei	18–21 October 2017	I accompanied a professional vermin hunter for these nights. In total, 6 jackals and 2 caracals were shot making use of the call-and-shoot technique.
Farm stay	Farm located ± 50 km outside Carnarvon	26–30 October 2017	
Williston's annual livestock show	Williston	24–25 February 2018	
Vermin hunting	On farms located between Carnarvon and Prieska	28 February 2018	I accompanied a professional vermin hunter for this night. In total, 3 caracals were shot making use of the call-and-shoot technique.
Farm stay	Farm located ± 20 km outside Vanwyksvlei	27 April–2 May 2018	During the day, I participated in activities on the farm, such as working and dosing sheep, patrolling the farm, etc.
Farm stay	Farm located ± 20 km outside Vanwyksvlei	17–24 May 2018	During the day, I participated in activities on the farm, such as working and dosing sheep, transporting feed from the local cooperation to the farm, patrolling the farm, etc.
Farm stay	Farm located ± 20 km outside Vanwyksvlei	4–6 July 2018	During the day, I participated in activities on the farm, such as patrolling the farm, working in and around the house, etc.
Attending a funeral	Vanwyksvlei	7–13 July 2018	
Prontuit shoot	On two farms located ± 30 km outside of Carnarvon	29–31 July 2019	<i>Prontuit</i> is an Afrikaans investigative television programme and for this specific episode regarding jackals' place in the Afrikaans cultural landscape, I was invited to talk about my research.

My understanding of the Karoo, its people, the SKA, jackals, and farmer–jackal conflict became deeper and more nuanced as a result of participating in everyday life events in my research site, such as grocery shopping at the Carnarvon Spar, having dinner at a local restaurant, having drinks and watching rugby at the local bar, attending church, drinking coffee at small, local businesses, going along on hunts, and attending livestock shows (Carnarvon and Williston) and game auctions (Victoria West). However, while my being a young, white female researcher did allow me to immerse myself

in these activities as a member of the broader “white” community in the region, it also posed some challenges which I reflect on in Section 4.6.

4.3.3 Documentary analysis

In addition to thematic analysis of my semi-structured interviews and field notes, I used discourse and content analysis to examine a wide range of documents dealing with jackals, human–jackal conflict and jackal management. In categorising these documents, I have drawn on Bryman’s (2008:514) classification system, i.e.: personal documents (e-mails and letters); visual objects (cartoons, comic strips and posters); official documents (protocols, legislations, constitutions, minutes of meetings and information sheets); mass-media outputs (television documentaries, radio interviews, newspaper articles and brochures); and virtual documents (websites, YouTube videos, blogs and postings to message boards and forums). I also analysed various fables and folktales in which jackals are either the protagonists or feature as a supporting character. Fables and folktales were particularly important as they represent real and imaginary relationships between humans (predominantly farmers) and jackals. While stories are a form of entertainment, the predominantly negative portrayal and construction of jackals both reflects and perpetuates attitudes toward and assumptions about the animal. More information on my analysis of these documents is provided in Section 4.4.

4.3.4 Keeping a fieldwork journal

As is generally the case in qualitative studies, my data analysis was not rigidly separated from my data collection. To assist me in the intricacies of this explorative, qualitative study, I made extensive use of a fieldwork journal. This was important for two reasons. First and foremost, the journal offered me a platform for organising the practicalities of my research. I used it to record basic information concerning my interviews, interviewee details (such as age, race, gender and interest group(s)) and dates of public meetings. I also used the journal to write down “ideas, examples, and plans for subsequent research steps” (Holly & Altrichter, 2011:44). Secondly, the fieldwork journal aided me in my progressive understanding of my research topic, as I used it to record my thoughts and feelings after a day in the field or while I was transcribing interviews.

This space allowed me to reflect on interviews after I had conducted them, including the interviews that unearthed data about the often strained relationships between various constituencies and/or individuals, which would place me in a potentially uncomfortable position when interviewing the

person(s) who was/were discussed. I also felt it important to record my reflections so that I could identify potential biases on my side – especially those resulting from my strong commitment towards wildlife conservation and my cultural affinity with the farmers – and to think about how to address them. This space was equally helpful for reflecting on my participant observation activities after I had completed them. I did not only record descriptions of observed activities, behaviours and social interactions, but also reflected on my experience by identifying my reactions and ideas. I also needed to reflect on the close bonds that formed between me and some of my research participants (see Section 4.6). In this instance I followed Newing's (2011:211) advice to occasionally leave the study site and spend a few days to catch up on my notes, think through what was emerging and delineate what I needed to do next. Such inclusion of data, interpretation, commentaries and reflection in my fieldwork journal allowed me to analyse my data throughout the data collection process.

4.4 Data analysis

As all interviews were voice-recorded, the first step in my data analysis was to transcribe the recordings. While I was fully aware that the act of transcribing would be a time-consuming and arduous process, doing it myself did allow me to get “closer to the data” and, as a result, to “identify key themes, and to become aware of similarities and differences between different participants' accounts” (Bryman, 2008:456) as I worked through each interview. These emerging themes could also be compared with my observation notes and reflections in my fieldwork journal which assisted in the elaboration and refining of my themes.

After fully transcribing three interviews in their entirety, I realised I could omit the preliminary introductions to my interviews as well as clear deviations from the topics to be covered as per my interview schedule from the remaining transcriptions. The bulk of my interviews that were conducted in Afrikaans were transcribed in that language, and only translated into English when I commenced with data analysis, as suggested by Merriam (2009:270). Each interview's transcription was saved as a separate Microsoft Word 2018 document.

The next step was to immerse myself in the data to familiarise myself with the content. I used an open-coding technique to first identify broad, common themes whilst reading through my transcripts. Initial themes included the power dynamics in jackal management; the sources of knowledge that underpin jackal management; the social dynamics amongst jackal interest groups; evidence and refutation of collective action; the different understandings of jackals; the discourse surrounding jackals, including evidence pointing to the jackal as a trope for shifty and/or clever activities that

threaten human wellbeing (thus potentially standing for the SKA); and other general insecurities that farmers face, such as drought, land reform and labour concerns. To test the validity of my initially identified themes, I continued re-reading the interview transcripts until I was satisfied that this iterative process of coding and classifying had led to the identification of clear codes which corresponded with my participants' reality and perspectives (Hale & Astolfi, 2007:207).

Guided by my research questions, I identified five overarching themes under which various sub-themes could be grouped. These themes were: Farmers' insecurity in relation to the jackal and the SKA; farmers' sense of nostalgia; different knowledge systems and their understandings of the jackal; the power relations around knowledge production in jackal management; and if and how the management and/or persecution of jackals contributes to collective action. Most of these themes, as well as their subthemes, were named using "content-characteristic words" (Elo & Kyngäs, 2008:110), in order to specifically emphasise the fact that these themes are "recurring motifs in the text" (Bryman, 2008:554). A separate Microsoft Word 2018 document was created for each theme, which contained its relevant subthemes in a table, as well as the page numbers of transcripts where examples of the themes or subthemes could be found. The data were colour-coded according to theme, which made it easier to locate the data relevant to a theme. To illustrate the themes that were identified, excerpts from the interview transcripts were selected and quoted verbatim in the presentation of the results.

As mentioned above, I also made use of discourse and content analysis to examine a range of documents and explore the history of farmer–jackal conflict, jackal management, the SKA, and the broader local context within which the SKA finds itself. Analysing this range of documents aided me, firstly, in unpacking the discourses surrounding jackals in mainstream media. I agree with Stibbe (2001:148; see also Molloy, 2011) that these publicly available documentary sources are very likely to influence people's social constructions of jackals. Secondly, these documents allowed me to explore the history of farming and conservation in the Karoo and the local context within which the SKA finds itself and, consequently, establish the veracity of some of the data provided by the research participants. Together, the collection and analysis of these sources of qualitative data allowed me to develop a matrix of issues for understanding the broader context of farmer–jackal conflict, as well as the practices and ideas shaped by different constituencies. In addition, these sources of qualitative data allowed me to get more perspective on the strained relationships between different constituencies.

Although I am aware that media artefacts may lack in authenticity and representativeness, I agree with Harker and Bates (2007:335) that such "material continues to shape how controversial issues are

defined, constructed, and framed in a public and social forum” (see also Hall & Rist, 1999:302; Bryman, 2008:525; Jerolmack, 2008:76; Gibson & Brown, 2009:75; Molloy, 2011; Keller, 2013; Montello & Sutton, 2013:96). As a result of the public availability of these documents and, consequently, their power of influence, I decided to emphasise these specific formats. In order to counteract a possible lack in authenticity and representativeness of media artefacts, and thereby increase the trustworthiness of the data, I made use of methodological triangulation.

As with the thematic analysis of empirical data, I read and re-read numerous documents to familiarise myself with each document’s content, but also with the general context in which jackals and the SKA are socially constructed. Specific attention was given to the “interdiscursivity” of the texts (and images were applicable), i.e. “identifying the presence and forms of combination of recurrent and relatively stable and durable ‘discourses’ in texts, and exploring their implications” (Sumares & Fidélis, 2011:60). An open-coding technique was used to broadly distinguish between negative and positive social constructions and/or discourses of jackals. Particular note was made of the anthropomorphic use of language in describing jackals as, for example, “*skelm*”, “*slim*”, “thieves”, “adaptable” and “crafty”. Similarly, I broadly distinguished between the negatives and positives people perceived the SKA to bring to the Karoo communities and noted particularly from whom the arguments and/or concerns came.

4.5 Ethical considerations

4.5.1 Compliance with formal requirements around research ethics

A request for ethical clearance was submitted to and granted by the Research Ethics Committee at Stellenbosch University, via the Departmental Ethics Screening Committee of the Department of Sociology and Social Anthropology (see Appendix K). Although this study was classified as “low risk” in terms of the risk of harm to my participants (SU-HSD-003881, Stellenbosch University Research Ethics Committee, 2011), a number of ethical issues still needed to be considered.

To ensure that the principles for the ethical conduct of research set out in the International Sociological Association’s Code of Ethics (2001) and Stellenbosch University’s (2013) policy for responsible research conduct were upheld in the field and thereafter, a number of steps were taken. Firstly, participation was voluntary throughout the data collection process. Secondly, potential research participants were briefed about the purpose and aims of the study as part of my initial request

around their participation via telephone call or e-mail. Once a potential research participant had agreed to be interviewed, he/she was informed about this again by means of an informed consent form that we both signed (see Appendices F and G).⁶⁷ This also set out the procedures I would follow during the interview and protocols concerning participants' rights (e.g. not to answer questions and to withdraw) and ensuring the confidentiality of information and anonymity of identities. Some of this information was also included in the request-for-participation e-mail sent to some potential research participants (see Appendices L and M).

Before I interviewed participants based in organisations I obtained institutional permission from their organisations where they deemed it necessary. Research participants were thus asked whether they are authorised to speak on behalf of the organisation without formal permission. In the instances where organisational constituencies were interviewed, it was also important for me to clearly document the fact that the research participant was representing the organisation for which he/she works. While personal views were accommodated, the research participant was asked to clearly identify a personal view as such, and to distinguish it from the position of the organisation.

In certain instances, however, it was neither possible nor necessary to work with the principle of informed consent, notably when I attended public meetings presented by SARAO personnel or other key informants. Since these were public meetings which were recorded by different parties not only in writing but also in audio and visual formats (including by the SARAO personnel themselves, as well as journalists and individual farmers), I did not deem my own attendance and recording of the discussion as problematic. According to Shils (1982:132, cited in Spicker, 2011:124), conducting participant observation "in public or in settings in which the participants conventionally or knowingly accept the responsibility for the public character of their actions and expressions", is permissible. Furthermore, officials speaking at these meetings did so in their official capacity. When accompanying research participants in the field (see Section 4.3.2) it was also not possible to obtain written informed consent. Instead, I adapted my informed consent form to cover verbal consent and was also explicit about my identity as a researcher. I thus did not try to gain data covertly and because of their interest in my research topic, participants were more than willing to show me what they did.

⁶⁷ Although the option was available on my informed consent form to merely give verbal consent, all but one of the research participants chose to give written consent. Verbal consent was given by the predation management expert with whom a telephonic interview was conducted (see Section 4.3.1). In one instance, a research participant (professional vermin hunter) asked for a copy of the informed consent form. Another professional vermin hunter only chose to sign the informed consent form after our interview was conducted. The two SARAO representatives who submitted written responses to my questions were so kind as to electronically sign the informed consent form and email it back to me.

As already indicated, the issue of ensuring the anonymity of the people whom I interviewed, in keeping with well-established principles of ethical research, raised some challenges that I needed to confront in the final write-up of my dissertation, given the strong likelihood that certain prominent individuals would be identifiable despite my use of pseudonyms or might prefer to be identified. I thus decided to use a two-pronged strategy that involved anonymity for most of my informants while checking with those of my research participants who are publicly known players in the jackal management debate, whether they would be comfortable with my using their real names in my final dissertation or not. In these cases, I provided the participants with a Word document consisting of excerpts from my dissertation where I quote and/or refer to him/her. In following up with this group of informants in this way, I was mindful of the debates among social scientists regarding anonymity and confidentiality in qualitative research (Scarth, 2016) and the “purpose and practice of academic research” (Tilley & Woodthorpe, 2011:209). A couple of the research participants whom I contacted in this way indicated that they would prefer to preserve their anonymity through pseudonyms. The majority who were comfortable with being named are identified by their (professional) surnames in the text. At the same time I decided to retain the first-name pseudonyms I had assigned to most of the local actors I interviewed, as previously agreed with them, given the charged environment around (lethal) jackal management and some fears around being seen to be critical of the SKA development.

As part of my commitment to ethical research, I have also committed to returning to my research site to report back on my findings once my doctoral studies have been formally completed.

4.5.2 Situational research ethics

During the course of my fieldwork, as my research participants referred to one another in the course of my interviews or shared information about my research site, I became increasingly aware that I was researching a close-knit community, which came with attendant ethical challenges in the field.⁶⁸ For one thing, it heightened the risk of my inadvertently breaching the confidentiality and anonymity standards that I had promised research participants. In response, I was extra-cautious in my approach to protecting the identities of those persons. To counteract the possible identification of research participants in the reporting of one’s results, Guta, Flicker, Travers, Wilson, Strike, Gaudry, Binder, O’Campo and Kuzmanovic (2014:6) suggest ensuring that “quotes and details of unique stories are not recognisable”. I also assigned numerical codes to my research participants as they were

⁶⁸ As Damianakis and Woodford (2012:708) identify in their article addressing qualitative research within small, connected communities, “although these communities can be geographically based groups, shared locality is not the defining feature of small connected communities”.

interviewed, reflecting the order in which they were interviewed, which I then recorded on each interview transcript and corresponding informed consent form. Subsequently, I linked this number to the pseudonym assigned to this informant for use in my dissertation.⁶⁹ All devices on which my digital documents were stored (e.g. my laptop and the file-hosting services and external hard drive I used for storing back-up copies) have been password-protected to ensure against improper access to data.

Although participant observation greatly increased my understanding of the social-ecological aspects of farmer–jackal conflict and the broader context within which the SKA development finds itself, it also raised some situational research ethics issues, as I immersed myself in what became an “intensely intimate and personal experience” (Bernard, 2006:383).⁷⁰ Even though my primary role was that of a researcher, I found myself forming strong bonds of friendship with some informants over the four years of my fieldwork; in a couple of instances, similar to what Ellis (1995) found in her own ethnographic studies, I found myself welcomed as if I was a family member. Instead of deeming these relationships as damning for my research, I adopted Tillmann-Healy’s (2003) “friendship-as-method” approach. Drawing on the principles of qualitative research (i.e. that it is holistic, contextual and open), friendship-as-method has been described as “involve[ing] the practices, the pace, the contexts, and the ethics of friendship” (Tillmann-Healy, 2003:734). As elaborated on earlier in this chapter, activities included, for example, informal conversations, participating in everyday life events and showing compassion and vulnerability.⁷¹

While such an approach can lend itself to the risks and vulnerabilities of friendship (such as disappointment, frustration and/or hurtfulness) (Tillmann-Healy, 2003:741), it also offered certain advantages not only for myself as researcher but also for the research participant. To the charge of instrumentalism, I can only answer that all research is instrumentalist to a greater or lesser extent while my developing friendships with some of my key informants was a consequence of their own passion for finding a solution to farmer–jackal conflict and their open-heartedness.

Research participants enjoyed having the opportunity to reflect on their experiences with me and, consequently, having their voices and opinions of farmer–jackal conflict validated. In some instances research participants also thanked me for my perspectives on human–jackal conflict in the Karoo; by providing them with my own and others’ perspectives, which they might otherwise simply dismissed

⁶⁹ See my discussion above in Section 4.5.1 about identifying the publicly known players in the jackal management debate.

⁷⁰ In Section 4.6 I discuss various steps taken to restrain overly embeddedness, i.e. researcher bias.

⁷¹ As will become evident in Section 4.6, there were some downsides to following such an approach. For example, while I gained full access to farmers and their families, I could not access farmworkers (and other interest groups) to the same degree.

out of hand, they were able to “learn as many new ways of thinking, feeling, and relating” as I did (Tillmann-Healy, 2003:738).

As researcher, friendship ties with key informants “reduced the perceived risk associated with confiding in me” (Hoffman, 1980, cited in Adler & Adler, 1987:38). I was prepared for the potential that individual farmers might experience a level of discomfort when discussing the impacts of jackals on their livestock, since farmers generally are, in the words of King (2006:56), “profoundly possessive (and proud) of their flocks”. While the emotional toll of livestock depredation was visible in some interviews, it was the financial impact that seemed to cause the greatest distress. Furthermore, being trusted by participants made it possible for me to interview them about sensitive issues such as the use of gin traps and poison to counter jackal predation which they might otherwise have been reluctant to disclose.

Having friends in the field also motivated me to conduct my research – it made me excited to go to the field, helped ward off feelings of loneliness while there and even meant I was sad when it was time to leave. It also forced me to question my role as researcher continuously: how did I want to conduct research, was I ever crossing ethical lines and what did that mean for my study and myself? Here I found it helpful to follow Ellis’ (2007:10) guidance: “the problem comes not from being friends with participants but from acting as a friend yet not living up to the obligations of friendship”.

4.6 Further reflections and conclusion

While a critical qualitative research design was central to my exploration of farmer–jackal conflict around the SKA core site, such a design was not without its limitations. In the first place, issues relating to reliability do arise in a project such as this, particularly given the intensity of the conflicts surrounding both the development of the SKA and jackal management and the possibility of perceptions of researcher bias being used to delegitimise one’s findings. However, in this research project I am appealing to the concept of *relatability*, i.e. “the extent to which the research is authentic or true to life” (Taylor, Sinha & Ghoshal, 2008:28) rather than *generalisability* as my study is about meanings and people’s experiences of jackals (and the SKA), as well as about the power relations in knowledge production around jackal management; quantifiable “factual” data, in the positivist sense, was not a matter of concern.

Even though a critical realist approach makes it clear that pure objectivity is unattainable, measures were nevertheless taken in order to increase the reliability and, consequently, the rigour and validity

of the results. The first was to ensure my semi-structured interviews were conducted with a large number of individuals in which the different interest groups involved in jackal management around the SKA core site were represented. By including research participants from various interest groups and engaging intensively with each groups' data, I am confident that sufficient data were gathered to "give an accurate understanding of the issues under investigation and the different perspectives that are present in the study population" (Newing, 2011:75). Furthermore, by including research participants who are not actively involved in jackal management around the SKA core site *per se*, but have experiences of this in other localities, it became possible for me to cross-check my findings against similar situations elsewhere and to place the views of those who are involved in the management of jackals in the SKA environment in a wider context.

In addition, methodological triangulation was used to increase the trustworthiness of the data by providing a well-rounded collection of empirical and secondary data for analysis. Participant observation was used to increase the internal and external validity of the study (Dewalt *et al.*, 1998; Bernard, 2006). By combining observer-as-participant and participant-as-observer roles⁷² with semi-structured interviews to collect data, I was able to observe interactions between farmers and SARAO personnel directly at public meetings, observe and participate in farmers' interactions with jackal, and contextualise the data emerging from the semi-structured interviews. Documentary analysis also contributed to my methodological triangulation. Finally, I have sought to enhance reliability by following a "highly structured, transparent and detailed approach" (Biggam, 2015:299) in which the reader is provided with extensive details on my research design, my sampling strategy, the interest groups that research participants represent, and my data collection, processing and analysis techniques.

Perhaps a more significant limitation flowing from my qualitative research design in my particular research site was the difficulty I had in accessing the views of farmworkers on jackals and their management. Through my participant observation I was able to interact directly with those farmworkers who are actively engaged in jackal management, such as the *voetjagters*, and observe their craft, and this was a valuable part of my research. However, even though I was able to hold informal conversations with some farmworkers in this way, this was mostly under the watchful eye of the farmer and/or his foreman and in their responses to my more directed questions about their views on jackals, farmworkers tended merely to repeat what the farmer would prompt them to say

⁷² Initially, I only planned to make use of an observer-as-participant role but as my fieldwork unfolded, I came to realise that field membership roles are flexible. Instead of holding onto the role I had in mind, I adjusted my levels of involvement and participation in the field as situations arose.

about jackals and/or the SKA. Consequently, I could not be sure whether the views expressed were their own or if they were simply agreeing with the farmer and/or foreman so as to not get in trouble.

As will become evident in chapters 6 and 7, relationships between farmers and farmworkers in the Karoo are still deeply paternalistic. Farmers are still very much in control over what happens on their property and “unsupervised” conversations with farmworkers would not have allowed the farmers to know what their workers were saying. As Brandt (2013:315) experienced during her ethnographic research on the re-configuration of power and belonging on trophy-hunting farms in the Cradock district, this struggle to engage with farmworkers who were regularly present, but in the shadow of the farmer and/or foreman, is “illustrative of the social distances” between people on farms. In addition to this, farmers also did not want me (a white, young woman from “outside”) to visit farmworkers’ houses alone after hours or over the weekends because of concerns about my personal safety. Alcohol abuse is still rife on some farms which can lead to hostile household dynamics (the potentiality of domestic violence). Such alcohol abuse is remnant of the “dop system” whereby farmworkers were paid with alcohol instead of wages or in addition to minimum wages.⁷³ As Kheswa (2015:48) states in her review on the history of commercial farming in South Africa, the “dop system” also served as a “personalised form of labour control” on farms.

As alluded to in the above paragraph, my social identity (especially the intersection of my race and my gender) thus both aided and constrained my access to research encounters in the field, in complicated ways. Being a young, white Afrikaans-speaking woman certainly helped my getting accepted in a white, male-dominated farming region. However, in some instances, I had to endure sexist remarks and patriarchal attitudes in the process, as well as deal with the unexpected insecurities from the female partners of some of my research participants about my interactions with ‘their men’. For example, the wife of a professional vermin hunter expressed resentment about my research relationship with her husband. While she did not object at the time to my accompanying her and her husband on a couple of vermin hunts, I later received a message from her over social media stating that I should leave her husband alone and that she would not hesitate to tell all her contacts in the Carnarvon region that I was a “homewrecker”. Deeply concerned about the consequences that this would have both for my personal reputation and my research, I responded with an apology and a clarification that it had not been my intention to cause her any uneasiness. I emphasised that her husband and I had had only brief follow-up exchanges via social media now and again about jackals

⁷³ This was particularly widespread on wine farms in South Africa’s Western Cape region (Kheswa, 2015:49).

and jackal management. To avoid any negative consequences and to respect his wife's wishes, I ceased all contact with the professional vermin hunter thereafter.

At the same time, the way farm residents responded to my presence in the field was very informative of how they associate certain roles and behaviours with particular racial and sexual identities (Brandt, 2013:328). For example, my getting my hands dirty by being hands-on with dosing and working sheep went against social expectations of how (white) women in the Karoo normally behave, as did my herding sheep, driving long distances alone in a *bakkie* (pick-up truck), going along on vermin hunts and playing with farmworkers' children. My engaging in activities, mostly considered for the preserve of white men, was seen by some as a threat to their position of authority. Reflecting on unexpectedly sexualised interpretations of my behaviour, such as the experience described above, was also revealing of the "strong sense of masculine prowess" present in the



Figure 4.5 The researcher "hands-on" during a vermin hunt: Inspecting a jackal's teeth and gums after it had been shot (Source: Terblanche, 2017).

Karoo's commercial farming landscape (Brandt, 2013:328). Instead of my challenging my research participants about these experiences and becoming involved in instances of human–human conflict, I followed the advice of Legard, Keegan and Ward (2003:160, cited in Harding, 2013:35), to aim at understanding what underpins human–human conflict and to translate that understanding into my research finding to which I now turn.

CHAPTER 5: *ONGEDIERTE*: THE JACKAL IN POPULAR CULTURE AND AS A TROPE FOR THE SKA

There is no shortage of references to jackals in folktales and fables where they fulfil the role of the “deceitful and greedy trickster” (Heale & Stewart, 2001:51; see Figure 5.1). This is portrayed especially clearly in folktales such as *Why the Lion does not eat fruit*, *The tree-climbing jackal* (Greaves, 2000), *Why chickens chose to live with humans* and *Why dogs and cats lap water* (von Wielligh, 2011). In addition to these negative attributes, jackals are also described in folktales as “sly” (Heale & Stewart, 2001:14; von Wielligh, 2012:50), “cunning and crafty” (Heale & Stewart, 2001:13), “resourceful” (von Wielligh, 2011:82), and “learned” [*geleerd*] (Grobelaar & Verster, 2011:80). Nevertheless, Jackal⁷⁴ is without a doubt mostly described as “*skelm*”,⁷⁵ which the *Verklarende Handwoordeboek van die Afrikaanse Taal* (1987) defines as a “dishonest, unreliable person; deceiver, crook” [*oneerlike, onbetroubare persoon; bedrieër, skurk*].

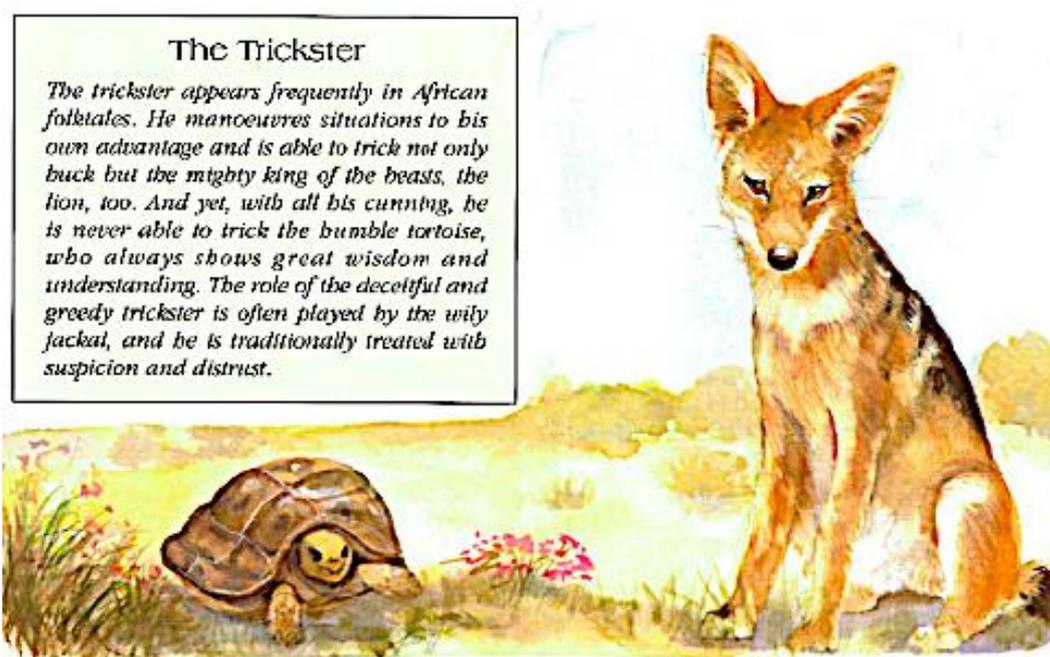


Figure 5.1 Heale and Stewart’s (2001:51) explanation of Jackal’s mostly negative characteristics in contrast to, for example, Tortoise who they describe as humble and has “great wisdom and understanding”.

⁷⁴ When written with a capital letter, Jackal is used as a proper noun, i.e. it serves as the name of the jackal character in folktales, fables and comic strips.

⁷⁵ I struggled to find a single English term that encompasses all the different shades of meaning of the term “*skelm*” which incorporates most of the translations given in the Pharos Dictionary (2010, s.v. ‘skelm’), i.e. cunning, sly, thief, devious, scheming, shifty, and stealthy.

As already noted in Chapter 3, political ecology acknowledges that ecological concepts are embedded in a complex web of cultural and political activity in which the “analysis of ecosystems [is...] significantly but not always entirely socially constructed” (Greenberg & Park, 1994:1). These constructions are thus only partial representations of the ontological reality of the object in question. While recognising that an external world exists independently of humans’ subjective experiences and understandings, I also recognise what Danermark *et al.* (2002:6) describe as a “dimension which includes our socially determined knowledge about reality”. Such socially determined knowledge is created and applied by various actors in an attempt to “grasp the world, relate to it, and manipulate it through concepts, knowledge, and acts” (Maxwell, 2012:6). Language allows us to give meaning to our experiences and, consequently, terms can have multiple meanings that are in turn linked to different emotions associated with the specific word. In the instance of animals, there is “a physical being, [but] once in contact with humans, they are given a cultural identity as people try to make sense of them, understand them, use them, or communicate with them” (Arluke & Sanders, 1996:9). In other words, animals can “take on different connotations” (Arluke & Sanders, 1996:175). As will become evident in this chapter, this is clearly the case in the public discourse concerning jackals among small-livestock farmers.

The aim of this chapter is, firstly, to contextualise farmers’ views on jackals and jackal management in relation to the way in which jackals have been constructed in popular culture and, secondly, to consider the symbolism of the jackal in relation to the SKA. Section 5.1 considers the portrayal of jackals in South African culture by discussing the jackal, first in pre-colonial stories, and thereafter in Afrikaans folktales, comic strips and fiction. In Section 5.2, I draw on how my participants (particularly the sheep farmers and professional vermin hunters) described jackals during my semi-structured interviews and participant observation with them. Here I argue that parallels can be drawn between the way these actors view jackals and how they talk about the SKA development, specifically how it came to be in South Africa. At the same time, I also draw parallels between how constituents of the ‘environmental jackal narrative’ view jackals and the SKA core site, focusing specifically on the ecological advantages of both and how farmers should “learn to live with the jackal” (Nattrass & Conradie, 2015:10), which can be extended to learning to live with the SKA.

5.1 The ever-present jackal in South African popular culture

5.1.1 The jackal in pre-colonial and colonial stories

According to Wittenberg (2014:593), the Khoekhoen viewed the jackal as an “attractive, roguish figure”. Its ability to outmanoeuvre powerful characters, such as Lion and Hyena, by exploiting their vulnerabilities is especially admired (see, for example, *The hungry jackal* [Heale & Stewart, 2001:12–15]). The jackal does not allow faunal elites to take full charge; in this way, the jackal serves as a proxy for the “human underdog in his dealings with powerful and oppressive masters” (Wittenberg, 2014:600).⁷⁶ In the same manner that the jackal outwitted faunal elites (i.e. apex predators) in folktales, South Africa’s indigenous inhabitants also tried to adjust to life under the rule of the new political elites on the Cape Frontier during the 18th and 19th centuries. As the Khoekhoen were forced to adapt to the presence of, and often violent conflicts with, white settlers, their folktales containing the jackal as a character were also reworked. According to Wittenberg (2014:607), the jackal became an “imaginative vehicle for a symbolic reordering of colonial power relations” in which they, the Khoekhoen (represented by a small, weak but cunning animal), emerged triumphant over white settlers (represented by a strong, big, aggressive animal).

While the Khoekhoen admired the “individual heroic action” of the jackal (Wittenberg, 2014:602), the hunter-gatherer |Xam attached more negative views to the jackal which they associated with cunningness, cowardice and selfishness – qualities which were denounced by the |Xam. Consequently, according to Wittenberg (2014:593), the jackal was not allowed to be a “figure of identification”. An example of such an occurrence is told in *The Jackal’s heart is not to be eaten*, which is documented in the Bleek-Lloyd archive.⁷⁷ According to this tale, small children, with their already timid frame, are not allowed to eat the heart of a jackal as it is a nervous and frightened animal. If a child is to eat a jackal heart, he/she will become a coward and his/her own heart will be filled with fear (McNamee, 2001:143; see also Bleek & Lloyd, 1968:373).

In his book, *The man who cursed the wind and other stories from the Karoo*, de Prada-Samper (2016) presents a collection of 61 oral narratives, all originally told in Afrikaans, encompassing myths,

⁷⁶ The application of the jackal serving as a trope will be explored further in Section 5.2.

⁷⁷ This famous archive contains rich and extensive material of the |Xam’s narratives regarding land, rain, the history of the first people, and the moon and the stars (Skotnes, 2007). These narratives were recorded by German Wilhelm Bleek and his sister-in-law, Lucy Lloyd, in the late 19th century, by interviewing |Xam prisoners in Cape Town’s Breakwater prison and translating their accounts of the life-worlds (Wittenberg, 2014:607). Their extensive material was subsequently stored in an archive named after the authors at the University of Cape Town.

folktales, legends and personal memories from various corners of the contemporary Karoo. These, he argues, provide clear evidence of the continuity of |Xam cultural values and artefacts among Karoo residents now classified as ‘coloured’ in terms of the apartheid-era classification system.

Among the sections in the book are three allocated to animal tales. Here the lively characters of “cunning Jackal” and “silly Hyena” (i.e. Wolf), also feature (de Prada-Samper, 2018). Some Jackal and Hyena stories presented by present-day Karoo storytellers are widely known, although under different names. Examples include *Jackal, Hyena and crow*; *Jackal, Hyena and the horse*; *Jackal, Hyena, the bees and the baboons*; and *Riding porcupine girl* (de Prada-Samper, 2016). Last mentioned, according to de Prada-Samper (2016:224) in fact seems to be a collection of Jackal and Hyena tales “strung together” as one. According to Schmidt (2018:140), other tales which include Jackal and Hyena, such as *Rooster got the better of Jackal*, a rare example where Jackal is at the receiving end of deceitfulness, “belong to the general Khoisan repertoire, while others still are restricted to the Northern Cape”.

The |Xam folklore presented in de Prada-Samper’s 2016 book, in which jackals feature prominently, are indicative of cultural resilience and the extent to which Afrikaans folklore has drawn on/been shaped by indigenous cultural traditions. In de Prada-Samper’s words (2016:24), the narratives in this book demonstrate “persistence, resilience and continuity, rather than complete cultural and physical extinction, [and] are the key concepts that explain the present reality of the Karoo communities”. Given the violence and dispossession suffered by Khoisan communities throughout the 18th and 19th centuries in the Karoo, academics and folklorists such as de Prada-Samper are impressed that oral narratives such as these have survived. In his article discussing the presence and influence of Farmer and Jackal in Khoikhoi oratures, Wittenberg (2014:603) is of the opinion that it is the “groundedness and the social connection of the Khoi tales that allow them to adapt themselves more readily to changing historical circumstance”.

A contemporary example of how jackal and lion imagery persists in popular culture in the Northern Cape as illustrative of unequal power relations occurred in 2007 when Jan van der Westhuizen, a member of the ≠Khomani San land restitution group, described the group’s relationship to SANParks. In 1999, 25 000ha of land within the new Kgalagadi Transfrontier Park had been awarded to the ≠Khomani San and Mier communities in settlement of a successful restitution claim (Carruthers, 2003:263). While this land claim is regarded by some as one of South Africa’s conservation co-management success stories (despite the many problems it faces), van der Westhuizen (cited in Dyll-Myklebust, 2011:141) challenged the unequal power relationships between his community and SANParks thus:

We have also had a tremendous struggle with the Parks. We call them the young male lion as he is a rich gentleman and we are the small jackals that just get a small bit of bread, or just wait for a small piece here and there of the bones or to scratch open the stomach contents once the young male lion is finished.

In contrast to earlier uses by the Khoekhoen, in which the jackal (i.e. the Khoekhoen) emerged triumphant over apex predators (i.e. political elites), this quote depicts a situation in which the jackal is surviving, but poorly and with a lower ranking in comparison to the lion, the faunal elite.

As will become evident in the following section, the Khoekhoen and |Xam's understanding and depiction of jackals are clearly visible in 20th century and more recent Afrikaans texts and discourses. This suggests that not only are contemporary attitudes towards jackals similar to, but very likely deeply informed by these earlier constructions, albeit filtered through very different farming practices and market and production orientations. In Section 5.2 I explore the extent to which the jackal also serves as a trope for the SKA in farmers' encounters with this powerful actor.

5.1.2 *Dit was 'n regte wolf-en-jakkals storie*.⁷⁸ The jackal in Afrikaans stories

Building on and intersecting with the above Khoisan tales, in the 20th century jackals have also come to be associated with cunning and dishonest people in Afrikaans literature and popular culture. This is evident in the expressions such as: '*n Jakkals wat slaap tel hoenders in sy drome*' [a jackal that sleeps counts chickens in his dreams], which means that even when a sly person is not actually executing evil tricks, he/she is devising plans to do so, and '*n jakkals met twee sterte*' [a jackal with two tails], referring to a person who is extremely "*skelm*" or hypocritical (de Wet, 2010:205). Other Afrikaans expressions that describe people in terms of jackal characteristics include '*Jakkals prys sy eie stert*' [Jackal praises his own tail], which refers to someone who is boastful; '*Hoe kaler jakkals, hoe groter stert*' [The more naked the jackal, the bigger its tail], which describes a person who owns very little but continues to brag, and '*jakkalsdraaie maak*' [making jackal circles], which describes a person who makes all sorts of excuses to get out of trouble. Jackal expressions are still commonly used in everyday language. Two of the most popular are '*Jakkals trou met wolf se vrou*'⁷⁹ [the fairies are baking, or a sunshine-shower] (de Villiers & Gouws, 1988:71) and '*so skelm soos 'n jakkals*' [as

⁷⁸ An Afrikaans expression that refers to a story in which someone was outmanoeuvred (de Wet, 2010:492).

⁷⁹ Indicating the popularity of this expression, *Jakkals trou met wolf se vrou* is also the name of popular Afrikaans songstress Karlien van Jaarsveld's second album, released in 2011. Although van Jaarsveld has been in the Afrikaans music industry since 2005, the single (with the same name) off this album firmly established her spot amongst other big names in the industry. On her website, the single is described as "a metaphor within a metaphor" and tells of the "unexpected twist that one's love story can take" (Karlien van Jaarsveld – *Jakkals trou met wolf se vrou*, 2011).

sly as a jackal]. Barring a few exceptions, jackals are consistently portrayed negatively in the Afrikaans language (see Appendix N).

The most popular tales of the wily jackal are captured in the *Jakkals-en-Wolf* (literally Jackal-and-Wolf) stories. According to de Prada-Samper (2016:38), these stories most likely found their way to southern Africa through the storytelling of European settlers. Due to the perceived similarities between the European fox and wolf and southern Africa's jackal and hyena, the European tales took root and were adapted to local conditions. However, in tracing Khoi orality in Afrikaans literary criticism, van Niekerk (2018:80) argues that the European origins of these stories were promoted to “diminish the role played by the original Khoi storytellers”. This erasure and/or sanitisation or denial of the stories' creators was particularly strong under Afrikaner nationalist rule when Afrikaans critics wished to “diminish the ‘Africanness’ of stories” (van Niekerk, 2018:87). This lack of recognition of the African origin of the Jackal-and-Wolf (or, rather, Jackal-and-Hyena) literature has become so entrenched within white Afrikaans consciousness, that today most Afrikaners believe that they “freely created their own [Jackal-and-Wolf] stories” (van Niekerk, 2018:89).

In their depiction of the relationship between the two animal characters, Jackal and Wolf, and the human character, Farmer, who depicts a stereotypical white, middle-aged, Afrikaans farmer, these stories comment on social issues in a satirical manner (Grobbelaar & Verster, 2011:1–2). Examples of *Jakkals-en-Wolf* stories in which Farmer also occurs include *Foreign gooseflesh versus home-grown mutton* (von Wielligh, 2011); *Crying Wolf*; *Wolf, the unlikely shepherd*; and *Jackal and Wolf earn their daily bread* (von Wielligh, 2012). Wolf often finds himself on the losing side in these tales whereas Jackal's canniness is always on display. While Jackal is responsible for devising plans, Wolf assists with the execution of them and usually runs into trouble and/or is made a fool of. By betraying Wolf in most, if not all, of these tales, Jackal is usually rewarded by Farmer with food. Eventually, Farmer learns of Jackal's tricks and in *Wolf, the unlikely shepherd*, Wolf cooperates with Farmer to “pay him [i.e. Jackal] back” (von Wielligh, 2012:39). In his defence, Jackal tries to convince Farmer that it is actually Wolf who is fooling him. Losing his temper with the conflicting accounts, Farmer ties up both of the animals. However while Farmer is fetching his rifle, and because of his carelessness, Jackal and Wolf are able to



Figure 5.2 Jackal and Wolf have a complicated relationship – sometimes friends and sometimes enemies (Source: Grobbelaar & Verster, 2003:189).

escape Farmer's detention. According to this tale, this experience cements Jackal and Wolf's friendship (von Wielligh, 2012:42).

Building on the *Jakkals-en-Wolf* fables, T.O. Honiball (1905–1990), a well-known South African political cartoonist, incorporated the two animal characters into mass Afrikaner culture by introducing them in the popular comic strip sporting the same name. Published between 1942 and 1969 in the weekly children's magazine, *Die Jongspan*, the *Jakkals-en-Wolf* comic strip was aimed mainly at (Afrikaans-speaking) children. Nevertheless and despite its strong Afrikaans character, with references to both tangible and intangible Afrikaner cultural norms and activities, Honiball's comic strips were enjoyed by non-Afrikaans-speakers as well, and across age groups.



Figure 5.3 The cover page of the first *Jakkals-en-Wolf* bundle published in 1942 by the then *Nasionale Pers*, an avid supporter of Afrikaner nationalism (Source: Verster, 2003:429).

In an attempt to reach a broader audience, Honiball's *Jakkals-en-Wolf* comic strip was also translated into other South African languages, including Tsonga, Tswana, Xhosa, Venda, Zulu, and Northern and Southern Sotho. However, despite their accurate linguistic translation, Verster (2003:457) argues that the strips were not adapted in other ways that would better suit their new African audience. Not only was the form of the comic strip unfamiliar to most black South Africans at the time – Wolf was an unknown character/animal while Jackal “does not occupy the same role as archvillain in black folktales as is the case with Western animal stories” (Verster, 2003:457). Rather, in traditional African folktales, it is the hare that is the sly character (Werner, 1933:253; Verster & Burden, 2006:184).⁸⁰

As in the traditional tales, the tussle between good and evil is central to Honiball's comics (Verster, 2003:484; Verster & Burden, 2006:193). Emanating from the European version of *Jackal-and-Wolf*, Honiball also depicts Jackal as a “habitual criminal” who is always looking to exploit others and bully them (Verster, 2003:462; see also Verster & Burden, 2006:192). In contrast, Wolf is portrayed as a relatively good, naïve character. As Jackal takes advantage of Wolf's character, Honiball ensures that

⁸⁰ As black South Africans, however, came into contact with Khoekhoens, and probably European settlers as well, the hare was later replaced by the jackal to fulfil the role of trickster (Werner, 1933:253; Heale & Stewart, 2001:51).

Wolf gains the sympathy of the readers. Furthermore, according to Verster and Burden (2006:193), “Honiball acts as a narrator in conversation with his readers by asking questions and rejecting immoral actions [that Jackal exemplifies] such as laziness, theft and lies”. By anthropomorphising his animal characters and allowing them to act like humans, Honiball allows readers, especially the youth, to learn about human relations and norms of acceptable social behaviour (Verster, 2003:461; Verster & Burden, 2006:191).



Figure 5.4 An example of Jackal attempting to exploit Bear, the butcher, and of Wolf's good character as he attempts to change Jackal's mind in *Die Jongspan* of 8 February 1946 (Source: van der Riet, 2011).

Thus Honiball's *Jakkals-en-Wolf* stories are constructed in such a way as to contain moral lessons. In contrast to the traditional *Jakkals-en-Wolf* fables cited earlier, even though Jackal's "underhanded dealings" do pay off, the good (i.e. Wolf) triumphs when Jackal eventually gets punished (Verster & Burden, 2006:188). As a result of Jackal finally receiving his dues, Honiball encourages optimism in his readers that good will be victorious in the end and it is not worthwhile to act like Jackal (Verster, 2003:462; Verster & Burden, 2006:192).

Jackals also feature in contemporary Afrikaans fiction, such as *Silwer: Jakkals van die Namib* (1990), written by Pieter Pieterse, and *Die Jakkalsjagter* (1990), written by Alexander Strachan. The former is based on a true story and takes the form of an animal novel set on Namibia's Skeleton Coast during

the late 1980s with *Silwer*, the jackal, a strong female character. While negative terminology is used throughout the book to describe *Silwer* and/or other jackals, such as “sly” [*slu*], “devious” [*slinks*], and “astute” [*uitgeslape*] (Pieterse, 1990), they are also admired for their fighting spirit. In the case of *Silwer*, her fighting spirit is directed at overcoming mange and protecting her pups. Fighting for survival is a theme that is also applicable to the human characters in the book, with the jackals acting as a proxy for the humans. As became evident during my fieldwork, in human–animal encounters all the relationships that are involved need to be considered – human–human, human–animal, and animal–animal – as they each impact on the other. In *Silwer: Jakkals van die Namib*, the main human protagonist, ranger Soois Fenske, struggles to make peace with the loss of his entire family during the South African Border War. Alongside *Silwer*’s fight for survival, Soois also has to wrestle with survival. Despite his despair, *Silwer* gives him a reason to live. With a “victory howl” [*oorwinningsblaf*] (Pieterse, 1990:111) by *Silwer* at the end of the novel, the reader is left with the lesson that one can overcome one’s difficulties.

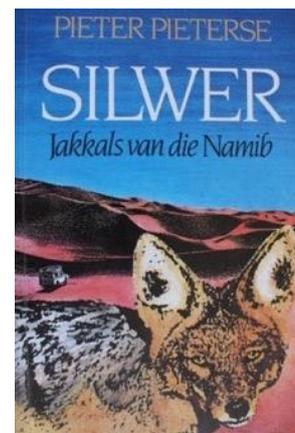


Figure 5.5 Pieter Pieterse’s 1990 fiction, *Silwer: Jakkals van die Namib*.

Strachan’s first novel, *Die Jakkalsjagter*, was also published in 1990 and is regarded as “one of the most significant postmodernist texts in Afrikaans” (Visagie, 2002:138). While the narrative revolves around a professional vermin hunter called upon to hunt a jackal on a livestock farm, hunting is also used in a metaphorical sense. The male protagonist, Lenka, is caught in a strict patriarchal order characterised by extreme levels of violence (towards humans and animals), insensitivity and an inability to stay in long-term relationships. Consequently, *Die Jakkalsjagter* is also about Lenka’s “symbolic jackals” (e.g. his divorce and the death of his father) that are destroying him from the inside (van der Merwe, n.d.). The professional vermin hunter and jackal seem to interchange the roles of hunter and hunted throughout the text. Here the apparent nature–culture dichotomy is also transgressed. Not only does hunting vermin symbolise the tussle between humans and nature, but it is also used to highlight that nature is within us in the form of natural urges (e.g. Lenka is a womaniser) (Muller, 1994). As a result, the text itself has been described in terms that are reminiscent of the way the jackal is perceived: “cunning and timid, but he is flexible – and he is beautiful” [*geslepe en sku, maar hy is lenig – en hy is mooi*] (Smuts, cited on

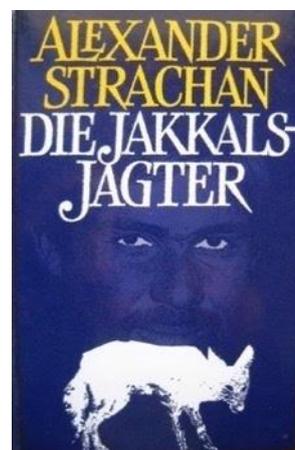


Figure 5.6 Alexander Strachan’s 1990 novel, *Die Jakkalsjagter*.

the back cover of Strachan's novel, 1990), here capturing people's ambivalent feelings towards jackals.

In summary, stories about the *slim* and *skelm* jackal abound in South Africa. Anthropomorphising these animals occurs not only in popular culture and literature, as discussed above, but is also an ongoing means for people to "anticipate and understand the behaviour of [...] animals" (Bekoff, 2007:63), in this case the jackal, in their everyday encounters with the animal. Attributing human characteristics to jackals seems to be particularly easy and popular. This is partly because of the animal's ability to physically cross what humans perceive as the boundary between nature and culture, including, as the evidence provided above has shown, by featuring as a proxy for human 'others' in numerous literary forms. Crossing the nature/culture divide is discussed further in Chapter 6; what is important here is to recognise how farmers' local knowledge of jackals and jackal management both draws on and feeds into understandings of the jackal that have been strongly present in popular culture in the Karoo for generations.

The implications for jackal management are not inconsequential. Jackals in the wild and on farms will continue to be negatively affected by their relatively poor public-relations image unless they are "disentangled from the baggage of these images and representations of them as imposed by humans" (Baker, 1993, cited in Peggs, 2012:126). I therefore agree with Williams (2002:120) who believes that it is "necessary for [the] effective protection and management of wilderness" to contest negative associations and social constructions of wilderness spaces and, I might add, the 'wild' animals living within (and beyond) them. Doing so, while understanding why groups construct wildlife in the way that they do, could also have the potential to decrease human-wildlife conflict.

5.2 The symbolism of the jackal in relation to the SKA core site

Owing to the fact that jackals predate on small-livestock, livestock farmers mostly make use of negative characteristics to describe jackals. However, my research shows that some farmers, as well as other constituents involved in jackal management, also admire certain characteristics of the animal, indicating some ambivalence in their stance towards the jackal. This is consistent with the ambiguities in the way that the jackal is depicted in the folktales described above. Characteristics highlighted in my interviews include, for example, jackals' adaptability (Frederich, interview, 11 May 2017; Viljoen, interview, 20 May 2017; Jan, interview, 5 July 2017), their flexibility (Natrass, interview, 17 January 2018), their resilience (James, interview, 16 October 2017), and their intelligence (Viljoen, interview, 20 May 2017; Conrad, interview, 16 October, 2017). This has led to what one

professional vermin hunter (who is also a farmer in the Kareeberg region) described to me as their “love–hate relationship” (Frederich, interview, 11 May 2017) with jackals, which I address below.

5.2.1 *Ongedierte*: It is a “love–hate relationship”

Throughout this chapter I have highlighted various characteristics used to describe jackals in popular Afrikaans-language culture. Most, if not all, of the predominantly negative characteristics used to describe jackals in literature were used by the farmers and professional vermin hunters with whom I engaged in the Kareeberg area to describe the animals in their environment. As already discussed in chapters 1 and 2, sheep farmers regard jackals as a major threat to their livelihoods and general wellbeing because they are deemed to be the main culprits in their livestock losses. While a number of farmers described the emotional toll that losing livestock has on them (Frederich, interview, 11 May 2017; Gys, interview, 15 May 2017; Ivan, interview, 28 June 2017), the knock-on effects that they focussed on the most are financial. In 2018, predation losses on South Africa’s commercial farms were estimated at R2,8 billion per annum, with small-livestock farmers bearing the brunt of this, accounting for almost 84% of this amount (Turpie & Akinyemi, 2018:71; du Toit, interview, 3 April 2019). Not only do farmers incur direct financial losses from the loss of livestock – they also have to incur extra expenses in attempting to manage these mesopredators, as illustrated by the following excerpt from an interview with Gawie, an elderly farmer who has been farming with Dorper sheep next to Alkantpan since 1970:

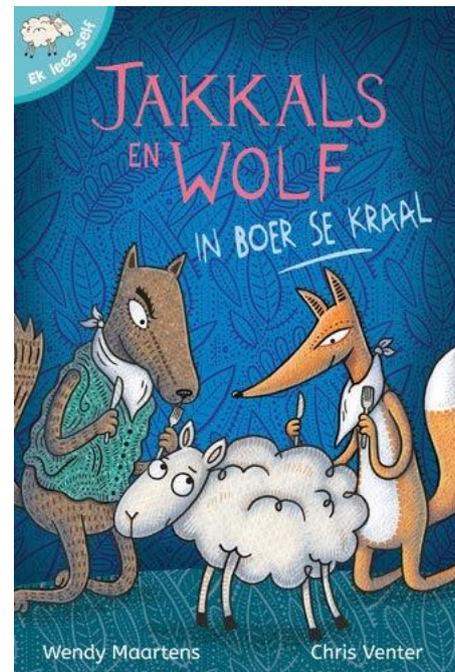


Figure 5.7 Jackals are implicated in livestock losses in real life and in *Jakkals-en-Wolf* fables as illustrated here in Maartens and Venter’s (2016) retelling of von Wielligh’s story.

There’s no other thing on which you spend more money than a jackal and a caracal, because guys have wrecked their vehicles, capsized them while hunting jackals. You hire a hunter at great expense to try and catch him. You electrify [boundary fences] and sacrifice nights in [the] cold [...] to hunt. And that’s all for a jackal. [*Daar’s nie nóg ‘n sekere ding wat geld aan gespandeer word as ‘n jakkals en ‘n rooikat nie, want ouens het hulle voertuie al opgefoeter, omgegooi met jakkalsjag. Jy huur ‘n jagter ten duurste om hom te probeer vang. Jy elektrifiseer*

[lyndrade] en jy offer snags op in [die] koue [...] om te jag. En dis alles vir 'n jakkals.].

(Interview, 12 May 2017).

Ranked in order of frequency, the five most popular terms used to describe jackals by my research participants were “*skelm*”, “*slim*”,⁸¹ “thieves”, “adaptable” [*aanpasbaar*] and “crafty” [*uitgeslape*]. Furthermore, in most of my interviews with farmers, jackals were not simply referred to as “jackals”. Rather, farmers opted to call them *ongediertes*, a term which, as already discussed, highlights their extraordinariness and non-animal-like qualities. As Gys, a prominent Williston farmer in his mid-60s, exclaimed in the closed meeting held in May 2018 between SRAO and farmers neighbouring the SKA core site, to attend to their specific concerns and expectations: “they [jackals] are not just ordinary problem animals, they are *ongediertes!*” [*Hulle [jakkalse] is nie net gewone probleemdiere nie, hulle is ongediertes!*].

Some jackals are regarded as even more extraordinary than usual, those that some farmers described as “super jackals”. These jackals are not a separate species but, rather, individual jackals that epitomise the species’ intelligence and craftiness, as they predate on large, adult sheep, not only lambs, and/or are particularly adept at escaping the clutches of farmers and/or vermin hunters. One of my key informants, Niklaas, used this term in response to a presentation by a zoologist on mammal responses to land-use change at one of SRAO’s information session that I attended, that was held in Carnarvon on 18 October 2017; his aim was to highlight that jackals in the Carnarvon district, i.e. jackals found on the farms around the SKA core site, are different from those jackals on which research, such as that being presented, is usually conducted (see Chapter 6). Interestingly, almost all of the professional vermin hunters I interviewed (including Viljoen, Tjaart, Felix, Bernard and Henrico) are of the view that jackals are not born with extraordinary abilities. Rather, they are able to learn from the mistakes that are made by farmers who still find time to hunt on the side and/or make use of “fly-by-night” vermin hunters,⁸² i.e. young, schoolboys who want to earn extra money during their school holidays (see Chapter 7). This can be seen as an implicit acknowledgement of jackals as agents/actors in the farmers’ world.

What I came to realise through the course of my fieldwork is that all the interest groups involved in jackal management, farmers included, admire jackals, at least to a certain extent and despite the

⁸¹ Such as with the Afrikaans term “*skelm*”, I found it difficult to find a suitable English term for “*slim*” as it incorporates most of the Pharos dictionary’s (2010, s.v. ‘slim’) translations: smart, clever, intelligent, brainy, astute, artful, crafty, cunning, guileful, sly and wily.

⁸² Interviewees used the term “fly-by-night” vermin hunters to describe amateur vermin hunters. These hunters do not treat vermin hunting as a profession but rather provide their services part-time for farmers who have livestock predation problems and also hunt as a hobby.

negativity they also associate with it. A minority of farmers acknowledged jackals for their beauty, with one farmer even describing it to me as a “fascinating animal” [*dit is ‘n fasinierende dier*] (Christiaan, interview, 10 July 2017). It is the jackal’s *slimstreke* [craftiness], adaptability and resilience that farmers and professional vermin hunters particularly admire, even while they curse its consequences for them. In this they share some common ground with the life scientists that could be built on in forging a more effective jackal management plan for the SKA protected area. Over and above the ecological role that jackals fulfil, in my interviews with them ecologists also highlighted their admiration for the animal’s resilience, flexibility, adaptability and the fact that it is a “very historically located animal” (Nattrass, interview, 17 January 2018). In asking ecologists how they would describe jackals, Conrad and James both reflected on its capacity to survive:

[It is a] superbly intelligent, impressive animal. [...] It knows how to assess a situation and adapt on its feet [...] he learns quickly what are the ins and outs”. [...] As a scientist, you have to take your hat off. There are just some species... They can bounce back from disturbance (Conrad, interview, 16 October 2017).

It has sort of a resilience theme. It has been hunted, uh, hated for centuries and um, here it is! It’s thriving! [...] What makes them so resilient: if a lot of their population is removed and threatened and yet, they ought to go on. They are still on their feet. They still have the next generation (James, interview, 16 October 2017).

5.2.2 The jackal as a trope for the SKA

There are many interesting parallels between the way that farmers view the jackal – as an ‘un-natural’ and devious threat to their livelihoods and sense of control over their environment – and the way that they view the SKA, with the two actors coming together decisively as inter-related problems with the declaration of the SKA core site as a protected area in which jackals can be expected to thrive. At the same time, it is not only among farmers that the jackal can be seen to function more or less explicitly as a trope for the SKA; ecologists’ insistence that farmers need to ‘learn to live’ with the jackal can also be seen as acting as a sub-text for their needing to accept the legitimacy of the SKA and the associated protected area in their midst. It is these parallels that have led me to consider the jackal as functioning as a complex trope for the SKA, a contention that I introduce by means of the following vignette in which a farmer associated the SKA and the jackal as two equally powerful intruders on his domain.

My first sight of Ivan, a well-known farmer in the Williston region, was of him slowly driving in his Isuzu *bakkie*, herding a flock of sheep. A stout, elderly man, he was in the *bakkie* but his farmworkers

were not and had to jog alongside it to keep up with their employer. After greeting one another, he escorted me back to the farmhouse. It was a cold, overcast winter's day so it was good to sit in front of the AGA stove – an iconic feature in most Karoo households – in Ivan's compact kitchen. When I asked about his children's pictures on the fridge, it became clear that Ivan is a family man who was missing his wife who was visiting one of their daughters in Cape Town. "Luckily, the jackals and the SKA keep me busy [while my wife is away]!" [*Gelukkig hou die jakkalse en die SKA my aan die gang [terwyl my vrou weg is!]*], he jocularly said while pouring the coffee.

Throughout the day it became evident that Ivan was starved for company. Originally planning on the interview being approximately two hours long, I finally left the farm as the sun was beginning to set. After having filled up on homemade dried sausage, coffee and rusks in the morning, lunch involved a healthy serving of boerewors and mashed potatoes. As we ate, Ivan returned to the relationship between jackals and the SKA, arguing that these two "*skelms*" are in cahoots with one another (interview, 28 June 2017). According to Ivan, along with the ongoing drought, jackals coming across from SARAO's property would make it impossible for him to continue farming next to the core site.⁸³ As weaning percentages fell he would not be able to farm productively and would thus be forced to sell his property. Furthermore, falling productivity would reduce the value of his farm below market value, making it a risky investment, while the ongoing uncertainty about whether SARAO was still planning to buy additional farms to add to their core site or not would ensure that no farmer would want to buy his property – and so, in the end, SARAO would be the only interested buyer (Ivan, interview, 28 June 2017). In other words, this would be the "perfect opportunity" [*perfekte geleentheid*] for SARAO to increase the size of the SKA core site (Ivan, interview, 28 June 2017).

In Ivan's view, neither SARAO nor "their jackals" as he described them would stay within the core site. Their impact spills over onto neighbouring farms, with SARAO seemingly using the jackal to drive farmers out of business. In turn, this is having a wider "ripple effect" [*rimpeleffek*] in the region (Ivan, interview, 28 June 2017). Even though SARAO promotes the positive developments it is bringing to the core site's adjacent towns, such as the upskilling and employment of affected farmworkers, the general economic investment in the towns it has encouraged and the maths and science education it is supporting in local schools, Ivan is convinced that, between them, the SKA development and the jackal are negatively impacting the "lifeline" [*voedingsaar*] of the small towns, which is sheep farming. Both are threatening the wellbeing not only of the individual farmer but also

⁸³ This issue was also central to the discussion between neighbouring farmers, SARAO, and SANParks representatives at the workshop in Williston in April 2018 which I attended.

of his/her family, his/her labourers and their families/dependents, as well as the economy of the broader community (Ivan, interview, 28 June 2017).

In an earlier interview, Stefan's wife had raised similar concerns about the consequences of the SKA development for their region very forcefully. Sitting in on my interview with her husband, she interrupted to pour her heart out:

What makes me angry, [...] they [SARAO] said by 2050 they will be done. Then they no longer need it [the land]. Then they have made this piece bare. And then? I mean, they disadvantaged two towns [referring specifically to Williston and Carnarvon, which have abattoirs]. They took away thousands of sheep. They took away a lot of people's work. Farmers have been taken away.⁸⁴ Life has been taken away. And then they just do not need it anymore. So they did not, they did not think any further. [*Wat vir my kwaad maak, [...] hulle [SARAO] het gesê teen 2050 is hulle klaar. Dan het hulle dit [die grond] nie meer nodig nie. Nou dan het hulle hierdie stuk dan kaal gemaak. En dan? Ek meen hulle het twee [verwys spesifiek na Williston en Carnarvon wat ook abattoirs het] dorpe gebenaadeel. Hulle het duisende skaap weggevat. Hulle het 'n klomp mens se werk weggevat. Boere is hier weggevat. Die lewe is hier weggevat. En dan het hulle dit net nie meer nodig nie. So hulle het nie, hulle het nie verder gedink nie.*] (Interview, 16 May 2017).

Akin to the way that the |Xam regarded the jackal as a symbol of cunningness, cowardice and selfishness (Wittenberg, 2014), I argue that for farmers on the boundary of the SKA core site, the jackal functions not only as a 'clever' threat to their livelihoods but also, and because of this, as a complex trope for the SKA and their relationship to it. This is because, like the jackal, the SKA development is also intruding on their livelihoods and the 'natural' order of things in the Karoo. Furthermore, in relation to this development, livestock farmers find themselves assigned a lower ranking than scientists (whether physicists or life scientists) in terms of how to deal with the actual problem of the jackal in their lives. While farmers are aggrieved about the financial and emotional impacts brought about by both the SKA and the jackal, now working in unison, their animosity towards the SKA and the jackal also lies with the fact that their autonomy – being "*baas van die plaas*"⁸⁵ –

⁸⁴ In a written response to my interview schedule for SARAO personnel (see Appendix H), SARAO's stakeholder engagement officer clarified the number of individuals who were impacted directly by SARAO's Land Acquisition Programme. According to him, 26 individual farmers (i.e. farm owners) were bought out through SARAO's Land Acquisition Programme, all of whom have been compensated. Simultaneously, 24 farmworkers with 55 dependents were also impacted (SARAO stakeholder engagement officer, written response, 17 July 2019). While some farmworkers moved with their employers to their new farm(s), others who were under the age of 65 have been employed by the NRF as general workers (SARAO stakeholder engagement officer, written response, 17 July 2019).

⁸⁵ A popular Afrikaans expression that refers to someone who is a master or is used by someone to clearly identify that they are the boss. This term also features in Chapter 6 where I discuss power relations on farms.

has been taken away. In other words, jackals as well as the astronomy development contravene white, commercial farmers' understanding of the 'natural' (i.e. social) order in the Karoo. Both are dismissive of the farmers' past and the nostalgia they feel for that, when man (the farmer) controlled nature (i.e. non-humans) effectively to serve his needs (by manipulating nature to farm more productively); both question farmers' continued dominance over their land and what happens on it.

Throughout my fieldwork, local farmers continued to question SARAQ's decision to establish the core site and the associated protected area among the towns of Brandvlei, Carnarvon, Vanwyksvlei and Williston, arguing that the SKA does not belong in this region of the Karoo. Not only are farmers, such as Maghiel, concerned with the loss of property in a prime livestock area, with good carrying capacity for sheep (interview, 4 July 2017), they are also aggrieved with their lack of involvement with South Africa's initial bid application in the early 2000s. While the specific locality for the SKA development was chosen by its South African agents in order to enhance the efficiency of the telescopes (see Chapter 2), farmers regard the radio telescopes as "out of place" and promoted by "outsiders" who are then "villainised"; interestingly, the 'outsider' and 'villain' terms were not used by farmers themselves in my interviews, but were attributed to them by one of SARAQ's personnel, in describing the adjacent farming community's mistrust towards the science project during a workshop on the SKA's struggles with anti-SKA advocacy groups in March 2018.⁸⁶

Although the farm of predation management expert Niel Viljoen does not border the SKA core site, he has been in conversation with numerous farmers in that area regarding the potential impact of the SKA as well as the best problem animal management strategies that they should implement. Drawing on both his local knowledge of community dynamics in the region, as well as his experience from being involved with SARAQ as a consultant on predation management, Viljoen reflected on the sense of uncertainty and loss farmers are now feeling, in relation to their personal histories of struggle to make a decent living on their farms:

You see, for years it has been a struggle of survival for all of them. And what the SKA has come and done, he has absolutely put the cherry on the cake. They have lost now. Do you understand? What he has done all his life to get there, get the child through school [...] and we are not talking about 20km to school, [...] and the piece of land, the economic unit, to get the child through university and understand, to get him on his feet. So a love developed for the land. The land personally brought him um, not prosperity, but personal... milestones [...] and as I said, it was a lifelong battle and the SKA is coming now and everything has [changed] within a day or two,

⁸⁶ This presentation took place at a workshop organised by the HSRC in 2018 with the goal of discussing opportunities to build interactive capabilities of universities and science councils for engagement and inclusive development.

or in a year or two... So yes, the emotional factor is great. I think it is the emotional factor that now blows up every time. Because I do not think that the science really knew what they were doing. They saw the possibility. And they drove the opportunity, they still drive it today at a massive speed! [...] They miss what the bigger picture is about. [*Jy sien, dit was vir hulle al die jare 'n stryd gewees om oorlewing. En wat SKA nou kom doen het, hy het nou absoluut die tjerrie op die koek kom sit. Hulle het nou verloor. Verstaan jy? Dit wat hy sy hele lewe lank gedoen het om daar te kan, die kind deur die skool te kry [...] en ons praat nie van 20km skool toe nie, [...] en die stukkie grond, die ekonomiese eenheid, om die kind deur universiteit te kry en verstaan, op sy voete te kry. So daar het 'n liefde geword vir die grond. Die grond het vir hom persoonlik uhm, nie welvaart gebring nie, maar persoonlike... mylpale [...] en soos ek sê, dit was 'n lewenslange stryd gewees en die SKA kom nou en als het nou in 'n dag of twee, of in 'n jaar of twee [verander]... So ja, die emosionele faktor daar is geweldig groot. Ek dink dis die emosionele faktor wat nou aanmekeer opvlam. Want ek dink nie die wetenskap het geweet regtig wat hulle doen nie. Hulle het die moontlikheid gesien. En hulle het die moontlikheid gedryf, hulle dryf hom vandag nog met 'n helse spoed! [...] Hulle kyk mis waaroor die groter prentjie gaan.*] (Interview, 20 May 2017).

According to Viljoen, farmers' struggle to trust SARA0 (their lack of institutional trust) is because it has been the cause of great uncertainty in the region. From their perspective, basic information relating to the scope and timing of the project seems to have been constantly subject to alteration since the purchase of the first two farms for construction of the KAT-7 telescopes. In this regard, the advocacy group Save the Karoo (2017) has stated on their website that such "irregularities, confusing facts, and contradictions have cast shadows of scepticism and suspicion" over SARA0 and their motives. Part of the problem here has been a significant difference in the way in which the shifts in the technical underpinnings of the SKA antenna dishes and their optimal configuration as an array have been interpreted by farmers and many townsfolk. A pertinent example of this has been the location and number of the spiral arms which are to extend from the SKA's core site. While the original plans shown at local community meetings showed five spiral arms, the number was later decreased to only three in 2016. As a result, only 71 properties are currently earmarked as affected by the placement of servitudes, compared to the original estimate of 220 properties (SKA SA, 2017b). Similarly, the final number of farms needed for the core site also decreased over the time in which I was conducting my fieldwork between 2016 and 2019 (see Chapter 2).

While the managers of the SKA project are at pains to explain that the technology that they are developing is evolving, hence it was not possible for them to be certain how much land would be required at the start – and, furthermore, that this uncertainty is consistent with the evolving nature of the science – local farmers who have had to live with the uncertainty have understood it not as a

consequence of scientific methodology but, rather, as an indication of capriciousness and/or secrecy on the part of the SKA. The resulting miscommunication has caused great tensions. Franco, an elderly farmer from the Williston region whose farm neighbours the SKA core site, emphasises:

I have no guarantee that they [SARAO] will tell me in a year or two that they also want me [my farm] because I mean, they, they have no blueprint on which they work. [...] They just go along and learn as time unfolds. And we need it now, but we need another farm, so we have to buy one more. [*Ek het geen waarborg dat hulle [SARAO] vir my oor 'n jaar of twee vir my gaan sê hulle wil my [plaas] ook hê nie, want ek meen hulle, hulle het mos geen bloudruk waarop hulle werk nie. [...] Hulle gaan mos nou maar aan soos, soos die tyd hulle leer. En ons het nou dit nodig, maar ons het nóg 'n plaas nodig, so ons moet nou nog een koop.*] (Franco, interview, 18 May 2017).

Although SARAO officials have confirmed that all the property they needed to acquire in full, were purchased by October 2017 (SKA SA, 2017e:10; SARAO land acquisition process manager, information session, 16 October 2017) and that there is no possibility that the land acquisition process will be reopened in the future to expand the SKA core site (SARAO stakeholder engagement officer, written response, 17 July 2019), farmers remain suspicious about the scope of the project. According to du Toit, the national chairperson of the NWGA and the PMF, farmers in the Kareeberg region find themselves in a vicious cycle of uncertainty, lack of trust in, and empty promises from, the SKA organisation:

This is a big disadvantage for the farmers there that have land. I think the biggest thing about SKA is that... these guys were never honest with the farmers there. I think it is a process that developed and everyone said, first it started at a point and then they said but if we take this away, then that will fall into place. And then there was a total breach of trust between SKA and the farmers, because the things they promised or what they said would fall into place, such as the new technology, um, for computers and for telephones, did not really get off the ground. And then they also said but they will not take away land or, you know, buy land [besides Losberg and Meysdam]. It was never put on the table and as the project progressed, all these funny things [took place]... so my view is that there was a total breach of trust because there was no honesty from them [SARAO] and now they, from the SKA's side, they say they were honest, but as the project expands, new things emerge, but I don't believe it, because when you start with a project then you know where the end of the project is. So you have to have a plan in place. So I really think that farmers were beat about the bush in that area, which is a very big frustration at this stage. So what happened now from the farmers' side, they simply kick back and say you do not do that, um, we do not give you permission, and there is no cooperation. [*Dis 'n groot nadeel vir die boere wat daar is wat grond het. Ek dink die grootste ding van SKA is dat... hierdie*

ouens was nooit eerlik met die boere daar nie. Ek dink dis 'n proses wat verloop het en almal het gesê, eers het hy op 'n punt begin en dan het hulle gesê, maar as ons dit wegvat sal dit in plek kom. En toe het daar 'n totale vertrouensbreuk gekom tussen SKA en die boere, want die goed wat hulle belowe het of wat hulle gesê het sal in plek kom, soos die nuwe tegnologie uhm vir rekenaars en vir telefone, het nie regtig van die grond afgekom nie. En toe't hulle ook gesê, maar hulle gaan nie grond jy weet wegvat of jy weet grond koop nie [boonop Losberg en Meysdam]. Dit was nooit op die tafel gewees nie en soos hierdie projek vorder, vind al hierdie snaakse goed [plaas]... so my siening is dat daar 'n totale vertrouensbreuk was omdat daar nie eerlikheid van hulle [SARAO] is nie en nou sê die, van die SKA se kant af, sê hulle was eerlik, maar soos die projek uitbrei, so kom na daar nuwe dinge na vore, maar ek glo dit nie, want as jy 'n projek begin dan weet jy tog waar is die einde van die projek. So jy moet 'n plan in plek hê. So ek dink regtig boere is om die bos gelei in daai omgewing wat 'n baie groot frustrasie is op hierdie stadium. So wat van boere se kant af nou gebeur het, is hulle trap net eenvoudig vas en sê julle doen dit nie, uhm, ons gee nie ons toestemming nie en daar is nie samewerking nie.]
(Interview, 3 April 2019)

In addition to the decision to place the core site in their midst, without clarity on its full extent, other examples of conversations from which farmers feel completely excluded centre directly on the jackal. This includes discussions on the principles of jackal management in general, and jackal management in and around the SKA's core site and the establishment of the national park (i.e. the special nature reserve) in particular, which is discussed further in chapters 6 and 7. Farmers are obsessive–compulsive when it comes to the issues that they feel they can control, even though or perhaps because farming is a venture with so much uncertainty, for instance with regard to the number of livestock losses they will suffer, weather patterns and the fluctuating market for their products. Only a handful of the farmers that I interviewed were willing to identify any positive contribution from SARAO towards mitigating some of the uncertainties that the SKA development has produced (see chapters 1 and 2); for these farmers the one possible assistance they could foresee was assistance from SARAO/SANParks in fixing the dilapidated fencing infrastructure on the boundaries of those farms now bordering the SKA (see Chapter 7).

What is worth noting here is that in contrast to the uncertainties surrounding the SKA, which has fed into the lack of trust between farmers and SARAO, jackals are regarded by farmers as far more of a known entity with certainty in relation to its behaviour. Franco, the elderly farmer already quoted above, explained the difference to me in these terms:

No, no jackals do not keep me up at night. [...] I grew up with them, it's part of your farming. You do not lie awake about that [jackals], but the SKA is a problem. He's a big problem because

you do not know what's going on. Today they say this, tomorrow they say that. There is [...] nothing which you can rely on. You cannot believe what they say to you because only tomorrow they say another thing. [*Nee, nee die jakkalse laat my nie wakker lê nie. [...] Ek het groot geword daarmee, dis deel van jou boerdery. Jy lê nie wakker daaroor [jakkalse] nie, maar SKA is 'n probleem. Hy's 'n groot probleem, want jy weet nie wat gaan aan nie. Vandag sê hulle dit, môre sê hulle dat. Daar's [...] niks wat jy op kan gaan nie. Jy kan nie eens glo wat hulle vir jou sê nie, want net môre sê hulle 'n ander ding.*] (Interview, 18 May 2017).

Nevertheless, farmers are not without agency in challenging those in higher rankings and trying to control the extent to which they do disrupt their position. Vermin hunting, which will be discussed in detail in Chapter 7, gives farmers a false sense of control (i.e. authority) on their land. Even though lethal control methods are not working effectively, given that farmers continue to face an onslaught from jackal (and caracal), they persist with them as it allows the individual 'problem' animal to be controlled.⁸⁷ Similarly with the SKA, while farmers might not be able to stop the international project, they have 'targeted' individual SARAO personnel as the object of their mistrust. As will become evident in the vignettes provided in Chapter 6 which is devoted to analysing and discussing the different knowledge systems and power relations in jackal management, SARAO's stakeholder engagement officer and land acquisition process manager often faced a verbal onslaught from farmers at public meetings. As with individual jackals, these individuals were relatively easy targets on whom farmers could take out their frustrations.

At the same time, parallels can also be drawn between how advocates of the 'environmental jackal narrative' (i.e. the ecologists) view jackals and the SKA core site, specifically in their focus on the positive advantages both actors bring to the environment and their argument that farmers should "learn to live with the jackal" (Nattrass & Conradie, 2015:10), and, by extension, with the SKA. Ecologists have latched onto what they regard as the potentially very positive contribution of the SKA core site towards increasing the amount of land in the Nama Karoo that has formal conservation protection status and allowing for the collection of environmental baseline data. Here the jackal can be seen as an interesting figure of co-existence rather than a threat. Thus James, a SAEON ecologist who strongly endorses the 'environmental jackal narrative' and regards the jackal as a "necessary ecological vector", in part because they assist in controlling rodent and insect populations on

⁸⁷ In their article 'Culling recolonizing mesopredators increases livestock losses: Evidence from the South African Karoo', Nattrass *et al.* (2019) provide evidence that irrespective of research and measurement approaches, lethal predator control in the Central Karoo district is counter-productive as it leads to "increased livestock losses the following year". In other words, they found a "statistically significant and substantial relationship" between predators culled in one year and livestock losses the following year. These findings accord with the 'environmental jackal narrative', but are in conflict with the 'farmer jackal narrative'.

farmlands, argues that farmers should consider the jackal as a friend and not a foe (interview, 16 October 2017) – and, by extension, should regard the SKA core site as something that they should learn to live with, rather than resist. SARAo personnel who work on a day-to-day basis with the SKA core site’s neighbouring communities in the surrounding small towns also try to establish the same sentiments among locals. This is done by emphasising the SKA development’s contributions not only at the global and national level, but also at the local scale, through its investment in local development projects such as computer facilities and small-business opportunities.

As discussed in Chapter 1, at a global scale this astronomy installation promises to answer questions at the “frontiers of physics and cosmology, where scientists are seeking to identify and understand the fundamental laws and structures of the universe” (Gastrow, 2015:6; see also Gastrow, 2014:85; Todd & Henschel, 2016). Scientists also expect that the SKA will make new discoveries and answer questions that we have not yet imagined (Brits, 2016:6; SKA SA, n.d.c.). Nationally, SARAo is seen to benefit the economy directly through its Human Capital Development Programme in the fields of science, technology, engineering and mathematics (SKA SA, 2015; see also Walker & Chinigò, 2018:12). On a local scale, even though the current managing director of SARAo, Dr Rob Adam, has stated on numerous occasions that the SKA project cannot fulfil the role of national and/or local government, SARAo is committed to five focus areas in the surrounding towns: “investing in the youth; supporting community upliftment programmes; developing small to medium enterprises; nurturing learners’ talent; and ensuring that communication connectivity is not compromised” (Gaea Enviro (Pty) Ltd, 2018:2; see also SKA SA, 2016c:1). Farmers, however, have complained at numerous public communication meetings held by SARAo that their specific needs (such as predator management) are not being addressed through these five focus areas at the local level and are always shifted to the back burner.

While relations between SARAo and the communities adjacent to the SKA core site, including farmers, improved in the four years after I started my fieldwork in 2016, farmers’ levels of frustrations regarding their lack of autonomy remained high. As a result, a small number of farmers have used some of the same terminology used to describe jackals, for SARAo and the SKA. During my interview with Viljoen, he agreed with my proposition that jackals could be seen as a trope for the SKA in the attitudes of local farmers when he reflected that the SKA “arrived here [in the region] on the sly and bit the farmer in the ass” [*op ‘n agterbakse manier hier [in die area] ingekom en hy het die boer aan die gat gebyt*] (interview, 20 May 2017); this description of the action of the SKA correlates strongly with the cunningness associated with jackals. While the terms used throughout this chapter to describe both of the non-human actors (i.e. the jackal and the SKA development) are

not technical terms, they resonate with Douglas's notion of "matter out of place" (1989, cited in Holm, 2012:76) which causes not only great uncertainty but also material hardship.

5.3 Conclusion

My literature review and fieldwork support the point made by Hytten (2009:18) that the social construction of an animal as either a pest or a protected species is "underpinned by different versions of the nature–culture dichotomy". Hytten was writing about Australia but, like the dingoes in Australia, jackals in the Karoo also cross what people perceive as the borders between nature and culture and this, more often than not, has had significant consequences for how these animals are treated. As soon as jackals transgress the thresholds of human space, they "are perceived as both symbolic and real threats to the social order" (Arluke & Sanders, 1996:169–170; see also Terblanche, 2015), and are constructed in primarily negative, vilifying terms. By contravening the norms and expectations that uphold the nature/culture dichotomy, jackals deviate from the behaviour that people deem 'natural' and appropriate for them. With their frequent visits to livestock farms, jackals exit nature and "interfere with cultural practices" (Hytten, 2009:22), i.e. with farming, and challenge farmers' control over the land.

Borrowing from Becker's (1963:1) labelling theory, it can then be argued that jackals gain their "outsider" status from the fact that they "cannot be trusted to live by the rules agreed on". The inflammatory labels attached to jackals, which emphasise their status as 'outsiders', include, for example, "enemy" (Beinart, 2003:195), "vermin" (Humphries *et al.*, 2015:541; Pathare, 2015:4) and "problem animal" (Avenant *et al.*, 2006:23; Pathare, 2015). Added to these, other negative attributes used by interviewees to describe jackals include "crafty" [*uitgeslape*] (Gawie, interview, 12 May 2017), "sly" [*slu*] (Maghiel, interview, 4 July 2017), and "cunning" (Kobus, interview, 30 October 2017). Above all, jackals were described by most interviewees as "*skelm*" and "*ongediertes*".

These are not new portrayals of jackals. As this chapter makes clear, their depiction as "*skelm*" by the farmers I interviewed is consistent with characteristics attributed to them in South African and Afrikaans folktales, comic strips, and fictions over generations. Despite mainstream ecological and scientific discourse about jackal behaviour and diet, these cultural artefacts reflect and reinforce the overwhelmingly negative views farming communities have about these animals. According to Benavides (2013:70–71), cultural artefacts which "create and reproduce animal metaphors [...] in turn feed the attachment of the general public to a metaphorical and analogical discourse, by means of which the notion of 'negative animals' maintains its presence and legitimacy". In other words,

while the majority of my research participants draw copiously on the negative stereotypes around jackals found in popular culture, their own characterisation of jackals also feeds back into popular culture.

According to Castree (2001:18), the above are not merely labels – instead, they speak “volumes not only about who is doing the knowing and acting, but what kind of a world they are trying to forge”. For Dolhinow (2002:9) these are social constructions which “direct our perception, focus our attention, and can enlarge or restrict our understanding of anything we consider”. In other words, language is the medium through which people construct their experiences (Burr, 1995:33, cited in Stibbe, 2001:145). However, there is not necessarily an agreement about these constructions; rather, they are “a site of variability, disagreement and potential conflict” (Burr, 1995:28). Consequently, and as mentioned above, jackals and other wildlife may be constructed differently across different contexts, and, as a result of contradicting views, human–human conflict may arise (Terblanche, 2015). Political ecology is, therefore, an appropriate approach to analysing human–wildlife conflict and wildlife management as it allows one to investigate the multiple subjective meanings people attach to wildlife, as well as to analyse the power relations involved in knowledge production (see Chapter 3).

As discussed in Section 5.2, many of the terms that have been used to describe jackals have also been used by Kareeberg farmers to characterise the SKA development and the uncertainties it has brought upon them. In summary, both jackals and the astronomy development are seen by farmers to contravene the ‘natural’ order in the Karoo in which (white) farmers are dominant and man controls nature (i.e. non-humans) to serve his needs. Not only have these non-human actors reconfigured what they themselves are, especially the ‘unnatural’ jackal which crosses over onto farmlands, but they have also reconfigured farmers and their environment, for instance by influencing social relationships (discussed further in Chapter 7) and creating a demand for vermin-proof fencing which impacts on other species as well, thus “interjecting themselves into [farmers’] lives unannounced and thereby enacting a minor but powerful form of domination” (Holm, 2012:80).

As jackals and, as I have argued, the SKA “dare to compete with humans” (Bough, 2006:394), they challenge not only commercial Karoo farmers’ livelihoods but also their “*baas van die plaas*” mentality and their sense of community and aesthetic attachment to the Karoo as a place of extensive, privately-owned sheep farms; they can thus both be thought of as *ongediertes* by local people. This characterisation is central to the local knowledge that farmers rely on in jackal management, one which pits their understanding of the animal’s behaviour against that of natural scientists working with more powerful systems of scientific knowledge, which is the subject of my next chapter. As with

the history of donkeys in Australia researched by Bough (2006), the very qualities that have allowed jackals to thrive in the Karoo (their resilience, adaptability and cunning) are the qualities that have led to their ongoing persecution by farmers struggling to assert their control over the land. In the case of the SKA development, the same rings true: farmers are seeing the SKA as the jackal that needs to be persecuted. For environmentalists, however, what is at issue is that if farmers are to survive, they need to learn to live with not only the jackal but also the SKA.

CHAPTER 6: THE POWER RELATIONS IN JACKAL MANAGEMENT: THE MARGINALISATION OF ‘LOCAL’ BY ‘SCIENTIFIC’ KNOWLEDGE

Brandvlei, one of the SKA core site’s constituency towns, is a small, desolate Karoo town halfway between Calvinia and Kenhardt in the Northern Cape Province. On the morning of 17 October 2017 it was the location of an information session presented by SARAQ to local farmers regarding the three ‘spiral arms’ that are planned to stretch out from the SKA’s core site over private farmland (see Chapter 1).⁸⁸ When I arrived at the venue, the Agricultural Association’s hall, a small group of white, Afrikaans-speaking farmers were already gathered outside, sipping coffee and exchanging sturdy handshakes and a few “*goeie môres*” [good mornings]. Some greetings were particularly enthusiastic, for instance one involving two strongly built, middle-aged men who had clearly not seen each other in quite a while. Given the steady decline in the Karoo’s white rural population (Hill & Nel, 2018:207), the increasing sizes of farms, and the reported loss of cell phone communication (which farmers blame on the SKA), farmers in this region of the country have been finding it increasingly difficult to keep in contact with one another.

Inside the cold hall the greetings continued, with SARAQ personnel making small talk with some of the farmers whom they had come to know through their Land Acquisition Programme. The meeting began with the programme manager of SARAQ’s land acquisition process officially welcoming everyone in attendance. While most SKA public communication meetings are attended by both townspeople and farmers, this meeting was for farmers only as it concerned topics directly associated with the land acquisition process. The information session included presentations and discussions on the negotiations for establishing servitudes so that the SKA could access and manage the dish-antennas it would be building on the three spiral arms; the property valuation approaches and principles for paying for the servitudes; the radio frequency interference tests to be carried out on the properties affected by the spiral arms, and, of particular interest for my research, dealing with mammal responses to land-use change. For this reason, two SAEON ecologists and one behavioural ecologist also attended the meeting, to provide clarity on SAEON’s interest in and working relationship with the SKA core site.

Justin O’Riain, a professor of behavioural ecology who has conducted research on human–jackal conflict in the Central Karoo and has some experience working with farmers, was the last presenter.

⁸⁸ The following account is based on my field notes taken during the meeting.

Speaking in broken Afrikaans and occasionally crossing over into English, he suggested that while “everyone thinks they know what the problem is [i.e. that the SKA’s core site will become a haven for numerous predators], we actually don’t know”, because there is no scientific evidence from the area to support this supposition. He thus requested the cooperation of the local farmers in a research project that he and his postgraduate student were conducting, on mammal responses to land-use change, stating in an attempt to appease his audience: “We can work with farmers even though we wear thick glasses” [*Ons kan saam met boere werk al dra ons dik brille*].⁸⁹ From his seat in the back of the hall, arms crossed, Viljoen, himself a predation management expert who also farms in the region, responded jocularly: “The thick glasses know f--k all!” [*Die dik brille weet f----n min!*].

The above vignette introduces the central problem addressed in this chapter, which is the gap between local knowledge and scientific knowledge around jackal management and the power dynamics involved. The exchange between the scientist ‘with the thick glasses’ and the farmer (who, as noted, is recognised as something of a lay expert on jackal management because he keeps up with the ecological science) points to the deep suspicions among farmers about the legitimacy of the science that SARAO managers are relying on to inform their jackal management strategy. While some SARAO managers and natural scientists did express their openness to ‘local’ knowledge during my fieldwork, most farmers are suspicious of their actual intentions and remain sceptical about the possibility of the effective integration of the two types of knowledges. This gap, further complicated by the absence of mutual trust (already noted in the previous chapter and elaborated on in Chapter 7), has thwarted collective action in planning jackal management strategies in and around the SKA core site and reinforced SARAO’s top-down approach in jackal management and the development of the special nature reserve.

In this chapter I present my research findings on the power dynamics around knowledge production in jackal management around the SKA core site and the marginalisation of local knowledge as a result. In sections 6.1 and 6.2 I present central elements of Kareeberg farmers’ knowledge about jackals and how it is expressed by two very different categories of local experts – the *voetjagter* and the farmer lay scientist. In Section 6.3 I turn to what is considered ‘scientific’ knowledge and its key role in justifying the establishment of the national park and developing a jackal management strategy in and around the SKA core site. Building on the general distinction between scientific and local knowledge already discussed in Chapter 3, my research findings show that with scientists at the helm

⁸⁹ An informal, often derogatory term used to describe (natural) scientists.

of not only radio astronomy but also jackal management, because of the assumed superiority of their scientific prowess and the authority that bestows on them, commercial farmers and the local communities adjacent to the SKA core site are experiencing their science as “deeply oppressive”⁹⁰ (Natrass, interview, 17 January 2018); their science is seen to be affecting their livelihoods negatively in numerous ways while belittling their own lived experience and knowledge of their environment.

In their article ‘The emergence of biodiversity conflicts from biodiversity impacts’ Young *et al.* (2010) list the underlying causes of human–human conflict. These dimensions are: 1) conflicts over beliefs and values; 2) conflicts of interest; 3) conflicts over process; 4) conflicts over information; 5) structural conflicts, and 6) inter-personal conflicts. While this categorisation is generally useful for the analysis of the human dimensions of human–wildlife conflict, the first category, conflicts over beliefs and values, is particularly relevant for this chapter. Conflicts over beliefs and values arise in situations where “differences exist over normative perceptions” (Young *et al.*, 2010:3979; see also Redpath *et al.*, 2015:7). As will also become evident in this chapter, human–jackal conflict around the SKA core site is riddled with dualistic thinking which permeates the divergent ways of thinking about jackals that are evident in the manner in which knowledge claims around jackals are shaped in terms of the following dichotomies: culture versus nature, human versus animal, biocentrism versus anthropocentrism and rationalism versus affective social action.⁹¹

6.1 Local knowledge: Natural vs ‘unnatural’ jackals

According to Philo and Wilbert (2000:11, cited in Jerolmack, 2008:74), all societies have an “imaginative geography of animals”. While humans do grant consent to certain animal species to enter “their” space, such as companion animals like dogs or cats (Peggs, 2012:72), wild animals are deemed unsuitable for this, particularly in farming societies. In addition to the perception that wildlife entering a tame, domestic or domesticated space are ‘unnatural’ and/or ‘degraded’, as discussed in the previous chapter, wild animals also threaten people’s livelihoods and their ordered relations directly. It is therefore no surprise that humans who make a living off the land are likely to at least attempt to separate themselves from these animals, i.e. set themselves apart from ‘nature’ (see

⁹⁰ While Natrass does not speak for farmers, she has come to this conclusion through her research on human–jackal conflict (see, for example, Natrass & Conradie, 2015).

⁹¹ Hurn (2011:48) found the same to be true on South Africa’s Cape Peninsula with regards to human–baboon conflict. For an application of Young *et al.*’s (2010) underlying causes of human–human conflict in relation to human–baboon conflict on the Cape Peninsula, see Terblanche (2015).

Gilleland, 2010). Jackals, however, challenge this understanding of separateness and the assumption that there is or should be a clear, fixed boundary between natural and cultural spaces. They are adept at bypassing fences, especially those “super jackals” that seem to have lost their fear of humans and are able to outsmart various management techniques, which renders controlling them extremely difficult.

Here an important dimension of local knowledge among farmers, which feeds into the ‘unnatural’ narrative, is that those that do live on farms do not act in the same way as jackals that stay in protected areas which predate almost exclusively on wild animals. All of the farmers I interviewed were at one that jackals will consume what are seen as ‘softer targets’ if they can, i.e. domestic animals such as sheep rather than wild prey; thus their presence on farms is extremely undesirable. As with the ambiguous identity of dingoes in Australia (Hyttén, 2009:21), jackals that live and stay in national parks are constructed differently. In these purportedly wild or natural areas, jackals are attributed value as part of the natural environment. However, as soon as jackals interfere with the agricultural economy and thwart farmers’ economic interests, they become “wanted” animals. Bernard, a professional vermin hunter who travels across South Africa to hunt problem animals, summed up this distinction succinctly:

Jackals have a place in the ecosystem, but remember, this [the farm] is not a natural ecosystem. This is a farming system. Just as you have to reduce your springboks because they eat the pastures. Just as you have to market your lambs because the lambs are too much. Space must be made for it. In the same way, you have to manage the jackals too because they eat your profit. [*Jakkalse het ‘n plek in die ekostelsel, maar onthou, hierdie [die plaas] is nie ‘n natuurlike ekostelsel nie. Hierdie is ‘n boerdery sisteem. Net soos wat jy jou springbokke moet minder maak, want hulle eet die weiding op. Net soos jy jou lammers moet bemark, want die lammers is te veel. Daar moet plek gemaak word vir dit. So moet jy nou maar die jakkalse ook bestuur, want hulle eet jou wins op.*] (Interview, 19 October 2017).

This shows that farmers’ and professional vermin hunters’ characterisation of jackals as *ongediertes* is not about the actual traits of the animal itself. Rather, it is indicative of how the understanding of the jackal (its social construction) and of animals more generally, is socio-spatially defined, with both physical and ethical consequences for their treatment (Ilicheva, 2010:64; Peggs, 2012:81; Terblanche, 2015:19). Precisely because of jackals’ “impurity”, which is a product of their tendency to stray across boundaries, Arluke and Sanders (two sociologists specialising in the field of sociozoology) have classified jackals on their sociozoologic scale as vermin (1996:178). While vermin are not necessarily life-threatening to humans, “they are believed to pollute what is regarded as pure and create disorder out of order” (Arluke & Sanders, 1996:178).

Farmers are frustrated that life scientists do not seem to take the distinction between natural and ‘unnatural’ jackals into consideration. While, as discussed further in Chapter 7, a few farmers do engage actively with academic material (particularly through informational communication and social media) – including papers presenting findings consistent with the strong ‘environmental jackal narrative’ – many accuse academics (i.e. ecologists and zoologists) of conducting research exclusively in protected areas and thus ‘getting their science wrong’ (Gys, interview, 15 May 2017; Stefan, interview, 16 May 2017; Franco, interview, 18 May 2017). All the farmers and professional vermin hunters I interviewed argue strongly that life scientists understate the extent of the predation crisis and the effects thereof, in part because much of their research is not focused on ‘unnatural’ jackals on farmland but on ‘natural’ jackals in protected areas:

A lot of the times they [ecologists and zoologists] conduct studies in nature... in parks, in national parks like the Beaufort West or Karoo National Park or so. Then they want to represent that park information to us and say he [jackals] has a role to play in ecology and so on. On a farm a jackal has no role to play. What should he do on a stock farm?! He has nothing, there is no scavenger and such class of things?! [*Hulle [ekoloë en dierkundiges] doen nou baie keer die studies in natuur... in parke, in nasionale parke soos die Beaufort-Wes of Karoo Nasionale Park of so. Dan wil hulle daai park inligting op ons weergee en sê maar hy [jakkalse] het 'n rol te speel in die ekologie en so. Op 'n plaas het 'n rooijakkals geen rol te speel nie. Wat moet hy doen op 'n veeplaas?! Hy't niks, daar's mos nie scavenger en sulke klas dinge nie?!*] (Gys, interview, 15 May 2017).

As noted in Chapter 1, the claim that jackal studies are generally confined to protected areas is inaccurate as there have been some recent studies which address human–jackal conflict on farms in Namaqualand (e.g. Jansen, 2016) and in the Central Karoo (e.g. Natrass & Conradie, 2015; Conradie & Natrass, 2017; Drouilly *et al.*, 2017; Viljoen, 2017; Drouilly *et al.*, 2018; Natrass & Conradie, 2018; Natrass *et al.*, 2019). Nevertheless, there is a shortage of up-to-date research on jackals and human–jackal conflict in South Africa, including context-specific research (Natrass, interview, 17 January 2018; Avenant, interview, 19 February 2018; de Waal, interview, 19 February 2018).

According to farmers Franco and Hugo, another reason why life scientists who advocate a strong version of the ‘environmental jackal narrative’ fail to understand the extent of the problem is because they are not living with it:

If you have someone there every day, then you come to learn their [the jackals'] demeanours and things. But I mean a guy sitting over there [outside of the Karoo] and he tells you “no, you have to let the jackals live and that’s that” [...] No! That’s nonsense! He [the jackal] simply has to die because we cannot live together here. We cannot live here together. They can look at the

jackals in the park [Kruger National Park] if they want to, but not here! [As jy elke dag mens daar het en dan kom jy mos nou hulle [die jakkals se] houdings agter en goed. Maar ek meen 'n ou wat daar anderkant sit [buite die Karoo] en hy vertel vir jou van "nee jy moet die jakkalse aan die lewe hou en dis dit" [...] Nee! Dis nonsens daai! Hy [die jakkals] moet eenvoudig dood, want ons kan nie saam lewe hier nie. Ons kan nie hier saamlewe nie. Hulle, hulle kan die jakkalse in die wildtuin [Nasionale Krugerwildtuin] loop kyk as hulle wil, maar nie hier nie! (Franco, interview, 18 May 2017).

I do not know if one of those kinds of men [greenies, professors] have been on a farm and farmed. [...] To see what is happening, how your sheep is torn apart, how they are eaten up. [Ek weet nie of een van daai soort manne [groenes, proffessors] al op 'n plaas gewees het en geboer het nie. [...] Om te gesien het wat aangaan, hoe is jou skaap stukkend geskeur, hoe's hulle opgevrete.] (Hugo, interview, 27 October 2017).

For his part, Kobus emphasised the adaptability of the jackal, which is associated with its cunningness and opportunism in its choice of food and sets it apart from other animals:

Look, the academics now come up with these terribly wonderful plans and things on how to farm with them [jackals] and how to farm holistically. [...] But as I said to you, I've been farming for 25 years, where I have been the owner of the farm [...]. There is plenty of natural prey for the predators! But I mean they, they have adapted. I mean why would you want to run yourself dead behind a steenbuck when you can feed off the lamb here behind his mother? [...] They can now say just what they want, it is not practical to farm with livestock, let's say commercially, I'm not talking about a guy who's sitting with 3, 4 000ha to play with, I'm talking about commercial farming, effective farming, there's no way how you can, how you can um, skimp at killing jackals and caracals. [Kyk, die akademië kom nou met hierdie vreeslike wonderlike plannetjies en goed van hoe ons saam met die goed [jakkalse] moet boer en hoe ons holisties moet boer. [...] Maar soos ek jou sê, ek is nou 25 jaar terug op die plaas wat ek nou self baas van die plaas is [...]. Daar's oorgenoeg natuurlike prooi vir die roofdiere! Maar ek bedoel hulle, hulle het aangepas. Ek bedoel, hoekom wil jy jou nou vrek hardloop agter 'n steenbok as jy die lam hier agter sy ma se gat loop vreet? [...] Hulle kan nou sê net wat hulle wil, dit is nie prakties moontlik om kleinvee boerdery, kom ons sê kommersieël, ek praat nie van 'n ou wat met 3, 4 000ha sit en speel nie, ek praat van kommersieël boer, effektief boer, daar's nie 'n manier hoe jy saam, hoe jy kan uhm, skimp om jakkalse en rooikatte dood te maak nie.] (Kobus, interview, 30 October 2017).

In order to protect their livestock and control 'out of place' jackals, farmers make use of various control methods that reflect their understanding of the problem and set up further points of conflict with environmentalists. While farmers neighbouring the SKA core site do make use of non-lethal

control measures (predominantly jackal-proof fencing), the lethal control of mesopredators is still the dominant means of dealing with livestock predation in the region. Here farmers draw on a variety of methods in their “toolbox of management tools” (PMF, 2016:9) as suggested by predation management experts. The most popular lethal control methods used by farmers neighbouring the SKA core site are shooting, calling-and-shooting and trapping, with a handful of farmers admitting that they also resort to poisoning as their ‘last hope’.⁹² Even though these control methods are not working effectively, given that farmers continue to face an onslaught from jackal (and caracal), they persist with them as more effective than the advice of ecologists to learn to live with the jackal. To the extent that jackals are indicative of farmers’ “inability to control all the variables in nature”, they have become “emblems of decay and contamination” (Dion & Rockman, 1996, cited in Holm 2012:77).

Consistent with the ‘farmer jackal narrative’ that Natrass and Conradie describes among farmers in the Central Karoo district of the Western Cape (2015), my farmer informants emphasised the necessity of hunting jackals so that they could farm viably. Ecologists and zoologists, however, are arguing that this is counter-productive (see, for example, Natrass & Conradie, 2015:10; Minnie *et al.*, 2016:385; Natrass & Conradie, 2018; Natrass *et al.*, 2019). While the studies on this in South Africa are not that extensive, those that have been published argue that “hunting disrupts the mutually exclusive territorial structure of jackal populations by creating vacant territories on farms” (Minnie *et al.*, 2016:385). These local studies draw on North American research on a similar species, the coyote (*Canis latrans*), which has found that higher coyote densities tend to occur in areas where the alpha breeding pair have been killed than in undisturbed ecosystems where the presence of the alpha pair reduces the degree of subordinate females that are also breeding (Reardon, 2018:48). In an interview I conducted with James, a SAEON ecologist, he drew on these findings to emphasise the importance of natural science research for effective jackal management, “because if you disturb the jackal population, you might actually make your problem worse and [...] you can’t go and fight that battle for the rest of your life” (interview, 16 October 2017).

Even though “numerous field studies across Africa, and the world, demonstrate that when predator population dynamics are disrupted, by hunting, for example, the animals compensate by producing larger litters, dispersing over bigger areas and altering their behaviour” (Reardon, 2018:48), Kareeberg farmers are resistant to the information imparted at public communication meetings such as the one in Brandvlei that I described at the start of this chapter. Without more context-specific

⁹² While poisoning is frowned upon by most, especially environmentalists, under the Northern Cape Nature Conservation Act No. 9 of 2009 it is legal to make use of poison as long as one possesses the necessary permit and adheres to the conditions outlined in the permit (Republic of South Africa, 2009). It is, however, unclear whether all of the farmers that make use of poison hold such a permit and/or abide by its conditions.

research in the Kareeberg region, farmers continue to doubt the science and to dismiss ecologists' research-based findings as mere hypotheses that their own experiences do not bear out.

Nevertheless, it is the natural scientists who are seen as central to the formulation of policies and management strategies for the future national park, without provision being made for the input of local knowledge beyond public meetings which are aimed at the communication of decisions, as required by policy, rather than at mutual learning. One of the main conclusions emerging from my research is that the establishment of the new protected area in the Kareeberg around the SKA could and should serve as a prime opportunity for the holders of scientific knowledge to draw on the local knowledge of farmers, farmworkers (specifically *voetjagters*), and professional vermin hunters; this would help to bridge the divide between the 'environmental' and 'farmer jackal narratives' and create jackal management policies that will be more effective in practice. According to Stefan (interview, 16 May 2017), a farmer neighbouring the SKA core site, "people who grew up with jackals" have the "most valuable" knowledge [*die's seker die waardevolste. Jy moet, [...] veral mense hê wat met jakkals grootgeword het*], as they are on the ground and not in "ivory towers", like academics and environmentalists. Viljoen, who, as discussed further below, is interested in and well informed on the science of jackal management, insisted in an interview that those such as himself who move among jackals and interact with them almost on a daily basis should play a "leading role in the overall management programme of that particular farm" [*leidende rol kan speel in die totale bestuursprogram van daai spesifieke plaas*] (interview, 20 May 2017); they are in the veld and know the spoor and dung and can locate the breeding sites.

The above quote again highlights the need for context-specific research that scales down as far as the individual farm level. Here, scientific research can potentially fulfil another gap in human–jackal conflict research in South Africa by identifying the factors that hinder Karoo farmers from implementing (non-lethal) predation management strategies – which is where social scientists can also play a part.⁹³ Some academic scientists do recognise the need for this, particularly those in the more applied fields. According to H.O. de Waal, a professor in animal nutrition who has conducted research on jackals and human–jackal conflict and promotes the inclusion of local knowledge in jackal management, many academics do not seem to learn from past mistakes. "No matter how well a management plan is conceptualised, we still fail to understand the human dimensions of human–jackal conflict", he says; as a result, management strategies continue to fail "every time" [*elke keer*]

⁹³ In their publication, 'Predators, livestock losses and poison in the South African Karoo', Natrass and Conradie (2018) point to several potential social determinants that lead to the lethal control of predators in the Central Karoo. Most pertinently, their research suggests that "farmers whose entire household income comes from sheep [as is the case in the Kareeberg region] cull predators in greater numbers" (Natrass & Conradie, 2018:785).

(interview, 19 February 2018). Several external factors are also implicated, including limited finances and/or lack of state support, but the inability of ecologists and zoologists to recognise the importance of not simply understanding, but also respecting, the reasons why farmers behave as they do, is part of the problem.

6.2 Identifying local knowledge experts: “*Die Karoo het nie net sterre-kennis nie*”

Sitting in on my interview with her husband, Jan, Nanette interjects that the Karoo has more to offer the scientific community than what they see when they look up at the sky: “the Karoo does not only have knowledge about the stars” [*die Karoo het nie net sterre-kennis nie*] (5 July 2017). What she means is that jackal ecology and management are areas of knowledge to which professional vermin hunters, farmers and their workers can contribute. As will become evident in this section, certain farmers and farmworkers are considered by other Karoo residents to be experts in jackal management.

6.2.1 The *voetjagter*

Before the development of vermin-proof fencing in the 1890s and coordinated hunting efforts among farmers, farmers relied on farmworkers, i.e. herders, to attend to their flocks. While all the farmers I interviewed employ fewer permanent farmworkers today than they did previously, those who are serious about their battle against the jackal (and the caracal) still rely on dedicated *voetjagters* (‘coloured’, male farmworkers) to identify and follow spoor, as well as set up traps for jackal and caracal, as part of their daily routine. In some instances where farmers have particularly high predation rates, a farmworker may be employed solely for his skills as a *voetjagter*. As these workers interact with jackals on almost a daily basis, farmers and professional vermin hunters applaud them for the practical knowledge on jackal behaviour they have gained from being in the veld. A majority of the farmers I interviewed admitted that they “cannot go on without them” [*ek kan nie sonder hom nie*], in the words of Hugo (interview, 27 October 2017). Recollecting an experience in the veld with his *voetjagter*, Gys was still impressed not only by the knowledge his *voetjagter* has, but also by how gently he works with the animals:

I had a hunter and [...] if you catch a big male caracal, then [...] he puts a choker around, you know, around his neck. Then he pulls him up, then he hits him lightly over the head with his knob-stick. [...] He just hits the cat unconscious. Then he operates on him. Then he takes out his bladder to catch that urine, then he cuts his bladder with a string, he operates him and

everything. The cat lies there [...] and then he kills him. Now you can ask why does he do that? [...] When a thing dies, he pees. And then his bladder is empty, then his urine is lost. This that man tells me. [...] He does not have a BSc degree. He doesn't, and he operates that kitten without that, that cat, not a kitten, without him knowing [laughing]! [*Ek het 'n jagter gehad en [...] as jy 'n groot mannetjie rooikat vang, dan [...] hy sit vir hom 'n strop om, jy weet, om sy nek. Dan trek hy hom op, dan slat hy vir hom met sy kiere net so ligte houtjie op sy kop. [...] Hy slaan die kat net katswink. Dan opereer hy vir hom. Dan haal hy sy blaas uit om daai urine op te vang dan knip hy sy blaas met 'n toutjie toe, hy opereer hom en als. Die kat lê daar [...] en dan maak hy hom dood. Nou kan jy vra hoekom doen hy dit so? [...] As 'n ding doodgaan, dan pee hy. En dan's sy blaas leeg, dan is sy urine verlore. Dit vertel daai jong vir my. [...] Hy't nie 'n BSc graad nie. Hy het nie, en hy opereer daai katjie sonder dat, daai kat, nie katjie nie, dat hy daarvan weet nie [laggery]!*] (Interview, 15 May 2017).

During my fieldwork concern was expressed that most Karoo *voetjagters* are elderly and this form of local knowledge is dying out and not being transmitted to the younger generation (i.e. farmworkers' children), who are choosing to move away from farmwork in general (Maghiel, interview, 4 July 2017). Reasons given for moving off the farm included labour issues, including the meagre salary; in the case of *voetjagters*, the long days and nights in the veld, the strenuousness and isolated nature of the work, and most importantly, the inconsistency of the work were particular deterrents. Comments by Stefan, a 71-year-old farmer whose farm borders the SKA core site, confirmed the lack of material reward for the skills that *voetjagters* deploy:

The actual thing is about the volatility. All good and well, when you hire a guy to hunt, then you do give him a ration. In other words, if he does not catch anything for a month, then can he not just have nothing? In other words, his ration and his small payment remain the same [...]. There is a base you pay him, yes. And if he now has extra income [i.e. when he receives a bonus for jackals and caracals killed], but as I say then a month goes by where he searches but nothing gets caught. So it is, it is hard. [*Die eintlike ding gaan oor die wisselvalligheid. Nou goed as jy nou 'n ou huur om te jag, jy gee mos darem nou 'n rantsoen. Met ander woorde, as hy nou vir 'n maand niks vang nie, kan hy mos nou nie niks hê nie? Met ander woorde sy ransoen en sy betalingjie bly dieselfde [...]. Daar's 'n basis wat jy hom betaal, ja. En as hy dan nou ekstra inkomste het [m.a.w. wanneer hy 'n bonus ontvang vir jakkalse en rooikatte wat doodgemaak is], maar soos ek sê dan gaan daar 'n maand om wat hy soek en dan kry hy net niks gevang nie. So dit is maar, dit is maar moeilik.*] (Interview, 16 May 2017).

Reflecting on this phenomenon, Conrad, a SAEON ecologist, pointed to the need to improve conditions of service:

It's a global phenomenon that people want to go to cities. If you want them [foot hunters] to stay, you need to create a business for that. So it's easy to cry organisation but we all know that we need to have innovative approaches to draw people back to this. And so, you cannot pay them peanuts anymore, you have to rely now on actually building a, some decent job for somebody. Either you do it or you start it now as a branch of your farm or as a company. But, if not, it's going to run dry. They predict that 80% of people will live in cities by 2020. So places like these will just go down. If it is not for innovation. (Interview, 16 October 2017).

Stefan's comments illustrate the extent to which relationships between farmers and farmworkers in the Karoo are still deeply rooted in paternalism. In an attempt to alleviate farmworkers' poor working conditions, farmers assume certain "social responsibilities" such as supplying transport, groceries and occasional *ad hoc* financial assistance on top of very low wages. They are, however, still very much in control over what happens on their property. While post-apartheid labour and tenure security legislation was supposed to minimise exploitation and increase social security for farmworkers in South Africa, the impact of this legislation has been very unevenly felt and in many areas can be seen to have simply reconfigured paternalistic relationships between farmers and farmworkers. Consequently, most South African farms continue to operate in a state of "neo-paternalism" which Ewert and Hamman (1999:202) define as a labour regime "regulated to some extent by state legislation, but still imbued with the spirit of paternalism". This is certainly the case in the Kareeberg. As already mentioned in Chapter 4, while I was able to hold informal conversations with some farmworkers, this was mostly under the watchful eye of the farmer and/or his foreman. Consequently, farmworkers did not feel free to express their own voice and merely repeated what the farmer would tell them to say about jackals and/or the SKA. This was particularly evident during my first interaction with a *voetjagter*, as will become evident in the following vignette.

In November 2016, Niklaas, a farmer who had boycotted one of SKA SA's public communication meetings in Carnarvon before it had even started, invited me to visit his farm early one morning. There I met Karel, his *voetjagter*. He was an elderly 'coloured' man, dressed in work clothes that clearly distinguished him from his employer. At the time he had been a full-time *voetjagter* for the previous seven years, five of them on Niklaas' farm. Sitting on the veranda, being served rusks, dried sausage and coffee by one of Niklaas' housekeepers, Karel was visibly uncomfortable. He was not used to being served while sitting on the *Baas's* veranda. Niklaas's instructions were stern, albeit spoken in a gentle tone: "Get some food!" [*Kry vir jou kos!*]; "Drink your coffee while it's still warm" [*Drink jou koffie terwyl dit nog warm is*]; "Tell her what you do" [*Sê vir haar wat jy doen*]; "Tell her what you think of this SKA business" [*Sê vir haar wat jy dink van hierdie SKA gedoente*].

In our discussion, it became clear that Karel is very knowledgeable about jackals and the farm. He knows exactly when it is lambing time, when it is the jackals' breeding season, where the dens of the jackals are and how to set a gin trap in such a way that the jackal does not smell him and/or see his footprints. "I walk 20 kilometres a day, Madam. At night I lie awake and listen to the sounds and during the day I rely on my gut feeling and look for spoor, dung and pee" [*Ek loop 20 kilometer 'n dag, Mevrou. Saans lê ek en luister na die geluide en gedurende die dag, luister ek na my binneste en soek vir spoor, mis en pie*"]. His opinions regarding the SKA highlight concerns about the *inkomeling*-nature of the project and underlying racial tensions between black African and coloured people in the Karoo, but it was hard to know how independent his views were in the presence of his employer:

We belong here. We are afraid of the black people coming in [SARAO staff and/or outsiders looking for job opportunities]. We are scared to go out. They come from outside and push us out. [*Ons aard hier. Ons is bang vir die swartmense wat inkom [SARAO personeel en/of buitestaanders opsoek na werksgeleenthede]. Ons is bang om uit te gaan. Hulle kom van buite af en druk ons uit.*]

After we had drunk our coffee, he offered to show me some jackal dens in the veld. In the veld no talking was allowed so he could focus – as he described to me, "you have to think like a jackal, you have to become one" [*jy moet dink soos 'n jakkals, jy moet 'n jakkals word*]. After Karel had found the den, Niklaas boasted about his *voetjagter* and how having a *voetjagter* on the farm was the best jackal management strategy: "In just over a month, he caught 31 jackals.



Figure 6.1 Karel in action, carefully scanning the veld looking for jackal dens (Source: Terblanche, 2016).

Night shooting [i.e. calling-and-shooting] does not work anymore" [*Oor bietjie as 'n maand, het hy 31 jakkalse gevang. Nagskiet [m.a.w. roep-en-skiet] werk nie meer nie*].

However, a year later, when I met Niklaas again at a SARAO information session in Williston, he was visibly upset when I asked him how things were going on the farm. With a long sigh he told me: "Oh girl, Karel is gone" [*Ai meisiekind, Karel is weg*]. Without his *voetjagter*, Niklaas was having to rely again on a professional vermin hunter, as needed. According to him, after being sober for eight

years, Karel had begun drinking again, which Niklaas would not tolerate on his farm. In the eyes of Niklaas, the *voetjagter* business had become too lucrative and Karel could not cope with the money which allegedly amounted to over R400 000 in the previous year alone.

My encounter with Karel confirmed what other farmers told me about the personal characteristics of *voetjagters*, as well as their concerns about the changing social environment around them. According to Hugo (interview, 27 October 2017), it requires a “unique person [and] nature to do the job” [*’n unieke mens [en] geaardheid wat daai job moet doen*]. Maghiel (interview, 4 July 2017) adds that “if you do not love the veld” [*as jy nie lief is vir die veld nie*] and do not have an absolute interest in the veld, one will not be able to do this work. Discussions around the strenuousness of the life of the *voetjagter*, and the fact that it seems to be too much for the younger generation in farmworker households, shifted in a handful of interviews to complaints about the state, which was primarily blamed for this (Maghiel interview, 4 July 2017; Hugo interview, 27 October 2017; Kobus interview, 30 October 2017). The primary culprit was identified as the state’s social grant system which was blamed for giving people handouts which failed to instil a sense of hard work and passion in its citizens. Additionally, while none of the farmers I interviewed wished to deny the children of farmworkers an education, they did see their school commitments as preventing these children from spending time in the veld with their elders and gaining ‘local’ knowledge via first-hand experience. This is illustrated in the following excerpts from interviews with farmers:

We no longer really get those men who walked on the ground, it’s just the old ones. Here and there you will get another young one, but they are not interested anymore. They get money from the state and then lie in the towns and pick up papers and, they do not really have to be busy, but he gets his pay. So why would he want to walk around in the veld? [*Ons kry nie meer regtig daai manne wat op die grond geloop het, hulle raak, dis net die oues. Hier en daar sal jy nog ’n jonge kry, maar hulle stel nie meer belang nie. Hulle kry geld by die staat en dan lê hulle in die dorpe en tel papiere op en, hulle hoef nie eintlik besig te wees nie, maar hy kry sy pay. So hoekom wil hy nou in die veld kom rondloop?*] (Maghiel, interview, 4 July 2017).

The little ones may not work anymore as they [the old foot hunters] worked [...] Back then they, they begun to carry gin traps for the older men. First of all, they have to go to school now. Back then they did not go to school, they were just taken out of school to do it. [...] They only carried the gin traps for a long time and then looked at gin traps and then how gin traps are put in place and after that they learned how to read the newspaper in the morning. The veld is a newspaper, every morning it is rewritten. And he knows how to read that newspaper. Tomorrow it is old news that happened yesterday. [*Die kleintjies mag mos nou nie meer werk soos hulle [die ou voetjagters] gewerk het nie. [...] Daai tyd het hulle, hulle het begin om vir die ouer manne*

slagysters te dra. In die eerste plek moet hulle mos nou skool toe gaan. Daai tyd het hulle nie skool gegaan nie, hulle is sommer uit die skool uit gehaal om dit te doen. [...] Hulle het net eers die slagysters gedra vir baie lank en dan slagysters kyk en dan's hoe word 'n slagyster nou gestel en dan daarvan af het hulle geleer hoe om die koerant in die oggend te lees. Die veld is 'n koerant, elke oggend word hy nuut oorgeskryf. En hy weet hoe om daai koerant te lees. Móre is dit ou nuus wat gister gebeur het.] (Hugo, interview, 27 October 2017).

I mean, I'm taking myself now, long before I was 18 I was working extremely hard on the farm. Walking in the veld, ravines, mountains, up and down, it's just how you track, how you learn, how to get to know the veld, where you set traps and put out a cage and those things [...]. Now the guys are all in the school and no one is allowed to work on the farm, so who should learn it, understand? [*Ek bedoel, ek vat nou myself, ek het dan lank voor ek 18 was bitterlik hard op die plaas gewerk. Veld toe stap, klowe, berge, op en af, dis maar hoe jy spore, hoe jy leer, hoe jy die veld leer ken, waar jy ysters stel en 'n hok uitsit en daai goed [...]. Nou sit die ouens almal in die skool en niemand mag werk op die plaas nie, so wie moet dit leer, verstaan?*] (Kobus, interview, 30 October 2017).

These interview transcripts not only reflect the unequal power relations still found on commercial farms, but also commercial farmers' yearning for the old days when they were “*baas van die plaas*”.

6.2.2 The farmer lay expert

In addition to *voetjagters* whose local knowledge of jackals is deeply rooted in the daily, grounded experience of living and working with jackals, farmers also consider other local actors, both farmers and professional vermin hunters, to be experts in jackal management. The prime example of a jackal expert in the region is Niel Viljoen, a local farmer in his mid-40s who has made it part and parcel of his farming practice to study the diet and behaviour of jackals. Viljoen has been in a “battle with jackals” [*stryd met die jakkalse*] since 1990 when he first started farming (interview, 20 May 2017). Throughout the years, fighting against the jackals evolved into a “passion to understand jackals” [*passie om die jakkalse te verstaan*] for this farmer, avid hunter and predation management consultant for the NWGA.

In response to my asking him to elaborate on what he means by “predation management” instead of “predator management”, Viljoen highlights the importance of proactiveness which he applies on his farm:

Predation management involves this: number one, you look at [...] the maintenance of your boundary fences. It's nothing to put up a boundary fence, but the management, there are certain

times in the year that are critical times to manage it. Um, and these are all times that you can pull through to the biology of the jackal, [...] the time for jackal pups, the hunting time when jackals move around [...]. And then it is [also] if it is the beginning of mating season, then they become vocal. That's in June/July. So then you have to keep your boundary fences closed and then of course after any [...] natural element like rain and, and snow. In many cases, snow presses our boundary fences down. [...] And the most important [period] for a farmer [...] to manage is, um, lamb times with the lambs. If the ewes lamb, along with [...] the afterbirth, that smell... I did tests with him, [at] 4km a jackal picks it up. [...] It's by nature, it's his instinct, he is a scavenger, he is going to come and look. So this is a hugely important time for a farmer to get it in his head. Then you have to manage. [*Predasiebestuur behels dit: nommer een, jy kyk na [...] die instandhouding van jou lyndrade. Dis niks om 'n lyndraad op te sit nie, maar die bestuur, daar's sekere tye in die jaar wat kritieke tye is om hom te bestuur. Uhm, en dit is als tye wat jy kan deurtrek na die biologie van die jakkals, [...] die kleintjie jakkalstyd, die jagtyd wanneer jakkalse wissel [...]. En dan is dit [ook] as dit die begin van paartyd is, dan raak hulle vokaal. Dis hier Junie/Julie maand. So dan moet jy weer jou lyndrade toe hou en dan natuurlik na enige [...] natuurlike element soos reën en, en sneeu. In baie gevalle druk sneeu ons lyndrade plat. [...] En die belangrikste [tydperk] vir 'n boer [...] om te bestuur is, uhm, lamtye met die lammers. As die ooie lam, saam met [...] die nageboorte, daai reuk... Ek het toetse met hom gedoen, [by] 4km tel 'n jakkals dit op. [...] Dis van nature, dis sy instink, hy is 'n aasdier, hy gaan kom kyk. So dis 'n enorme belangrike tyd vir 'n boer om dit in sy kop te kry. Dan moet jy bestuur.*] (Interview, 20 May 2017).

As he shifted from predator to predation management and began to achieve success on his farm, his reputation spread like wildfire among other farmers, even reaching into the community of life scientists working on jackal management in the Karoo. Viljoen's constant message to fellow farmers goes against the grain of much local knowledge and overlaps with those on the 'science' side of the divide in knowledge systems: one cannot ignore jackals and farmers need to accept the reality of jackals on their farms. As a result, the only way to farm successfully is to farm alongside the jackal:

You must know your property, you must know the jackal's biology, you must know its behavioural patterns. Because as I just told you, you are farming with a jackal whether you want to know it or not. He is on your farm. [*Jy moet jou grond ken, jy moet die jakkals se biologie ken, jy moet sy gedragpatrone ken. Want soos ek net nou vir jou gesê het, jy boer met 'n jakkals of jy dit wil weet of nie. Hy is op jou plaas.*] (Viljoen, interview, 20 May 2017).

When asked why farmers view him as “one of the jackal experts” [*een van dié jakkalskenners*] (Gys, interview, 15 May 2017), Viljoen said it is because he and other farmers “speak the same language” [*ons praat dieselfde taal*] (interview, 20 May 2017). However, what differentiates Viljoen from most

other Kareeberg farmers is that, in addition to his local knowledge, he also draws on and engages with the ‘environmental jackal narrative’ by being involved in scientific research as well as policymaking. Consequently, all of the ecologists and zoologists I interviewed for my research also have high praise for Viljoen and his ability to bridge social networks. Nicoli Nattrass, a professor in social science who has conducted research on human–jackal conflict and often works alongside Viljoen, points to the systematic nature of his data collection:

He [Viljoen] does his own research but what frustrates him is that it was never under the umbrella of a university so it doesn’t have the scientific imprint on. But it is still systematic data collection on his part. And he has worked with us and it seems to work quite well because on the one level he was a bit sceptical if we would actually deliver anything but then we would send him, you know, maps of where the jackals went which he’s then used for talks. So you know, there’s been a bit of give and take. His, he has used our stuff to help with presentations to farmers and we think well that’s useful because they do listen to him more than us. (Interview, 17 January 2018).

For Jurie du Plessis, who holds a PhD in Ecology and has conducted research on jackals and human–jackal conflict, Viljoen is a practical example of how a farmer’s relationship with his farm (and jackals) should be:

You must know your farm. You have to be there. You cannot just sit on the stoep and, and say to your workers go, go and do that. He [Viljoen] says you must be on your farm. [...] You have to walk on your farm. You need time on the ground. And I think that’s the most important thing the guys do not want to do anymore. I think that’s the big one... they do not know their farm. You have to know where your jackal is sleeping. [*Jy moet jou plaas ken. Jy moet daar wees. Jy kan nie net hier op die stoep sit en, en jou werkers sê gaan, gaan doen dit nie. Hy [Viljoen] sê jy moet op jou plaas wees. [...] Jy moet loop op jou plaas. Jy moet tyd op die grond. En ek dink dis die belangrikste wat die ouens nie meer wil doen nie. Ek dink dis van die groot... hulle ken nie hulle plaas nie. Jy moet weet waar jou jakkals slaap.*]. (Interview, 19 February 2018).

This points to a further dimension of the changing political ecology of farming in the Karoo. Here both a farmer and predation management expert (Viljoen) and an ecologist (du Plessis) have highlighted the concern that many farmers are no longer living on their farms and actively managing predators, predation and livestock. The loss of a close relationship between the farmer and his farm(s), in the case of absentee landowners, has also been highlighted by farmers neighbouring the SKA core site as a concern. Many constituents deem this to be the main contributor of the repopulation of vermin on Karoo farms.

6.3 Scientific knowledge, power and the SKA national park

As stated earlier in chapters 1 and 2, the approximately 130 000ha owned by the NRF is in the process of being declared as a protected area, more specifically, a special nature reserve in terms of South African legislation (SARAO's stakeholder engagement officer, written response, 17 July 2019).⁹⁴ While astronomy will remain SARAO's primary focus, the SKA core site's "secondary use is to ensure the protection of the environment/ecosystem through the conservation of biodiversity and the promotion of long-term environmental research and monitoring" [*sekondêre gebruik van die grond is om die beskerming van die omgewing/ekosisteem te verseker deur die bewaring van biodiversiteit en die bevordering van langtermyn omgewingsnavorsing en -monitering*] (SARAO's land acquisition process programme manager, closed meeting, 18 May 2018). Natural scientists, especially ecologists, have welcomed the positive contribution that they see the SKA core site making towards conservation in the Nama Karoo, adding approximately 41% to the Department of Environmental Affairs' NPAES' Upper Karoo target (Todd, n.d.).⁹⁵

While the proposal to establish the special nature reserve has been applauded by ecologists, conservationists and physicists alike, neighbouring farmers were caught off guard by the announcement of moves to establish a national park in their midst and the involvement of SANParks in its management. This was clearly evident during the first round in a series of public participation events organised by SARAO in April 2018, as part of a larger public participation process for the drafting of the new park's Park Management Plan. At these meetings, the gulf between farmers and SARAO with regard to the knowledge systems that should be drawn on to manage jackals effectively in the region was very apparent, as the following account of the public consultation meetings held in Williston and Carnarvon brings to the fore.⁹⁶

⁹⁴ In his written response the SARAO official cited that 120 700ha will be declared as a protected area. However, the total given in the text was the figure in general circulation in 2018/19, representing the approximate size of the total core site.

⁹⁵ The information provided here was also highlighted by the programme manager for SARAO's land acquisition process, at the April 2018 workshops held by SANParks and SARAO to discuss the development of the SARAO National Park Management Plan, in Williston, Brandvlei and Carnarvon which I attended. According to the programme manager for SARAO's land acquisition process, it is part of SARAO's "collective responsibility" to support and promote environmental research and conservation.

⁹⁶ A third workshop was held in Brandvlei, which I also attended. It was not, however, attended by any farmers and the approximately 15 community members who were in attendance were not well informed about developments.

6.3.1 Managing the SKA national park

Inside the Williston church hall there were only about 20 attendees occupying a small section of the room as an employee of NCC Environmental Services in Cape Town welcomed those present and outlined the agenda of the meeting. After the welcome, as part of her introduction and background discussion, the programme manager for SARA O's land acquisition process explained that, in compliance with the requirements of the NEMPA Act of 2003, it was envisaged that the NRF would be appointing SANParks as the Land Management Authority for the SKA core site. In order to run the national park successfully, SANParks would be responsible for developing a management plan in which stakeholder engagement (i.e. public participation) would be central. At this point, some farmers shook their heads and one sitting next to me leaned over and whispered: "Can you believe this?" [*Kan jy dit glo?*].

Upon asking attendees to contribute to the mission statement of the national park (which in the end will form part of the management plan), it became clear that farmers, who formed the majority of those in attendance, were not happy with the agenda. One by one they stood up and raised their opinions: "We cannot describe it [the mission statement], because we are fairly negative" [*Ons kan dit [die missie verklaring] nie beskryf nie, want ons is redelik negatief*]; "It is something that really does not belong here" [*Dit is iets wat regtig nie hier hoort nie*]; "We did not decide to establish a park there, how can we contribute to the [park's] mission?" [*Ons het nie besluit om 'n park daar te stig nie, hoe kan ons bydra tot die missie [van die park]?*].



Figure 6.2 The programme manager for SARA O's land acquisition process explains to farmers attending the Williston workshop held by SANParks and SARA O about SANParks' involvement with the SKA core site (Source: Terblanche, 2018).

In an attempt to put them at ease, as well as to clear up any misunderstanding, a SANParks official who up until then had not introduced himself, restated that a general management plan was required for SANParks to run the proposed national park properly. As summarised in the Facilitation Report

that was produced on the Williston workshop, he emphasised the importance of ‘stakeholder engagement’ in this process:

The planning process is a staged approach and the purpose is to source information for incorporation in the management plan. However, this purpose is situated within a broader context of forming and sustaining relationships with the public so as to secure mutual understanding and ongoing support (Gerhardt, 2018:5).

All of the April 2018 workshops with SANParks were organised around three objectives: first, the identification of challenges and risks by the local community; second, the identification and discussion of the special features of the area; and third, the desired state of the proposed national park (Gerhardt, 2018:5–6). The objectives are evidence of the profound paradigm shift that SANParks has undergone in the past 23 years, from its former strictly protectionist approach “towards one that recognises the need to use biodiversity sustainably and to involve the community in conservation” (Wynberg, 2002:233). This shift is underpinned by the values espoused in the Bill of Rights section of South Africa’s post-apartheid Constitution of 1996. The introduction in the 1990s of the Social Ecology programme of SANParks, more commonly known as the ‘People and Parks’ programme, required protected areas not only to justify their existence based on conservation principles, but also to ensure that the benefits that they offered to local communities surrounding the parks outweighed any losses they sustained by virtue of the land being excluded from other uses such as grazing, farming, mining or housing (de Villiers, 2008). As a result, SANParks is committed to going beyond its motto *Custos Naturae* (i.e. custodians of nature) and advancing community-based projects in line with South Africa’s National Development Framework for Sustainable Development as well as the National Development Plan (SANParks, 2018). However, in combining its responsibilities for wildlife conservation with responsibilities for addressing the socio-economic needs of local, surrounding communities, the agency has found itself enmeshed in contradictory forces as it has tried to negotiate what can be described as a spider’s web of diverse interests, competing expectations and differing understandings of sustainability.

These contradictions dominated the workshops in Williston and Carnarvon where, instead of the focus being on the organisers’ stated objectives for the meeting, it was the strained relationship between SARA and farmers that dominated proceedings, indicative of the lack of trust and miscommunication that had characterised prior discussions about the SKA core site during the Land Acquisition Programme. While the farmers who spoke wanted to make it clear that none of them were against conservation (as emphasised by Dian, a farmer and active professional vermin hunter who spoke at the Williston workshop), what they were objecting to was that “the decisions have already

been made” [*die besluite [is] klaar gemaak*], and they did not trust what was seen as yet another example of a top-down approach by scientists over farmers.

As Williston farmers began to list their concerns (ranging from jackal and caracal to the management of the fences, tax implications and access to the area), Gys questioned whether a national park would be of any benefit to the region: “Should we have a national park there? Hear all the problems! I conserve on my farm on land that is resting” [*Moet ons ‘n nasionale park daar hê? Hoor dan al die probleme! Ek bewaar dan op my plaas op grond wat rus*]. His frustrations finally getting the better of him, Gys eventually stormed out of the workshop while discussions were still ongoing.

The workshop held in Carnarvon two days later unfolded in a similar manner once a challenge by a Save the Karoo member who attempted to halt the workshop had been dealt with. With approximately 30 people in attendance representing various interest groups, the Save the Karoo member interrupted the welcoming and opening of the workshop to voice his concerns: “Your way of doing [management style] is very steam roller-ish” [*Julle manier van doen [bestuursstyl] is baie stoomrolleragtig*]. He accused the organisers of running a “dictatorship” [*diktatorskap*] and presenting an information session rather than a workshop, which did not allow for real input from community members. In defence of the meeting, the SANParks official emphasised that the “workshop is to start the planning of the new national park. [...] It’s important to create relationships. [...] You need to form the plan with us” [*werkswinkel is om die beplanning te begin van die nuwe nasionale park. [...] Dis belangrik om verhoudinge te skep. [...] U moet saam met ons die plan stig*]. Eventually it was agreed that the Carnarvon workshop would go ahead, but another one was scheduled for June 2018 to satisfy the calls of Save the Karoo members for more consultation.

While this suggested that a genuine attempt was being made to incorporate local knowledge into the management plan, farmers were not convinced. Niklaas insisted that what was in place was a top-down communication and implementation approach: “When was the decision made that it is going to



Figure 6.3 The workshop held by SANParks and SARAO in Carnarvon to discuss the development of the SARAO National Park Management Plan (Source: Terblanche, 2018).

become a national park?!” [*Wanneer is die besluit gemaak dat dit ‘n nasionale park gaan word?!*]. Throwing his hands up in the air out of frustration, he said: “We don’t have a say... we have no say” [*Ons het nie ‘n sê nie... ons het geen sê nie*].

In addition to their concerns that they are not being taken seriously, farmers and professional vermin hunters who held strongly negative views towards the proposed park also cited food security as a concern, as valuable agricultural land is being taken out of production and converted into a protected area. While a minority of the farmers and professional vermin hunters that I interviewed did see the value of a conservation area, most views about the special nature reserve among farmers were extremely negative, as captured in the following quotation:

I get quite hot under the collar for academics and for the greenies. [...] I mean, there are really enough parks! [...] I mean you sit, if I just think about what is around here, you have the West Coast park, below, you have the Tankwa Karoo, you’re sitting with the Karoo National Park here at Beaufort [West]. I mean it’s hundreds, thousands of hectares! [...] And then another 140 000ha [sic]. [*Ek raak nogal warm onder die kraag vir die akademici en vir die groenes. [...] Ek bedoel daar’s mos nou regtig genoeg parke! [...] Ek bedoel jy sit, as ek dink net hier rond, jy’t nou die Weskus park, hier onder, jy’t die Tankwa Karoo, jy sit met die Karoo Nasionale Park hier by Beaufort[-Wes]. Ek bedoel dis honderde, duisende hektaar! [...] En dan nóg 140 000ha [sic].*] (Kobus, interview, 30 October 2017).

For his part Jan was more reflective in his interview with me about the relationship between sheep farming and the environment, but concluded by reaffirming the importance of farmers for feeding not simply South Africans, but ‘the world’:

It’s a terribly big problem for us as sheep farmers. Well, we should probably have never started farming with sheep here, but where are we going to get our sheep meat from? [...] We completely overthrew nature with our sheep farming here. It is probably not what really should have happened here [...]. Put back the nature, or try to put it back as it was, and it will not work either. Because, unfortunately, we are too many people in South Africa, too many people in the world who need food. And we eat meat. That is so. [*Dis ‘n verskriklike groot probleem vir ons as skaapboere. Nou goed, ons moes seker nooit hier begin boer het met skaap nie, maar waar gaan ons skaapvleis vandaan kry? [...] Ons het die natuur totaal omver gewerp met ons skaapboerdery hier. Dit is seker nou nie wat regtig hier moes gebeur het nie [...]. Sit die natuur terug, of probeer dit terug sit soos wat dit was, en dit gaan ook nie werk nie. Want, jammer, ons is te veel mense in Suid-Afrika, te veel mense in die wêreld wat moet voedsel hê. En ons eet maar vleis. Dit is so.*] (Jan, interview, 5 July 2017).

Farmers often reminded SARAO personnel at the many public meetings that I attended that the original picture that had been sold to them was one of their livestock grazing among the radio telescopes, depicting a happy co-existence between local livelihoods and astronomical science (see Figure 2.11). This point was made again at the workshop with SANParks and SARAO in Williston in April 2018 with one farmer requiring clarity on why springbok and other game species would be allowed to graze among the radio telescopes but not livestock. While SARAO personnel present justified the decision to clearly demarcate the spaces allocated to radio astronomy and to livestock farming by citing safety and security regulations as well as the low-intensity management strategies required for game, farmers were not mollified. For them the primary consideration was that ‘science’ (both radio astronomy and ecology) was taking precedence over farming. While turning the core site into a protected area would allow SARAO to contribute to the advancement of science and showcase the achievements of radio astronomy in and for South Africa and Africa, local needs were being overshadowed.

6.3.2 Jackal management in the SKA national park

Thus around the SKA core site a ‘messy’ management space is emerging, as environmentalists, ecologists and zoologists try to implement a pro-science management strategy in an area where farmers have adopted a largely hostile approach to the new authorities. This feeds into an ‘anti-science’ narrative among the new managers whereby ignorant farmers are disparaging of their objective, rationalist, bureaucratic and scientifically supported approach to managing jackals (and the park more generally). As part of the IEMP’s commitment to long-term environmental research and monitoring, the NRF plans to conduct research on the presence and abundance of mesocarnivores and their prey within the core area (Gaea Enviro (Pty) Ltd, 2018:4). Such evidence, it is argued, will allow SANParks, the proposed land manager of the core site, to make informed management decisions about wildlife, including whether jackals in the new protected area should be actively managed or not (Gaea Enviro (Pty) Ltd, 2018:48). According to SARAO’s stakeholder engagement officer (written response, 17 July 2019), studies are currently being conducted by the University of Cape Town in and around the SKA core site which will “determine the movement and the change in numbers” of the jackal (and caracal) population. This information will in turn be linked to a management plan that “will be developed”, which SANParks will be responsible for implementing.

SARAO’s commitment to scientific knowledge in its management of this new and contested protected area was made clear at a closed meeting held between SARAO personnel and the SKA core site’s neighbouring farmers in May 2018, at which the programme manager for SARAO’s land acquisition

process stated that even though they are well aware of farmers' concerns regarding problem animals, SARAQ has to follow strict procedures in developing its policies, because SARAQ forms part of an international consortium. In other words, every management decision that is taken by SARAQ needs to be supported by scientific evidence that will be internationally acceptable. The following account of this meeting, based on my observation and notes, captures the limitations of this rationalist way of thinking, or, at least, of justifying one's position in the face of strong emotions.

At the meeting, the SARAQ staff member defended the need to rely on scientific evidence in developing a jackal management plan for the SKA core site in this way:

The SKA's official position is that we [SARAQ] do not hunt jackal. [...] We do not have the scientific knowledge yet [i.e. that active hunting solves livestock predation]. But I will go back to management and say this is what the farmers say [that lethal methods should be used]... you can't leave me alone. But we must justify our actions. Not only nationally but also internationally. Farmers' opinions are not good enough, there must be scientific backing. [*Die SKA se amptelike posisie is ons [SARAQ] jag nie jakkalse nie. [...] Ons het nog nie die wetenskaplike kennis nie [m.a.w. dat aktiewe jag vee predasie oplos nie]. Maar ek sal teruggaan na bestuur toe en sê dít is wat die boere sê [dat daar van dodelike metodes gebruik gemaak moet word] ... julle kan my nie alleen los nie. Maar ons moet ons aksies verantwoord. Nie net nasionaal nie, maar ook internasionaal. Boere se opinies is nie goed genoeg nie, daar moet wetenskaplike backing wees.*]

She was also at pains to convey a conciliatory tone to the farmers, emphasising throughout the meeting that "we [i.e. SARAQ] never said that we will not shoot" [*ons [m.a.w. SARAQ] het nooit gesê ons sal nie skiet nie*], provided 'scientific' knowledge supported such a strategy, and stating that she knows all too well the losing battle farmers are fighting with jackals. The twelve men and two women who were sitting in a half-circle in front of



Figure 6.4 The first closed meeting between SARAQ personnel and farmers neighbouring the SKA core site was held in May 2018 at Klerefontein just outside of Carnarvon (Source: Terblanche, 2018).

her were, however, not impressed. Gys, the prominent farmer in his mid 60s who had stormed out of the April 2018 meeting in Williston, was particularly adamant in refusing to back-down. The memory of the heated argument he and the SRAO staff member had been involved in the previous month was still fresh in people's minds. Since the national park would not be open to tourists, and SANParks would not be responsible for the costs of maintaining and running the park (in contrast with other national parks), SRAO's land acquisition process manager had described the national park as "business unusual" [*besigheid ongewoon*], emphasising the uniqueness not only of the management mandate for the park, but also of the radio astronomy project and the region's ecology. Turning her statement against her, Gys retorted that since the park is "business unusual", "no [standard] science and/or livestock practice is feasible" [*geen [staandaard] wetenskap en/of vee praktyk geld nie*]. Slamming his fist on the table, he raised his voice even more:

How can you [SRAO] leave us with this situation?! Our vermin control and yours should then also be "action unusual". By 30 June [2018]! You can explain this to the scientists. [*Hoe kan julle [SRAO] ons los met hierdie situasie?! Ons ongediertebeheer én julle s'n moet ook "aksie buite gewoon" wees. Teen 30 Junie [2018]! Jy kan dit vir die wetenskaplikes verduidelik.*]

Sitting next to him, his wife tried to calm him down by rubbing his forearm. Picking up the conversation, another elderly farmer in his late 60s from the Williston region, Franco, was also dismissive of the need for research. According to him, "the people that do research, do not farm with sheep" [*die mense wat navorsing doen, boer nie met skaap nie*] and as a result, had no business in saying how farmers should run their farm, including how they should manage their predators.

The above vignette reflects the SKA management's commitment to an understanding of science as "objective knowledge free from emotions, private interests, bias or prejudice" (Gieryn, 1983:785), which is seen as constituting the foundation of western science. Scientific expertise is also seen as superior to the knowledge of lay citizens, since the former contributes towards knowledge, whereas the latter is based on emotions and values (Gustafsson, 2011:655; see also Chapter 3). Gys's verbatim response reflects the concerns of numerous farmers who argue that by the time the research on mesocarnivores and their impact has been concluded, it will be too late to initiate a management plan as they will already have suffered considerable losses – financial and physical – because of unchecked jackal predation. As mentioned above, their particular date of concern was the 30th of June 2018 by when the farmers who were still leasing their former properties from SRAO in the SKA core site would have had to evacuate their farms. The farmers on the borders of these farms were extremely concerned that jackal predation would increase on their farms – an outcome that has since been anecdotally reported to be the case, as noted in Chapter 1.

6.4 Conclusion: The importance of bridging the gap between scientific and local knowledge

While there is a large body of work emphasising the importance of pluralist decision-making perspectives in wildlife management as “foundational to transactional management”, because it “accounts for the multiple views of reality among stakeholders” (Zollinger & Daniels, 2005:255), the establishment of the proposed SKA national park is being managed rather differently. Here formal processes of consultation are in place, as required by national legislation, but ultimately it is the scientific knowledge of external decision-makers and physicists attached to the SKA and academic ecologists and zoologists working on jackals that is dominant with regards to wildlife management on the SKA core site. Consistent with the theoretical insights of political ecology, this chapter has shown that the decision-making related to jackal management and the future usage of the SKA core site, is embedded in relations of power and authority, in which the language of science is also used to silence or disempower those challenging management decisions that have already been made.

The professional elites who are centrally involved with policy development and decision-making regarding jackals continue to dictate not only the terms of jackal management in practice, but also to manage the public discussions related to jackals, due to their perceived scientific expertise and occupation of key positions in the institutions tasked with responsibility for environmental management at the new park. In this way these professional elites also continue to impact on the lives of the farmers living around the SKA core site, who fall outside of the land over which they have direct control. Although SARAO has organised numerous public meetings in the towns of Carnarvon, Williston, Vanwyksvlei and Brandvlei since South Africa won the bid to co-host the SKA in 2012, the farmers neighbouring, and in the vicinity of, the SKA core site have not been identified as a special interest group, but have always had to voice their concerns as members of the broader ‘local community’ that is invited to attend these meetings as local stakeholders. Arguably, the equally pressing, but very different, concerns raised by residents of the neighbouring small towns centring on job creation, economic development, social upliftment and investment in the local schools have overshadowed those of the numerically very small group of 16 farmers whose 31 farms border the SKA core site. The May 2018 meeting described above was the first time a closed meeting was held between neighbouring core site farmers and SARAO personnel. Up until this point, local farmers (which extends to those whose farms may be affected by the spiral arms as well as farmers in the vicinity of the core site) have experienced the same brushing aside of their ‘farmer jackal narrative’, in the words of Natrass and Conradie (2015), by the ‘environmental jackal narrative’, i.e. the eclipsing of their local knowledge by scientific knowledge.

Farmers are questioning what they perceive to be the rigidity of the scientific approach to jackal management. In the process of opposing the objective, demographically informed, and scientifically supported approach to jackal management, constituents of the ‘farmer jackal narrative’ have also attempted to vilify those of the ‘environmental jackal narrative’, especially environmentalists and/or animal activists. Interestingly, as many animal activists also follow an essentially affective approach to wildlife conservation, there can also be divisions among the advocates of the importance of moving away from seeing the jackal as ‘the enemy’, its predatory instincts best managed by lethal methods of control, in this case, between animal rights activists campaigning in terms of values and morality, and natural scientists committed to a research-led approach. As Herda-Rapp and Marotz (2005:89) found in relation to the mourning dove (*Zenaida macroura*) in Wisconsin, the “emotionalism, bias and attachment to individual animals” of the affectionalists among animal-rights advocates have seemed to turn on the rationalists in the environmental sciences. The latter counterattack by arguing against allowing any emotions in wildlife management decisions, as these will only get in the way of developing policy based on solid conservation science. These tensions are particularly visible in the debate on whether the lethal management of jackals is counter-productive or not (Natrass & Conradie, 2015:10; Minnie *et al.*, 2016:385; Natrass & Conradie, 2018; Natrass *et al.*, 2019; see also Chapter 2), where activists opposed to this condemn not only the farmers who practise these methods, but also the life scientists who have not declared themselves necessarily opposed to such methods.

Such opposition can also be expressed through interpersonal conflicts, which Young *et al.* (2010:3979) have identified as one of the categories of conflict in the typology they developed to analyse the human dimensions of human–wildlife conflict. Interpersonal conflicts between individual SARAO officials and farmers could be seen running as a thread through many of the meetings I attended. Such conflicts occur not only when there are personality differences among the individuals concerned, as well as miscommunication and mistrust between the institutions or constituencies that they represent, but also when the constituencies simply do not understand the position of the others (Jones, Young & Watt, 2005:14; see also Terblanche, 2015:111). As human–wildlife conflict is an emotive subject, as is clearly the case with human–jackal conflict in the Kareeberg, vehement emotions are likely to underpin responses to wildlife management decisions, that can also influence interpersonal behaviour (Manfredo, 2008; Redpath *et al.*, 2015:7).

The conflict between farmers and the SARAO that was evident at the meetings described above is embedded in larger struggles around autonomy, identity and the future of commercial farming in its current form in the Kareeberg area. Upon reflecting on the SARAO information session held in Williston in October 2017 one ecologist who was present empathetically stated:

I think we heard it in the room today, who are you to tell me whether I can switch on my cellphone or not. It's an intervention. The SKA didn't care so much about the impact of the satellite dishes put somewhere in the veld. That's almost, so what? It's a very small impact. Its impact is that you must shut down all your instruments. And that is, um, people don't like to be told what to do. Or what not to do. [...] And they weren't asked. They are being told (James, Interview, 16 October 2017).

While a minority of farmers and professional vermin hunters recognise that life scientists bring valuable knowledge to jackal management, which should influence farmers' management strategies, the majority of farmer research participants were hostile. They criticised life scientists for not studying "these jackals" (i.e. the jackals in and around the SKA's core site, including on their farms) and expecting them to rely on general scientific research that has not been conducted in their area. Given the academics' lack of experience on the ground, and the time it takes to produce scientifically acceptable research results (Simoné, interview, 18 May 2017; Frederick, interview, 18 May 2017; de Waal, interview, 19 February 2018), farmers are forced to rely on their own knowledge and that of their peers for advice and support. According to Nico Avenant, who holds a PhD in Zoology and has conducted research on jackals and human–jackal conflict, another reason why farmers revert back to their own knowledge and "uses the method which he learnt from his father or [...] from older farmers" [*gebruik die metode wat hy by sy pa geleer het, of [...] by die ou boere geleer het*], is isolation (interview, 19 February 2018). In other words, the farmer feels as if "there is no one he can ask advice" [*hy't niemand vir wie hy kan raad vra nie*] (interview, 19 February 2018). At the same time, as my discussion of the *voetjagter* and farmer lay expert in the first part of this chapter made clear, there are also strong views on the legitimacy of the experience-based knowledge of the jackal that is to be found on commercial farms.

Manfredo (2008:69) has argued that in order to move away from opposing groups simply trying to discredit the position of their opponents, wildlife managers, as well as all the interest groups involved, should focus on areas of agreement, so as to facilitate social engagement (see also Sidaway, 2005). An essential criterion for facilitating social engagement is to utilise an interdisciplinary approach and to engage seriously with local knowledge and what it can bring to the analysis of jackal behaviour in particular and more sustainable farming practices in general. What is needed to curb the top-down approach that is evident in the approach to jackal management around the SKA core site, are experts who are able to transcend the 'environmental' and 'farmer jackal narratives' and draw together both the scientific and the local knowledge and expertise that is available, as resources in the development of policy and the structures that will be needed to implement and monitor them. Incorporating local knowledge will not only promote wider acceptance of management techniques and/or structures

within the Kareeberg area, but also decrease farmers' (and *voetjagters* 's) sense of marginalisation from developments in their area, and contribute to building trust among the different interest groups involved in jackal management in the specific context of the SKA core site.

Trust, as already discussed in Chapter 3, is an essential component of social capital. In the next chapter I turn to the structural and cognitive dimensions of social capital and their significance for the lack of collective action evident in jackal management in my research site.

CHAPTER 7: JACKAL MANAGEMENT, SOCIAL CAPITAL AND COLLECTIVE ACTION

Drawing on the concepts discussed in Chapter 3, this chapter focuses on the significance of social capital in the management of jackals on the boundary of the SKA core site, and the role of thin interpersonal and institutional trust in bridging divisions and enabling more effective collective action around jackal management to emerge. Focusing on social capital in its structural form (i.e. in terms of social networks), Section 7.1 addresses the changing significance of hunting clubs in farmers' jackal management strategies, and the impact of advances in information and communication technology in enabling jackal management constituencies to come together in ways which were previously not possible and/or popular. One of the contradictory consequences of this, however, is that social media, coinciding with changes in the composition of the farming community as the number of farmers, especially resident farmers, has declined, has also had the effect of turning jackal management into a predominantly individual endeavour, thereby reducing its former role as a social activity around which farmers and their wives could bond.

Relating to the cognitive dimensions of social capital, this chapter clearly shows that while thick interpersonal trust is evident in the different interest groups, thin interpersonal trust and trust in institutions are lacking to a great extent. Consequently, even though jackals contribute to group mobilisation among farmers to a degree, collective action by all the interest groups in the Kareeberg to manage these mesopredators is absent. However, and potentially recasting the significance of the jackal as a trope for the SKA in interesting ways, towards the end of my fieldwork there were signs of some movement in the direction of collective action. Undoubtedly, as my discussion up until now has made very clear, the SKA has impacted negatively on the social cohesion of the farming community, especially during the process of buying out those farmers targeted to make way for the core site. However, with those farmers removed from the Kareeberg by mid-2018 and the moves to establish the core site as a special nature reserve underway, the dynamics around jackal management began to shift. As discussed in Section 7.3, farmers are now, even if only to a certain extent, becoming more involved in decisions to be made by SARAO and SANParks regarding the management of the core site as a protected area, in particular in relation to the erection and upkeep of strong boundary fences. This, it turns out, is an area where the SARAO and farmers have converging interests – the former to keep people out of the core site and the latter to keep jackals inside.

7.1 Social cohesion in the Kareeberg region: “*Ons praat oor hotnots*”⁹⁷ en *jakkalse. Dis dit*”

Sitting in on my interview with Jan (5 July 2017), his wife, Nanette, recalled a conversation she had had with one of their neighbouring farmers. In response to her explanation to her neighbour of what my research is about, including my interest in whether jackals might be seen to be fulfilling a “positive role” by bringing people together, the neighbour had reportedly made the comment captured in the section heading: that farmers only talk about their workers (identified in an unselfconsciously disparaging way) and jackals. As this comment suggests, here jackals and farmworkers are seen as equivalent, inasmuch as both are seen as the cause of farmers’ problems. Both are also seen as beyond the pale of the farmers’ social circle: farmers deem farmworkers to be in a lower social ranking than themselves (the white farmer) in a similar manner to how they deem jackals (*ongediertes*) to be in a lower ranking than other animals.

Derived from the Dutch *Huttentut*, meaning to stutter, the term Hottentot was used historically by the early Dutch settlers at the Cape to denote the Khoisan, depicting them as persons of “inferior intellect or culture” (Hughes, 2006:241). Today the term is frowned upon in public discourse, but while it is regarded as “an offensive mode of address to a coloured person” (Hughes, 2006:243), I found it is still used in a deeply derogatory way in everyday speech by some white Karoo residents when they are talking with those assumed to be part of their in-group. While I would not describe all my farmer participants as racist, some racism did filter through as some continue to use this derogatory term in relation to their farmworkers. The term is also expressive of their frustrations with what they experience as their workers’ unreliability, often brought upon by alcohol abuse.⁹⁸ Excessive alcohol consumption often negatively influences the abilities of farmworkers and, as a result, also leads to uncertainties on the part of their employers as to whether they will arrive for work (especially on a Monday), or be able to work if they do arrive; it is also implicated in domestic violence in farmworkers households. While this term highlights the inequalities and injustices of the past towards people of colour, it also reflects the extent to which group boundaries within the Karoo are still very tightly racially defined.

⁹⁷ While I am very aware that this term is considered deeply offensive, particularly by those to whom it is meant to refer, I use it here because it reflects the discourse among local farmers in the Kareeberg region. No insult is intended.

⁹⁸ As mentioned in Chapter 4, widespread alcohol abuse in the Northern Cape Province is seen as a legacy of the “dop system”, whereby farmworkers were paid with alcohol instead of wages, or in addition to minimum wages.

Just as relationships with their workers offer farmers common ground on which to bond, so too the constant threat of jackals has allowed livestock farmers to bond with one another around this actor – physically and emotionally. As will become evident in the discussion below, jackals are a topic of conversation on “everybody’s lips” [*dis op almal se lippe*] (Viljoen, interview, 20 May 2017) and a constant in the lives of livestock farmers. Gawie reaffirms this, stating that jackals are a “problem that everybody faces” [*dit is almal se probleem*] and consequently, “everybody shares their experiences” [*elkeen vertel wat hy beleef het*] in the hope of finding a solution (interview, 12 May 2017).

7.1.1 The social function of hunting

Hunting has performed numerous functions for communities throughout time and across the world, and South Africa is no different. The original inhabitants of South Africa’s Karoo, the |Xam San, were hunter-gatherers. For them hunting involved far more than simply procuring a source of food; before a hunt, they would conduct a religious ceremony to prepare themselves and bless the hunt. In the colonial period, as described in Chapter 2, the ecology of the Karoo was profoundly altered by the hunting of wildlife on a massive scale.

Today hunting in the Karoo, as in many other places, still “provides an avenue for social interaction and maintenance of cultural traditions, while it fosters connections within families and communities” (Arnett & Southwick, 2015:735). Beyond its contribution of meat and a potential income source, hunting allows hunters to establish a connection with the environment as they are required to “become intimately knowledgeable of the landscapes, habitats, and species they hunt” and “how these agencies interact with each other” (Arnett & Southwick, 2015:736). This is certainly the case for farmers, *voetjagters* and professional vermin hunters in the Kareeberg. In addition to the particular connection with nature it engenders, hunting in the Karoo is also expressive of certain values and meanings (Brandt, 2013:173) associated with the old colonial and apartheid social order, as will become evident in the vignette below, in which I describe an abortive jackal hunt that I had been invited to join in June 2017.

Aware of my visit, Ben – a foreman on a farm in the Loxton region – had already prepared his 30-06 rifle before sunset for the night ahead. Even though hunting is not one of his primary tasks on the farm, for him, a young Afrikaner man in his twenties situated in a small Karoo town, hunting serves as both a form of entertainment and source of extra income.

As the night progressed, I became increasingly concerned about the two children of farmworkers who had joined us on the hunt and were sitting in the open back of the single cab Isuzu *bakkie*. Even though the vehicle's open back provided them with an undisturbed view of the surroundings, the young children were not warmly dressed like Ben and myself. In stark contrast to our hunting outfits consisting of layer upon layer, the children's clothing was scanty, with numerous tears. Nevertheless, this outing seemed like the highlight of their week. During his time on the farm, Ben had developed a close relationship with the children who often accompany him on his tasks (including hunting) instead of going to school, claiming that they also wanted to become a farm foreman one day (see Figure 7.1). However, the later and colder the night became, the sleepier and less focused the children became until Ben finally decided to take them back to their houses and to ask an older worker to join us for assistance. After Ben's pressing of the *bakkie*'s hooter and calling for the worker, Hansie finally emerged from his house, clearly intoxicated as he stumbled over to us. Nevertheless, after negotiating his payment, he climbed onto the back of the *bakkie*.



Figure 7.1 Here a child assists Ben and one of the farmworkers by holding down a British Alpine goat so that it can receive medicine (Terblanche, 2017).

As more hours passed by with no jackal in sight, Ben became increasingly tense, frustrated and irritated. While Hansie was struggling to scan the horizon with the spotlight (his intoxication not helping in this situation), Ben abruptly stopped the *bakkie*. Unable to keep the spotlight on the horizon, Hansie pointed it up at the night sky which finally pushed Ben over the edge: "I'm not looking for f-----g shooting stars!" [*Ek soek nie f-----n verskietende sterre nie!*], he shouted, as if it was Hansie's fault that we could not find jackals.

In contrast to the dramatic expression of the ongoing power imbalances in the Karoo captured in the vignette above, vermin hunting can be seen to promote social cohesion within the local communities in which it is accepted practice, with farmers, professional vermin hunters and *voetjagters* all in conversation with one another – albeit operating from different levels. This social cohesion stretches beyond the Karoo's boundaries. During our interview, Bernard, a professional vermin hunter who

travels across South Africa to hunt problem animals, alluded to the fact that, despite all the politics present in vermin hunting, the profession has allowed him to significantly grow his social network:

There are few places in South Africa where I do not know people or have friends. [...] Everywhere you know people. [*Daar's min plekke in Suid-Afrika wat ek nie mense ken of pëlle het nie. [...] Oralster ken jy mense*]. (Interview, 19 October 2017).

As my discussion of social capital in Chapter 3 has shown, these social networks, which are a valuable asset for their members, are central to theories of social capital. Within the ‘farmer jackal narrative’, the various constituents exchange information on jackals with the common purpose of exterminating “problem animals” and as a result, lessening their livestock losses. While there is no formal organisation in place for vermin hunting as of yet (Bernard, interview, 19 October 2017), professional vermin hunters and farmers have taken it upon themselves to exchange information informally and thereby rally together:

You exchange advice then the guys will ask, the other guys who are shooting, what did he play now? What, how did you call them in? Did he call them in with food or with other jackals or so, you know? That's how you improve your technique. [*Jy ruil raad uit dan vra die ouens, die ander manne wat ook skiet nou jong, wat het hy nou gespeel? Wat, hoe het hy hulle ingeroep? Het hy hulle met kos ingeroep of ander jakkalse of so, jy weet? So verbeter jou tegniek ook*] (Gys, interview, 15 May 2017).

Each district has its group and every farmers' association has its group and [...] I know us full-time hunters [...] we are all in a jackal-group. We WhatsApp each other. [...] We talk to each other. This guy struggles here tonight with a jackal, he no longer knows what advice to follow. He struggles because the thing answers, but he does not come in. Oh, then we help each other [...]. And sounds, which sounds work. [...] Everybody's jackals work on the same seasons. [*Elke distrik het sy ou groepie en elke boerevereniging het sy groepie en [...] ek weet ons klomp voltydse jagters [...] ons is almal op 'n jakkalsgroep. Ons WhatsApp mekaar. [...] Ons praat met mekaar. Die ou sukkel hier vanaand met 'n jakkals, hy weet nou nie meer waste raad. Hy sukkel, want die ding antwoord, maar hy kom nie in nie. Ag, dan help ons mekaar [...]. En klanke, watter klanke werk. [...] Almal se jakkalse werk maar op dieselfde seisoene*] (Bernard, interview, 19 October 2017).

In the Karoo's patriarchal society, hunting allows hunters to express their (socially approved) masculinity as well as achieve “prominence and promotion” (Arnett & Southwick, 2015:736), which is especially evident amongst professional vermin hunters. As many of them rely on vermin hunting

as their only income source, building a reliable reputation is key, as it increases their social network and thus their potential income.

7.1.2 The decline of hunting clubs

For the larger part of the 19th and 20th centuries, coordinated and organised approaches were established to combat jackals and other mesocarnivores, which “attracted significant amounts of public funding and political support” (Beinart, 2003:232). A prominent example of such a coordinated and organised approach, which at the same time contributed to group mobilisation, is the hunting clubs which were established across South Africa at the request of local farmers (Stadler, 2006:12). The most well-known hunting club in South African history is *Oranjejag*, which operated between 1966 and 1993 in the sheep-farming districts of the Orange Free State and the western Transvaal. All livestock farmers were expected to be members, but due to the withdrawal of government subsidies, *Oranjejag* came to an end.⁹⁹ No longer as popular as in the mid-20th century, today only a few private hunting clubs continue to operate, one of them being Williston’s *ongedierte* club.

Still moderately active, Williston’s *ongedierte* club consists of a few members who pay a monthly membership fee. Updates are regularly shared over two-way radio indicating where and how many jackals (and other species) have been hunted and, as a motivation for continuing to be part of the club, farmers receive R100 per skin submitted to the club (Kobus, interview, 30 October 2017). As became evident during my interviews with Williston farmers, the income from handing in skins is hardly sufficient reason for them to continue with their membership, considering the time, effort and cost of vermin hunting. Rather, it is a longing for the camaraderie of their fellow farmers and the opportunity for socialising that is the major incentive, especially as the depopulation of farms is being experienced as negatively influencing the community’s social fabric.

Kobus, who was born and raised in Williston and began farming approximately 30 kilometres outside of the town in 1993, sounds nostalgic as he narrates his upbringing in Williston and the commando hunts during the 1970s. Today, hunting and persecuting problem animals remains the primary purpose of such get-togethers, but socialising forms an important part of such an outing, for both men and women (Stefan, interview, 16 May, 2017). Hidden behind the agenda of vermin hunting, men use commando hunting as an “outing” [*n uitstappie*] (Kobus, interview, 30 October 2017) and women

⁹⁹ For a more detailed discussion on *Oranjejag*, see Chapter 2.

socialise while cooking for their husbands. As a result, farmers and their wives continue to build bonds and thick interpersonal trust with their peers.

Numerous factors have, however, contributed to the demise of Williston's *ongedierte* club and commando hunts, which a number of informants listed for me as the withdrawal of government support, internal fighting regarding financial contributions, the upkeep of the horses that some hunters prefer to use for their transport, time and financial constraints, and the depopulation of the countryside (Frederick, interview, 18 May 2017; Simoné, interview, 18 May 2017; du Toit, interview, 3 April 2019). However the most significant contributing factor, I argue, is the advancement of vermin hunting technologies. Both non-lethal control methods (such as the King collar, lights and sirens) and lethal control methods (such as calling-and-shooting) have become more individualistic, i.e. can be deployed by the individual farmer

or vermin hunter on his own, thereby undermining the role that jackals have played in group mobilisation. As each farmer and professional vermin hunter is now "sort of equipped to help himself" [*elke ou is half toegerus om homself te kan help*] (Hugo, interview, 27 October 2017; see Figure 7.2), individuals are more inclined to manage jackals (and caracals) on their own. In my interview with him, Hugo went on to explain these changes as follows:



Figure 7.2 A farmer in conversation with a professional vermin hunter celebrating the success of the three caracals that were shot. On the hunter's *bakkie* one can also see the extent to how equipped professional vermin hunters are to conduct their business individually (with the assistance of a driver) (Terblanche, 2018).

These calls and things are now much easier than with the commando hunts. The commando hunts required thousands of labourers [...]. And horses. So, such a day costs too much money today. If you have to pay 100 men at R150 a day, then hunting costs you, then you do not even get the jackal. And if you let the chopper come, then it's R6 000 and the jackal is dead. Or, or if you get a guy that comes and shoots tonight, and he knows, he can see what he shoots. It's the most effective way, selective, to shoot selectively is to shoot at night. [*Hierdie roepe en goeters is mos nou baie makliker as met die kommando jagte. Die kommando jagte het duisende arbeiders geverg [...]. En perde gewees. So, só dag, kos vandag te veel geld. As jy nou met 'n*

100 manne teen R150 per dag moet betaal dan kos so jag jou, dan kry jy nie eens die jakkals nie. En as jy die chopper laat kom het, dan is dit R6 000 dan lê die jakkals. Of, of jy kry 'n ou wat vanaand kom skiet het, en hy weet, hy kan sien wat hy skiet. Dis die mees effektiewe manier, selektief, om selektief te skiet is om in die aand te skiet.] (Interview, 27 October 2017).

Franco, one of my farmer informants whose farm borders the SKA core site and is 69 years old also reflected on the changes he has observed in his time as a farmer:

See our methods have now also changed. Look in those years we had commandos with horses and you had a commando circle, you pulled a circle and two men sat in front in the corner. The wires were closed and the commando also closed. And the man in the corner is your best shot, they then shoot the jackals dead. Then it's over. Then they're dead. But nowadays there are not so many horses here, not so many humans either. We can no longer do commando hunting. [...] No, now, now we make use of night shooting, it's probably the most effective for us at this stage, because if you know where the jackal is, then you can drive there and you will most likely find it there. [*Kyk ons metodes het mos nou ook verander. Kyk in daai jare het ons met kommandojagte met perde en jy't 'n kommando sirkel, jy't 'n sirkel getrek en twee manne het voor gesit in die hoek. Die drade was toegemaak en daai kommando trek dan toe. En die man in die hoek is jou beste skut, hulle skiet dan die jakkalse dood. Dan's dit verby. Dan's hulle dood. Maar nou deesdae is hier nie meer so baie perde nie, hier's nie meer so baie mens nie. Ons kan nie meer kommandojag as't ware hou nie. [...] Nee nou, nou gebruik ons maar die nagskiet, dis seker op hierdie stadium vir ons die doeltreffendste, want as jy weet waar die jakkals loop, dan kan jy daarnatoe ry en jy sal hom dan nou heel waarskynlik daar kry.] (Interview, 18 May 2017).*

With the advances in vermin hunting technology and the “shift [of vermin hunting] from a joint effort to an individual effort” [*dit het net verskuif van 'n gesamentlike poging na 'n individuele poging*] (du Toit, interview, 3 April 2019), the careers of *voetjagters* such as Daniel and his son, Titus, have also been placed in jeopardy. Both father and son left farmwork to focus solely on hunting jackal and caracal. While Titus began hunting with his father (who started



Figure 7.3 Even though technology has enhanced vermin hunting, *voetjagters* such as Daniel and Titus continue to rely on traditional vermin hunting methods, e.g. hunting with their dog and setting gin traps (Terblanche, 2019).

about 20 years ago), he has been hunting on his own for the past ten years. Asked why they chose to hunt jackal (and caracal) over farmwork, Titus responded by saying that he likes jackal hunting “because it gives me money, a cent” [*ek hou van jakkalsjag, want hy gee my ‘n geldjie, ‘n sentjie*]; he earns “more money now than when he did general farmwork” [*meer geld gekry as plaaswerk*] (informal conversation, 30 July 2019). However, nowadays they are feeling increasing pressure to perform on the job – not only because of financial constraints, but also because they “compete with helicopters and shooting” [*ons kompeteer nou met helikopters en skiet*] (Daniel, informal conversation, 30 July 2019).

7.1.3 The “new” hunting clubs

Technology (in the form of social media) has also allowed some jackal management actors to enhance their social networks and form new kinds of hunting clubs. On a local scale, WhatsApp groups, such as *Geroei*, allow farmers and professional vermin hunters to exchange information and communicate about how many animals have been killed and share animal calls, photos and videos. While it did not arise in my interviews, online platforms such as blogs (e.g. *Jaracal*¹⁰⁰ which is dedicated to professional vermin hunters) and numerous Facebook groups (e.g. *Mutilated by Predators*, *ATN Varminting South Africa*, *Cull’em Varminting*, *G&G Varminting*, *RG Varminting and Culling*, and *Die Jakkals Jagter*) also contribute to the widening of individual farmers’ and professional vermin hunters’ social network. Online platforms allow farmers and professional vermin hunters to communicate with peers across South Africa, and even internationally, while exchanging ‘local’ knowledge and factual information. Moreover, these platforms allow them to seek advice, share their experiences as well as their love for their livestock and hunting. All this can be done in the security of the closed nature of the groups. The ‘*Mutilated by Predators*’ (2018) Facebook group description highlights the antagonism that hunters face from “activist groups” and the consequent need for a closed group:

Save farm livestock from problem animals! Due to the over population of certain predator species, and some activist groups against methods of protecting farm animals and controlling predator animal specie numbers, livestock and their young, get eaten alive and are very stressed and mutilated. These animals need protection and we need people to be aware of what some activist groups are doing to farm animals and food security by telling people only what they want them to believe and not the real truth, as been experienced firsthand by livestock farmers.

¹⁰⁰ The word *Jaracal* is a portmanteau of the two mesopredators who are considered to be responsible for most of southern Africa’s, and South Africa’s, livestock predation: jackal and caracal.

Farmers and professional vermin hunters are also making use of online platforms to voice their discontent with life scientists. A 2017 example of this was the reaction to a peer-reviewed academic article discussing the diversity and relative abundance of leopards, jackals and caracals, as well as their prey consumption, on farmland and in a protected area within the Karoo region. The article (Drouilly *et al.*, 2017) reported on research that showed that, due to the increased availability of domestic livestock (sheep and goats) on farmland, jackal prefer domestic livestock over similar-sized wild mammals even if wild prey is abundant on farmland. The relative frequency of occurrence per scat for jackals is indicative of this preference, with 41,6% of the scat contents comprising small-livestock of which 25,4% can be attributed to sheep (Drouilly *et al.*, 2017:7). Sharing a brief overview article of this research on his Facebook page, Bernard unlocked a handful of vehement reactions – not because his followers disagreed with the findings but because it confirmed what they already knew (i.e. their local knowledge). Responding to this post, Bernard’s Facebook friends questioned the status and exclusivity accorded a PhD degree as “thousands of vermin hunters and farmers have known this for years” [*duisende jakkals jagters en boere weet dit al jare*] and “it is not difficult to understand” as it is “general knowledge” [*gedink dis algemene inligting, dis mossie [sic] so moeilik omte [sic] verstaan nie*] (cited in Anonymous professional vermin hunter, 2017).



Figure 7.4 A screenshot of some of the interaction on Bernard’s Facebook page with regards to Drouilly *et al.*’s (2017) article (Source: Anonymous professional vermin hunter, 2017).

While the above example of online interaction with scientific studies seems negative, it also shows that there is not an iron-cast divide between the ‘farmer’ and ‘environmental’ jackal narratives. Rather, farmers are engaging selectively with the work of life scientists, i.e. highlighting the arguments of the ‘environmental jackal narrative’ that suit their purposes, such as the finding that jackals do predate on livestock and seemingly prefer livestock over wild prey. As one of the comments on Drouilly *et al.*’s (2017) article suggests: “I’m just grateful she has the guts to publish [the findings] as other scholarly friends who analyse hundreds of stomach content are still a bit

sceptical” [*Ek is net dankbaar sy het die guts om dit te publiseer [sic] julle ander geleerde vriende wat honderde pensinhoude ontleed swyg nog biki [sic]*] (cited in Anonymous professional vermin hunter, 2017).

I also encountered some evidence of this bridging between the two constituencies in the ‘jackal narratives’ debate in the specific context of the SKA’s core site, most vividly during the series of information sessions SRAO organised in October 2017 around the three ‘spiral arms’ that are planned to stretch out from the SKA’s core site over private farmland. The dynamics of mistrust that were on display at the information session in Brandvlei have already been described at the start of Chapter 6. At the meeting that followed in Carnarvon the next day, however, not only mistrust but also some recognition of the humanity of the other parties in the room was on display, as the following vignette reveals.

Worn out after a vermin hunt the previous night, when I had accompanied Bernard on Niklaas’s farm, I met Niklaas for breakfast at a small coffee shop in Carnarvon ahead of the meeting. “I see you were successful last night!” [*Ek sien julle was suksesvol gisteraand!*], he boasted, referring to the one jackal we had bought back to the farmhouse. After devouring our full farmhouse breakfasts, I accompanied Niklaas to his *bakkie*. “Look what I got in the back for that Prof!” [*Kyk wat het ek hier agterin vir daai Prof!*], he told me, referring to O’Riain, the behavioural ecologist who had given the presentation on mammal responses to land-use change at the SRAO information session in Brandvlei the previous day (described in Chapter 6). Popping my head into the Isuzu *bakkies*’ canopy, I found the stomach of the jackal that Bernard had shot the night before, neatly placed in a plastic bag.

Arriving at Carnarvon’s golf clubhouse later that morning, I could feel the tension in the air. As with the information sessions held in Williston and Brandvlei over the previous two days, this one was designed to follow the same structure. What set it apart from the other two meetings, however, is that the SRAO information meetings in Carnarvon had developed a reputation of being conflictual, with emotions running high and farmers and townsfolk regularly accusing SRAO personnel of being untruthful.

As the professor whom Niklaas and I had discussed over breakfast took the floor for his presentation, a farmer shouted: “The only good jackal is a dead one!” [*Die enigste goeie jakkals is ’n dooie een!*] summarising Kareeberg farmers’ antipathy towards the mesopredators. O’Riain took this comment in his stride, arguing that this was why research should be done, so as to understand the community and what the problem is. Sharing some research results from work he had been involved with in the Central Karoo district, he summarised the findings that have already been described above: on

farmlands, “jackals prefer sheep to wildlife. They’re showing a preference for sheep, they’re targeting sheep”. At this point Niklaas turned around to face me and whispered: “Girl, quickly go and fetch that ‘gift’ for me in the *bakkie*” [*Meisiekind, gaan haal gou daai ‘geskenk’ vir Oom in die bakkie*]. After I had returned to the clubhouse with Niklaas’s “present”, the tensions subsided as laughter erupted. In broken English, Niklaas managed to say to O’Riain, in between the attendees’ laughter: “Prof, this is for you! You can have a look and see the sheep wool inside the jackal’s stomach! [...] I’m going to send them [SARAO] my bills!”.

After the meeting, Conrad (a SAEON ecologist) and Niklaas found time to laugh together about the prank. O’Riain also thanked Niklaas for the jackal stomach and promised to analyse it as soon as he was back in Cape Town. Returning to seriousness, Niklaas apologised to the two ecologists for any animosity they might have felt towards them during the meeting, clarifying that it was not directed towards them personally, but at SARAO: “You new people coming in need to get a sense of what is happening between the SKA and the farmers. You must understand where the farmers come from and what the feeling is” [*Julle nuwe mense wat inkom moet ‘n gevoel kry van wat aangaan tussen die SKA en die boere. Julle moet verstaan waar kom die boere vandaan en wat die gevoel is*].



Figure 7.5 The jackal which was the source of Niklaas’s “gift” to the behavioural ecologist (Source: Terblanche, 2017).

While many of my research informants across the spectrum of jackal management interest groups alluded to the fact that jackal management on farms was becoming an increasingly isolated endeavour, the (social media) platforms mentioned above are playing a central role in reminding those impacted by livestock predation that they do not face this struggle alone. On the other hand, the closed nature of these platforms means that they do not contribute effectively to the larger collective action necessary for successful jackal management. By the same token, for successful collective action to be pursued, scientists engaged in research on jackal ecology also need to look beyond the formal platforms they favour for reporting on their results, such as academic conferences and tightly managed public information sessions, and become part of the conversation in more informal settings so as to increase thin interpersonal trust and build institutional trust; the vignette described above

suggests that opportunities for this are there but need to be recognised and nurtured. Building institutional trust as a basis for collective action is a theme I return to in Section 7.3.

7.1.4 The emergence of new voluntary associations

Focusing mostly on the structural aspect of social capital, most sociologists, such as Bourdieu, Coleman and Putnam, emphasise “dense networks as a necessary condition for the emergence of social capital” (Portes, 1998:6). Although formal social networks still exist among commercial farmers in the Karoo region, particularly in the form of farmer associations and church congregations, the decline of the hunting clubs and advent of social media are evidence of changing dynamics. In this regard I argue that new forms of social networks are replacing those that were significant in the 20th century and are proving particularly significant as a source of social capital for farmers to draw on in facing all the challenges of farming in the region. Even though the ongoing drought, depopulation of farms, jackals and the SKA have negatively impacted group mobilisation (discussed further below), some farmers are using these challenges to forge new kinds of networks. By forming various voluntary associations, which Siisiäinen (2000) describes as “socially organised groups based on mutual trust between the members”, farmers have invested in building strong, nested relationships with those who share their characteristics and/or concerns. As will become evident in this section, voluntary associations have contributed to solving logistical problems (such as having platforms to speak from) as well as playing a central role in boosting confidence (by asserting farmers’ authority and reaffirming their sense of belonging).

As per the legal protocols, every farmer whose land was earmarked for acquisition for the SKA core site was approached individually, with the state determined to ensure confidentiality around the negotiations and the valuation of each property according to its specific features. The issues which were seen to influence individual property valuations included the date by when the land would be handed over, the future of the farmworkers on each farm, as well as “property values, improvements made and possible quantifiable losses that can be proven” (SKA SA, n.d.j.). To counteract this individuality, the farmers affected by the Land Acquisition Programme decided to form the Kareeberg Farmers’ Forum. During the negotiations to purchase their farms, the forum represented 16 farmers earmarked for land purchase or, if the negotiations failed, expropriation (with compensation then set in terms of the applicable legislation). Even though the forum ceased to exist, it played an important role in voicing the concerns of its members, such as over the delays in conducting the initial Environmental Impact Assessment study and the future of the farmworkers (Genis, 2016). Instead of

fighting alone against SARAO, the Kareeberg Farmers' Forum allowed farmers to have a greater voice in one forum.

Another prominent example of a voluntary association that came into realisation because of the SKA was 'Save the Karoo', an anti-SKA campaign with the aim of "shar[ing] experiences and concerns of Karoo inhabitants" related to the SKA (Save the Karoo, 2017). Save the Karoo's main line of argument, was to accuse the SKA of "threatening [the Kareeberg region's] inhabitants, their future and also the environment" (Save the Karoo, 2016a). While mostly active on Facebook, leading members of the group also attended most of the SARA0 public meetings I attended during my fieldwork, to voice their concerns. Furthermore, they actively engaged with SARA0 personnel privately. As highlighted in a letter to the then Minister of Science and Technology, Dr Naledi Pandor,

particular concerns included their dissatisfaction regarding the Environmental Impact Assessment, the lack of disclosure regarding the SKA project, the loss of cell phone communication, the implications of water points being shut down within the core site, and the way in which, in their view, the constitutional rights of the communities impacted by the SKA were being ignored (Torr, 2017). One of its members, a church minister from Carnarvon,

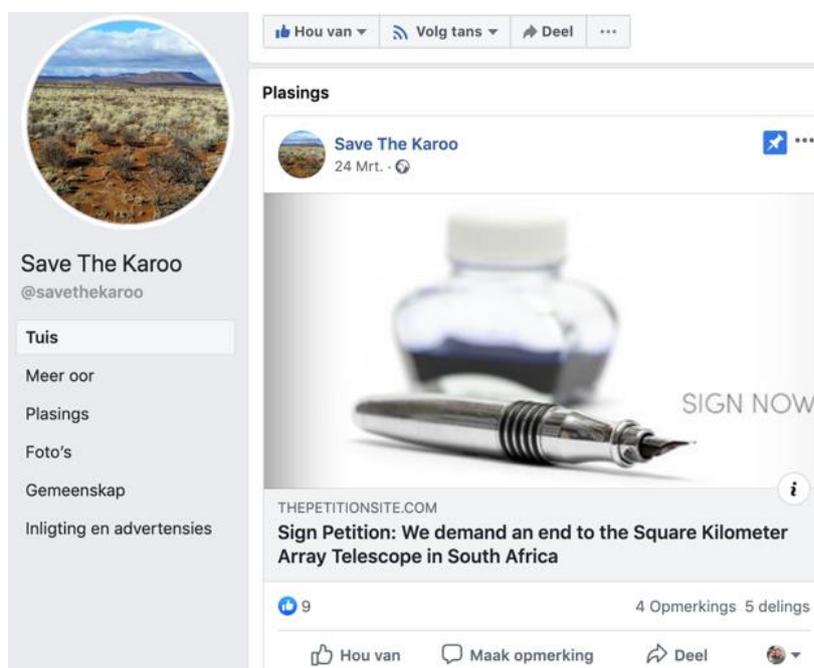


Figure 7.6 A screenshot of one of Save the Karoo's most recent Facebook posts, urging its members to sign a petition to end the SKA development in South Africa (Source: Save the Karoo, 2016b).

insisted at a workshop organised by the HSRC in 2018 that Save the Karoo was not "anti-SKA", as people were making it out to be, but, rather, "pro-democracy", as they were advocating against the lack of information and communication from SARA0. However, as I observed at various meetings, Save the Karoo members developed a reputation for attempting to derail public meetings rather than proposing possible solutions, and as a result they alienated SARA0 personnel and also lost some respect within the farming community.¹⁰¹

¹⁰¹ In Chapter 6 I described a notable example of this.

Another voluntary association, the *Landbou Aksie Groep* (LAG), was supported by Agri SA, the national association for commercial farmers, and its provincial affiliate, Agri Northern Cape, as a representative structure of those farmers who will be impacted by the SKA's three spiral arms extending from its core site (SKA SA, 2017f). While it appears that LAG is not necessarily against the SKA development, it does provide a safe space for farmers to talk to one another about mutual problems/concerns regarding the SKA, as well as to use LAG as their 'official voice' i.e. representative. Although some landowners are not formally part of this structure, LAG makes it easier for both SARA0 and those it represents to negotiate with one another.

In summary, voluntary associations established by farmers and/or townsfolk play a role of a trust intermediary with regards to the SKA development. As the farmers trust their peers more, because of cultural affinity (i.e. thick interpersonal trust), they rely on these intermediaries to accurately represent their concerns. In jackal management, however, such a trust intermediary seems to be absent and consequently, it is harder to establish thin interpersonal trust. On a positive note, the examples highlight Burt's (1992) argument that dense networks are not necessary for social capital. Rather "it is the relative absence of ties, labelled 'structural holes', that facilitates individual mobility" (Burt, 1992, cited in Portes, 1998:6).

7.2 Working against group mobilisation: The jackal as a cause of estrangement among people

Undermining the case for the jackal's role in increasing social capital, jackals have also been blamed for distancing people from one another. Most farmers I spoke to jocularly told me that jackals are negatively influencing their social lives, including their family lives, as they have to spend more and more time on jackals and their management. In other words, jackals are the cause of estrangement from one's family and other farmers, especially those that do not manage their jackals properly. This point of view was emphasised by Maghiel who neighbours the SKA core site:

It's a common topic when we are together, it is what we talk about, but at this point in time I do not think jackals bring people together. They rather remove [...] people from one another, because amongst us are people that do not even bother to kill a jackal. [*Dis 'n gemeenskaplike onderwerp as ons bymekaar is, waaroor ons gesels, maar ek dink op die stadium bring jakkalse nie mense bymekaar nie. Hulle verwyder eerder [...] ons van mekaar af, want hier sit tussen ons mense wat nie eens die moeite doen om 'n jakkals dood te maak nie.*] (Interview, 4 July 2017).

Linking to the earlier discussion on the increasing individualism of jackal management, du Toit, the national chairperson of the NWGA and the PMF, argues that estrangement and becoming increasingly individualistic is not only as a result of jackals and/or livestock predation, but a general trend in modern lifestyles:

Look, a jackal hunt in the past was a nice social event. So, it does not happen anymore and sometimes one misses it because it was a social event. So I just see it as life gets busy, one sees that those social events not only affect jackals or predation but everywhere it is less. Every guy becomes more focused on himself and in the end, I think it is also about time and survival. [*Kyk 'n jakkalsjag in die verlede was 'n lekker sosiale geleentheid. So, dit gebeur nie meer nie en 'n ou mis dit partykeer, want dit was 'n sosiale geleentheid. So ek sien dit maar soos die lewe besig raak, sien 'n ou dat daardie sosiale geleentede nie net jakkalse of predasie raak nie, maar oral minder is. Elke ou raak meer op homself ingestel en ek dink op die ou einde gaan dit ook oortyd en oorlewing.*] (Interview, 3 April 2019).

The same rings true for professional vermin hunters and life scientists involved in jackal research. Professional vermin hunters often travel long distances to find work and spend nights working and days sleeping and/or travelling to their next destination, removing them from their loved ones. The advancement of technologies used to manage jackals has also allowed professional vermin hunters to hunt individually, increasing the competition amongst them. Frederich, a professional vermin hunter residing in Vanwyksvlei, explains:

You do not really share your tips, because if you do share it, that guy comes later on your ground and then he will shoot later, he takes, because there are not many guys who allow shooting. The guys who do shoot either use me, or that guy, or another guy from outside. Now when I share my tips with the guy here and I tell him where I shot the jackals, then he worms him into that guy, then I lose a farm [...] and an income. So if you lose your farms in the end, it's a problem. So no, I have friends, one can probably call them friends, when we are in contact with one another, but they do not live here. They work in other areas and we share tips with each other. [*Jy deel nie sommer jou tips uit nie, want as jy hier uitdeel maak dit daai ou kom lateraan op jou grond en dan kom skiet hy lateraan, vat hy, omdat hierso is nie baie ouens wat laat skiet nie. Die ouens wat laat skiet gebruik óf vir my óf daai ou, óf 'n ou van buite af. Nou as ek my tips deel met die ou hier en vir hom sê waar het ek die jakkalse geskiet dan gaan wurm hy hom in by daai ou, dan verloor ek 'n plaas [...] en 'n inkomste. So as jy op die ou einde jou plase verloor dan is dit 'n probleem. So nee, ek het vriende, mens kan hulle seker vriende noem, wat ons is in kontak met mekaar, maar hulle bly nie hier nie. Hulle werk in ander areas en ons deel tips met mekaar.*] (Interview, 11 May 2017).

Individualism and competitiveness have also been identified as problems among the academics researching jackal ecology and jackal management. At several South African universities (notably the University of Cape Town, University of the Free State, University of Mpumalanga and Nelson Mandela University), there are research hubs addressing predation as a central issue for South African livestock farmers, but according to one of my participants, these groups tend “do things in their own way and are king of their castle” [*elkeen doen dit op sy eie manier en elkeen is koning op sy mishoop*] (de Waal, interview, 19 February 2018); this can lead to a duplication of work, knowledge and information. While academics from across the country were involved in the scientific assessment for PredSA, there are concerns that “professional jealousy” [*professionele jaloesie*] and “academic pride” are undermining collegial co-operation (de Waal, interview, 19 February 2018) – a situation that is, of course, not unique to predation studies in academia. While pride can be seen as a positive attribute, hubristic pride is associated with “arrogance and self-aggrandisement” which promotes prejudice and discrimination (Ashton-James & Tracy, 2012:466). du Plessis concurred with this assessment, noting how academics are quick to demarcate “their” territories (interview, 19 February 2018).

7.2.1 Depopulation of the Kareeberg farms: “*Hulle sê al wat daar werk is die windpomp en die ramme*”

During our interview at his house (not in the Karoo) (19 February 2018), de Waal, a professor in animal nutrition who has researched jackals and farmer–jackal conflict and actively promotes the inclusion of ‘local’ knowledge in jackal management, sketched the isolated picture of the Karoo. To illustrate this, he suggested that the only things that are still working in the Karoo are windmills and sheep (rams) (interview, 19 February 2018). For example, where once each surveyed farm was occupied by an owner and his/her workers, many farmers now own more than one property (e.g. four or five farms), with only the main farm permanently occupied; the other farms are only visited when necessary.

In the early 20th century, *bywoners*, poor white families living as foremen and assistants in a second dwelling on the farm, were a common occurrence. Successful farmers provided refuge for their fellow Afrikaners in the aftermath of the South African War and into the years of the Great Depression (Giliomee, 2002). As the white population benefitted from the segregationist policies of the state and significant support for agriculture, the white population generally prospered; this was accompanied by a process of urbanisation which saw the rural white population of the Karoo decline from 43% of the total rural population in 1911 to just 13% in 2004 (Hill & Nel, 2018:207). According to Hill and Nel (2018:206), the total rural population in the Karoo began to decline from the 1970s, “signifying

a deep-rooted structural shift in the rural economy, which has transitioned to larger farming units with a reduced reliance on labour”.

With increasing property sizes, the number of farmworkers on farms has also decreased. Some farmers I interviewed alluded to the fact that on top of labour relations issues, labour has also become too expensive for them. As a result, they now require fewer permanent workers to do more work (on all of their properties) and only require temporary workers now and again (e.g. in shearing season or when fences have to be rebuilt). While some farmers still have a dedicated *voetjagter* whose only job is to hunt vermin, most workers have this task added to their other tasks (such as maintaining boundary fences and repairing windmills). As farm sizes increase it takes longer to complete these tasks. This has provided jackals (and caracals) a breathing space and forced farmers to “try and live around livestock predation” [*ons moet nou maar om dit probeer lewe*] (Bernard, interview, 19 October 2017). At the same time, the rise in what is called ‘lifestyle’ or ‘weekend farmers’ has added to the problem (see Chapter 2), as Bernard explained to me:

You see, what makes it very difficult, in earlier years someone stayed on every farm. [...] But now hordes of farmers live in the Cape and live in Johannesburg and in P.E. [Port Elizabeth] and live wherever, with property here [in the Karoo]. That farmer is not involved, he will not be involved in the vermin club. Half of those farmers do not even shoot on his farm or even fight against the jackal on his farm. Some of them do not even have sheep on their farm. So it negatively affects the jackal that you kill. [...] Your neighbour too. [*Jy sien, wat dit baie moeilik maak nè, is vroeër jare het elke plaas het iemand gebly. [...] Maar nou is dit hordes boere wat in die Kaap bly en in Johannesburg bly en in P.E. [Port Elizabeth] bly en waarookal bly met grond hier [in die Karoo]. So daai boer is nie betrokke nie, hy gaan nie by die ongedierteklub betrokke wees nie. Die helfte van daai boere skiet nie eens op sy plaas of bestry nie eens die jakkals op sy plaas nie. Van hulle het nie eens skaap op hulle plaas nie. So dit skep 'n negatiewe invloed op die jakkalse wat jy doodmaak. [...] Op jou buurman ook.*] (Interview, 19 October 2017).

All my research participants blamed the lack of “feet on the ground” and consequently “active management” as the main culprit behind the repopulation of mesopredators on Karoo farms (Viljoen, interview, 20 May 2017; de Waal, interview, 19 February 2018; du Toit, interview, 3 April 2019). The arrival of the SKA has further contributed to the problem of depopulation of farms which, according to de Waal, is “ideal for the jackal!” [*ideaal vir die jakkals!*] (interview, 19 February 2018). As jackals are nervous animals, less activity and movement on farms encourages them to explore larger regions than before. Without active management, empty farms – and the SKA’s core site among

them – will act as havens for these animals where they can breed and raise their young without fear of persecution.

7.2.2 Jackal management as a professional business: It is no longer a “brandy and Coke affair”

After my meeting them for the first time in May 2016, at the Carnarvon public communication meeting organised by SARAO, Hugo and his wife invited me a couple of times to visit them on their farm between Carnarvon and Victoria West. Even though one of Hugo’s farms was part of SARAO’s Land Acquisition Programme, he holds no grudges against the project; for him, rather, the purchase of his farm was a “saving grace”, as the rangeland on that farm had suffered as a result of the drought.

Before moving his attention completely to livestock farming, Hugo was also a livestock marketer for a couple of years. During his visits to farms, farmers would often complain about livestock predation whereby he offered his vermin hunting services and subsequently built a social network in the region:

It was actually just to help the farmers. I saw a void, [...] that time I did livestock marketing, I came to the farmer then the farmer complained to me, but the jackal eats his lambs. And then I told him, but, then I’ll come tonight, to see what is wrong and so [...] solve the problem for him. And so now a relationship built of he backs me at my work and I help him every now and then when I see he, he struggles. [...] He raises more lambs and I get more commission at the end of the day, so the one hand washed the other hand. [*Dit was maar eintlik net om die boere te help. Ek het ‘n leemte gesien, [...] daai tyd het ek veebemarking gedoen, ek het by die boer gekom dan het die boer by my gekla, maar die jakkals eet sy lammers op. En dan’t ek hom gesê maar, dan kom gou vanaand dan kom kyk ek wat fout is en so [...] die probleem kom oplos vir hom. En so dan’t nou maar ‘n verhouding gebou van hy ondersteun my weer by die, by my werk en ek help hom so nou en dan as ek sien hy, hy sukkel. [...] Hy maak meer lammers groot en ek kry meer kommissie op die ou einde van die dag so die een hand het maar die ander hand gewas.*] (Hugo, interview, 27 October 2017).

One reason why Hugo decided to quit vermin hunting is because, in his words, the “control of jackals is no longer a brandy and Coke affair as in the beginning” [*die jakkalse se beheer is nie meer ‘n brandewyn en Coke affêre nie soos dit begin het nie*] (interview, 27 October 2017), emphasising that vermin hunting has turned into a professional business and that killing jackals is more serious than ever. He is also pointing to the disappearance of the (highly gendered) sociability formerly attached to vermin hunting.

Apart from those farmers who still find time to hunt jackals (and caracal) on the side and/or make use of “fly-by-night” vermin hunters,¹⁰² most now rely on the services rendered by professional vermin hunters. During my interviews with professional vermin hunters, it became apparent that they are very serious about their profession. While money and business opportunities do play a role in the “fierce competition” [*kwaai kompetisie*] amongst themselves and against “fly-by-nights” (Schneekluth, telephone interview, 7 February 2018), their main concern is to assist farmers deal with the problem of jackals. As livestock predation does not seem to be an issue that will be solved anytime soon, if ever, du Plessis sketches how lucrative professional vermin hunting can be, in a context of generally low wages:



Figure 7.7 At R1 200 per jackal and caracal, Bernard has a lucrative professional vermin hunting business (Source: Terblanche, 2017).

A few years ago, I do not know what it is now, the guys asked per kilometre, they asked you x-amount to come out and then they asked you per jackal, per caracal. And that was, I’m talking under correction, something like 600 or R700 per jackal. So if that guy shot three jackals in one evening then he, with travelling expenses, made 4-5000 Rand out of that farmer. That’s a good business. [...] I mean, here in Bloemfontein now, I’ve seen it in the last two or three years, seeing the guys driving the *bakkies* [that] you’ve never seen [before]. You can see, it has become an industry. That guy is on the road for 20 days [...] of the month and he drives and he shoots. And he comes back every year. He returns to that farmer every year and he makes his five or his R10 000. [*So paar jaar terug, ek weet nie wat dit nou is nie, het die ouens per kilometer gevra, hulle het jou x-bedrag gevra om uit te kom en dan het hulle jou per jakkals, per rooikat [gevra]. En dit was, ek praat onder korreksie, iets soos 600 of R700 per jakkals gewees. So as daai ou in ‘n aand drie jakkalse geskiet het dan het hy, met reiskoste saam, het hy 4-5000 Rand uit daai boer uit gemaak. So dis ‘n goeie bedryf. [...] Ek meen hier in Bloemfontein nou, ek het dit in die laaste twee of drie jaar [gesien], sien jy die ouens met die bakkies ry wat jy nooit [voorheen] gesien het nie. Jy kan sien, dit het ‘n bedryf geword. Daai ou is op die pad 20 dae*

¹⁰² Brandt (2013:119–120) describes, in her ethnographic research on the re-configuration of power and belonging on trophy-hunting farms in the Cradock district, that Karoo farmers have been familiarised with firearms and the use thereof since a young age. In addition, white South African males have an “intimate link” with their weapons, which contribute to their sense of security as well as their way of life.

[...] *van die maand en hy ry en hy gaan skiet. En hy kom elke jaar terug. Hy kom elke jaar weer na daai boer toe en hy maak sy vyf of sy R10 000.*] (Interview, 19 February 2018).

Money aside, professional vermin hunters, such as Frederich (interview, 11 May 2017), Felix (interview, 4 July 2017) and Bernard (interview, 19 October 2017), argue that their main frustration with “fly-by-nights” lie with the fact that while the latter are able to shoot the “dumb” jackals, the “smart” ones are not touched. In these interviews their anthropomorphic characterisations of jackals as *slim*, *skelm*, “adaptable” [*aanpasbaar*] and “crafty” [*uitgeslape*], because of their ability to escape from the clutches of farmers and/or vermin hunters, were very evident. According to Peter Schneekluth, who has a background in nature conservation and identifies himself as the oldest and longest-serving predation management expert in South Africa, vermin hunters’ failure to kill the “smart” jackals leads to frustrations which boil over into human relationships (telephone interview, 7 February 2018); the ego involved in projecting an image of success also disinclines vermin hunters to share information with one another and/or with other interest groups.

Similar to the “professional jealousy” [*professionele jaloesie*] de Waal described among academics involved in research on jackal ecology (interview, 19 February 2018), professional vermin hunters are also very protective of their ‘territories’. Unlike the amateur hunters and/or farmers who would willingly share stories and tips on how to kill jackals with one another, professional vermin hunters are much more secretive and operate on their own (Frederich, interview, 11 May 2017; Bernard, interview, 19 October 2017). Bernard also noted that although farmers outsource their jackal management to professional vermin hunters such as himself, a lack of trust persists:

No, we’re just a one-man business. You can go, you can talk at a farmer’s association, that farmer hears what you say and he walks out there and he’s *tsjut!* Feel feathers for you. He just does it in his old way and stuff. No, no one is disturbed, every farmer has his own way. Every farmer thinks you’re a jackal who only wants him to have more jackals. There are *skelms* in the jackal industry as well. Just as there are *skelms* in the farming industry and any industry. There are *skelm* vermin hunters too. [*Nee, ons is maar ‘n eenmansaak. Jy kan gaan, jy kan by ‘n boerevereniging gaan praat, daai boer luister wat jy sê en hy loop daar uit en hy tsjut! Voel vere vir jou. Doen dit maar net so op sy oue trant en goeters aan. Nee wat, niemand steur, elke boer het mos maar sy eie manier. Elke boer dink jy’s ‘n jakkals wat net sy jakkalse wil meer hê. Daar is skelms in die jakkalsbedryf ook. Net soos daar skelms in die boerderybedryf en enige bedryf is. Daar is skelm jakkalsjagters ook.*] (Interview, 19 October 2017).

As there is no central governing body representing professional vermin hunters, each is left to his/her own devices. Adding to the stress is having to negotiate the different hunting ordinances found in

South Africa's provinces, which Bernard sees not only as a “moneymaking scheme” [*‘n geldmaak storie*] for provincial governments, but also a means for some of the older, more established professional vermin hunters who present predator and predation management courses (such as Viljoen and Henrico), to assert their power in the industry (interview, 19 October 2017). While the last-mentioned group contributes to policies, laws and research (i.e. bridging and linking social capital), those who are still actively hunting are not shown appreciation. Bernard expressed his frustration as follows:

Now what makes me a bad, weaker hunter than Henrico or the guys I've just mentioned? I mean I have been shooting jackals just as long as they have. I am currently full-time in jackal hunting. Not one of them are full-time jackal hunters. [...] This is not taken into account. And what bothers us, a lot of the jackal hunters, probably 10 guys, [...] they are informed in all these cases. If a new law comes out, or something is planned, then these 10 guys are contacted, they take, they want to take advantage. [*Nou wat maak my nou ‘n slegte, swakker jagter as Henrico of die ouens wat ek nou genoem het? Ek meen ek skiet al net so lank soos hulle jakkalse. Ek is huidiglik voltyds in jakkalsjag. Hulle is nie een voltyds jakkalsjagters nie. [...] Dit word nie in ag geneem nie. En wat ons baie pla, daar's ‘n handjie vol jakkalsjagters, seker 10 ouens, [...] hulle word geken in al hierdie sake. As daar ‘n nuwe wetgewing uitkom, of iets beplan word, dan word daai 10 ouens gekontak, hulle word, hulle wil die voordeel trek.*] (Interview, 19 October 2017).

To avoid engaging with these politics, professional vermin hunters such as Frederich and Bernard have isolated themselves from other vermin hunters (except close friends and those whom they mentor), further contributing to the lack of trust and collective action in jackal management.

7.3 Good fences make good neighbours

While it is important to work together with your neighbouring farmers to manage jackals as the territories of these animals might span across different farms, the maintenance of fencing remains a contested issue among commercial farmers. With official government subsidies for fencing completely phased out by the early 1990s, farmers now have to rely on the goodwill and financial resources of their neighbours and co-farmers to adhere to the Fencing Act 31 of 1963. According to this Act,

the owner of a holding situated in an area in which contributions are obligatory in respect of boundary fences other than jackal-proof fences, may erect a jackal-proof fence in respect of that

holding or convert any boundary fence in respect of that holding into a jackal-proof fence but shall, as against the owner of an adjoining holding who does not wish such fence to be jackal-proof, bear any additional cost necessary to make it jackal-proof (Republic of South Africa, 1963:8).

Underlying this stipulation is the presumption of good neighbourliness and trustworthy relationships among neighbours. An example of this is the co-operation demonstrated by two Williston farmers (Gys and Christiaan) who decided to erect an electrified fence along their joint boundary. Even though they still encounter problem animals on their property, they are satisfied that the numbers have decreased considerably over the years. As shown by Gys' personal records, the number of jackals and caracals caught on his farm decreased from 28 and 7 in 2014 to 16 and 2 in 2016, respectively (see Figure 7.8 below).

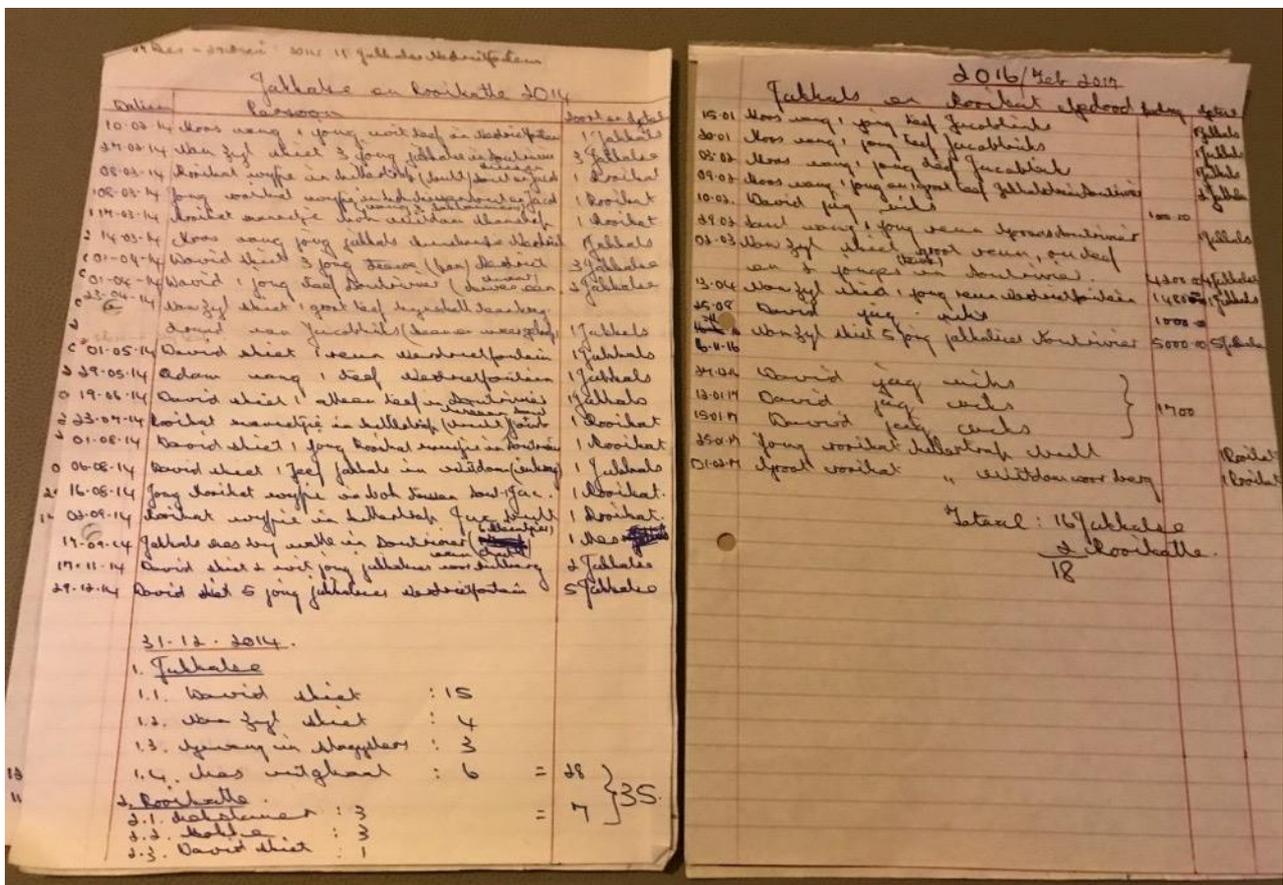


Figure 7.8 Gys' detailed personal records on the number of problem animals caught on his farm; the date; who caught it; the method used; and detail of the animal (Source: Terblanche, 2017).

Both Gys and Christiaan pertinently emphasised the truth for them in the well-known saying that “good fences make good neighbours”. While most farmers try to adhere to the Fencing Act 31 of 1963, Gys alluded to the fact that the costs related to problem animal control can result in “enmity” [kwaai vriendskap]:

There is a law about neighbourliness. Neighbours have certain obligations towards one another, especially regarding fencing. I do not know if you know: 500mm on either side of a boundary fence is no man's land. I can climb over into my neighbour's veld, that 500mm. [...] A meter is no man's land with the fence running in the middle. And you have a collective responsibility to maintain that fence. If your animals are technically speaking, if your jackals come to me, and now that's where enmity comes in, then I can say to you, "Hey! Make a plan with your jackals! They come and eat my lambs!" [...] If he does not respond, you can report him to a lawyer and say that you must maintain your fence, your animals come through to me. [*Daar's mos 'n wet oor buurmanskap. Bure het sekere verpligtinge teenoor mekaar veral wat omheinings aanbetref. Ek weet nie of jy weet nie: 500mm weerskante van 'n grensheining, is niemandsland. Ek mag oorklim daar in my buurman se veld, daai 500mm. [...] 'n Meter is niemandsland met die heining wat in die middel loop. En jy het 'n gesamentlike verantwoordelikheid om daai heining instand te hou. As jou diere tegnies gesproke, jou jakkalse na my toe kom, en dis nou waar kwaai vriendskap inkom, dan kan ek vir jou sê: "Hey! Maak 'n plan met jou jakkalse! Hulle kom vreet my lammers op!" [...] As hy nie reageer nie, kan jy hom deur 'n prokureur aanskryf en sê jy moet jou heining instandhou, jou diere kom deur na my toe.*] (Interview, 15 May 2017).

With the depopulation of farms in the region, as well as the increasing sizes of farms, some farmers have been struggling with their neighbours to hold them to their obligations in respect of boundary fences. Financial strains because of the ongoing drought, livestock predation and lack of government support have also resulted in dilapidated fencing infrastructure. For these reasons, the arrival of the SKA as a major landowner in the region is seen by some farmers to hold out the promise of some positive developments for the farmers neighbouring the core site, in the form of 'good fences'. This is an instance where farmers' sense of expectation with regard to the SKA's responsibilities for local development can be seen as similar to that found in the responses of local townspeople to the SKA in relation to the numerous social problems in the small towns in the vicinity of the SKA core site (Gastrow & Oppelt, 2019). This is based on their understanding of SARAo as a state-run entity with a great deal of money and resources, which means that they are in a position to repair dilapidated fences. In this regard, although he does feel considerable animosity towards the SKA project, as was made evident in the previous chapter, Gys is also one of a handful of farmers who is hopeful that SARAo could be a 'good neighbour' when it comes to fencing:

I believe we will be better off with SKA, because SKA cannot be a weaker neighbour. At least they have a bit more money and we can now perhaps push for better fences. [*Ek glo ons sal met SKA beter wees, want SKA kan nie 'n swakker buurman wees nie. Hulle het mos nou dan 'n bietjie meer geld en ons kan dalk mos nou vir hulle druk vir beter heinings.*] (Interview, 15 May 2017).

During the workshops held in April 2018 with SANParks and SARAo to discuss the possibility of establishing a new national park, Williston and Carnarvon farmers raised their concerns about the fence specifications for the SKA core site. While the SANParks official present at the workshops stated that their specification for game fencing (for the game species present in the SKA core site) is 1.8 metres, farmers disagreed, as in their experience this would not be sufficient to keep jackals and caracals out of their properties. As summarised in the SARAo and SANParks public participation process' condensed Facilitation Report, the workshop facilitator and report author highlighted fencing and predator control as two of the top discussion points:

Table 7.1 Fencing and predator control as points raised at the workshops held by SANParks and SARAo to discuss the development of the SARAo National Park Management Plan and their desired state management implications (Source: Gerhardt, 2018:6–7).	
<i>Points raised</i>	<i>Desired state management implications</i>
Fencing: Neighbouring property owner should be able to consult on fence specification for problem animal control.	<p>Constructing a fence in consultation with the local community, specifically neighbouring properties.</p> <p>Using local expertise to consult on the fence upgrade and construction within acceptable financial constraints.</p> <p>Assisting with fence patrols and small scale maintenance of the fence to control the movement of problem animals onto neighbouring farms.</p>
Predator Control: Concerns were raised that problem animal numbers will rise dramatically in the National Park which will have an effect on sheep flock totals.	<p>Introducing a research program [sic] to ascertain the population dynamics of meso-predators within the proposed National Park, as well as the impact of possible population density growth and shifts.</p> <p>To assist the neighbouring community with the management the impact of predation animals on stock production farms.</p>

Fencing and predator control issues were also prominent concerns raised at the closed meeting held between neighbouring farmers and SARAo in May 2018, which the programme manager for SARAo's land acquisition process defined as the "key forum for how our [the SKA's] boundary fence will look" [*sleutelforum vir hoe ons [die SKA se] heining gaan lyk*] over and above consulting with SANParks. Besides the discussions on the fence specifications (e.g. the height, whether new fences should be erected, the height of droppers and questions about electrifying the fence or not), farmers were mainly concerned with the level of commitment by SARAo to the investment in a solid boundary. Farmers recognised that SARAo's primary concerns are to do with what occurs inside their boundaries and not with issues on the other side of the boundary/fence. In other words, sheep farming does not form part of SARAo's image of the landscape in which they have become major landowners, as they are focused on a different, "modern" land-use for the Karoo.

Before the 2018 closed meeting started, I was able to spend some time in casual conversation with two SARAO employees, in which we reflected on the SARAO and SANParks workshops that had been held in Williston, Brandvlei and Carnarvon a month earlier (described earlier). Already suspecting that some of the same issues would emerge, one of the SARAO employees asked me when last had I driven to Brandvlei via the SKA road. She continued: “Next time that you drive that way around, look a bit at the fences. It’s in a dreadful condition. The farmers always say it’s our jackals, but they themselves don’t look after their property” [*Volgende keer as jy daarom ry, kyk bietjie hoe lyk die drade. Dis in ‘n walglieke toestand. Die boere sê altyd dis ons jakkalse, maar hulle kyk self nie na hulle grond nie*] (SARAO land acquisition process manager, informal conversation, 18 May 2018).

Over and above already “fixing a lot on their side” [*ons het al baie reg gemaak aan ons kant*], according to the SKA core site’s manager, SARAO personnel attending the closed meeting did signal their realisation that jackal (and caracal) are nifty in crossing farm boundaries and that merely improving fencing “will not keep jackals out” [*dit gaan nie die jakkalse uithou nie*] (closed meeting, 18 May 2018). At this meeting SARAO also indicated that they are open to suggestions from farmers about these issues, thereby implicitly pointing to a management approach which de-emphasises the scientific/local knowledge divide so strongly present in other meetings, and allows for bridging between the two groups. In the course of the meeting, after the tensions discussed earlier subsided, both farmers and SARAO personnel expressed their commitment to establishing “good neighbourliness” [*goeie buurmanskap*] (SARAO land acquisition process manager, closed meeting, 18 May 2018); the general consensus was that practising good neighbourliness involved following the Fencing Act (which applies to SARAO). While the SKA’s core site manager was adamant that he would supply the fencing materials, he also offered to inspect the fence from his side. Franco, whose farm borders the SKA core site, expressed the sentiments of most of the farmers who were present, by saying that, if the material was given to him, he would ensure that the fence would be maintained [*gee vir my die materiaal, en ek sal hom instandhou*] (closed meeting, 18 May 2018). As of mid-2019, this agreement was still holding, according to SARAO’s stakeholder engagement officer, with SARAO “providing material to maintain fences and the landowners [providing] the labour to maintain fences” (telephone interview, 17 July 2019).

During our telephonic conversation on 17 July 2019, SARAO’s stakeholder engagement officer also elaborated on SARAO’s response to the farmers’ concerns regarding fencing and their own interest in the matter: to enhance security around the national key point, which would simultaneously increase

the effectiveness of jackal management, he stated that “a double fence¹⁰³ [will be erected] on SARAO’s expense within the next six/seven months. We are considering electrifying the fence but that will be done in consultation with the radio frequency specialist” [*‘n dubbel heining [sal opgerig word] op SARAO se onkoste binne die volgende ses/sewe maande. Ons oorweeg om die heining te elektrifiseer, maar dit is in konsultasie met die radio frekwensie spesialis*]. In other words, over and above the current fence demarcating the boundary of the SKA core site, consideration is being given to a second fence running alongside the existing, to be constructed and maintained by SARAO. According to SARAO’s stakeholder engagement officer (written response, 17 July 2019), “the specification of this fence is being done in consultation with different stakeholders including the neighbouring farmers”.

During our interview in May 2017, Viljoen, the farmer lay expert, also emphasised the importance of “good neighbourliness” [*goeie buurmanskap*] and its importance in fence management, while acknowledging the adroitness of jackals in circumventing such obstacles:

The big thing is regarding the management of the isolation, of the fence [...]. I feel the erection of the fence [...] the physical installation thereof should be SKA’s responsibility, but the farmers can help with the maintenance. [...] Good neighbourliness, yes. [...] It’s hard to point to whose jackals are whose jackals, but if you get an area that cannot be managed, um, with weak fencing, you are going to sit with a problem. [*Die groot ding gaan oor die bestuur van die isolasie, van die draad [...]. Ek voel die draad se oprigting [...] die fisiese staanmaak gaan SKA se verantwoordelikheid wees, maar die boere kan help met die onderhoud en die instandhouding. [...] Goeie buurmanskap, ja. [...] Dis moeilik om vinger te wys wie se jakkals is wie se jakkalse, maar as jy ‘n area gaan kry wat nie bestuur toegepas kan word nie, uhm met swak drade, gaan jy ‘n probleem kry.*] (Interview, 20 May 2017).

A major reason why farmers see fencing as an important management tool in the struggle against jackals is the belief that having secure, fixed boundaries ensures that all interest groups meet their responsibilities regarding jackals and jackal management. As a result, fences can also hold interest groups to account. As can be seen in the case of human–baboon conflict on the Cape Peninsula (Terblanche, 2015:93), the existence of boundaries can also be used to shift responsibilities between interest groups, according to the interpretation of where the boundary lies and who is responsible for its maintenance, thereby negatively impacting on collective management strategies and decisions. Even though a “fences and fines” approach to conservation has been widely criticised (e.g. Siurua,

¹⁰³ Extending approximately 200 kilometres, SARAO’s stakeholder engagement officer estimated the cost of erecting this new fence at approximately R35 million.

2006; Spierenburg & Wels, 2006; Holmes, 2007), in the case of the SKA core site and future protected area, having a fixed, properly maintained fence around the site represents a happy convergence of interests among farmers and SARAo: while SARAo is mostly concerned with keeping people out of its property, to safeguard the radio astronomy installation and its designation as a National Keypoint, farmers believe that the fencing will at the same time contribute to jackal management. Thus for SARAo, erecting proper fencing can signal to farmers and the rest of the Kareeberg community that they are taking their concerns into consideration and are serious about enhancing their relationship with their neighbours, thereby building institutional trust. If this outcome holds over time, the symbolism of the fence as representing a good neighbour, and the symbolism of the jackal as a trope for the SKA among livestock farmers, will be brought into an interesting relationship with one another – here the fence as bulwark against the intruder that needs to be contained in its proper place. However, as the ‘environmental jackal narrative’ argues, jackals are able to move across boundaries and cannot necessarily be contained in a confined space; the SKA also extends beyond the core site, by virtue of the spiral arms that will extend beyond it, as well as the declaration of the Central Karoo astronomy advantage areas over much of the Nama Karoo.

7.4 Conclusion

This chapter confirms Rostila’s (2010:317) observation that there is a “reciprocal relationship between the structural and cognitive dimensions of social capital”, in other words, while social networks and relations are necessary to establish trust, trust is also “considered the foundation for the exchange of social resources in social networks (both informal and formal)”. In order to deal effectively with the impacts of jackals and the SKA – both aspects where thin interpersonal trust and institutional trust are limited – farmers continue to rely mostly on their (closed) social networks, i.e. on thick interpersonal trust.

While trust within groups (thick trust) has led to the creation of voluntary associations that have been able to represent farmers in relation to the SKA, and have also supported trust-building among their members/participants, thus reinforcing forms of social capital, there are weak levels of trust between the different groups (thin trust) along with high transaction costs. Given the prevailing lack of trust between groups, the different players in jackal management still rely on negative stereotypes about out-groups and continue to produce “negative norms and behaviours [of the other] within the network” (Rostila, 2010:321). The management of sheep has also changed over the years, as farms have become larger and more farmers have become removed from their farms; this has encouraged

increased individualism amongst farmers, which has further worked against the goal of more effective jackal management. While the farmers I interviewed are generally nostalgic for a past in which they believe farmers had been in control of their land, a major conclusion emerging from my research is that they need to adapt to the changing circumstances if they are to manage problem animals successfully. This involves not simply making use of new technologies, such as social media in their (individualistic) strategies, but also investing in activities and organisations in order to build the trust they consider was present in the past when the management of mesopredators was “a collective undertaking” [*n gesamentlike poging*] (du Toit, interview, 3 April 2019).

While there is some evidence that farmers and professional vermin hunters are engaging selectively with the work of life scientists (i.e. bridging between the ‘environmental’ and ‘farmer jackal narrative’), this is also hampered by the lack of interpersonal and institutional trust. Nevertheless, such bridging connections provide links to external resources and allow for the opportunity to share information. At the same time, in the specific context of the SKA core site, some relatively recent examples of bridging between SARAO and farmers have begun to emerge since mid-2018. In Section 7.4 the discussions around the (re)establishment of fencing around the SKA core site was identified as an example of both groups finding common interests in this endeavour, and stress the importance of good neighbourliness.

Farmers and professional vermin hunters acting on their own, and each using the jackal management techniques that they deem the most successful, have made it easier for jackals to proliferate on commercial farms. Most life scientists I interviewed are of the view that the main reason for the repopulation of the Karoo by jackals is the lack of collective action, such as in the past when all farmers used similar management techniques and were involved in joint activities. In its capacity to modify its behaviour in ways that affect human practices, the jackal has demonstrated its agency (see Chapter 3). All those concerned with these developments – farmers, vermin hunters, life scientists and project managers – also need to keep up with the mesopredator, i.e. modify the techniques they use to manage jackals. As with Khodyakov’s (2007) definition of trust, jackal management (as with livestock farming) possesses a temporal dimension and has an agentic nature.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

Even though calls for more studies of jackal ecology (du Plessis *et al.*, 2015; Natrass *et al.*, 2017) are beginning to be met in the natural sciences (see Chapter 1), comparatively little attention has been paid to the human aspects of farmer–jackal conflict. In recent years, according to my literature search, only 10 studies of a social science nature have been conducted on farmer–jackal conflict in the Karoo. Most fall within the field of environmental history and analyse how the capacity of jackals to modify their behaviour allowed them to adapt to the colonial agrarian economy that emerged in the Karoo during the 19th century and, simultaneously, how the jackal has played a role in agrarian change, actively shaping human society (e.g. van Sittert 1998 & 2016; Beinart, 2003; Natrass *et al.*, 2017; Carruthers & Natrass, 2018). Two of the 10 studies are of a primarily economic nature, assessing the success of predation management methods (hunting clubs and culling, respectively) in curbing livestock and subsequent financial losses (Conradie, 2012; Conradie & Piesse, 2013). In addition, studies by Niekerk (2010) and Turpie and Akinyemi (2018) provide an overview of the socio-economic impacts of livestock predation and its prevention in South Africa as a whole. Natrass and Conradie’s (2015) important article, ‘Jackal narratives: Predator control and contested ecologies in the Karoo, South Africa’, was the first piece of sociological research on jackal ecology and management in the Karoo, in this case looking at the issue in the Central Karoo District Municipality of the Western Cape. This work has been followed by two further publications on jackal ecology and management (Natrass & Conradie, 2018 & Natrass *et al.*, 2019), which build on this research as well as recent ecological studies in the Central Karoo, and discuss the lethal control of mesopredators in this context.

This dissertation was motivated by both my academic interest in contributing to this literature and my personal interest in wildlife conservation. Given the paucity of sociological studies, a study of the social dimensions of farmer–jackal conflict, in the context of a significant and politically contested land-use change, that of the SKA, seemed both a useful and timely contribution, underscoring the importance of the social sciences in analysing these cross-cutting issues and contributing to a deeper social-ecological understanding of farmer–jackal conflict in an under-researched location. When I first embarked on my research, however, I had not realised quite how many themes and issues relating to jackals and their management would arise in the context of the SKA and the development of its core site. As developments in my research site unfolded, the issue of how the jackal functions as a symbol of marginalisation for farmers on the privately owned land neighbouring the SKA core site emerged as a compelling theme. While the different understandings of jackals among farmers, professional vermin hunters and natural scientists were important for understanding the political

ecology of jackals, I also found it necessary to investigate the power relations around knowledge production in relation to the SKA as a significant site of global astronomical science, and to reflect on the impact of this development on jackal management and the prospects for collective action in dealing with jackal predation. This is especially pertinent in a changing Karoo environment where commercial farmers' general understandings of themselves as socially and politically marginalised in post-apartheid South Africa, and economically under threat, have become particularly acute in the Kareeberg, as a result of the development of the SKA core site and plans to declare that site a special nature reserve.

In this final chapter of my dissertation, I first review my key findings and present the conclusions that can be drawn from them in relation to my research questions, including prospects for more effective jackal management in the future in the Kareeberg region. In Section 8.2, I reflect on the broader contribution to knowledge of my dissertation. In Section 8.3, I conclude with recommendations for future research as well as some practical steps that can be taken to advance more effective jackal management in the Kareeberg region.

8.1 Reflections on key findings

This section reflects on the key findings of my research in relation to my overarching research question which was formulated as follows: What are the dynamics shaping farmer–jackal conflict on the farmlands bordering the SKA core site in the Karoo region of South Africa's Northern Cape Province and what can we learn from this about jackal management and human–wildlife conflict?

In order to answer this broad, composite question, I identified a number of subsidiary questions around which my research project was structured. These concerned the attitudes of farmers towards the SKA, the understandings of the jackal among the different interest groups in jackal management, the significance of the construction of the jackal as an *ongedierte* in Afrikaans popular culture, the power relations in knowledge production between 'scientific' and 'local' knowledge, the role of collective action and trust, and prospects for effective jackal management in the Kareeberg region. In answering the overarching question around the dynamics shaping farmer–jackal conflict, I highlight three sets of issues that emerged from my research as particularly significant: first, the negative impact on their livelihoods that the major land-use change that the SKA represents has brought for Kareeberg farmers; second, farmers' perceived loss of autonomy and authority over their land, the latter however tied to their loss of state support and the marginalisation of their local knowledge in the contemporary discourse around jackal management; and third, the absence of both thin

interpersonal and institutional trust among the constituencies involved in jackal management across both the long-established privately owned land and now the very recent publicly owned land in the area. In concluding this section, I also look at the implications for jackal management into the future.

8.1.1 The impact of the SKA as a major land-use change in the Karoo on farmer livelihoods

Human–jackal conflict is not a new concern as there is evidence that the pastoralist Khoekhoen suffered from livestock predation before the onset of colonialism (Carruthers & Nattrass, 2018:30). The Khoekhoen’s adverse relationship with jackals is also evident in their folktales in which the jackal features prominently as a protagonist, which fed into popular constructions of the jackal as *ongedierte* (see Chapter 5). Nevertheless, as settled commercial livestock farming expanded during the 19th and 20th centuries, farmer–jackal conflict became a particularly serious concern for human livelihoods based on sheep farming. In recent decades this problem has escalated which can be attributed to a number of factors, including the cessation of state subsidies for predator control and fencing in the early 1990s; consolidating land ownership, leading to ever-bigger farms and linked also to the rise in absentee owners (often labelled ‘lifestyle’ or ‘weekend’ farmers); as well as the mounting pressure on farmers from environmentalists and life scientists to desist the lethal control methods on which Karoo farmers have long relied, in part because this is seen as cruel, but increasingly because of the evidence to show that jackals fulfil an important ecological role (Davies-Mostert *et al.*, 2007:10; Bothma, 2012:6; CapeNature, 2015:6; Nattrass & Conradie, 2015:15). These developments have coincided with, and are seen to add to, other pressures experienced by the commercial farming sector, such as the serious and ongoing drought, generally unfavourable economic conditions, concerns around land reform, legislated increases in the minimum wages that farmers can pay their workers, their sense of political marginalisation and loss of community as the number of family farms declines, and, in the case of livestock farmers, changes in land-use, including the growing prominence of game farming.

For Kareeberg farmers the SKA – a powerful and unknown force – has been a particularly intrusive addition to the above mix, further exacerbating the pressures farmers are experiencing, by reducing the local farming community through its Land Acquisition Programme and introducing new restrictions on communications and lifestyles (see Chapter 2). The extent to which the reduction in the number of sheep farms in the area will have negative knock-on effects on the local agriculture-based economy, through, for instance, the reduced numbers of sheep being sent to local abattoirs, is not yet clear, but the study by Kirsten (2016) has suggested that it could be locally significant. During

the time of my fieldwork, uncertainty about the full extent of the SKA's land needs and what its requirements around minimising radio frequency interference involved, was an added source of tension. All of this has been done in the name of a science that brings no obvious compensatory benefits to local farmers.

What has further aggrieved Kareeberg farmers was the decision to declare the SKA core site as a protected area, with life scientists associated with the new park welcoming this as an opportunity to further their research agenda and insisting that farmers must learn to co-exist with both the SKA and jackals. The possibility that a national park would be declared in their midst was not apparent to farmers (or the wider community) when the SKA bought its first two farms in 2008. In this context, as discussed in Chapter 5, the jackal has come to function for farmers as a complex trope for the SKA, with their battles against these two 'cunning intruders' on their land inextricably entwined. Like the jackal, the SKA development is threatening farmers' livelihoods and upsetting the 'natural' order of things in the Karoo as the farmers perceive it, which is a landscape organised around and dedicated to commercial sheep farming. Furthermore, in relation to this development, livestock farmers whose home it is, find themselves assigned a lower ranking than externally based scientists (whether physicists or life scientists) in terms of how to deal with the actual problem of the jackal in their lives.

8.1.2 The biggest *ongedierte*: Farmers' loss of autonomy, authority and state support

While farmers are aggrieved about the negative financial impacts brought about by both the SKA and the jackal, now experienced as working together, their animosity towards the SKA and the jackal also lies with the fact that their autonomy – being "*baas van die plaas*" [the master of the farm] – is being taken away. In other words, in contravening white, commercial farmers' understanding of the 'natural' (in actuality, the social) order in the Karoo, jackals as well as the astronomy development also confirm their marginalisation in contemporary South Africa. The SKA management is dismissive of the farmers' history and the nostalgia they feel for a past in which 'man' (white commercial farmers) controlled nature (i.e. non-humans) effectively, to serve his needs. Unlike jackals and the SKA development, farmers see themselves as custodians of the Nama Karoo as a farming space. Here I agree with Brandt (2013:126) that, despite the challenges that they face, which heighten their sense of instability and insecurity, Karoo farmers also regard themselves as "survivors". Drawing on a strong sense of the rightfulness of their claims to authority, farmers in the Kareeberg region have a burning passion to re-assert themselves in a position of authority above that of the *ongediertes*.

At the same time, farmers are also aggrieved by the loss of state support in their struggle against the jackal. Their insistence on their autonomy to act as the custodians of their land is thus qualified by

their expectations of what the state should be doing to support them in this role. The retraction of government subsidies for predator management in the early 1990s, and its mounting support for conservation efforts and initiatives instead, has had long-lasting effects on farmer–jackal conflict, with farmers not only experiencing an increase in predation, but also feeling that they are the only ones who are serious about predator management. Schneekluth emphasised this in one of my interviews as follows:

Only stones are rolled in the farmers’ way, nothing else. In a nutshell, uh, until the middle, until the late eighties, it [government] was absolutely pro-farmers. Even nature conservation, the conservation department was pro-farmers, they helped the farmers to manage jackals. And it [...] went well, then for a number of years nothing happened, until the new [post-apartheid] regime came, almost nothing happened, everything was now kind of... everybody by itself. And then the change came so in the, so 2005 or something like that, absolute anti-boer. Just more regulations, regulations, regulations. From, from friends to the farmers, became enemies of the farmers. [*Daar word net klippe in die boere se pad gerol, niks anders nie. In ‘n neutedop uh, tot in die middel, tot in die eind tagtiger jare was dit [die regering] absoluut pro-boere gewees. Tot in natuurbewaring, die natuurbewaringdepartement was pro-boere gewees, hulle het die boere gehelp om jakkalse te bestuur. En dit het [...] goed gegaan, toe’t daar vir ‘n aantal jare niks gebeur nie, tot die nuwe [post-apartheid] regime gekom het, daar [het] amper niks gebeur nie, alles was nou soortvan... everybody by itself. En dan het die verandering gekom so in die, so 2005 or something like that, absolute anti-boer. Net nog regulasies, regulasies, regulasies. Van, van vriende vir die boere, het vyande van die boere geword.*] (Telephone interview, 7 February 2018).

De Waal concurs with the above perspective in noting that “the farmer’s resentment is not because the jackal bothers him, but because he has to handle it alone” [*die boer se wrewel is nie omdat die jakkals hom pla nie, maar dis omdat hy alleen daai ding moet hanteer*]:

That is actually what it is about. [...] They say it is the state’s animals, right? [...] Unfortunately, the Department of Environmental Affairs is hyper-conservationist and [Department] Agriculture, which is actually responsible to manage, such as animal diseases, is completely absent. [*Dis eintlik waaroor dit gaan. [...] Hulle sê dis die staat se diere, nè? [...] En ongelukkig die Departement Omgewingsake is hiper-bewaer en [Departement] Landbou wat eintlik, op wie se terrein eintlik bestuur is, soos die siektes van diere, is totaal afwesig.*] (Interview, 19 February 2018).

As noted by Viljoen (interview, 20 May 2017), the intensity of farmers’ hatred for this non-human actor, which has the ability to control so many aspects of their lives, often obstructs their judgement

about the best ways to respond to what is happening around them. In a situation characterised by du Plessis (interview, 19 February 2018) as one of despondency [*moedeloosheid*], in which farmers are deeply dissatisfied with the state, it is the jackal that is at the receiving end of livestock farmers' frustrations and is killed. As is evident in the accounts of farmer/jackal interactions throughout this dissertation, individual jackals are the one thing in their environment over which farmers feel they still have some control and, as a result, the individual 'problem' jackal bears the brunt of farmers' frustrations and focus of what can be seen as displaced anger as well. Schneekluth captured this outcome very well:

He [the jackal] is not really the problem. The problem is actually caused by the bureaucrats... first the activists and then the bureaucrats. Then it is also the academics, they are also a bit guilty that it has become a problem. Basically, this is not a problem at all! One just has to leave the farmer so that he, how he thinks the problem should be solved... let him do it! Now he is bound by laws and even more laws and regulations.] [*Hy [die jakkals] is nie eintlik die probleem nie. Die probleem word eintlik veroorsaak deur die burokrate... eers die aktiviste en dan die burokrate. Dan is dit ook die akademiese mense, hulle is ook so bietjie skuldig daaraan dat dit 'n probleem geword het. Basies is dit glad nie 'n probleem nie! Mens moet die boere net los sodat hy, wat hy dink hoe hy sy probleem moet oplos... laat hom dit doen! Nou word hy deur wette en nóg wette en regulasies word hy aan bande gesit.*] (Telephone interview, 7 February 2018).

Also at issue in understandings of autonomy and farmer/state relationships are the power relations that are tied up with the dominance of scientific over local knowledge in jackal (and broader environmental) management. As shown in Chapter 6, the scientific knowledge of external decisionmakers and astrophysicists attached to the SKA, and, the academic ecologists and zoologists working on jackal ecology, enjoys a position of dominance with regards to wildlife management in and around the SKA core site. In this way these 'outside' professional elites continue to impact on the lives of the farmers living around the SKA core site – specifically overlooking or dismissing the experience-based knowledge of the jackal that is to be found on commercial farms among not only ordinary farmers, but also *voetjagters* and farmer lay experts. Consistent with the theoretical framework provided by political ecology, what this dissertation has shown is that the decision-making related to jackal management and the development of the SKA core site is embedded in relations of power and struggles over land as a resource, in which the language of science has been used to silence or disempower those challenging management decisions that have already been made.

Thus, as shown by my research, farmers' "hatred and emotional passion [...] to get rid of the jackal and to get it off one's property" [*haat en emosionele passie [...] om die jakkals weg te kry en van sy*

grond af te kry] (Viljoen, interview, 20 May 2017) has also been directed at the SKA, another even more powerful non-human actor that has intruded on farmers' lives and land, and disregards farmers' interests in pursuit of its own agenda. As farmers' experience of the loss of autonomy and the marginalisation of their local knowledge have both grown, they have become increasingly reliant on their (closed) social networks, i.e. on thick interpersonal trust (in which their struggle to control the jackal plays a part). In order to deal effectively with the impacts of jackals and the SKA, however, what is needed in the Kareeberg is the development of what Khodyakov (2007) has defined as thin interpersonal trust and institutional trust (see Chapter 3), both of which are currently extremely in short supply as became evident throughout my dissertation.

8.1.3 The lack of trust

While SKA managers and ecologists have begun to show some willingness to acknowledge farmers' concerns around the SKA core site as a haven for predators since the completion of the Land Acquisition Programme, farmers remain critical about the effective integration between 'scientific' and 'local' knowledge in jackal management. This is mostly as a result of the strained relationship between SRAO and farmers as a result of several years of negotiations and disputes around the development of the SKA core site, characterised by the absence of both thin interpersonal and institutional trust, and poor communication mechanisms (by farmers' standards). For Ostrom and Ahn (2003:5), trust is the "core link between social capital and collective action". Without this key feature, groups are unable to identify "values that they share [and as a result...] solve collective problems" (Ostrom, 2009:21). Even though thick personal trust is still evident in the Kareeberg, wariness among the actors on all sides has thwarted successful collective action in planning jackal management strategies in and around the SKA core site, as well as reinforced a top-down approach to decision-making on the part of the SKA. This highlights the unequal power relations in jackal management, as well as, the development of the protected area on the SKA's core site.

The importance of thin interpersonal and institutional trust for effective jackal management is another of my key research findings. The increasing individualism in the jackal management strategies that farmers are adopting also highlights the lack of bridging social capital (thus thin interpersonal and institutional trust) amongst the different jackal management interest groups.¹⁰⁴ Farmers and professional vermin hunters acting on their own, each using the control methods which they deem most successful, is, however, assisting jackals (and caracal) to "recolonise the old sheep-farming

¹⁰⁴ For a schematic representation of the various constituencies with an express interest in jackal management in and around the SKA core site, see Appendix D.

districts” (Nattrass & Conradie, 2015:7; see also Nattrass *et al.*, 2019); in this they have also been aided by the depopulation of farms in the region (for which the SKA is also partly responsible), which has further undermined the social fabric of the farming community and their prospects for collective action. Most life scientists I interviewed are of the opinion that the lack of collective action that was evident in the past, when all farmers used the same management techniques, is a major reason for the repopulation of mesopredators. The management of sheep has also evolved throughout the years, becoming more individualistic amongst farmers. The principle of collective action is, however, what needs to be restored, in order to successfully fight problem animals. In other words, while farmers may continue to use new technologies to their advantage, they should also be investing in re-building the trust of the past when mesopredators were “collectively managed” [*dis ‘n gesamentlike poging*] (du Toit, interview, 3 April 2019).

For trust to be established between all groups involved in jackal management, the networks and relationships already present (alluded to in Chapter 7) should be used as a resource on which to build. Only when SARAO recognises farmers’ concerns and suggestions, for example around the management of the new national park, can trust between farmers and scientists be developed. Similarly, only when constituents of the ‘environmental jackal narrative’ concede that the ‘farmer jackal narrative’ has some valid points (for instance, that jackals prefer sheep to similarly sized alternative prey; see Chapter 7) and involve farmers in the policymaking at which their research is directed, will trust and meaningful relationships be developed among these parties. At the same time, the onus also rests on farmers to seek bridging social networking opportunities, communicate their local knowledge and engage with the new ecological science, instead of waiting for someone else to fix the problems.

In this regard, the relatively recent examples of improved dialogue between SARAO and farmers that began to emerge from mid-2018 in relation to the (re)establishment of fencing around the SKA core site does appear to hold some promise. Even though it is established that in the absence of strong barriers jackals (and caracal) are capable of dispersing over great distances and across many farms in the Karoo (see, for example, Figure 3.3), in the case of the future protected area at the SKA core site, having a fixed, properly maintained fence around the site does represent a happy convergence of interests among farmers and SARAO and hence a basis for further interaction and shared work. While SARAO is mostly concerned with keeping people out of its property, to safeguard the radio astronomy installation and its designation as a National Key Point, farmers believe that the fencing will, at the same time, contribute to jackal management. This discussion of fencing is pointing to a new phase in the relationship between the SKA as the new landowner and the farmers adjacent to its core site which was just beginning to emerge at the end of my fieldwork. For SARAO, erecting and

maintaining the fencing can signal to farmers and the rest of the Kareeberg community that they are taking their concerns into consideration and are serious about enhancing their relationship with their neighbours, thereby helping to build institutional trust (if not finally containing the jackals within their land).

Viewing trust as a dynamic process emphasises that, even if trust is not yet present, it can be established and nurtured. At the same time, once trust is present, it should be maintained, otherwise it very likely will be lost. Importantly, “trust as a social practice and process [...] involves the responsibility of both parties, commitment to the relationship, and the possibility of social change” (Khodyakov, 2007:125).

8.1.4 Prospects for more effective jackal management in the Kareeberg region

Strongly evident throughout this dissertation is the adversarial relationship between Kareeberg livestock farmers and jackals which has shaped human–wildlife relationships in this area for generations. Accosted as the main culprit in livestock losses (see Chapter 1), jackals have been categorised by farmers as *ongediertes*. While the English translation of this term, vermin, conveys farmers’ views of jackals as “agents of degradation and the enemy of other, more proper and desirable forms of nature” (Holm, 2012:77), the Afrikaans term also conveys the idea of the jackal as an aberration, literally a “non-animal or de-animalised creature” (Beinart, 2003:207). In this vein the jackal is seen as taking on human qualities; anthropomorphic characteristics commonly attached to jackals by my research participants included, for example, “*skelm*”, “*slim*”, “thieves”, “adaptable” [*aanpasbaar*] and “crafty” [*uitgeslape*].

As described in Chapter 1, numerous control measures, both lethal and non-lethal, have been tried to reduce livestock losses and address farmer–jackal conflict. Management efforts have, however, been largely unsuccessful, since predation has not declined and jackals remain “more resilient than ever” (Dugmore, 2016; see also Bothma, 2012; Smith, 2012; du Plessis *et al.*, 2015:138; Minnie *et al.*, 2016:380). According to Beinart (2003:232), the “inherited characteristics” of jackal, as well as “their capacity to modify behaviour”, allowed them to adapt successfully to the colonial agrarian economy during the 19th and 20th centuries, and this resilience is still apparent. At the same time, recent research is producing new insights as to why the jackal as a species is so resilient. This research also points to the problems that arise for livestock farmers practising indiscriminate killing, as a result of the accelerated breeding rates that follow if the hierarchy within the jackal population in a given area is disrupted through the killing of the alpha (breeding) pair (Natrass & Conradie, 2015:10; Minnie *et al.*, 2016; Reardon, 2018:48). As already noted, for more effective jackal management strategies to

emerge, these findings need to be integrated with farmers' concerns and the knowledge they bring to the table; however, as my findings on trust have demonstrated, this is not a generally shared understanding of the way forward.

My research findings highlight the social dynamics operating within and around conservation issues, as well as the need for participation and mutual learning among interest groups in order to resolve wildlife management problems. Without an understanding of all the interest groups and their diverse viewpoints, effective wildlife management, and in this instance jackal management, will continue to be challenging. This is especially relevant in relation to the SKA, where strong divisions between the advocates of the 'environmental' and the 'farmer jackal narratives', as well as the hierarchy of 'scientific' over 'local' knowledge, continue to dominate the forums that have been put in place to date for mutual exchange. Here the theoretical insights of political ecology and qualitative research methodologies aimed at understanding not only the differences but also the areas of common or converging interests among the groups involved in wildlife management, can offer a "productive starting point" (Patterson *et al.*, 2003:174) for dialogue.

In the context of the Kareeberg what will be significant here is the willingness of farmers to engage with the science that the jackal ecologists are producing and to work with these new ideas constructively. Strong fences around the SKA may reduce farmer–jackal (hence farmer–astronomer) conflict on this border but will not resolve the problems of predation in the district more generally. Viljoen, the farmer lay expert who is experimenting with various methods of predation management (instead of predator management; see Chapter 6), captured the challenge farmers face succinctly, as follows: "the challenge is between the farmer and the jackal, about who will be the most adaptable" [*Dis die challenge tussen die boer en die jakkals oor wie die aanpasbaarste gaan wees*] (interview, 20 May 2017).

Situating the vignettes presented throughout the dissertation within the context of a changing political ecology helps to place the issue of jackal management within a wider social-ecological framework. If farmers are unable to be resilient in the face of changing circumstances and adapt to these changes, then, in the words of social scientist Nicoli Nattrass, "a form of destruction of community" is likely to accelerate (interview, 17 January 2018). She has suggested that viewing white, commercial farmers in the Karoo both historically and within a contemporary social-ecological frame allows one to see them as subject to social-ecological pressures as a group just like the jackal. While Karoo farmers thrived before the mid-1990s, as the beneficiaries of state subsidies and, more broadly, white-dominated politics, they are now a community in decline (see also Hill & Nel, 2018):

You could also take a historical view and go well, hang on a minute, the San lost or were dispossessed by these guys. Now they [white farmers] are getting dispossessed, it's just, it's just [viewed] in the long historical picture. They were a blimp [on the radar] that probably never should have happened. They only, in fact, made any sense in the Karoo with lots and lots [of...] subsidies. (Natrass, interview, 17 January 2018).

At the same time, while major land-use changes are occurring in the Kareeberg (and elsewhere in the Karoo), it is likely, as Walker *et al.* (2018:15) have argued, that livestock farming will continue to be the major land-use in much of the Karoo into the foreseeable future. This means that it is incumbent on the state and life scientists to work with farmers in securing ecologically and socially sustainable livelihoods through effective predation management methods. Even if the livestock farmers of the future Karoo will no longer be predominantly white, as is likely to become the case, the reality of farming with jackals (and other mesopredators) will still be an issue for farmers. The need for all the actors, human and non-human, to find ways of co-existence will therefore remain.

8.2 Reflections on the contribution to knowledge

As the above discussion of my findings shows, conducting my research in the shadow of the SKA has added a new dimension to the study of farmer–jackal conflict as an example of human–wildlife conflict. As discussed in chapters 1 and 2, the SKA core site is promoting an alliance of physical and natural sciences in support of the SKA core site and its future as a protected area. In this process Kareeberg farmers have found themselves in conflict, not only with the ecologists and zoologists working on jackal ecology, but also with the yet more powerful community of scientists and managers attached to the SKA. Attending public meetings organised by SARAo in the Kareeberg region made me realise how misunderstood farmers feel with regard to the significance of the farmer–jackal conflict issue in the region and how deep the gulf between scientists (i.e both SARAo and ecologists) and local people is. These meetings also allowed me to identify a practical problem: the local farmers who bear the brunt of the conflict with the jackal were not being included in jackal management decisions and policymaking at local, provincial and national levels, for reasons that seemed important to unpack. In this they were not alone, as many of the residents of local towns have also felt excluded from the decision-making process to proceed with the SKA development, despite being directly affected by this development (Walker & Chinigò, 2018; Atkinson, 2019; Parkington *et al.*, 2019). Jackals, as one of the farmers' major issues of concern was, however, not an issue they shared with townspeople; it is one that is central to the future of farming in the Karoo.

My study confirms the significance of the context-specific interaction of social, political and economic factors in driving environmental conflicts. In the specific context of the Kareeberg, old tropes around the jackal are being reworked in relation to the SKA. While white, commercial farmers already perceive themselves to have a lack of autonomy and authority in jackal management, this feeling has been exacerbated by the presence of the SKA, hence the fusing of the two struggles in various ways. Over and above the South African government's aspirations to shift to a knowledge-based economy, in which the SKA development is regarded as a major achievement, farmers no longer receive government support for predator and predation management. My discussion of commercial farmers' perceptions, decision-making processes and challenges shows how their sense of place and belonging in the contemporary Karoo is filled with uncertainty, with implications not only for them but also for the future of commercial agriculture in this region and the local economies it underpins.

As became evident throughout this dissertation, jackals are the one thing in their environment over which farmers feel they have some control and thus, as I have argued, this uncanny animal has borne the brunt of farmers' frustrations. I have also argued that farmers' local knowledge could be a valuable resource for the management of the SKA core site and the development of the Park Management Plan for the future protected area. However, while there is large body of work emphasising the importance of pluralist decision-making perspectives in wildlife management, as "foundational to transactional management" and taking account of "the multiple views of reality among stakeholders" (Zollinger & Daniels, 2005:255), at this point it is not clear if the SKA national park will be managed in this way.

The inability of those responsible for developing a jackal management strategy around the SKA core site to address heterogeneity and establish trust has resulted in "continued public frustration" which, as Messmer (2009:14) has argued, is likely "reduce the credibility of the agency administering the programme and detract from long-term objectives" (see also Redpath *et al.*, 2015). As a result of miscommunication and lack of transparency between rationalists and affectionalists, misperceptions can also arise, as constituents may fail to "understand 'the constraints and pressures on the other'" (Reynolds & Braithwaite, 2001:40, cited in Burns & Howard, 2003:708).

Transparency is thus required amongst all jackal management interest groups to tackle "misunderstandings, miscommunication, and misperceptions" (Maser & Pollio, 2012:33). Increased dialogue between constituents, along with assigning a certain amount of responsibility to citizens (i.e. farmers), can assist in improving not only understanding and relationships between the authorities and the public, but also between scientific experts (rationalists) and those who base their reasoning on emotions (affectionalists) (McCool, Guthrie & Smith, 2000, cited in Young *et al.*, 2010:3984). In

addition, issues relating to “power, interest and representation” – which, according to Richards, Sherlock and Carter (2004, cited in Young *et al.*, 2010:3985) are crucially important in any situation in which dialogue ensues – also need to be addressed. For this, careful consideration is needed in establishing who the constituents of jackal management around the SKA core site are, to ensure that the dialogue among them is not dominated by certain interests and/or viewpoints, and to allow knowledge transfer from scientific to local knowledge and vice versa. The words of one of the ecologists working on farmer–jackal conflict captures this important point: while “scientists come with academic knowledge, [...] farmers are scientists in their own way” (interview, 16 October 2017).

What my study shows is the importance of building thin interpersonal and institutional trust, where it is lacking, for effective wildlife management; the trust that this engenders can also be a basis for collective action in other spheres of human activity. In the words of du Plessis, in an interview in February 2018:

Biology and ecology can tell you a lot of things, but in the end it is people who have to implement it and, if you are not sensitive to their circumstances and their situations, you can do what you want. That thing will fall flat. If you do not take that part into account, I think it is for anything, not just for jackals, it, it will just fall flat. [*Die biologie en ekologie kan vir jou 'n klomp goed sê, maar op die ou einde is dit mense wat dit moet impimenteer en, en as jy nie sensitief is teenoor hulle omstandighede en hulle situasies nie, kan jy doen wat jy wil. Daai ding gaan plat val. As jy nie daai deel in ag neem nie, ek dink dis vir enigeiets dis nie net vir jakkalse so nie, dit, dit gaan net plat val.*] (Interview, 19 February 2018).

Given the power of the SKA and the SARAO, they should take the lead in building institutional trust and promoting knowledge transfer. In cooperation with SANParks as the proposed land manager of the core site, the finalisation of the future protected area’s Park Management Plan would be a good place to start with this process.

8.3 Recommendations for future work

I have identified several areas for future work – both research and pragmatic – throughout my study. The recommendations that are mentioned here are primarily based on the limitations of this study (mentioned throughout Chapter 4), as well as topics that were discussed in the preceding chapters. Other potential areas for future work were also suggested by some of the research participants.

While the SKA has placed Carnarvon and the Kareeberg region on the global map in terms of astronomical research, there is still a dearth of social-ecological research focused on the Nama Karoo. The recent establishment of the SARChI research programme within which my study has been conducted has begun to address some of the gaps in Karoo studies.¹⁰⁵ In 2018, the *African Journal of Range and Forage Science* published a double special issue on the Karoo as a complex social-ecological system, thereby promoting inter-disciplinary work across the natural and social sciences and “significantly adding to previous syntheses of Karoo knowledge” (Henschel *et al.*, 2018:151). In 2019 the *Journal of Southern African Studies* also published a special issue focusing on the history and development impacts of astronomy in the Karoo, including in relation to the SKA (Walker, Chinigò & Dubow, 2019:628). However, despite the recent upsurge in research and publications regarding the Karoo, there is still much to be done in general and in jackal-related research in particular.

One issue that farmers’ highlighted is the need for context-specific research on jackal management, which for them means scaling down as far as the farm level. Given ecologists’ findings that jackals are mobile animals that do not respect farm boundaries in order to find vacant territories (see Figure 3.3), this request by farmers is justified. A farm-level perspective would assist in understanding the intersection of micro-ecologies and farmer’s views on the jackal, on lethal and non-lethal control methods and on the environment in general. Such research would also benefit from a social science perspective on the human dimensions of human–wildlife conflict. Human–jackal conflict research in South Africa could build on this dissertation by focusing on the factors that hinder or encourage individual Karoo farmers in implementing non-lethal predation management strategies (see, for example, Natrass & Conradie, 2018).

Another important need that emerges in relation to the SKA core site concerns outreach activities that combine education on both astronomy and environmental conservation. One proposal specifically related to jackal knowledge is to involve life scientists and/or professional vermin hunters in the presentation of short courses in the Kareeberg region, which could be organised in conjunction with the SARAo and SANParks as the future land management authority of the SKA core site; representatives of local farmers’ associations, national farmer associations such as Agri SA, the NWGA and the RPO, and research hubs at South African universities addressing predation as a major issue for South African livestock farmers, could all be involved. This would contribute to the building

¹⁰⁵ The SARChI Research Chair in the Sociology of Land, Environment and Sustainable Development, under Prof Cheryl Walker, popularly known as the ‘Cosmopolitan Karoo’ project, was established at Stellenbosch University in 2016; see www.cosmopolitankaroo.co.za.

of bridging social capital and deepening the thin interpersonal trust between the advocates of the ‘environmental’ and ‘farmer jackal narratives’ identified by Natrass and Conradie (2015).

Here it will be important to move beyond a top-down approach, with science experts at the helm, and, as political ecology reminds sociologists, look beyond the most vocal and powerful interest groups to “document and highlight the existence of local or indigenous knowledge and practices in the area of wildlife management and control” (Knight, 2000:5; see also Hannigan, 2006:55; Teel & Manfredi, 2010:137). Currently, there is no official platform in the region that brings ecologists, zoologists, farmers, *voetjagters* and professional vermin hunters together, to share their jackal management knowledge with one another. Such a platform or platforms would offer farmers and *voetjagters* an opportunity to present their experiences, insights and stories with their peers as well as life scientists.

Another way to improve the dialogue is to involve farmers and *voetjagters* in policymaking discussions related to jackal management in the same way as some professional vermin hunters are involved. Not only will this assist in documenting valuable local knowledge that local residents are concerned might be disappearing; such initiatives may also encourage local people to stay in the Karoo and actively participate in the shaping of their futures. As most Karoo *voetjagters* are elderly, concern was expressed by farmers and professional vermin hunters that the local knowledge they hold is ‘dying out’ and not being transmitted to the younger generation who are choosing to move away from the work of *voetjagters* and farmwork in general. Documenting their knowledge and collecting the life histories of people who have been disregarded for so long, is another valuable research activity.

Over and above the issues around jackal management, during my fieldwork I was made very aware of the major social challenges on farms around the SKA core site and in the broader region, which constitute another important area of work, both research and advocacy. Examples of such challenges include alcohol abuse and the inequalities and physical abuses still embedded in the apparently paternalistic relationships on Karoo farms. Farmers are still very much in control over what happens on their property and, consequently, reinforce the asymmetric power relations that are a feature of paternalism. While new labour and tenure legislations were supposed to increase social security for farmworkers in South Africa, it is evident that much work remains to be done in this regard in the Kareeberg.

On a related but more pragmatic note, this research project highlighted the need to promote interdisciplinary work involving wildlife managers and social scientists. Future social research needs to address the general lack of integration between the social and natural sciences by committing to

more interdisciplinary research and training in the field of wildlife studies in South Africa, which has traditionally been perceived to be a natural science domain. With the assistance of social scientists and their training in humanist values, which is essential for working with diversity and complexity (Berger, 1963), wildlife managers will be better placed to “recognise, embrace, and incorporate differing stakeholder values, attitudes, and beliefs in the policy making process” (Messmer, 2000:100) and determine if the management strategies they wish to advance are culturally, politically and socio-economically “compatible with the local context in which they are applied” (Knight, 2000:5). Also, as suggested by Dickman (2010, cited in McLennan & Hill, 2012:226), understanding how and why people socially construct wildlife and their interactions with wildlife as they do, “should be an integral component of conflict-mitigation initiatives”.

In conclusion, it is my hope that my dissertation will not only encourage wildlife managers to recognise the need to incorporate an understanding of human dynamics in wildlife management decisions, but also increase interest among social scientists in further research on the sociology of human–jackal conflict as well as human–wildlife conflict more generally, and thereby contribute to solutions that reduce the conflicts and promote co-existence among different interest groups, as well as between humans and non-humans. Engagements with jackal management constituents in the Kareeberg, especially the livestock farmers who are struggling with jackals as a threat to their livelihoods on a daily basis, inevitably created expectations among many of them that my research would provide solutions to the age-old conflict between farmers and jackals. While I am very aware that this dissertation does not provide definitive solutions to farmer–jackal conflict around the SKA core site (which require multi-disciplinary perspectives), I sincerely hope that it does do justice to the complex ways in which this conflict draws farmers, the SKA, ecologists, zoologists and jackals together as actors in the Karoo, and thereby makes a contribution to ensuring their more fruitful co-existence in the future.

REFERENCE LIST

- Adams, W.M., Brockington, D., Dyson, J. & Vira, B. 2003. Managing tragedies: Understanding conflict over common pool resources. *Science*, 302:1915–1916.
- Adler, P.A. & Adler, P. 1987. *Membership roles in field research*. Newbury Park: SAGE.
- Agrawal, A. 1995. Dismantling the divide between indigenous and scientific knowledge. *Development and Change*, 26:413–439.
- Agri SA. 2018. *About us* [Online]. Available: <https://www.agrisa.co.za/about> [2019, August 25].
- Agri SA. 2019. *Agricultural drought report 2018/2019*. [Pretoria]: Head Office [Online]. Available: file:///Users/renelleterblanche/Desktop/Agri%20SA_Drought%20Survey%20Report%202018-19_V4%20MT.pdf [2019, October 7].
- Agri24 se [sensor]us verskuif. 2002. [Online]. Available: <https://www.netwerk24.com/landbou/Nuus/agri24-se-sensorus-verskuif-20170914>. [2018, June 25].
- Akama, J.S., Lant, C.L. & Burnett, G.W. 1996. A political-ecology approach to wildlife conservation in Kenya. *Environmental Values*, 5(4):335–347.
- Aliber, M., Mabhera, S. & Chikwanha, T. n.d. *Agrarian reform and rural development*. [Alice]: University of Fort Hare [Online]. Available: https://www.parliament.gov.za/storage/app/media/Pages/2017/october/High_Level_Panel/Commissioned_Report_land/Commissioned_Report_on_Agrarian_Reform_UFH.pdf [2019, August 25].
- Allen, W., Ogilvie, S., Blackie, H., Smith, D., Sam, S., Doherty, J., McKenzie, D., Ataria, J., Shapiro, L., MacKay, J., Murphy, E., Jacobson, C. & Eason, C. 2014. Bridging disciplines, knowledge systems and cultures in pest management. *Environmental Management*, 53(2):429–440.
- Anonymous professional vermin hunter. 2017. Social networking account (Facebook), 28 December [Online]. Available: <https://www.facebook.com/blok.botha.1/posts/2276709269021641> [2018, September 13].
- Apps, P. 2000. *Wild ways: Field guide to the behaviour of southern African mammals*. Cape Town: Struik.
- Archer, S. 2000. Technology and ecology in the Karoo: A century of windmills, wire and changing farming practice. *Journal of Southern Africa Studies*, 26(4):675–696.
- Arluke, A. & Sanders, C.R. 1996. *Regarding animals*. Philadelphia: Temple University Press.
- Arnett, E.B. & Southwick, R. 2015. Economic and social benefits of hunting in North America. *International Journal of Environmental Studies*, 72(5):734–745.

- Ashton-James, C.E. & Tracy, J.L. 2012. Pride and prejudice: How feelings about the self influence judgments of others. *Personality and Social Psychology Bulletin*, 38(4):466–476.
- Atickem, A., Williams, S., Bekele, A. & Thirgood, S. 2010. Livestock predation in the Bale mountains, Ethiopia. *African Journal of Ecology*, 48(4):1076–1082.
- Atkinson, A. 1991. *Principles of political ecology*. London: Belhaven Press.
- Atkinson, D. 2016. Is South Africa's Great Karoo region becoming a tourism destination? *Journal of Arid Environments*, 127(1):199–210.
- Atkinson, D. 2019. When stars collide: Competing development paradigms in the Central Karoo. *Journal of Southern African Studies*, 45(4):689–709.
- Atkinson, D., Wolpe, R. & Kotze, H. 2017. *Socio-economic assessment of SKA phase 1 in South Africa* [Online]. Available: <http://www.skaphase1.csir.co.za/wp-content/uploads/2017/01/SocioEconomic-Assessment.pdf> [2017, November 20].
- Avenant, N., de Waal, H.O. & Combrinck, W. 2006. The Canis-caracal programme: A holistic approach, in “Prevention is the cure”! *Proceedings of a workshop on holistic management of human–wildlife conflict in the agricultural sector of South Africa*. Johannesburg: Endangered Wildlife Trust: 23–25.
- Babbie, E. 2010. *The practice of social research* (12th ed.). Belmont: Wadsworth.
- Bagniewska, J. & Macdonald, D. 2010. *Animals, the environment and people*. Oxford: Wildlife Conservation Research Unit. [Online]. Available: <http://www.rspca.org.uk/ImageLocator/LocateAsset?asset=document&assetId=1232725664202&mode=prd>. [2014, December 24].
- Barua, M. 2014. Bio-geo-graphy: Landscape, dwelling, and the political ecology of human–elephant relations. *Environment and Planning D: Society and Space*, 32(5):915–934.
- Becker, H.S. 1963. *Outsiders: Studies in the sociology of deviance*. London: The Free Press of Glencoe.
- Beinart, W. 2003. *The rise of conservation in South Africa: Settlers, livestock, and the environment 1770–1950*. New York: Oxford University Press.
- Beinart, W. 2018. An overview of themes in the agrarian and environmental history of the Karoo since c.1800. *African Journal of Range and Forage Science*, 35(3&4):191–202.
- Bekoff, M. (ed.). 2007. *Encyclopaedia of human–animal relationships: A global exploration of our connections with animals*. Westport: Greenwood Press.
- Benavides, P. 2013. Animal symbolism in folk narratives and human attitudes towards predators: An analysis of their mutual influences. *Folklore*, 124(1):64–80.

- Benjaminsen, T.A., Rohde, R., Sjaastad, E., Wisborg, P. & Lebert, T. 2006. Land reform, range ecology, and carrying capacities in Namaqualand, South Africa. *Annals of the Association of American Geographers*, 96(3):524–540.
- Berger, P.L. 1963. *Invitation to sociology: A humanistic perspective*. London: Penguin Books.
- Bergman, D.L., de Waal, H.O., Avenant, N.L., Bodenchuk, M.J., Marlow, M.C. & Nolte, D.L. 2013. The need to address black-backed jackal and caracal predation in South Africa, in *Proceedings of the 15th Wildlife Damage Management Conference*. Lincoln: University of Nebraska-Lincoln:86–94.
- Berkes, F. 2009. Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management*, 90(5):1692–1702.
- Bernard, H.R. 2006. *Research methods in anthropology: Qualitative and quantitative approaches* (4th ed.). Lanham: AltaMira Press.
- Bhaskar, R. 2008. *A realist theory of science*. London. Routledge.
- Bhogal, N. 2018. The role of the Square Kilometre Array in South Africa's economic development strategy. *South African Journal of Science*, 114(3&4):78–84.
- Bidwell, D. 2010. Bison, boundaries, and brucellosis: Risk perception and political ecology at Yellowstone. *Society and Natural Resources*, 23(1):14–30.
- Biggam, J. 2015. *Succeeding with your master's dissertation: A step-by-step handbook* (3rd ed.). Berkshire: Open University Press.
- Bleek, W.H.I. & Lloyd, L.C. 1968. *Specimens of Bushmen folklore*. Cape Town: Struik Publishers.
- Botha, L. 2015. *Jagklubs se data help met roofdiere* [Online]. Available: <http://landbou.com/nuus/jagklubs-se-data-help-met-roofdiere/> [2016, June 8].
- Bothma, J. du P. 2012. *Literature review of the ecology and control of the black-backed jackal and caracal in South Africa*. [Cape Town]: CapeNature. [Online]. Available: <http://www.capenature.co.za/wp-content/uploads/2014/02/Literature-Review-of-the-Ecology-and-Control-of-black-backed-jackal-and-caracal-Bothma-2012.pdf> [2016, June 8].
- Bough, J. 2006. From value to vermin: A history of the donkey in Australia. *Australian Zoologist*, 33(3):388–397.
- Bourdieu, P. & Wacquant, L.J.D. 1992. The purpose of reflexive sociology (The Chicago Workshop), in P. Bourdieu & L.J.D. Wacquant (eds.). *An invitation to reflexive sociology*. Cambridge: Polity Press. 61–215.
- Bourdieu, P. 1986. The forms of capital, in J.G. Richardson (ed.). *Handbook of theory of research for the sociology of education*. Westport: Greenwood Press. 46–58.
- Bourdieu, P. 1990. *The logic of practice*. Stanford: Stanford University Press.

- Bradley, J. 1993. Methodological issues and practices in qualitative research. *The Library Quarterly*, 63(4):431–449.
- Brandt, F. & Spierenburg, M. 2014. Game fences in the Karoo: Reconfiguring spatial and social relations. *Journal of Contemporary African Studies*, 32(2):220–237.
- Brandt, F. 2013. Tracking an invisible great trek: An ethnography on the re-configuration of power and belonging on trophy-hunting farms in the Karoo. Unpublished doctoral dissertation. Amsterdam: Vrije Universiteit.
- Brassine, M.C. 2011. The diet and ecological role of black-backed jackals, *Canis mesomelas*, in two conservation areas in the Eastern Cape province, South Africa. Unpublished master's thesis. Grahamstown: Rhodes University.
- Bray, Z. 2008. Ethnographic approaches, in D. della Porta & M. Keating (eds.). *Approaches and methodologies in the social sciences: A pluralist perspective*. Cambridge: Cambridge University Press. 296–315.
- Bremner, A. 2019. *Kristalle is jakkalse se tier* [Online]. Available: <https://www.proagri.co.za/kristalle-is-jakkalse-se-tier/> [2019, September 10].
- Brits, E. 2016. SKA werp lig op Donker Era. *Die Burger*, 27 August:6.
- Brits, E. 2019. *MeerKAT spots massive bubbles in Milky Way* [Online]. Available: <https://www.dailymaverick.co.za/article/2019-09-11-meerkat-spots-massive-bubbles-in-milky-way/> [2019, September 22].
- Brown, K. 2002. Cultural constructions of the wild: The rhetoric and practice of wildlife conservation in the Cape Colony at the turn of the twentieth century. *South African Historical Journal*, 47(1):75–95.
- Browne-Nuñez, C. & Jonker, S.A. 2008. Attitudes toward wildlife and conservation across Africa: A review of survey research. *Human Dimensions of Wildlife*, 13(1):47–70.
- Bryman, A. 2008. *Social research methods* (3rd ed.). Oxford: Oxford University Press.
- Burger, A. 2016. *SKA bedreig gebied, sê inwoners* [Online]. Available: <http://www.netwerk24.com/ZA/Kalahari-Bulletin/Nuus/ska-bedreig-gebied-se-inwoners-20160412> [2016, December 3].
- Burns, G.L. & Howard, P. 2003. When wildlife tourism goes wrong: A case study of stakeholder and management issues regarding dingoes on Fraser Island, Australia. *Tourism Management*, 24(6):699–712.
- Burr, V. 1995. *An introduction to social constructionism: An introduction to social constructionism*. London: Routledge.
- Burt, R.S. 1992. *Structural holes: The social structure of competition*. Cambridge: Harvard University Press.

- Butler, S.S. 2018. Knowledge relativity: Carnarvon residents' and SKA personnel's conceptions of the SKA's scientific and development endeavours. Unpublished master's thesis. Stellenbosch: Stellenbosch University.
- Campbell, L.M. 2007. Local conservation practice and global discourse: A political ecology of sea turtle conservation. *Annals of the Association of American Geographers*, 97(2):313–334.
- CapeNature. 2015. *Landowner's guide: Human–wildlife conflict: Sensible solutions to living with wildlife*. [Cape Town]: CapeNature. [Online]. Available: http://www.capenature.co.za/wp-content/uploads/2015/05/Landowners-Guide_Human-Wildlife-Conflict.pdf. [2015, July 19].
- Carolan, M.S. 2005. Society, biology, and ecology: Bringing nature back into sociology's disciplinary narrative through critical realism. *Organisation and Environment*, 18(4):393–421.
- Carruthers, J. & Nattrass, N. 2018. History of predator-stock conflict in South Africa, in G. Kerley, S. Wilson & D. Balfour (eds.). *Livestock predation and its management in South Africa: A scientific assessment*. Port Elizabeth: Centre for African Conservation Ecology, Nelson Mandela University. 30–52.
- Carruthers, J. 2003. Past & future landscape ideology: The Kalahari Gemsbok National Park, in W. Beinart & J. McGregor (eds.). *Social history & African environments*. Athens: Ohio University Press. 255–266.
- Carspecken, P.F. 1996. *Critical ethnography in educational research: A theoretical and practical guide*. New York: Routledge.
- Castelvecchi, D. 2019. *Black hole sports huge 'bubbles': Pioneering radio telescope reveals remnants of energetic explosions at Milky Way's heart* [Online]. Available: <https://www-nature-com.ez.sun.ac.za/magazine-assets/d41586-019-02726-x/d41586-019-02726-x.pdf> [2019, September 22].
- Castree, N. 2001. Socialising nature: Theory, practice, and politics, in N. Castree & B. Braun (eds.). *Social nature: Theory, practice, and politics*. Malden: Blackwell. 1–21.
- Chinigò, D. 2019. From the 'Merino revolution' to the 'astronomy revolution': Land alienation and identity in Carnarvon, South Africa. *Journal of Southern African Studies*, 45(4):749–766.
- Chinigò, D. 2020. Sheep under telescope image, E-mail to R. Terblanche [Online], 10 February. Available E-mail: davide.chinigo@gmail.com.
- Cillié, B. 1987. *Soogdiere van suider-Afrika: 'n Veldgids*. Sandton: Frandsen Publishers.
- Coleman, J.S. 1988. Social capital in the creation of human capital. *American Journal of Sociology*, 94(1):95–120.
- Collier, A. 1994. *Critical realism: An introduction to Roy Bhaskar's philosophy*. London: Verso.

- Conover, M. 2001. *Resolving human–wildlife conflicts: The science of wildlife damage management*. Boca Raton: Lewis Publishers.
- Conradie, B. & Piesse, J. 2013. The effect of predator culling on livestock losses: Ceres, South Africa, 1979–1987. Working Paper No. 319. Cape Town: Centre for Social Science Research, University of Cape Town.
- Conradie, B. & Nattrass, N. 2017. The robustness of self-reported data on predation: A comparison of two Karoo surveys. *African Journal of Agricultural and Resource Economics*, 12(3):217–229.
- Conradie, B. 2012. Are hunting clubs the solution to small stock depredation? The case of Ceres, 1979 and 1980. *Agricultural Economics Association of South Africa*, 51(1):96–113.
- Corburn, J. 2003. Bringing local knowledge into environmental decision making: Improving urban planning for communities at risk. *Journal of Planning Education and Research*, 22(4):420–433.
- Cosmopolitan Karoo*. n.d. [Online]. Available: <http://cosmopolitankaroo.co.za/> [2019, October 6].
- Council for Scientific and Industrial Research. 2016. *Integrated environmental management plan for the South African mid-frequency array of SKA phase 1 2018–2023*. Stellenbosch: Council for Scientific and Industrial Research.
- Cox, T. 1993. *Cultural diversity in organisations: Theory, research and practice*. San Francisco: Berrett-Koehler.
- Crosby, A. Agri SA. 2018. *Submission on expropriation without compensation*. [Pretoria]: Head Office [Online]. Available: <file:///Users/renelleterblanche/Desktop/Agri%20SA%20Submission%20EWC%2025%20May%202018.pdf> [2019, October 7].
- Curry, P. 2006. *Environmental ethics: An introduction*. Cambridge: Polity Press.
- Damianakis, T. & Woodford, M.R. 2012. Qualitative research with small connected communities: Generating new knowledge while upholding research ethics. *Qualitative Health Research*, 22(5):708–718.
- Danermark, B., Ekström, M., Jakobsen, L. & Karlsson, J.C. 2002. *Explaining society: Critical realism in the social sciences*. London. Routledge.
- Davies-Mostert, H., Hodkinson, C., Komen, H. & Snow, T. 2007. *Predators and farmers*. [Online]. Available: <http://www.midlandsconservancies.org.za/documents/Predators%20and%20Farmers%20book.pdf>. [2016, July 21].
- Davis, D.K. 2009. Historical political ecology: On the importance of looking back to move forward. *Geoforum*, 40(3):285–286.

- de Klerk, W. 2015. *Dis nie altyd Jakkals van Riebeeck se skuld nie* [Online]. Available: <http://www.netwerk24.com/Sake/Landbou/Dis-nie-altyd-Jakkals-van-Riebeeck-se-skuld-nie-20150227> [2016, December 5].
- de Prada-Samper, J.M. (ed.). 2016. *The man who cursed the wind and other stories from the Karoo – Die man wat die wind vervloek het en ander stories van die Karoo*. Cape Town: African Sun Press.
- de Prada-Samper, J.M. 2018. “I have already seen in the clouds”: The nature of the water-creature among the Xam Bushmen and their modern descendants. *Folkloristika*, 3(1):13–37.
- de Villiers, B. 2008. People and parks: Challenges and opportunities, in *Land reform in South Africa: Constructive aims and positive outcomes – Reflecting on experiences on the way to 2014*. Johannesburg: Konrad-Adenauer-Stiftung: 79–97.
- de Villiers, M. & Gouws, R.H. 1988. *Idiome woordeboek: Verklarings met afsonderlike Afrikaanse en Engelse begrippelyste*. Cape Town: Nasou Beperk.
- de Waal, H.O. & Combrinck, W.J. 2000. The development of the Dorper, its nutrition and a perspective of the grazing ruminant on veld. *Small Ruminant Research*, 36(2):103–117.
- de Waal, H.O. 2018. Predation management in South Africa – historical milestones. Occasional Paper No. 1. Bloemfontein: African Large Predator Research Unit, University of the Free State.
- de Wet, A. 2016. Dink soos ’n jakkals, *Plaastoe!*, 5:10–19, May.
- de Wet, J. 2010. *Wat praat jy! Afrikaanse idiome, gesegdes en vaste uitdrukkings met verklarings* (4th ed.). Pretoria: Protea Boekhuis.
- Decker, D.J. & Chase, L.C. 1997. Human dimensions of living with wildlife: A management challenge for the 21st century. *Wildlife Society Bulletin*, 25(4):788–795.
- defenceWeb. 2016. *DoD doing its bit to ensure no radio interference for SKA* [Online]. Available: http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=45413:dod-doing-its-bit-to-ensure-no-radio-interference-for-ska&catid=111:sa-%E2%80%A61/3 [2016, December 3].
- Dempsey, J. 2010. Tracking grizzly bears in British Columbia’s environmental politics. *Environment and Planning A: Economy and Space*, 42(5):1138–1156.
- Devers, K.J. & Frankel, R.M. 2000. Study design in qualitative research: 2 sampling and data collection strategies. *Education for Health*, 13(2):263–271.
- Dewalt, K.M., Dewalt, B.R. & Wayland, C.B. 1998. Participant observation, in H.R. Bernard (ed.). *Handbook of methods in cultural anthropology*. Walnut Creek: AltaMira Press. 259–299.
- Dickens, P. 2003. Changing our environment, changing ourselves: Critical realism and transdisciplinary research. *Interdisciplinary Science Reviews*, 28(2):95–105.

- Directorate Statistics and Economic Analysis. 2013. *Abstract of agricultural statistics*. [Pretoria]: Department of Agriculture, Forestry and Fisheries [Online]. Available: <https://www.nda.agric.za/docs/statsinfo/abstact2013.pdf>. [2019, March 15].
- Dodds, S. 1998. Justice and indigenous land rights. *Inquiry*, 41(2):187–205.
- Dolhinow, P. 2002. Anthropology and primatology, in A. Fuentes & L.D. Wolfe (eds.). *Primates face to face: Conservation implications of human–nonhuman primate interconnections*. Cambridge: Cambridge University Press. 7–24.
- Dorper Sheep Breeders' Society of South Africa. 2018. *Breed history* [Online]. Available: <http://www.dorpersa.co.za/dorper-breed-info/breed-history/> [2019, August 22].
- Drouilly, M., Natrass, N. & O'Riain, M.J. 2017. Dietary niche relationships among predators on farmland and a protected area. *The Journal of Wildlife Management*, 82(3):1–12.
- Drouilly, M., Tafani, M., Natrass, N. & O'Riain, J. 2018. Spatial, temporal and attitudinal dimensions of conflict between predators and small-livestock farmers in the Central Karoo. *African Journal of Range and Forage Science*, 35(3&4):245–255.
- du Plessis, J.J., Avenant, N.L. & de Waal, H.O. 2015. Quality and quantity of the scientific information available on black-backed jackals and caracals: Contributing to human–predator conflict management? *African Journal of Wildlife Research*, 45(2):138–157.
- du Plessis, J.J., Avenant, N.L., Botha, A.J., Mkhize, N.R., Müller, L., Mzileni, N., O'Riain, M.J., Parker, D.M., Potgieter, G., Richardson, P.R.K., Rode, S.C., Viljoen, N., Hawkins, H-J., Tafani, M. 2018. Past and current management of predation on livestock, in G. Kerley, S. Wilson & D. Balfour (eds.). *Livestock predation and its management in South Africa: A scientific assessment*. Port Elizabeth: Centre for African Conservation Ecology, Nelson Mandela University. 125–177.
- Dublin, H.T. & Hoare, R.E. 2004. Searching for solutions: The evolution of an integrated approach to understanding and mitigating human–elephant conflict in Africa. *Human Dimensions of Wildlife*, 9(4):271–278.
- Dugmore, H. 2016. *New approach needed to outfox costly predators* [Online]. Available: <http://www.bdlive.co.za/opinion/2016/02/08/new-approach-needed-to-outfox-costly-predators> [2016, June 8].
- Dyll-Myklebust, L. 2011. 'Lodge-ical' thinking and development communication: !Xaus Lodge as a public-private-community partnership in tourism. Unpublished doctoral dissertation. Durban: University of Kwa-Zulu Natal.
- Ekers, R. 2012. *The history of the Square Kilometre Array (SKA): Born global*, 17 April, Manchester [Online]. Available: <https://pos.sissa.it/163/007/pdf>. [2017, November 20].

- Ellis, C. 1995. Emotional and ethical quagmires in returning to the field. *Journal of Contemporary Ethnography*, 24(1):68–98.
- Ellis, C. 2007. Telling secrets, revealing lives: Relational ethics in research with intimate others. *Qualitative Inquiry*, 13(1):3–29.
- Elo, S. & Kyngäs, H. 2008. The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1):107–115.
- Emirbayer, M. & Mische, A. 1998. What is agency? *Journal of Sociology*, 103(4):962–1023.
- Erasmus, D. 2012. *A giant leap for local science* [Online]. Available: <http://www.farmersweekly.co.za/agri-business/bottomline/a-giant-leap-for-local-science/> [2016, December 3].
- Escobar, A. 2008. *Territories of difference: Place, movements, life, redes*. Durham: Duke University Press.
- Escobar, A. 2010. Postconstructivist political ecologies, in M.R. Redclift & G. Woodgate (eds.). *The international handbook of environmental sociology* (2nd ed.). Cheltenham: Edward Elgar. 91–105.
- Esler, K.J., Milton, S.J. & Dean, R.J. 2010. *Karooveld: Ekologie en bestuur*. Pretoria: Briza Publications.
- Ewert, J. & Hamman, J. 1999. Why paternalism survives: Globalization, democratization and labour on South African wine farms. *Sociologia Ruralis*, 39(2):202–221.
- Field, J. 2003. *Social capital*. London: Routledge.
- Folke, C., Hahn, T., Olsson, P. & Norberg, J. 2005. Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources*, 30(1):441–473.
- Forsyth, T. 2003. *Critical political ecology: The politics of environmental science*. London: Routledge.
- Funck, H. n.d. *Calling in South Africa* [Online]. Available: https://www.jaracal.co.za/calling_sa.htm [2017, December 3].
- Gaea Enviro (Pty) Ltd. 2018. Integrated environmental management plan (IEMP) for SKA Phase 1 mid-frequency array (SKA1_MID) in South Africa. Clanwilliam: Gaea Enviro (Pty) Ltd.
- Garman, J. 2019. *The Dorper Sheep: A hardy adaptable breed* [Online]. Available: <https://countrysidenetwork.com/daily/livestock/sheep/dorper-sheep-hardy-adaptable-breed/> [2019, March 15].
- Gastrow, M. & Oppelt, T. 2019. The Square Kilometre Array and local development mandates in the Karoo. *Journal of Southern African Studies*, 45(4):711–728.

- Gastrow, M. 2014. The stars in our eyes: Representations of the Square Kilometre Array telescope in the South African media. Unpublished doctoral dissertation. Stellenbosch: Stellenbosch University.
- Gastrow, M. 2015. Science and the social media in an African context: The case of the Square Kilometre Array telescope. *Science Communication*:1–20.
- Gauntlett, D. 2011. *Making is connecting: The social meaning of creativity, from DIY and knitting to YouTube and Web 2.0*. Cambridge: Polity Press.
- Genis, A. 2016. *Landelike insig: Wantroue oor grondverkope aan SKA* [Online]. Available: <http://m24lbarg01.naspers.com/argief/berigte/landbouweekblad/2016/05/06/LB/36/01.html>. [2016, October 29].
- Gerhardt, C.F. 2018. *Facilitation report: SARA O and SANParks public participation process: Carnarvon*. [Cape Town]: NCC Environmental Services [Online]. Available: http://www.ska.ac.za/wp-content/uploads/2018/07/SKA_SANPARKS-PPP_round1_Carnarvon-_02062-18.docx [2019, February 13].
- Gibson, W. & Brown, A. 2009. *Working with qualitative data*. London: SAGE.
- Gieryn, T.F. 1983. Boundary-work and the demarcation of science from non-science: Strains and interests in professional ideologies of scientists. *American Sociological Review*, 48(6):781–795.
- Giliomee, H. 2002. ‘Wretched folk, ready for any mischief’: The South African state’s battle to incorporate poor whites and militant workers, 1890–1939. *Historia*, 47(2):601–653.
- Gilleland, A.H. 2010. Human–wildlife conflict across urbanisation gradients: Spatial, social, and ecological factors. Unpublished doctoral dissertation. Tampa: University of South Florida.
- Glacken, C.J. 1965. The origins of the conservation philosophy, in I. Burton & R.W. Kates (eds.). *Readings in resource management and conservation*. Chicago: University of Chicago Press. 158–163.
- Goffman, E. 1963. *Stigma: Notes on the management of spoiled identity*. New Jersey: Prentice-Hall Inc.
- Gold, R.L. 1958. Roles in sociological field observations. *Social Forces*, 36(3):217–223.
- Gómez-Limón, J.A., Vera-Toscano, E. & Garrido-Fernández, F.E. 2014. Farmers’ contribution to agricultural social capital: Evidence from southern Spain. *Rural Sociology*, 79(3):380–410.
- Gorski, P.S. 2013. “What is critical realism? And why should you care?”. *Contemporary Sociology*, 42(5):658–670.
- Gottschalk, K. 2010. South Africa’s space program. *Astropolitics*, 8(1):35–48.
- Greaves, N. 2000. *When hippo was hairy and other tales from Africa* (2nd ed.). Cape Town: Struik Publishers.

- Green, L.J.F. 2008. 'Indigenous knowledge' and 'science': Reframing the debate on knowledge diversity. *Archaeologies*, 4(1):144–163.
- Greenberg, J.B. & Park, T.K. 1994. Political ecology. *Journal of Political Ecology*, 1:1–12.
- Grobbelaar, P.W. & Verster, S. 2003. *Famous South African folk tales* (1st revised ed.). Cape Town: Human & Rousseau.
- Grobbelaar, P.W. & Verster, S. 2011. *Jakkals en Wolf*. Cape Town: Human & Rousseau.
- Gustafsson, K. 2011. Made in conflict. Local residents' construction of a local environmental problem. *Local Environment*, 16(7):655–670.
- Guta, A., Flicker, S., Travers, R., Wilson, M., Strike, C., Gaudry, S., Binder, L., O'Campo, P. & Kuzmanovic, D. 2014. *HIV CBR ethics: Confidentiality in close-knit communities* [Online]. Available: http://hivethicscbr.com/documents/HIVCBREthics_FactSheet06.pdf. [2017, July 26].
- Hale, C.D. & Astolfi, D. 2007. *Evaluating education and training services: A primer*. Florida: Saint Leo University.
- Hall, A.L. & Rist, R.C. 1999. Integrating multiple qualitative research methods (or avoiding the precariousness of a one-legged stool). *Psychology and Marketing*, 16(4):291–304.
- Hall, R. 2009. Dynamics in the commercial farming sector, in R. Hall (ed.). *Another countryside? Policy options for land and agrarian reform in South Africa*. Bellville: Institute for Poverty, Land and Agrarian Studies. 121–131.
- Halpern, D. 2005. *Social capital*. Cambridge: Polity Press.
- Hannigan, J. 2006. *Environmental sociology* (2nd ed.). New York: Routledge.
- Haraway, D.J. 2003. *The companion species manifesto: Dogs, people, and significant otherness*. Chicago: Prickly Paradigm Press.
- Haraway, D.J. 2008. *When species meet*. Minneapolis: University of Minnesota Press.
- Hardcastle, M., Usher, K. & Holmes, C. 2006. Carspecken's five-stage critical qualitative research method: An application to nursing research. *Qualitative Health Research*, 16(1):151–161.
- Harding, J. 2013. *Qualitative data analysis from start to finish*. London: SAGE.
- Harker, D. & Bates, D.C. 2007. The black bear hunt in New Jersey: A constructionist analysis of an intractable conflict. *Society and Animals*, 15(4):329–352.
- Heale, J. & Stewart, D. 2001. *African myths and legends*. Cape Town: Struik Publishers.
- Helfrich, K. 2017. *Alkantpan and the SKA will live – and work – in harmony* [Online]. Available: http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=49815:alkantpan-and-the-ska-will-live--and-work--in-harmony&catid=7:Industry&Itemid=116 [2017, November 21].
- Henderson, L. 2015. Predation management: Where are we?, *Stockfarm*:18–19, April.

- Henschel, J.R., Hoffman, M.T. & Walker, C. 2018. Introduction to the Karoo Special Issue: Trajectories of Change in the Anthropocene. *African Journal of Range and Forage Science*, 35(3&4):151–156.
- Herda-Rapp, A. & Marotz, K.G. 2005. Contested meanings: The social construction of the mourning dove in Wisconsin, in A. Herda-Rapp & T.L. Goedeke (eds.). *Mad about wildlife: Looking at social conflict over wildlife*. Leiden: Brill. 73–96.
- Hey, D. 1964. The control of vertebrate problem animals in the province of the Cape of Good Hope, Republic of South Africa, in *Proceedings of the 2nd Vertebrate Pest Control Conference*. Lincoln: University of Nebraska-Lincoln:57–70.
- Hey, D. 1967. Recent developments in the control of vertebrate problem animals in the province of the Cape of Good Hope, Republic of South Africa, in *Proceedings of the 3rd Vertebrate Pest Control Conference*. Lincoln: University of Nebraska-Lincoln:158–164.
- Hill, C.M. & Wallace, G.E. 2012. Crop protection and conflict mitigation: Reducing the costs of living alongside non-human primates. *Biodiversity Conservation*, 21(10):2569–2587.
- Hill, C.M. 1998. Conflicting attitudes towards elephants around the Budongo Forest Reserve, Uganda. *Environmental Conservation*, 25(3):244–250.
- Hill, C.M. 2004. Farmers' perspectives of conflict at the wildlife–agriculture boundary: Some lessons learned from African subsistence farmers. *Human Dimensions of Wildlife*, 9(4):279–286.
- Hill, T. & Nel, E. 2018. Population change in the Karoo. *African Journal of Range and Forage Science*, 35(3&4):203–208.
- Hobson-West, P. & Davies, A. 2018. Societal sentience: Constructions of the public in animal research policy and practice. *Science, Technology, and Human Values*, 43(4):671–693.
- Hobson-West, P. 2007. Beasts and boundaries: An introduction to animals in sociology, science and society. *Qualitative Sociology Review*, 3(1):23–41.
- Hobson, K. 2007. Political animals? On animals as subjects in an enlarged political geography. *Political Geography*, 26(3):250–267.
- Hoffman, M. 2014. *Canis mesomelas* [Online]. Available: <http://www.iucnredlist.org/details/3755/0> [2016, June 8].
- Hoffman, M.T. 2015. Environmental change in twentieth-century South Africa and its implications for land reform, in B. Cousins & C. Walker (eds.). *Land divided, land restored: Land reform in South Africa for the 21st century*. Auckland Park: Jacana Media. 56–67.
- Hoffman, M.T., Skowno, A., Bell, W. & Mashele, S. 2018. Long-term changes in land use, land cover and vegetation in the Karoo drylands of South Africa: Implications for degradation monitoring. *African Journal of Range and Forage Science*, 35(3&4):209–221.

- Hoffman, M.T., Walker, C. & Henschel, J.R. 2018. Reflections on the Karoo Special Issue: Towards an interdisciplinary research agenda for South Africa's drylands. *African Journal of Range and Forage Science*, 35(3&4):387–393.
- Holly, M.L. & Altrichter, H. 2011. Research diaries, in B. Somekh & C. Lewin (eds.). *Theory and methods in social research* (2nd ed.). Los Angeles: SAGE. 43–52.
- Holm, N. 2012. Consider the squirrel: Freaks, vermin, and value in the ruin(s) of nature. *Cultural Critique*, 80:56–95.
- Holmern, T., Nyahongo, J. & Røskaft, E. 2007. Livestock loss caused by predators outside the Serengeti National Park, Tanzania. *Biological Conservation*, 135(4):518–526.
- Holmes, C.A. & Smyth, W. 2011. Carspecken's critical methodology – A theoretical assessment. *International Journal of Multiple Research Approaches*, 5(2):146–154.
- Holmes, G. 2007. Protection, politics and protest: Understanding resistance to conservation. *Conservation and Society*, 5(2):184–201.
- Hudenko, H.W. 2012. Exploring the influence of emotion on human decision making in human–wildlife conflict. *Human Dimensions of Wildlife*, 17(1):16–28.
- Hughes, G.I. 2006. *An encyclopaedia of swearing: The social history of oaths, profanity, foul language, and ethnic slurs in the English-speaking world*. Armonk: M.E. Sharpe.
- Humphries, B.D., Hill, T.R. & Downs, C.T. 2015. Landowners' perspectives of black-backed jackals (*Canis mesomelas*) on farmlands in KwaZulu-Natal, South Africa. *African Journal of Ecology*, 53(4):540–549.
- Hurn, S. 2011. “Like herding cats!” Managing conflict over wildlife heritage on South Africa's Cape Peninsula. *Ecological and Environmental Anthropology*, 6:39–53.
- Hytten, K.F. 2009. Dingo dualisms: Exploring the ambiguous identity of Australian dingoes. *Australian Zoologist*, 35(1):18–27.
- Idiome oor jakkalse. 2014, June 23&24. *Jaracal* [Web log post]. Available: <http://jaracal.com/viewtopic.php?f=1&t=33133> [2019, July 25].
- Ilicheva, A. 2010. Wild in the city: Past, present, and future. *Yearbook of the Association of Pacific Coast Geographers*, 72(1):56–72.
- International Sociological Association. 2001. *Code of Ethics* [Online]. Available: http://www.isa-sociology.org/about/isa_code_of_ethics.htm. [2017, July 26].
- International Union for Conservation of Nature and Natural Resources. 2017. *2001 categories and criteria (version 3.1)* [Online]. Available: http://www.iucnredlist.org/static/categories_criteria_3_1 [2017, November 20].
- Ishihara, H. & Pascual, U. 2009. Social capital in community level environmental governance: A critique. *Ecological Economics*, 68(5):1549–1562.

- Jackson, C.M. 1989. The fiery fight for animal rights. *The Hastings Center Report*, 19(6):37–39.
- Jansen, C. 2016. Diet of key predators responsible for livestock conflict in Namaqualand, South Africa. Unpublished master's thesis. Stellenbosch: Stellenbosch University.
- Jerolmack, C. 2008. How pigeons became rats: The cultural–spatial logic of problem animals. *Social Problems*, 55(1):72–94.
- Johansson, T. 2008. *Beasts on fields. Human–wildlife conflicts in nature-culture borderlands*. Published doctoral dissertation. Helsinki: University of Helsinki.
- Jones, S. 2006. A political ecology of wildlife conservation in Africa. *Review of African Political Economy*, (33)109:483–495.
- Jones, S., Young, J. & Watt, A. 2005. *Biodiversity conflict management: A report of the BIOFORUM project*. Banchory: Centre for Ecology and Hydrology [Online]. Available: http://www.unibuc.ro/prof/risnoveanu_g/docs/res/2012sepBiodiversity_Conflict_Management_-_A_report_of_the_BIOFORUM_project.pdf. [2019, October 5].
- Jorgensen, D.L. 1989. *Participant observation: A methodology for human studies*. Newbury Park: SAGE [Online]. Available: <http://methods.sagepub.com.ez.sun.ac.za/book/participant-observation> [2017, July 26].
- Joseph, C. 2010. Exploring the animal–human bond through a sociological lens, in M. Demello (ed.). *Teaching the animal: Human–animal studies across the disciplines*. New York: Lantern Books. 299–340.
- Kamler, J.F., Klare, U. & Macdonald, D.W. 2012. Seasonal diet and prey selection of black-backed jackals on a small-livestock farm in South Africa. *African Journal of Ecology*, 50(3):299–307.
- Karliën van Jaarsveld – *Jakkals trou met wolf se vrou*. 2011. [Online]. Available: http://www.karlienvanjaarsveld.co.za/musiek_jakkalstmwsv.php. [2018, June 12].
- Karoo Development Foundation. 2019. *Meat of origin Karoo minimum standards* [Online]. Available: <https://www.karoomeatoforigin.com/karoo-standards/> [2019, August 26].
- Kawulich, B.B. 2005. Participant observation as a data collection method. *Forum: Qualitative Social Research* [Electronic], 6(2). Available: <http://www.qualitative-research.net/index.php/fqs/article/view/466/996> [2017, July 26].
- Kearns, A. & Forrest, R. 2000. Social cohesion and multilevel urban governance. *Urban Studies*, 37(5–6):995–1017.
- Keller, R. 2013. *Doing discourse research: An introduction for social scientists*. London: SAGE.
- Kerley, G., Wilson, S. & Balfour, D. (eds.). 2018. *Livestock predation and its management in South Africa: A scientific assessment*. Port Elizabeth: Centre for African Conservation Ecology, Nelson Mandela University.

- Kerley, G.I.H., Behrens, K.G., Carruthers, J., Diemont, M., du Plessis, J., Minnie, L., Somers, M.J., Tambling, C.J., Turpie, J., Wilson, S. & Balfour, D. 2019. Building assessment practice and lessons from the scientific assessment on livestock predation in South Africa. *South African Journal of Science*, 115(5/6):1–4.
- Kheswa, N. 2015. A review on the history of commercial farming in South Africa: Implications for labour legislation. *Ubuntu: Journal of Conflict and Social Transformation*, 4(1):37–54.
- Khodyakov, D. 2007. Trust as a process: A three-dimensional approach. *Sociology*, 41(1):115–132.
- Kidner, D.W. 2000. Fabricating nature: A critique of the social construction of nature. *Environmental Ethics*, 22(4):339–357.
- King, L. 2006. An armour approach to the prevention of small-stock predation, in “Prevention is the cure”! *Proceedings of a workshop on holistic management of human–wildlife conflict in the agricultural sector of South Africa*. Johannesburg: Endangered Wildlife Trust: 56–59.
- Kirsten, J.F. 2016. *An estimation of the agricultural economic and local economic impact of phase 1 of the SKA*. [Stellenbosch]: Council for Scientific and Industrial Research [Online]. Available: <http://www.skaphase1.csir.co.za/wp-content/uploads/2017/01/Agriculture-Economic-Study.pdf> [2018, June 30].
- Kissui, B.M. 2008. Livestock predation by lions, leopards, spotted hyenas, and their vulnerability to retaliatory killing in the Maasai steppe, Tanzania. *Animal Conservation*, 11(5):422–432.
- Kloppenborg, J. 1991. Social theory and the de/reconstruction of agricultural science: Local knowledge for an alternative agriculture. *Rural Sociology*, 56(4):519–548.
- Knapp, C.N. & Fernandez-Gimenez, M.E. 2009. Understanding change: Integrating rancher knowledge into state-and-transition models. *Rangeland Ecology and Management*, 62(6):510–521.
- Knight, J. 2000. Introduction, in J. Knight (ed.). *Natural enemies: People–wildlife conflicts in anthropological perspective*. London: Routledge. 1–35.
- Kotze, I. & Rose, M. (eds.). 2015. *Farming facts and futures: Reconnecting South Africa’s food systems to its ecosystems*. [Cape Town]: WWF-SA [Online]. Available: http://awsassets.wwf.org.za/downloads/wwf006_ffl_report_low_res.pdf. [2019, March 15].
- Koutsou, S., Partalidou, M. & Ragkos, A. 2014. Young farmers’ social capital in Greece: Trust levels and collective actions. *Journal of Rural Studies*, 34(1):204–211.
- Koutstaal, K. 2013. “Blurred lines”: How different views on baboon agency shape the conservation policy making dialogue in Cape Town, South Africa. Unpublished master’s thesis. Leiden: Leiden University.
- Kritzinger, M.S.B. & Sabbagha, N.G. 1981. *Afrikaanse spreekwoorde en uitdrukkings met die Engelse ekwivalent* (21st ed.). Pretoria: van Schaik Publishers.

- Kritzinger, M.S.B., de Villiers, A.M.M. & Pienaar, E.J. 1945. *Afrikaanse spreekwoorde, gesegdes, ens. met 'n kort verklaring van die betekenis en die Engelse ekwivalent* (13th ed.). Pretoria: van Schaik Publishers.
- Legendijk, D.D.G. & Gusset, M. 2008. Human–carnivore coexistence on communal land bordering the greater Kruger area, South Africa. *Environmental Management*, 42(6):971–976.
- Lanz, J. 2016. *Soils and agricultural potential study: SEA for the SKA project, Northern Cape*. [Stellenbosch]: Council for Scientific and Industrial Research [Online]. Available: <http://www.skaphase1.csir.co.za/wp-content/uploads/2017/01/Agriculture-Soils-Assessment.pdf> [2018, June 30].
- LAP: *SKA South Africa Land Acquisition Programme*. n.d. [Online]. Available: http://www.ska.ac.za/wp-content/uploads/2016/06/lap_brochure.pdf [2019, February 13].
- Liu, F., McShea, W.J., Garshelis, D.L., Zhu, X., Wang, D. & Shao, L. 2011. Human–wildlife conflicts influence attitudes but not necessarily behaviours: Factors driving the poaching of bears in China. *Biological Conservation*, 144(1):538–547.
- Loveridge, A.J. & Nel, J.A.J. 2004. Black-backed jackal (*Canis mesomelas*), in *Canids: Foxes, wolves, jackals and dogs: Status survey and conservation action plan*. Gland: International Union for Conservation of Nature/Species Survival Commission Canid Specialist Group: 161–166.
- Lute, M.L. & Gore, M.L. 2014. Knowledge and power in wildlife management. *The Journal of Wildlife Management*, 78(6):1060–1068.
- Maartens, W. & Venter, C. 2016. *Jakkals en Wolf in Boer se kraal*. Pretoria: Lapa Publishers.
- Madden, F. 2004. Creating coexistence between humans and wildlife: Global perspectives on local efforts to address human–wildlife conflict. *Human Dimensions of Wildlife*, 9(4):247–257.
- Manfredo, M.J. 2008. *Who cares about wildlife? Social science concepts for exploring human–wildlife relationships and conservation issues*. New York: Springer.
- Marshall, K., White, R. & Fischer, A. 2007. Conflicts between humans over wildlife management: On the diversity of stakeholder attitudes and implications for conflict management. *Biodiversity Conservation*, 16(11):3129–3146.
- Maser, C. & Pollio, C.A. 2012. *Resolving environmental conflicts* (2nd ed.). Boca Raton: CRC Press.
- Massé, F. 2016. The political ecology of human–wildlife conflict: Producing wilderness, insecurity, and displacement in the Limpopo National Park. *Conservation and Society*, 14(2):100–111.
- Matheka, R.M. 2001. The political ecology of wildlife conservation in Kenya, 1895–1975. Unpublished doctor of philosophy thesis. Grahamstown: Rhodes University.

- Maxwell, J.A. 2012. *A realist approach for qualitative research*. Thousand Oaks: SAGE Publications.
- McLennan, M.R. & Hill, C.M. 2012. Troublesome neighbours: Changing attitudes towards chimpanzees (*Pan troglodytes*) in a human-dominated landscape in Uganda. *Journal of Nature Conservation*, 20(4):219–227.
- McManus, J., Goets, S.A., Bond, W.J., Henschel, J.R., Smuts, B. & Milton, S.J. 2018. Effects of short-term intensive trampling on Karoo vegetation. *African Journal of Range and Forage Science*, 35(3&4):311–318.
- McNamee, G. (ed.). 2001. *The girl who made stars and other Bushman stories*. Einsiedeln: Daimon Verlag.
- Meatmaster Society of South Africa. 2020. *Standard of excellence* [Online]. Available: <http://www.meatmastersa.co.za/Breed-Standard.htm> [2020, February 14].
- Meissner, H.H., Scholtz, M.M. & Palmer, A.R. 2013. Sustainability of the South African livestock sector towards 2050 – Part 1: Worth and impact of the sector. *South African Journal of Animal Science*, 43(3):282–297.
- Merriam, S.B. 2002. *Qualitative research in practice: Examples for discussion and analysis*. San Francisco: Jossey-Bass.
- Merriam, S.B. 2009. *Qualitative research: A guide to design and implementation*. San Francisco: Jossey-Bass.
- Messmer, T.A. 2000. The emergence of human–wildlife conflict management: Turning challenges into opportunities. *International Biodeterioration and Biodegradation*, 45(3):97–102.
- Messmer, T.A. 2009. Human–wildlife conflicts: Emerging challenges and opportunities. *Human–Wildlife Conflicts*, 3(1):10–17.
- Miller, K.K. & McGee, C.T.K. 2001. Toward incorporating human dimensions information into wildlife management decision-making. *Human Dimensions of Wildlife*, 6(3):205–221.
- Milne, C. 2000. The history of the Dorper sheep. *Small Ruminant Research*, 36(2):99–102.
- Milton, S.J. & Dean, R.J. 2015. Repairing compound damage in arid ecosystems – challenges and controversies. *Transactions of the Royal Society of South Africa*, 70(2):127–133.
- Minnie, L. 2016. Effects of lethal management on black-backed jackal population structure and source-sink dynamics. Unpublished doctoral dissertation. Port Elizabeth: Nelson Mandela Metropolitan University.
- Minnie, L., Gaylard, A. & Kerley, G.I.H. 2016. Compensatory life-history responses of a mesopredator may undermine carnivore management efforts. *Journal of Applied Ecology*, 53(2):379–387.

- Mkhize, N. 2014. Game farm conversions and the land question: Unpacking present contradictions and historical continuities in farm dwellers' tenure insecurity in Cradock. *Journal of Contemporary African Studies*, 32(2):207–219.
- Mkhize, N.N. 2012. Private game farms and the tenure security of farm workers and dwellers in Cradock – Implications for tenure reform in South Africa. Unpublished doctoral dissertation. Cape Town: University of Cape Town.
- Molloy, C. 2011. *Popular media and animals*. Hampshire: Palgrave MacMillan.
- Montello, D.R. & Sutton, P.C. 2013. *An introduction to scientific research methods in geography and environmental studies* (2nd ed). London: SAGE.
- Moore, D.S. 1993. Contesting terrain in Zimbabwe's eastern highlands: Political ecology, ethnography, and peasant resource struggles. *Economic Geography*, 69(4):380–401.
- Muller, M.A.E. 1994. Betekenisvorming in poststrukturelitiese literêre teorieë en die relevansie daarvan vir die eietydse Afrikaanse verhaalkuns. Unpublished doctoral dissertation. Potchefstroom: Potchefstroom University for Christian Higher Education.
- Mutilated by Predators. 2018. Social networking group (Facebook), 13 September [Online]. Available: <https://www.facebook.com/groups/mutilated/about/> [2018, September 13].
- Naidoo, A. 2014. *SKA will change the way we listen to the universe* [Online]. Available: <https://www.brandsouthafrica.com/investments-immigration/science-technology/ska-will-change-the-way-we-listen-to-the-universe> [2019, September 10].
- Nattrass, N. & Conradie, B. 2015. Jackal narratives: Predator control and contested ecologies in the Karoo, South Africa. *Journal of Southern African Studies*, 41(4):1–19.
- Nattrass, N. & Conradie, B. 2018. Predators, livestock losses and poison in the South African Karoo. *Journal of Cleaner Production*, 194(1):777–785.
- Nattrass, N., Conradie, B., Drouilly, M. & O'Riain, M.J. 2017. A brief history of predators, sheep farmers and government in the Western Cape, South Africa. Working Paper No. 398. Cape Town: Centre for Social Science Research, University of Cape Town.
- Nattrass, N., Conradie, B., Stephens, J. & Drouilly, M. 2019. Culling recolonizing mesopredators increases livestock losses: Evidence from the South African Karoo. *Ambio*, [Electronic]. Available: <https://link-springer-com.ez.sun.ac.za/article/10.1007%2Fs13280-019-01260-4> [2020, February 9].
- Nel, E., Taylor, B., Hill, T. & Atkinson, D. 2011. Demographic and economic changes in small towns in South Africa's Karoo: Looking from the inside out. *Urban Forum*, 22:395–410.
- Nel, J.A. 1993. *Geskiedenis van die Dorper*. Middelburg: The Dorper Sheep Breeders' Society of South Africa.

- Nelson Mandela University. 2017. *Background and objectives of PredSA* [Online]. Available: <http://predsa.mandela.ac.za/Background-and-Objectives-of-PredSA> [2017, December 3].
- Neumann, R.P. 2005. *Making political ecology*. London: Hodder Arnold.
- Neumann, R.P. 2011. Political ecology III: Theorizing landscape. *Progress in Human Geography*, 35(6):843–850.
- Newing, H. 2011. *Conducting research in conservation: Social science methods and practice*. Oxon: Routledge.
- Newton, T., Deetz, S. & Reed, M. 2011. Responses to social constructionism and critical realism in organisation studies. *Organisation Studies*, 32(1):7–26.
- Nimmo, R. 2011. The making of the human: Anthropocentrism in modern social thought, in R. Boddice (ed.). *Anthropocentrism: Humans, animals, environments*. Leiden: Brill. 59–79.
- Nooteboom, B. 2007. Social capital, institutions and trust. *Review of Social Economy*, 65(1):29–53.
- Notzke, C. 2013. An exploration into political ecology and nonhuman agency: The case of the wild horse in western Canada. *The Canadian Geographer*, 57(4):389–412.
- Okello, M.M. 2005. Land use changes and human–wildlife conflicts in the Amboseli area, Kenya. *Human Dimensions of Wildlife*, 10(1):19–28.
- Ostrom, E. & Ahn, T.K. 2003. Introduction, in E. Ostrom & T.K. Ahn (eds.). *Foundations of social capital*. Cheltenham: Edward Elgar. xi–xxxix.
- Ostrom, E. 2009. What is social capital?, in V.O. Bartkus & J.H. Davis (eds.). *Social capital: Reaching out, reaching in*. Cheltenham: Edward Elgar. 17–38.
- Oxford South African concise dictionary* (2nd ed.). 2010, s.v. ‘greenie’. Cape Town: Oxford University Press.
- Oxford South African concise dictionary* (2nd ed.). 2010, s.v. ‘rationalism’. Cape Town: Oxford University Press.
- Palmer, E. 1966. *The plains of Camdeboo: The classic book of the Karoo*. Rivonia: Lowry Publishers.
- Parkington, J., Morris, D. & de Prada-Samper, J.M. 2019. Elusive identities: Karoo |Xam descendants and the Square Kilometre Array. *Journal of Southern African Studies*, 45(4):729–747.
- Pathare, S.P. 2015. Detection of black-backed jackal in still images. Unpublished master’s thesis. Stellenbosch: Stellenbosch University.
- Patterson, M.E., Montag, J.M. & Williams, D.R. 2003. The urbanisation of wildlife management: Social science, conflict, and decision making. *Urban Forestry and Urban Greening*, 1(3):171–183.
- Payne, G. & Payne, J. 2004. *Key concepts in social research*. London: SAGE.

- Pedynowski, D. 2003. Science(s) – which, when and whose? Probing the metanarrative of scientific knowledge in the social construction of nature. *Progress in Human Geography*, 27(6):735–752.
- Peggs, K. 2012. *Animals and sociology*. Hampshire: Palgrave Macmillan.
- Pharos Dictionary*. 2010. s.v. ‘skelm’. Cape Town: NB Publishers.
- Pharos Dictionary*. 2010. s.v. ‘slim’. Cape Town: NB Publishers.
- Pieterse, P. 1990. *Silwer: Jakkals van die Namib*. Cape Town: Tafelberg Publishers.
- Plummer, R. & FitzGibbon, J. 2006. People matter: The importance of social capital in the co-management of natural resources. *Natural Resources Forum*, 30(1):51–62.
- Portes, A. 1998. Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, 24(1):1–24.
- Predation Management Forum. 2016. *Predation management manual: The farmer’s one-stop guide to identifying and managing predators*. [Cape Town]: Shumani Mills [Online]. Available: http://www.pmfsa.co.za/images/news/Manual_Engels.pdf [2017, November 20].
- Pretty, J. & Smith, D. 2004. Social capital in biodiversity conservation and management. *Conservation Biology*, 18(3):631–638.
- Proctor, J.D. 1998. The social construction of nature: Relativist accusations, pragmatist and critical realist responses. *Annals of the Association of American Geographers*, 88(3):352–376.
- Putnam, R.D. 1993. *Making democracy work: Civic traditions in modern Italy*. Princeton: Princeton University Press.
- Putnam, R.D. 2000. *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.
- Ragland, C.J., Bernacchi, L.A. & Peterson, T.R. 2015. The role of social capital in endangered species management: A valuable resource. *Wildlife Society Bulletin*, 39(4):689–699.
- Reardon, M. 2018. *Wild Karoo: A journey through history, change and revival in an ancient land*. Cape Town: Struik Nature.
- Redpath, S.M., Gutiérrez, R.J., Wood, K.A., Sidaway, R. & Young, J.C. 2015. An introduction to conservation conflicts, in S.M. Redpath, R.J. Gutiérrez, K.A. Wood & J.C. Young (eds.). *Conflicts in conservation: Navigating towards solutions*. Cambridge: Cambridge University Press. xi–xxxix.
- Republic of South Africa. 1963. *Fencing Act 31 of 1963*. Pretoria: Government Printer.
- Republic of South Africa. 1975. *Expropriation Act 63 of 1975*. Pretoria: Government Printer.
- Republic of South Africa. 2004. *National Environmental Management: Protected Areas Act 57 of 2003*. Pretoria: Government Printer.

- Republic of South Africa. 2008. *Astronomy Geographic Advantage Act 21 of 2007*. Pretoria: Government Printer.
- Republic of South Africa. 2010. *National Protected Area Expansion Strategy for South Africa 2008: Priorities for expanding the protected area network for ecological sustainability and climate change adaptation*. Pretoria: Government Printer.
- Republic of South Africa. Department of Environmental Affairs. 2019. *Notice of adoption of an Integrated Environmental Management Plan* [Online]. Available: https://www.environment.gov.za/news/SKA_requirementforenvironmentalauthorisation [2019, September 20].
- Republic of South Africa. Department of Science and Technology. 2014. *Declaration of the Karoo central astronomy advantage areas in terms of the Astronomy Geographic Advantage Act, 2007*. Government Gazette no. 37397, 28 February.
- Republic of South Africa. Northern Cape Provincial Legislature. 2009. *Northern Cape Nature Conservation Act No. 9 of 2009* [Online]. Available: https://sherloc.unodc.org/res/cld/document/northern-cape-nature-conservation-act-9-of-2009_html/NC_Nature_Conservation_Act.pdf [2019, October 2].
- Reyers, B., Roux, D.J., Cowling, R.M., Ginsburg, A.E., Nel, J.L. & O'Farrell, P. 2010. Conservation planning as a transdisciplinary process. *Conservation Biology*, 24(4):957–965.
- Robbins, P. 2012. *Political ecology: A critical introduction* (2nd ed.). Massachusetts: John Wiley & Sons.
- Rostila, M. 2010. The facets of social capital. *Journal for the Theory of Social Behaviour*, 41(3):308–326.
- Roux, P.W., Vorster, M., Zeeman, P.J.L. & Wentzel, D. 1981. Stock production in the Karoo region. *Proceedings of the Annual Congresses of the Grassland Society of Southern Africa*, 16(1):29–35.
- RSG Geldsake. 2019. Radio Sonder Grense. Tuesday 12 March.
- Saj, T.L., Sicotte, P. & Paterson, J.D. 2001. The conflict between vervet monkeys and farmers at the forest edge in Entebbe, Uganda. *African Journal of Ecology*, 39(2):195–199.
- Save the Karoo. 2016a. Social networking group (Facebook), 7 October [Online]. Available: https://www.facebook.com/pg/savethekaroo/about/?ref=page_internal [2018, October 7].
- Save the Karoo. 2016b. Social networking group (Facebook), 24 March [Online]. Available: <https://www.facebook.com/savethekaroo/> [2019, August 9].
- Save the Karoo. 2017. *SKA is ruining the Karoo's future* [Online]. Available: <http://savethekaroo.com/> [2018, October 7].
- Sayer, A. 2000. *Realism and social science*. London: SAGE Publications.

- Scarth, B.J. 2016. Bereaved participants' reasons for wanting their real names used in thanatology research. *Research Ethics*, 12(2):80–96.
- Schmidt, S. 2018. The man cursed the wind and other stories from the Karoo/Die man wat die wind vervloek het en ander stories van die Karoo. *Critical Arts*, 32(2):137–142.
- Schoon, M.L., Robards, M.D., Meek, C.L. & Galaz, V. 2015. Principle 7 – Promote polycentric governance systems, in R. Biggs, M. Schlüter & M.L. Schoon (eds.). *Principles for building resilience: Sustaining ecosystem services in social-ecological systems*. Cambridge: Cambridge University Press.
- Schutte, N. (ed.). 2013. *South African breeds*. Lyttelton: Plaas Publishing.
- Selebatso, M., Moe, S.R. & Swenson, J.E. 2008. Do farmers support cheetah *Acinonyx jubatus* conservation in Botswana despite livestock depredation? *Oryx*, 42(3):430–436.
- Sidaway, R. 2005. *Resolving environmental disputes: From conflict to consensus*. London: Earthscan.
- Siisiäinen, M. 2000. Two concepts of social capital: Bourdieu vs. Putnam. *ISTR Fourth International Conference: "The Third Sector: For What and for Whom?"*. 5–8 July, Dublin, Ireland. [Electronic]. Available: https://cdn.ymaws.com/www.istr.org/resource/resmgr/working_papers_dublin/siisiainen.pdf [2018, October 7].
- Sillero-Zubiri, C., Hoffman, M. & Macdonald, D.W. (eds.). 2004. *Canids: Foxes, wolves, jackals and dogs: Status survey and conservation action plan*. Gland: International Union for Conservation of Nature/Species Survival Commission Canid Specialist Group.
- Silverman, D. 2013. *Doing qualitative research* (4th ed.). London: SAGE.
- Simonsen, S.H., Biggs, R., Schlüter, M., Schoon, M., Bohensky, E., Cundill, G., Dakos, V., Daw, T., Kotschy, K., Leitch, A., Quinlan, A., Peterson, G. & Moberg, F. n.d. *Applying resilience thinking: Seven principles for building resilience in social-ecological systems*. Stockholm: Stockholm Resilience Centre.
- Siurua, H. 2006. Nature above people: Rolston and “fortress” conservation in the south. *Ethics and the Environment*, 11(1):71–96.
- Skotnes, P. 2007. *Claim to the country: The archive of Lucy Lloyd and Wilhelm Bleek*. Johannesburg: Jacana.
- Smith, N. 2012. *Talk first, shoot later* [Online]. Available: <http://www.farmersweekly.co.za/article.aspx?id=32419&h=Talk-first,-shoot-later> [2016, June 8].
- Smuts, B. n.d. *Predators on livestock farms: A practical farmers' manual for non-lethal, holistic, ecologically acceptable and ethical management*. Landmark Foundation [Online]. Available:

http://www.the-eis.com/data/literature/Predators%20on%20Livestock%20Farms_A%20Practical%20Farmers%20Manual.pdf [2019, August 25].

Smuts, T.N. 2012. An archaeological perspective on the nineteenth century development of land, landscape and sheep farming in the Karoo. Unpublished master's thesis. Cape Town: University of Cape Town.

Snow, T. 2006. Wildlife–human conflict resolution methods and agrochemical abuse problems, in *“Prevention is the cure”! Proceedings of a workshop on holistic management of human–wildlife conflict in the agricultural sector of South Africa*. Johannesburg: Endangered Wildlife Trust: 53–54.

Snyman, M.A. 2014. *South African sheep breeds: Dorper* [Online]. Available: <http://gadi.agric.za/InfoPacks/2014017%20South%20African%20Sheep%20breeds%20-%20Dorper.pdf>. [2019, March 15].

South African National Parks. 2018. *About us* [Online]. Available: <https://www.sanparks.org/about/> [2018, October 29].

South African Wool Board. 1971. *An illustrated world history of the sheep and wool industry*. Pretoria: The South African Wool Board.

Spicker, P. 2011. Ethical covert research. *Sociology*, 45(1):118–133.

Spierenburg, M. & Wels, H. 2006. “Securing space”: Mapping and fencing in transfrontier conservation in southern Africa. *Space and Culture*, 9(3):294–312.

Square Kilometre Array South Africa. 2015. Promising future for young achievers, *SKA SA Northern Cape News*, 1:4.

Square Kilometre Array South Africa. 2016a. *Media release: MeerKAT joins the ranks of the world's great scientific instruments through its First Light image* [Online]. Available: <https://www.ska.ac.za/media-releases/meerkat-joins-the-ranks-of-the-worlds-great-scientific-instruments-through-its-first-light-image/> [2019, August 25].

Square Kilometre Array South Africa. 2016b. *Understanding the Astronomy Geographic Advantage Act: Information sheet*. Cape Town: Square Kilometre Array South Africa.

Square Kilometre Array South Africa. 2016c. SKA SA extends a hand of cooperation, *SKA SA Northern Cape News*, 3:1.

Square Kilometre Array South Africa. 2017a. SKA SA now part of the South African Radio Astronomy Observatory, *SKA SA Northern Cape News*, 5/6:1.

Square Kilometre Array South Africa. 2017b. *Overview of SKA SA programmes: Input to Kareeberg Municipality IDP* [Carnarvon]: Square Kilometre Array South Africa.

- Square Kilometre Array South Africa. 2017c. *SARAO and SAEON sign three-year Memorandum of Agreement to implement the Integrated Environmental Management Plan for SKA in South Africa* [Online]. Available: <http://www.ska.ac.za/media-releases/sarao-and-saeon-sign-three-year-memorandum-of-agreement/> [2017, November 21].
- Square Kilometre Array South Africa. 2017d. *Media release: SKA and Agri SA partners for the benefit of local communities* [Online]. Available: <https://www.ska.ac.za/media-releases/ska-and-agri-sa-partners-for-the-benefit-of-local-communities/> [2019, June 23].
- Square Kilometre Array South Africa. 2017e. Land acquisitions process 100% completed, *SKA SA Northern Cape News*, 5/6:6.
- Square Kilometre Array South Africa. 2017f. *SKA SA Projek: Inligting sessie aan grond eienaars in die spirale arms van SKA Mid Fase 1* [Online]. Available: http://www.ska.ac.za/wp-content/uploads/2018/03/presentation_october_2017.pdf [2019, October 3].
- Square Kilometre Array South Africa. 2019. *Media release: South Africa's MeerKAT discovers giant radio bubbles at centre of Milky Way* [Online]. Available: <https://www.ska.ac.za/south-africas-meerkat-discovers-giant-radio-bubbles-at-centre-of-milky-way/> [2019, September 22].
- Square Kilometre Array South Africa. n.d.a. *The project* [Online]. Available: <http://www.ska.ac.za/about/the-project/> [2019, August 25].
- Square Kilometre Array South Africa. n.d.b. *Radio astronomy* [Online]. Available: <http://www.ska.ac.za/outreach/radio-astronomy/> [2019, June 23].
- Square Kilometre Array South Africa. n.d.c. *Frequently asked questions* [Online]. Available: <https://www.ska.ac.za/about/faqs/> [2019, August 25].
- Square Kilometre Array South Africa. n.d.d. *MeerKAT radio telescope* [Online]. Available: <https://www.ska.ac.za/science-engineering/meerkat/about-meerkat/> [2019, June 23].
- Square Kilometre Array South Africa. n.d.e. *Media release* [Online]. Available: <http://tracker1.co.za/weblink/17060dfb-7d4f-450b-8c78-e037fb91f281.htm> [2019, August 25].
- Square Kilometre Array South Africa. n.d.f. *Difference between a Strategic Environmental Assessment (SEA) and an Environmental Impact Assessment (EIA)* [Online]. Available: <http://www.ska.ac.za/about/strategic-environmental-assessment/difference-between-a-sea-and-an-eia/> [2017, November 21].
- Square Kilometre Array South Africa. n.d.g. *Introducing you to SARAO* [Online]. Available: <http://www.ska.ac.za/about/sarao/> [2019, February 13].
- Square Kilometre Array South Africa. n.d.h. *Astronomy Geographic Advantage Act* [Online]. Available: <https://www.ska.ac.za/about/astronomy-geographic-advantage-act/> <https://www.ska.ac.za/about/astronomy-geographic-advantage-act/> [2019, June 21].

- Square Kilometre Array South Africa. n.d.i. *Strategic Environmental Assessment and the Integrated Environmental Management Plan for the SKA Phase 1 mid-frequency array* [Online]. Available: <https://www.ska.ac.za/about/strategic-environmental-assessment/> [2019, June 23].
- Square Kilometre Array South Africa. n.d.j. *Land acquisitions process (LAP)* [Online]. Available: <https://www.ska.ac.za/about/land-acquisitions/> [2018, October 7].
- Square Kilometre Array stakeholder engagement officer. 2019. Maps, E-mail to R. Terblanche [Online], 17 July. Available E-mail: anton@ska.ac.za.
- Square Kilometre Array. 2015a. *SKA infographic – SKA 1-low* [Online]. Available: <https://www.skatelescope.org/multimedia/image/ska-infographic-ska1-low/> <https://www.skatelescope.org/multimedia/image/ska-infographic-ska1-low/> [2019, June 23].
- Square Kilometre Array. 2015b. *SKA infographic – SKA 1-mid* [Online]. Available: <https://www.skatelescope.org/multimedia/image/ska-infographic-ska1-mid/> [2019, June 23].
- Square Kilometre Array. 2019a. *The SKA project* [Online]. Available: <https://www.skatelescope.org/the-ska-project/> [2019, August 25].
- Square Kilometre Array. 2019b. *SKA science* [Online]. Available: <https://www.skatelescope.org/science/> [2019, September 10].
- Square Kilometre Array. 2019c. *Frequently asked questions about the SKA* [Online]. Available: <https://www.skatelescope.org/frequently-asked-questions/> [2019, June 23].
- Square Kilometre Array. 2019d. *The history of the SKA project* [Online]. Available: <https://www.skatelescope.org/history-of-the-skaproject/> [2019, August 25].
- Square Kilometre Array. 2019e. *Founding members sign SKA observatory treaty* [Online]. Available: <https://www.skatelescope.org/news/founding-members-sign-ska-observatory-treaty/> [2019, October 7].
- Stadler, H. 2006. Historical perspective on the development of problem animal management in the Cape Province, in “*Prevention is the cure*”! *Proceedings of a workshop on holistic management of human–wildlife conflict in the agricultural sector of South Africa*. Johannesburg: Endangered Wildlife Trust: 11–16.
- Statistics South Africa. 2011a. *Kareeberg* [Online]. Available: http://www.statssa.gov.za/?page_id=993&id=kareeberg-municipality [2016, December 3].
- Statistics South Africa. 2011b. *Loxton* [Online]. Available: http://www.statssa.gov.za/?page_id=4286&id=6939 [2017, July 26].
- Statistics South Africa. 2011c. *Van Wyksvlei* [Online]. Available: http://www.statssa.gov.za/?page_id=4286&id=6953 [2018, August 29].

- Stellenbosch University Research Ethics Committee (Human Research: Humanities). 2011. *Standard Operating Procedure* [Online]. Available: <http://www0.sun.ac.za/research/assets/files/REC%20SOP%20Final.pdf>. [2016, June 4].
- Stellenbosch University. 2013. *Policy for responsible research conduct at Stellenbosch University* [Online]. Available: http://www0.sun.ac.za/research/assets/files/Policy_Documents/POLICY%20FOR%20RESPONSIBLE%20RESEARCH%20CONDUCT%20AT%20STELLENBOSCH%20UNIVERSITY.pdf. [2016, July 11].
- Stewart, P. & Zaaiman, J. 2014. Glossary, in P. Stewart & J. Zaaiman (eds.). *Sociology: A South African introduction*. Cape Town: Juta. 553–574.
- Stibbe, A. 2001. Language, power and the social construction of animals. *Society and Animals*, 9(2):145–161.
- Strachan, A. 1990. *Die jakkalsjagter*. Cape Town: Tafelberg Publishers.
- Strang, V. 2009. Integrating the social and natural sciences in environmental research: A discussion paper. *Environment, Development and Sustainability*, 11(1):1–18.
- Sumares, D. & Fidélis, T. 2011. Natura 2000 and the narrative nature of nature: A case for critical discourse analysis. *Journal of Integrative Environmental Sciences*, 8(1):53–68.
- Sundberg, J. 1998. Strategies for authenticity, space, and place in the Maya Biosphere Reserve, Petén, Guatemala. *Conference of Latin Americanist Geographers Yearbook*, 24:85–96.
- Sutherland, W.J., Gardner, T.A., Haider, L.J. & Dicks, L.V. 2013. How can local and traditional knowledge be effectively incorporated into international assessments? *Oryx*, 48(1):1–2.
- Takyi, E. 2015. The challenge of involvement and detachment in participant observation. *The Qualitative Report*, 20(6):864–872.
- Taylor, B. & de Loe, R.C. 2012. Conceptualizations of local knowledge in collaborative environmental governance. *Geoforum*, 43(6):1207–1217.
- Taylor, B., Sinha, G. & Ghoshal, T. 2008. *Research methodology: A guide for researchers in management and social sciences* (3rd ed.). New Delhi: Prentice-Hall of India Private Limited.
- Teel, T.L. & Manfredi, M.J. 2010. Understanding the diversity of public interests in wildlife conservation. *Conservation Biology*, 24(1):128–139.
- Terblanche, R. 2015. Good fences make good neighbours: A qualitative, interpretive study of human–baboon and human–human conflict on the Cape Peninsula. Unpublished master’s thesis. Stellenbosch: Stellenbosch University.
- The Karoo Predator Project. 2016. *Hot on the “tail” of a jackal* [Online]. Available: <https://karoopredatorproject.wordpress.com/2016/07/17/hot-on-the-tail-of-a-jackal/> [2019, August 24].

- Tilley, L. & Woodthorpe, K. 2011. Is it the end for anonymity as we know it? A critical examination of the ethical principle of anonymity in the context of 21st century demands on the qualitative researcher. *Qualitative Research*, 11(2):197–212.
- Tillmann-Healy, L.M. 2003. Friendship as method. *Qualitative Inquiry*, 9(5):729–749.
- Todd, S. & Henschel, J. 2016. *SAEON@SKA: Ecological research and monitoring framework: Background document*. [Kimberley]: South African Environmental Observation Network.
- Todd, S. n.d. *Fine-scale mapping in the SKA core area*. [Kimberley]: South African Environmental Observation Network [Online]. Available: <http://www.skaphase1.csir.co.za/wp-content/uploads/2017/01/Core-Area-Assessment.pdf> [2017, November 21].
- Torr, E. 2017. Correspondence. 5 July.
- Turner, D.W., III. 2010. Qualitative interview design: A practical guide for novice investigators. *The Qualitative Report*, 15(3):754–760.
- Turpie, J.K. & Akinyemi, B.E. 2018. The socio-economic impacts of livestock predation and its prevention in South Africa, in G. Kerley, S. Wilson & D. Balfour (eds.). *Livestock predation and its management in South Africa: A scientific assessment*. Port Elizabeth: Centre for African Conservation Ecology, Nelson Mandela University. 53–81.
- Twidle, H. 2019. Impossible images: Radio astronomy, the Square Kilometre Array and the art of seeing. *Journal of Southern African Studies*, 45(4):767–790.
- van de Ven, T.M.F.N., Tambling, C.J. & Kerley, G.I.H. 2013. Seasonal diet of black-backed jackal in the Eastern Karoo, South Africa. *Journal of Arid Environments*, 99(3):23–27.
- van der Hoef, M. 2017. The local, the global, and the self: An ethnographic account of a community Computer Centre in Carnarvon, Northern Cape, and its significance for its users' sense of self and their place in the world. Unpublished master's thesis. Stellenbosch: Stellenbosch University.
- van der Merwe, C. n.d. *Alexander Strachan: Die jakkalsjagter* [Online]. Available: <http://www.oulitnet.co.za/leeskring/11jakkals.asp> [2018, June 19].
- van der Merwe, F. 2017. SKA en jakkalse, E-mail to R. Terblanche [Online], 26 February. Available E-mail: francois@tierhoek.co.za.
- van der Riet, G. 2011. *From the Golden Age to present, recording the history of comic book publishing and collecting in South Africa* [Online]. Available: <http://southafricancomicbooks.blogspot.com/2011/12/honiball.html> [2019, July 25].
- van Niekerk, H.N. 2010. The cost of predation on small livestock in South Africa by medium-sized predators. Unpublished master's thesis. Bloemfontein: University of the Free State.
- van Niekerk, J. 2018. Afrikaans stories of Jackal and Hyena: Oral and written traditions. *Tydskrif vir Letterkunde*, 55(3):80–95.

- van Sittert, L. 1998. "Keeping the enemy at bay": The extermination of wild carnivora in the Cape Colony, 1889–1910. *Environmental History*, 3(3):333–356.
- van Sittert, L. 2016. Routinising genocide: The politics and practice of vermin extermination in the Cape Province c.1889–1994. *Journal of Contemporary African Studies*, 34(1):111–128.
- Verklarende Handwoordeboek van die Afrikaanse Taal* (2nd ed.). 1987. s.v. 'skelm'. Johannesburg: Perskor Publishers.
- Verster, F. & Burden, M. 2006. Strokies vir kinders: *Jakkals en Wolf* en ander reekse deur T.O. Honiball. *Suid-Afrikaanse Tydskrif vir Kultuurgeskiedenis*, 20(1):180–200.
- Verster, F.P. 2003. 'n Kultuurhistoriese ontleding van pikurale humor, met besondere verwysing na die werk van T.O. Honiball. Unpublished doctoral dissertation. Stellenbosch: Stellenbosch University.
- Vesic, J. 2011. The political ecology of wildlife conservation: The case of white-tailed deer in southern Ontario. Unpublished master's thesis. Toronto: York University.
- Viljoen, S. 2017. Wildlife health in human-modified landscapes: Epidemiology of tick-borne pathogens affecting black-backed jackals and caracals. Unpublished master's thesis. Cape Town: University of Cape Town.
- Vink, N., Kirsten, J. & van Zyl, J. 2000. Agricultural policy: Undoing the legacy of the past, in C.G. Thirtle, J. van Zyl & N. Vink (eds.). *South African agriculture at the crossroads: An empirical analysis of efficiency, technology and productivity*. Basingstoke: MacMillan. 22–44.
- Visagie, A. 2002. White masculinity and the African Other: *Die werfbobbejaan* by Alexander Strachan. *Alternation*, 9(1):131–141.
- von Wielligh, G.R. 2011. *Animal Tales 2*. Pretoria: Protea Book House.
- von Wielligh, G.R. 2012. *Animal Tales 3*. Pretoria: Protea Book House.
- Wacquant, L. 2006. Habitus, in J. Beckert & M. Zafirovski (eds.). *International encyclopedia of economic sociology*. London: Routledge. 317–321.
- Walker, C. 2019. Cosmopolitan Karoo: Land, space and place in the shadow of the Square Kilometre Array. *Journal of Southern African Studies*, 45(4):641–662.
- Walker, C., Chinigò, D. & Dubow, S. 2019. Karoo futures: Astronomy in place and space – introduction. *Journal of Southern African Studies*, 45(4):627–639.
- Walker, C., Milton, S.J., O'Connor, T.G., Maguire, J.M. & Dean, W.R.J. 2018. Drivers and trajectories of social and ecological change in the Karoo, South Africa. *African Journal of Range and Forage Science*, 35(3&4):157–177.
- Walker, C.J. & Chinigò, D. 2018. Disassembling the Square Kilometre Array: Astronomy and Development in South Africa. *Third World Quarterly*, 39(10):1–19.

- Walker, P. 1998. Politics of nature: An overview of political ecology. *Capitalism Nature Socialism*, 9(1):131–144.
- Walker, P.A. 2006. Political ecology: Where is the policy? *Progress in Human Geography*, 30(3):382–395.
- Walker, P.A. 2007. Political ecology: Where is the politics? *Progress in Human Geography*, 31(3):363–369.
- Wall, E., Ferrazzi, G. & Schryer, F. 1998. Getting the goods on social capital. *Rural Sociology*, 63(2):300–322.
- Walton, L.R. & Joly, D.O. 2003. *Canis mesomelas*. *Mammalian Species*, 715:1–9.
- Watts, M. & Peet, R. 2004. Liberating political ecology, in R. Peet & M. Watts (eds.). *Liberation ecologies: Environment, development, social movements* (2nd ed.). London: Routledge.
- Weber, M. 1947. *The theory of social and economic organization*. A.M. Henderson & T. Parsons (tr.). Illinois: The Free Press of Glencoe.
- Weiss, K., Hamann, M. & Marsh, H. 2013. Bridging knowledges: Understanding and applying indigenous and western scientific knowledge for marine wildlife management. *Society and Natural Resources*, 26(3):285–302.
- Werner, A. 1933. *Myths and legends of the Bantu*. London: George G. Harrap and Company Limited.
- Wild, S. 2012. *Searching African skies: The Square Kilometre Array and South Africa's quest to hear the songs of the stars*. Auckland Park: Jacana Media.
- Wild, S. 2018. *New, mesmerising drone footage shows just how big SA's new R4 billion radio telescope is* [Online]. Available: <https://www.businessinsider.co.za/mesmerizing-drone-footage-shows-just-how-big-sas-new-r44-billion-radio-telescope-is-2018-7> [2019, August 22].
- Williams, D.R. 2002. The social construction of arctic wilderness: Place meanings, value pluralism, and globalization, in *Wilderness in the Circumpolar North: Searching for compatibility in ecological, traditional, and ecotourism values*. Anchorage: University of Alaska. 120–132.
- Wittenberg, H. 2014. The boer and the jackal: Satire and resistance in Khoi orature. *Critical Arts*, 28(4):593–609.
- Woodward, W. 2008. *The animal gaze: Animal subjectivities in southern African narratives*. Johannesburg: Wits University Press.
- 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(5/6): 233–243.
- Yin, R.K. 2009. *Case study research: Design and methods* (4th ed.). Los Angeles: SAGE.

- York, R. & Longo, S.B. 2015. Animals in the world: A materialist approach to sociological animal studies. *Journal of Sociology*, 53(1):1–15.
- Young, J.C., Marzano, M., White, R.M., McCracken, D.I., Redpath, S.M., Carss, D.N., Quine, C.P. & Watt, A.D. 2010. The emergence of biodiversity conflicts from biodiversity impacts: Characteristics and management strategies. *Biodiversity Conservation*, 19:3973–3990.
- Zeemaps. 2019a. *PhD fieldwork interview locations* [Online]. Available: <https://www.zeemaps.com/map?group=3129041&location=Carnarvon%2C%20Pixley%20Ka%20Seme%2C%20Northern%20Cape%2C%20ZAF>. [2019, August 7].
- Zeemaps. 2019b. *PhD fieldwork participant observation locations* [Online]. Available: <https://www.zeemaps.com/map?group=3137299&location=Carnarvon%2C%20Pixley%20Ka%20Seme%2C%20Northern%20Cape%2C%20ZAF&add=1#>. [2019, August 7].
- Zimmerer, K.S. & Bassett, T.J. 2003. Approaching political ecology: Society, nature, and scale in human–environment studies, in K.S. Zimmerer & T.J. Bassett (eds.). *Political ecology: An integrative approach to geography and environment-development studies*. New York: Guilford Press. 1–25.
- Zollinger, B. & Daniels, S.E. 2005. We all can just get along: The social constructions of prairie dog stakeholders and the use of a transactional management approach in devising a species conservation plan, in A. Herda-Rapp & T.L. Goedeke (eds.). *Mad about wildlife: Looking at social conflict over wildlife*. Leiden: Brill. 253–278.

Interviews

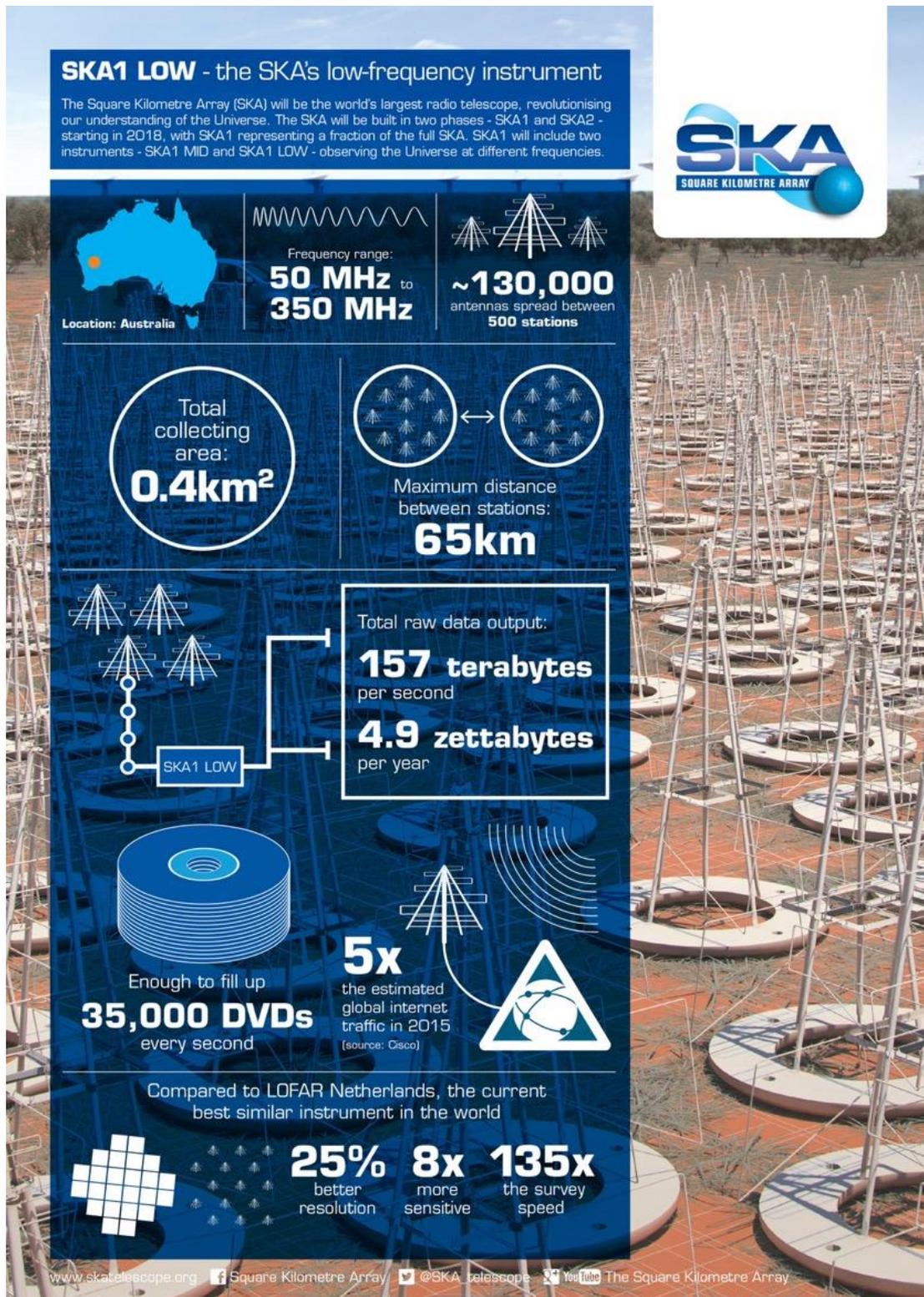
- Avenant, N. 2018. Personal interview. 19 February, Bloemfontein. [Recording in possession of author].
- Bernard. 2017. Personal interview. 19 October, Private Farm in Kareeberg Local Municipality. [Recording in possession of author].
- Christiaan. 2017. Personal interview. 10 July, Private Farm in Kareeberg Local Municipality. [Recording in possession of author].
- Conrad. 2017. Personal interview. 16 October, Williston. [Recording in possession of author].
- de Waal, H.O. 2018. Personal interview. 19 February, Bloemfontein. [Recording in possession of author].
- du Plessis, J. 2018. Personal interview. 19 February, Bloemfontein. [Recording in possession of author].
- du Toit, G. 2019. Personal interview. 3 April, Somerset West. [Recording in possession of author].
- Felix. 2017. Personal interview. 4 July, Williston. [Recording in possession of author].

- Fourie. 2017. Personal interview. 6 July, Private Farm in Karoo Hoogland Local Municipality.
[Recording in possession of author].
- Franco. 2017. Personal interview. 18 May, Private Farm in Karoo Hoogland Local Municipality.
[Recording in possession of author].
- Frederich. 2017. Personal interview. 11 May, Vanwyksvlei. [Recording in possession of author].
- Frederick. 2017. Personal interview. 18 May, Private Farm in Karoo Hoogland Local Municipality.
[Recording in possession of author].
- Gawie. 2017. Personal interview. 12 May, Private Farm in Kareeberg Local Municipality.
[Recording in possession of author].
- Gys. 2017. Personal interview. 15 May, Private Farm in Karoo Hoogland Local Municipality.
[Recording in possession of author].
- Hugo. 2017. Personal interview. 27 October, Private Farm in Kareeberg Local Municipality.
[Recording in possession of author].
- Ivan. 2017. Personal interview. 28 June, Private Farm in Karoo Hoogland Local Municipality.
[Recording in possession of author].
- James. 2017. Personal interview. 16 October, Williston. [Recording in possession of author].
- Jan. 2017. Personal interview. 5 July, Private Farm in Karoo Hoogland Local Municipality.
[Recording in possession of author].
- Kobus. 2017. Personal interview. 30 October, Williston. [Recording in possession of author].
- Maghiel. 2017. Personal interview. 4 July, Private Farm in Karoo Hoogland Local Municipality.
[Recording in possession of author].
- Nattrass, N. 2018. Personal interview. 17 January, Cape Town. [Recording in possession of author].
- SARAO stakeholder engagement officer. 2019. Telephone interview. 17 July, Stellenbosch.
- Schneekluth, P. 2018. Telephone interview. 7 February, Stellenbosch. [Recording in possession of author].
- Simoné. 2017. Personal interview. 18 May, Private Farm in Karoo Hoogland Local Municipality.
[Recording in possession of author].
- Stefan. 2017. Personal interview. 16 May, Private Farm in Karoo Hoogland Local Municipality.
[Recording in possession of author].
- Viljoen, N. 2017. Personal interview. 20 May, Private Farm in Ubuntu Local Municipality.
[Recording in possession of author].

APPENDICES

Appendix A: Infographics of SKA's low- and mid-frequency instruments

(Source: SKA, 2015a&b)



SKA1 MID - the SKA's mid-frequency instrument

The Square Kilometre Array (SKA) will be the world's largest radio telescope, revolutionising our understanding of the Universe. The SKA will be built in two phases - SKA1 and SKA2 - starting in 2018, with SKA1 representing a fraction of the full SKA. SKA1 will include two instruments - SKA1 MID and SKA1 LOW - observing the Universe at different frequencies.



Location: South Africa

Frequency range: **350 MHz** to **14 GHz**

~200 dishes
(including 64 MeerKAT dishes)

Total collecting area: **33,000m²**
or **126 tennis courts**

Maximum distance between dishes: **150km**

Total raw data output:

2 terabytes per second

62 exabytes per year

Enough to fill **340,000** average laptops with content **every day**

x340,000

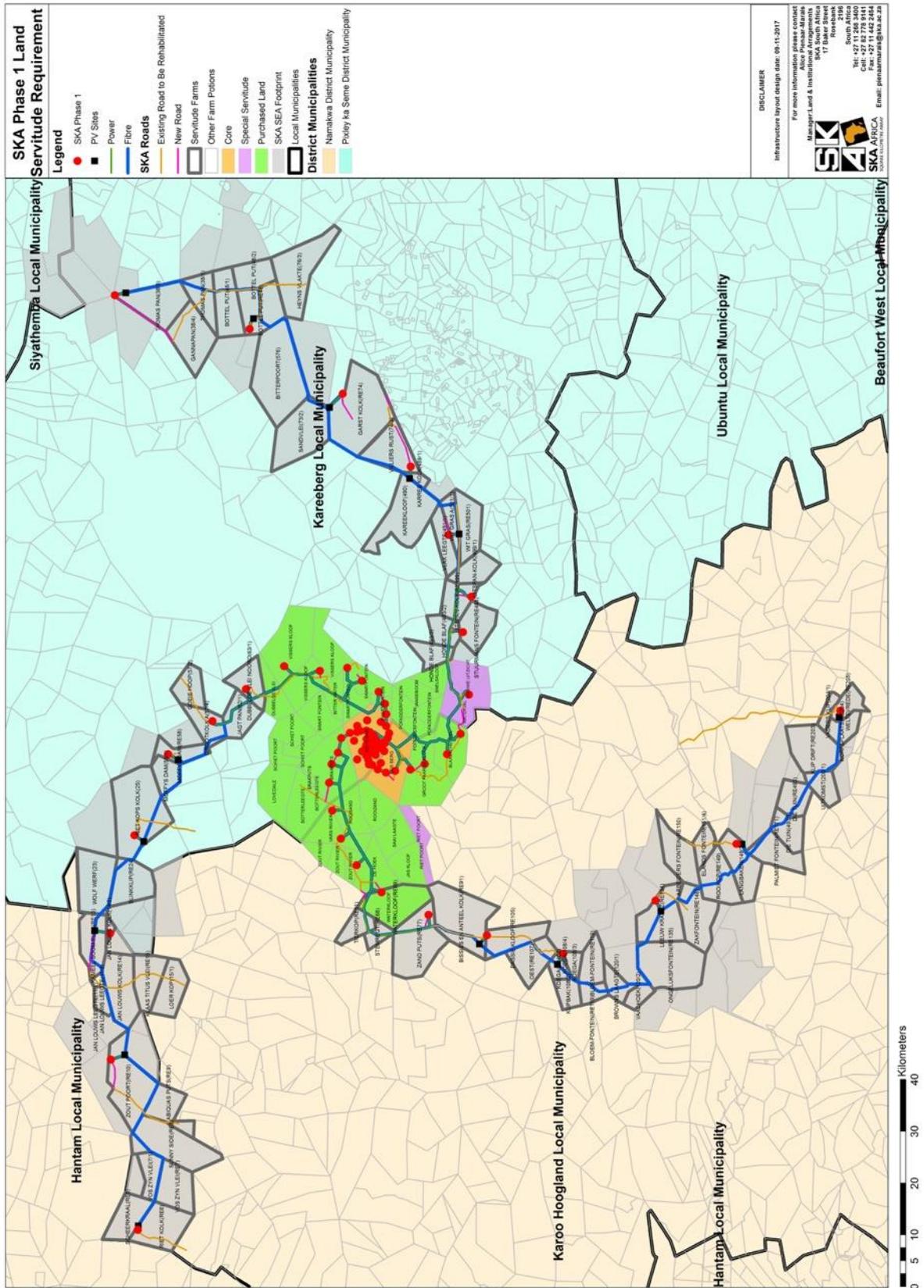
Compared to the JVLA, the current best similar instrument in the world:

4x the resolution

5x more sensitive

60x the survey speed

Appendix B: Detailed map of SKA core site and the three ‘spiral arms’ (Source: SKA SA stakeholder engagement officer, 2019)



Appendix C: Profile of (interviewed) research participants in terms of age, gender, race and interest group(s)

Pseudonym/Real name ¹⁰⁶	Age	Gender	Race	Interest group(s)
Bernard	42	Male	White	Professional vermin hunter
Christiaan	60s	Male	White	SKA core site neighbouring farmer
Conrad	30s	Male	White	Ecologist
Felix	56	Male	White	Professional vermin hunter/Regional farmer
Fourie	50s	Male	White	SKA core site neighbouring farmer
Franco	69	Male	White	SKA core site neighbouring farmer
Frederich	40s	Male	White	Professional vermin hunter/Regional farmer
Frederick	69	Male	White	SKA core site neighbouring farmer
Gawie	70s	Male	White	Regional farmer (bordering Alkantpan)
Gerrie	70s	Male	White	Former Alkantpan employee/Regional farmer
Guillau du Toit*	59	Male	White	NWGA representative/PMF representative
Gys	64	Male	White	SKA core site neighbouring farmer
H.O. de Waal*	60s	Male	White	Ecologist
Hanru	40s	Male	White	Regional farmer
Hans	50s	Male	White	Regional farmer
Henrico	50s	Male	White	Predation management expert/Professional vermin hunter
Hugo	43	Male	White	Regional farmer/SKA core site farmer/Professional vermin hunter
Ivan	55	Male	White	SKA core site neighbouring farmer
Jacques	40s	Male	White	Alkantpan employee
Jakob	30s	Male	White	Regional farmer
James	50s	Male	White	Ecologist
Jan	51	Male	White	Regional farmer
Joubert	59	Male	White	RPO Northern Cape representative/SKA core site farmer
Jurie du Plessis*	30s	Male	White	Ecologist
Kobus	60s	Male	White	Regional farmer
Lodewyk	71	Male	White	Regional farmer/SKA core site farmer
Luan	60s	Male	White	SKA core site neighbouring farmer
Maghiel	50s	Male	White	SKA core site neighbouring farmer
Nico Avenant*	55	Male	White	Ecologist
Nicoli Natrass*	58	Female	White	Social scientist
Niel Viljoen*	40s	Male	White	Predation management expert/professional vermin hunter/regional farmer
Peter Schneekluth*	60s	Male	White	Predation management expert/Professional vermin hunter
SARAO's stakeholder engagement officer	39	Male	White	SARAO representative
Simoné	27	Female	White	SKA core site neighbouring farmer
Stefan	71	Male	White	SKA core site neighbouring farmer
Tjaart	58	Male	White	National Department of Agriculture, Forestry and Fisheries employee/Professional vermin hunter

¹⁰⁶ Names followed by an asterisk indicate that it is the participant's real name.

Appendix D: Schematic representation of the various constituencies with an express interest in jackal management in and around the SKA core site



Appendix E: Schematic representation of (interviewed) research participants, their interest group(s), and how snowball sampling unfolded



Appendix F: Informed consent form for research participants (English)



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jou kennisvenoot • your knowledge partner

STELLENBOSCH UNIVERSITY CONSENT TO PARTICIPATE IN RESEARCH

Ongediertes: A critical qualitative study of the political ecology of black-backed jackal and its management around the Square Kilometre Array core site.

I am Renelle Terblanche, a doctoral student at the Sociology and Social Anthropology department at Stellenbosch University. I am conducting research for my doctoral dissertation and would like to invite you to participate in my study which investigates the contested relationships between humans and jackals on the boundary of the proposed SKA core site.

As part of this study I wish to collect information from people such as yourself who fall within one (or more) of the stakeholder categories which I would like to include in this research project. If you agree to take part in this study, I will ask you to respond to some questions and engage in conversation with me, in which you draw on your experiences and knowledge concerning issues related to my study. This should take approximately one hour to one hour 30 minutes.

Before I proceed, I need your agreement, either orally or by means of your signature, that you are aware of the following:

1. Participation in this research is voluntary, in other words, you can choose whether to take part or not.
2. If you volunteer to participate in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer, and still remain in the study.
3. Please note that all interviews will be voice recorded. This will ensure accuracy of notes and transcriptions. If you agree to be recorded, you may ask for the voice-recorder to be switched off at any time during the interview. Any recordings will be kept secure and will not be made available to anyone other than myself and my supervisor.
4. Depending on the stakeholder group, I might request you for the opportunity to accompany (and, if possible, assist) you on a few expeditions and/or hunts in order to collect observational data.
5. As this study is voluntary, there will be no remuneration for participation. However, I hope to contribute to a solution for a sustainable relationship between humans and jackals, and to improved jackal management which may benefit participants indirectly. My research project also has the potential to extend and deepen the analysis of human-wildlife conflict.
6. Any information that is obtained in connection with this study and that can be identified with participants, will remain confidential and will be disclosed only with the participant's permission or as required by law. Confidentiality will be maintained by means of assigning pseudonyms to participant responses. Privacy of any personal data collected will be ensured by securing against improper access to all data.

If you have any questions or concerns about the research, or require a copy of the research findings, please feel free to contact me, my supervisor or my institution:

Renelle Terblanche

Mobile: 083 569 9854

E-mail: 15596567@sun.ac.za or renelleterblanche@gmail.com

Prof Cherryl Walker

Office: 021 808 2473

E-mail: cjwalker@sun.ac.za

Division for Research Development, Stellenbosch University, Ms Malene Fouché

Office: 021 808 4622

E-mail: mfouche@sun.ac.za

ORAL CONSENT / SIGNATURE OF RESEARCH PARTICIPANT

The information above was described to me by Renelle Terblanche in Afrikaans/English and I am in command of this language or it was satisfactorily translated to me. I was given the opportunity to ask questions and these questions were answered to my satisfaction. I hereby consent voluntarily to participate in this study. I have been given/have been offered but not accepted a copy of this form.

Name of Participant

Signature of Participant

Date

OR oral consent given and noted by the researcher

SIGNATURE OF RESEARCHER

I declare that I explained the information given in this document to _____

[name of the participant]. He/she was encouraged and given ample time to ask me any questions. This conversation was conducted in Afrikaans/English and no translator was used. This participant chose to give consent via:

Signature OR Oral consent

[Circle as applicable]

Appendix G: Informed consent form for research participants (Afrikaans)



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UNIVERSITEIT STELLENBOSCH INWILLIGING OM DEEL TE NEEM AAN NAVORSING

Ongediertes: A critical qualitative study of the political ecology of black-backed jackal and its management around the Square Kilometre Array core site.

Ek is Renelle Terblanche, 'n doktorale student in die Departement Sosiologie en Sosiale Antropologie, Universiteit Stellenbosch. Ek doen navorsing vir my doktorale proefskrif en nooi u om deel te neem aan my navorsingstudie wat ondersoek instel na die omstrede verhouding tussen mense en jakkalse op die grens van die SKA se voorgestelde kern terrein.

Deel van hierdie studie is om inligting in te samel van persone, soos u self, wat binne een (of meer) van die belanghebbendes kategorieë wat ek in hierdie navorsingsprojek wil insluit, val. As u instem om deel te neem aan hierdie studie, sal ek u vra om 'n paar vrae te beantwoord en 'n gesprek te voer met my waar u reflekteer op u ervarings en kennis rakende kwessies wat verband hou met my studie. Dit sal ongeveer een uur tot een uur en 30 minute duur.

Voordat ek verder gaan, benodig ek u instemming, hetsy mondelings of deur middel van u handtekening, dat u bewus is van die volgende:

1. Deelname aan hierdie navorsing is vrywilliglik, met ander woorde, u kan kies om deel te neem of nie.
2. Indien u inwillig om deel te neem aan die studie, kan u enige tyd daaraan onttrek sonder enige nadelige gevolge. U kan ook weier om sekere vrae te beantwoord wat u nie wil beantwoord nie, maar steeds aan die studie deelneem.
3. Neem asseblief kennis dat alle onderhoude opgeneem sal word met 'n bandopnemer. Dit sal akkuraatheid van notas en transkripsies verseker. As u instem om opgeneem te word, mag u gedurende die onderhoud vra dat die bandopnemer afgeskakel word. Enige opnames sal veilig bewaar word en sal slegs beskikbaar wees vir my en my studieleier.
4. Afhangende van die belanghebbende groep, mag ek u versoek om u op 'n paar ekspedisies en/of jagte te vergesel (en, indien moontlik, te help) ten einde waarneming data in te samel.
5. Aangesien hierdie studie vrywilliglik is, sal daar geen vergoeding vir deelname wees nie. Nietemin, hoop ek om by te dra tot 'n oplossing vir 'n volhoubare verhouding tussen mens en jakkals en jakkalsbestuur te verbeter waarby deelnemers indirek kan baatvind. My navorsingsprojek het ook die potensiaal om uit te brei op, en die ontleding van mens-wildlewe konflik te verdiep.
6. Enige inligting wat deur middel van die navorsing verkry word en wat met u in verband gebring kan word, sal vertroulik bly en slegs met u toestemming bekend gemaak word of soos deur die wet vereis. Vertroulikheid sal gehandhaaf word deur skuilname toe te ken aan die deelnemers se antwoorde. Vertroulikheid van persoonlike data wat ingesamel is, sal verseker word deur die beveiliging teen onbehoorlike toegang tot al die data.
7. Ek mag moontlik die resultate van my studie in 'n akademiese publikasie publiseer. Soos met die doktorale proefskrif, sal u identiteit vertroulik bly in so 'n publikasie deur gebruik te maak van skuilname.

Indien u enige vrae of besorgdheid omtrent die navorsing het, staan dit u vry om in verbinding te tree met myself, my studieleier, of my instelling:

Renelle Terblanche

Selfoon: 083 569 9854

E-pos: 15596567@sun.ac.za or renelleterblanche@gmail.com

Prof Cherryl Walker

Kantoor: 021 808 2473

E-pos: cjwalker@sun.ac.za

Afdeling Navorsingsontwikkeling, Universiteit Stellenbosch, Me Malene Fouché

Kantoor: 021 808 4622

E-pos: mfouche@sun.ac.za

MONDELINGE TOESTEMMING / VERKLARING DEUR DEELNEMER

Die bostaande inligting is aan my gegee en verduidelik deur Renelle Terblanche in Afrikaans/Engels en ek is dié taal magtig of dit is bevredigend vir my vertaal. Ek is die geleentheid gebied om vrae te stel en my vrae is tot my bevrediging beantwoord. Ek wil hiermee vrywillig in om deel te neem aan die studie. Ek het 'n afskrif van hierdie vorm gekry/'n afskrif is aangebied, maar nie aanvaar nie.

Naam van Deelnemer

Handtekening van Deelnemer

Datum

OF mondelinge toestemming is gegee en aangedui deur die navorsers

VERKLARING DEUR NAVORSER

Ek verklaar dat ek die inligting in hierdie dokument vervat verduidelik het aan _____ [naam van die deelnemer].
Hy/sy is aangemoedig en oorgenoeg tyd gegee om vrae aan my te stel. Dié gesprek is in Afrikaans/Engels gevoer en geen vertaler is gebruik nie. Die deelnemer het gekies om toestemming te gee via:

Handtekening OF Mondelinge toestemming

[Omkring soos van toepassing]

Appendix H: Interview schedule for SARA0 key informants



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Renelle Terblanche

15596567

PhD (Sociology) candidate

Department of Sociology and Social Anthropology

Information on the SKA core site

1. What is the final size (hectares) of the SKA core site?
2. Regarding the Land Acquisition Process (LAP), how many properties were bought out?
3. How many individual farmers were bought out through the LAP?
4. When was the LAP process finally concluded?
5. How much did the LAP cost?
6. Is there any possibility that the LAP could be renewed in the future in order to expand the SKA core site? If yes, how likely is this, what would be the reasons and when might it occur?
7. Have all farmers whose farms have been acquired received their compensation as of today's date?
8. Are any farmers whose farms have been acquired through the LAP still actively farming on their former properties and, if so, by when do you anticipate that this will stop?
9. How many farmworker households were affected by the LAP?

10. Have all of the affected farmworker households moved off the SKA core site as of today's date and if so, where have they moved to?
11. How many of the affected farmworker households have been or will be employed by the SKA and in what capacity? At what stage are these arrangements?
12. If not all farmworker households have been or will be employed by the SKA, are they eligible for any compensation and, if so, what is in place in this regard?
13. Is a map of the final core site publicly available and, if so, where can I get hold of it?
14. Is a map of the final core site (which also indicates the neighbouring farms) publicly available and, if so, where can I get hold of it?
15. Is a map of the final layout of the 'spiral arms' and the affected properties publicly available and, if so, where can I get hold of it?
16. At what stage are the negotiations around servitudes with farmers whose properties fall within the 'spiral arms'?

Information on the national park and SANParks
--

17. Has the SKA core site been proclaimed as protected area as yet? If yes, please supply details of the proclamation. If no, please supply details of what is planned in this regard and what the status of these plans is as of today's date.
18. Has a decision been made yet as to the name of the SKA protected area/National Park and, if so, when and what?
19. Is it correct that the SKA core site will be designated as a 'special nature reserve' in terms of the relevant legislation?
20. Has SANParks been officially appointed as the land manager of the SKA core site by now? If yes, when did this happen? If no, what is the status of the planning around this?
21. How will the relationship between SARAo and the designated Land Manager of the SKA core site be managed? What authority will SARAo have concerning decisions around the management of the land? Is there a publicly available Memorandum of Understanding or similar agreement that sets out the terms of this relationship and, if so, where can I access it?

22. Who can you refer me to at SANParks to discuss their role and involvement on the management of the SKA core site?

Relationships with local commercial farmers

23. When did the NRF/SKA South Africa/SARAO first start consulting with local farmers regarding the LAP and need to minimise radio frequency interference in and around the SKA core site through the phasing out of livestock farming on the SKA core site?
24. It seems that initially there were local expectations that commercial livestock farming could continue on farms beyond the two farms acquired for KAT and MeerKAT. Were these expectations incorrect? If not, when and why was a decision made to expand the SKA core site and rule out livestock farming on the affected properties?
25. Are there any prospects that livestock farming could be resumed on the SKA core site in the future, if concerns around the impact of livestock farming on the functioning of the SKA infrastructure could be appropriately addressed?
26. In your opinion, has the relationship with commercial farmers currently neighbouring or near to the SKA core site improved or remained the same or got worse now that the LAP has been completed and what do you think are the reasons for this?

Predator management

27. Livestock farmers have raised concerns in public communication meetings that the fencing around the SKA core site will not be maintained and that this will increase the vulnerability of their livestock to predation, especially from jackal. What is your response to this concern and how do you think it should be addressed?
28. Who is responsible for maintaining the boundary fence between the SKA core site and neighbouring farmers and what funds are available for this?
29. Livestock farmers in the vicinity of the SKA have argued that effective jackal management is critical for the future of commercial agriculture in the region. What is your response to this? Do you think that farmers' concerns regarding jackals and jackal predation are justified?

30. In public communication meetings, SARAO has stated that their jackal management strategy has to be based on “scientific knowledge”. What in your view constitutes scientific knowledge with regard to jackal management and where can this be found? Does the local knowledge of farmers and professional vermin hunters around methods of jackal management constitute scientific knowledge and/or is there a role for this knowledge in jackal management?

Is there anything else you would like to bring to my attention arising from the issues covered by this set of questions?

Finally, please let me know how I should identify you in my dissertation if I wish to quote or refer to your responses to this interview. For instance, can I use your name or only your official title or only a pseudonym or a generic title (e.g. SARAO staff member)?

Thank you for your time and insight

Appendix I: Interview schedule for farmers (English and Afrikaans)

The below semi-structured interview schedule indicates broad themes to explore, with the listed questions as guides. // *Die onderstaande semi-gestruktureerde onderhoud skedule dui breë temas aan om te verken met die genoteerde vrae as riglyne.*

Demographic information // *Demografiese inligting*

Participant // *Deelnemer*: _____

Affiliation // *Affiliatie*: _____

Date // *Datum*: _____

Time // *Tyd*: _____

Location // *Ligging*: _____

Background // *Agtergrond*

1. Landowner's farming history. // *Grondeienaar se boerdery geskiedenis.*
2. Information on livestock ownership, livestock management and livestock losses. // *Inligting rakende vee eienskap, veebestuur en veeverliese.*
3. Landowner perceptions of jackal on his/her farm: // *Grondeienaar se persepsies van jakkalse op sy/haar plaas:*
 - 3.1. How often are jackals seen? // *Hoe gereeld word jakkalse gewaar?*
 - 3.2. Location of jackal sightings? // *Ligging van jakkalswaarnemings?*
 - 3.3. Population change? // *Populasie veranderinge?*

4. How do you manage jackals/jackal predation on your farm? // *Hoe beheer u jakkalse/jakkals predasie op u plaas?*
5. Over the last couple of years, has livestock predation by jackals on your farm increased or decreased? // *Oor die afgelope paar jaar, het vee predasie deur jakkalse op u plaas vermeerder of verminder?*

Human–jackal conflict in general // Mens–jakkals konflik oor die algemeen

1. What are the main causes of human–jackal conflict? // *Wat is die hooforsake van mens–jakkals konflik?*
2. How can this conflict be alleviated? // *Hoe kan hierdie konflik verlig word?*
3. What is the best way to manage jackals? // *Wat is die beste manier om jakkalse te bestuur?*
4. Do you think co-existing with jackals is possible? // *Dink jy saambestaan met jakkalse is moontlik?*

Different understandings of jackals // Verskillende begrippe van jakkalse

1. What is your attitude towards jackals? // *Wat is jou houding teenoor jakkalse?*
2. If I say “black-backed jackal”, what comes to mind? // *As ek “rooijakkals” sê, waaraan dink u?*
3. How do you feel when jackals predate on your livestock? // *Hoe voel u wanneer jakkalse roof op u vee?*

Sources of knowledge that underpin jackal management // Bronne van kennis wat jakkalsbestuur stut

1. What sources do you draw on to justify your position/understanding of jackals/jackal management? // *Van watter bronne maak u gebruik om u posisie/begrip van jakkalse/jakkalsbestuur te regverdig?*

2. Where does this knowledge come from? In what is it situated? // *Van waar af kom hierdie kennis vandaan? In wat is dit geleë?*

Power dynamics in jackal management // *Magsdinamika in jakkalsbestuur*

1. Who would you consider to be the expert in jackal management? // *Wie sou u as die kenner van jakkalsbestuur beskou?*
2. How would you describe the politics of jackal management? // *Hoe sou u die politiek van jakkalsbestuur beskryf?*
3. Explain the power relations around knowledge production in jackal management. // *Verduidelik die magsverhoudings rondom kennisproduksie in jakkalsbestuur.*
4. Are there power inequalities in jackal management? // *Is daar mags ongelykhede in jakkalsbestuur?*
5. As a farmer, do you feel that you are in the position to influence and/or contribute to jackal management? // *As 'n boer, voel u dat u in die posisie is om jakkalsbestuur te beïnvloed en/of by te dra tot jakkalsbestuur?*

Social dynamics amongst jackal stakeholder groups // *Sosiale dinamika onder jakkals belangegroep*

1. Who do you have conversations with regarding jackals? // *Met wie het u gesprekke oor jakkalse?*
2. Does the management and/or persecution of jackals contribute to group mobilisation? // *Dra die bestuur en/of vervolging van jakkalse by tot groep mobilisasie?*
3. Does it bring people together or push people away from one another? // *Bring dit mense bymekaar of stoot dit mense weg van mekaar af?*
4. Which stakeholder groups does it bring together/push away? *Watter belanghebbendes bring dit bymekaar/stoot dit weg?*
5. How does it bring people together/push them away? // *Hoe bring dit mense bymekaar/stoot dit hulle weg?*

Jackal as proxy for general insecurities of farmers // *Jakkals as gevormagtigde vir algemene onsekerhede van boere*

1. What do jackals symbolise for you? // *Wat simboliseer jakkalse vir u?*
2. What is your opinion about the SKA core site in relation to jackals? // *Wat is jou mening oor die SKA kern met betrekking tot jakkalse?*
3. Will the boundary create more conflict or assist in managing jackals? // *Sal die grens meer konflik skep of sal dit bystand bied tot die bestuur van jakkalse?*
4. What is your view about the land-use change from agriculture to conservation? // *Wat is jou mening oor die grondgebruik verandering vanaf landbou tot bewaring?*
5. Has the SKA and other jackal management stakeholders taken care to identify concerns, interests, experiences and perceptions of farmers regarding human–jackal conflict? // *Het die SKA en ander belanghebbendes gesorg om boere se kommer, belangstellings, ervarings en persepsies oor mens–jakkals konflik in ag te neem?*

Appendix J: Interview schedule for key informants (English and Afrikaans)

The below semi-structured interview schedule indicates broad themes to explore, with the listed questions as guides. // *Die onderstaande semi-gestruktureerde onderhoud skedule dui breë temas aan om te verken met die genoteerde vrae as riglyne.*

Demographic information // *Demografiese inligting*

Participant // *Deelnemer*: _____

Affiliation // *Affiliasie*: _____

Date // *Datum*: _____

Time // *Tyd*: _____

Location // *Ligging*: _____

Background // *Agtergrond*

1. What is your history with jackals/jackal management? // *Wat is jou geskiedenis met jakkalse/jakkalsbestuur?*
2. What is the stance of the organisation that you are representing and/or are a member of towards jackal and/or jackal management? // *Wat is die houding van die organisasie wat jy verteenwoordig en/of 'n lid van is rakende jakkalse en/of jakkalsbestuur?*

Human–jackal conflict in general // *Mens–jakkals konflik oor die algemeen*

1. What are the main causes of human–jackal conflict? // *Wat is die hooforsake van mens–jakkals konflik?*
2. How can this conflict be alleviated? // *Hoe kan hierdie konflik verlig word?*

3. What is the best way to manage jackals? // *Wat is die beste manier om jakkalse te bestuur?*
4. Do you think coexisting with jackals is possible? // *Dink jy saambestaan met jakkalse is moontlik?*

Different understandings of jackals // *Verskillende begrippe van jakkalse*

1. What is your attitude towards jackals? // *Wat is jou houding teenoor jakkalse?*
2. If I say “black-backed jackal”, what comes to mind? // *As ek “rooijakkals” sê, waaraan dink u?*
3. Do you feel that various stakeholder groups’ concerns, interests, experiences and perceptions regarding jackals are taken into consideration? // *Voel u dat verskeie belanghebbendes se probleme, belange, ervarings en persepsies met betrekking tot jakkalse in ag geneem word?*

Sources of knowledge that underpin jackal management // *Bronne van kennis wat jakkalsbestuur stut*

1. What sources do you draw on to justify your position/understanding of jackals/jackal management? // *Van watter bronne maak u gebruik om u posisie/begrip van jakkalse/jakkalsbestuur te regverdig?*
2. Where does this knowledge come from? In what is it situated? // *Van waar af kom hierdie kennis vandaan? In wat is dit geleë?*

Power dynamics in jackal management // *Magsdinamika in jakkalsbestuur*

1. Who would you consider to be the expert in jackal management? // *Wie sou u as die kenner van jakkalsbestuur beskou?*
2. How would you describe the politics of jackal management? // *Hoe sou u die politiek van jakkalsbestuur beskryf?*
3. Explain the power relations around knowledge production in jackal management. // *Verduidelik die magsverhoudings rondom kennisproduksie in jakkalsbestuur.*

4. Are there power inequalities in jackal management? // *Is daar mags ongelykhede in jakkalsbestuur?*
5. As an organisation, do you feel that you are in the position to influence and/or contribute to jackal management? // *As 'n organisasie, voel u dat julle in die posisie is om jakkalsbestuur te beïnvloed en/of by te dra tot jakkalsbestuur?*

Social dynamics amongst jackal stakeholder groups // *Sosiale dinamika onder jakkals belangegroep*

1. Who do you have conversations with about jackals? // *Met wie het u gesprekke oor jakkalse?*
2. Does the management and/or persecution of jackals contribute to group mobilisation? // *Dra die bestuur en/of vervolging van jakkalse by tot groep mobilisasie?*
3. Does it bring people together or push people away from one another? // *Bring dit mense bymekaar of stoot dit mense weg van mekaar af?*
4. Which stakeholder groups does it bring together/push away? // *Watter belanghebbendes bring dit bymekaar/stoot dit weg?*
5. How does it bring people together/push them away? // *Hoe bring dit mense bymekaar/stoot dit hulle weg?*

Jackal as proxy for general insecurities of farmers // *Jakkals as gevormagtigde vir algemene onsekerhede van boere*

1. What is your opinion about the SKA core site in relation to jackals? // *Wat is jou mening oor die SKA kern met betrekking tot jakkalse?*
2. Will the boundary create more conflict or assist in managing jackals? // *Sal die grens meer konflik skep of sal dit bystand bied tot die bestuur van jakkalse?*
3. What is your view about the land-use change from agriculture to conservation? // *Wat is jou mening oor die grondgebruik verandering vanaf landbou tot bewaring?*

Appendix K: Ethical clearance from Stellenbosch University



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jou kennisvenoot • your knowledge partner

Approved with Stipulations New Application

17-Nov-2016

Terblanche, Renelle R

Proposal #: SU-HSD-003881

Title: **Ongediertes: A critical qualitative study of the political ecology of black-backed jackal and its management around the Square
Kilometre Array core site**

Dear Miss Renelle Terblanche,

Your New Application received on 02-Nov-2016, was reviewed

Please note the following information about your approved research proposal:

Proposal Approval Period: 17-Nov-2016 -16-Nov-2019

The following stipulations are relevant to the approval of your project and must be adhered to:

The researcher mentions that she will have some interaction with government officials or representatives of organisations for this study. **If the interaction involves a formal interview in which these individuals are asked to comment on issues from the perspective of their organisation or department (i.e. in their official capacity), the researcher should undertake to obtain permission from the relevant government department or organisation to confirm that their representative may speak on their behalf. The researcher may consider checking with her participant in this case, whether he/she is authorised to speak on behalf of the department/ organisation without formal permission, or whether such formal written permission is required before the interview takes place.**

Please provide a letter of response to all the points raised IN ADDITION to HIGHLIGHTING or using the TRACK CHANGES function to indicate ALL the corrections/amendments of ALL DOCUMENTS clearly in order to allow rapid scrutiny and appraisal.

Please take note of the general Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

Please remember to use your **proposal number** (SU-HSD-003881) on any documents or correspondence with the REC concerning your research proposal.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Also note that a progress report should be submitted to the Committee before the approval period has expired if a continuation is required. The Committee will then consider the continuation of the project for a further year (if necessary).

This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki and the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health). Annually a number of projects may be selected randomly for an external audit.

National Health Research Ethics Committee (NHREC) registration number REC-050411-032.

We wish you the best as you conduct your research.

If you have any questions or need further help, please contact the REC office at 218089183.

Included Documents:

REC: Humanities New Application

Sincerely,

Clarissa Graham
REC Coordinator
Research Ethics Committee: Human Research (Humanities)

Appendix L: Request-for-participation e-mail (English)

To whom it may concern

I am a student at Stellenbosch University currently pursuing my PhD degree in Sociology. I am interested in exploring the dynamics entrenched in human–black-backed jackal conflict in the specific context of South Africa’s Karoo region, especially around the boundary of the Square Kilometre Array (SKA) radio telescope core site. This will involve an analysis of the social meanings attached to jackals by different constituencies, the power relations around knowledge production in jackal management, and how the management and/or persecution of jackals contributes to group mobilisation. Consequently, my study will highlight the human dimensions of human–wildlife conflict, along with the importance of collaborative working relationships between various stakeholders involved in wildlife management. Overall, I hope to contribute to a solution for a sustainable relationship between humans and jackals, and to improved jackal management.

In order to collect data for this project, I wish to conduct an interview – that should not last more than an hour – with yourself or with a representative of your institution/organisation. Because of the qualitative nature of the study, mostly open-ended questions will be posed. The data collected during the interviews will only be used for the purposes of my doctoral dissertation, and will be treated with complete confidentiality.

If possible, I would also sincerely appreciate the opportunity to accompany and observe (and, if possible, assist) you in the field, e.g. during calling-and-shooting excursions, setting up traps, patrolling the farm, etc. in order to collect observational data.

Thank you for considering my request.

Kind regards,

Renelle Terblanche

E-mail: 15596567@sun.ac.za

Mobile: 083 569 9854

Appendix M: Request-for-participation e-mail (Afrikaans)

Heil die leser

Ek is 'n student aan die Universiteit van Stellenbosch tans besig met my PhD in Sosiologie. Ek stel belang in die dinamika verskans in die konflik tussen mense en rooijakkalse in die spesifieke konteks van die Karoo, veral rondom die grens van die Square Kilometre Array (SKA) radioteleskoop kern. Hierdie behels 'n ontleding van die verskeie sosiale betekenis wat belanghebbendes heg aan jakkalse, die magsverhoudings rondom kennisproduksie in jakkalsbestuur, en hoe die bestuur en/of vervolging van jakkalse bydra tot groep mobilisasie. Gevolglik sal my studie die menslike dimensies van mens-wildlewe konflik na vore bring, saam met die belangrikheid van samewerking tussen verskeie belanghebbendes wat betrokke is by natuurlewebestuur. Algeheel, hoop ek om by te dra tot 'n oplossing vir 'n volhoubare verhouding tussen mens en jakkalse, asook om jakkalsbestuur te verbeter.

Ten einde data in te samel vir die projek, wil ek 'n onderhoud voer – wat nie meer as 'n uur behoort te wees nie – met u of met 'n verteenwoordiger van u instansie/organisasie. As gevolg van die kwalitatiewe aard van die studie, sal meestal oop vrae word gestel. Die data wat tydens die onderhoude ingesamel word, sal slegs gebruik word vir die doeleindes van my Doktorale proefskrif, en sal streng vertroulik behandel word.

Indien moontlik, sal ek dit ook opreg waardeer om u te vergesel (en, indien moontlik, te help) in die veld, bv tydens roep en skiet uitstappies, die oprigting van 'n strik, patroleering van u plaas, ens. ten einde waarnemende data in te samel.

Dankie dat u my versoek oorweeg.

Vriendelike groete,

Renelle Terblanche

E-pos: 15596567@sun.ac.za

Selfoonnommer: 083 569 9854

Appendix N: The portrayal of jackals in the Afrikaans language

Table 8.1 Afrikaans idioms and expressions containing the word “jackal” and their English explanations or equivalents (Sources: Kritzinger, de Villiers & Pienaar, 1945:71; Kritzinger & Sabbagha, 1981:135; de Villiers & Gouws, 1988:32; de Wet 2010:204–205; Jaracal, 2014).	
Afrikaans idioms and expressions	English explanation or equivalent
<i>'n Jakkals laat hom nie maklik in 'n slagyster vang nie</i>	He is too sly to be caught
<i>'n Jakkals vang nie 'n skaap in die dag nie</i>	A thief will not be devious where it is easy for him/her to get caught
<i>'n Jakkals vang nie skape van voor nie</i>	A thief will act covertly
<i>'n Jakkals verander van haar, maar nie van snare nie</i>	A leopard cannot change its spots
<i>'n Jakkals wat slaap, tel hoenders in sy drome</i>	When a sly person does not execute evil tricks, he/she devises plans to do so
<i>As Jakkals die passie preek, moet Boer sy ganse oppas</i>	When the fox preaches, beware of your geese
<i>As jakkals dik is, is die druiwe suur</i>	If you are saturated, you do not even taste good food anymore
<i>Boer jy ook met jakkalskos?</i>	Used to ask if someone is also a sheep farmer
<i>Die jakkals byt</i>	Backache due to digging or crouching
<i>Die jakkals het in die dou gerol</i>	The infatuation has blown over
<i>Die jakkals loer weer by sy oë uit</i>	In his/her eyes you can see that he/she is scheming again
<i>Dis bo my jakkals</i>	This beats me
<i>Dis klein jakkalsies wat die wingerde verniel</i>	It is the little foxes that spoil the vines
<i>Ek ruik jakkals</i>	Mockingly said when someone praises him-/herself
<i>Gaan met die jakkalse om, dan leer jy tjank</i>	Mix with the wrong people and you will bear the consequences
<i>Hoe kaler jakkals, hoe groter stert</i>	Great boast, small roast
<i>Hy gooi stert soos 'n jakkals</i>	He is devising clever plans
<i>Hy het 'n jakkals gaan skiet</i>	He went to the bathroom to regurgitate
<i>Hy het te lank aan die jakkals se stert gesuig</i>	He drank too much
<i>Hy is 'n jakkals</i>	A wily fox
<i>Hy is 'n jakkals met baie draaie</i>	He has very clever plans
<i>Hy is 'n kaal jakkals</i>	Someone who does not own anything
<i>Hy is 'n tweestert-jakkals</i>	He is extremely cunning or hypocritical
<i>Hy meet die jakkals, maar vergeet die stert</i>	He does not accurately measure
<i>Hy is soos 'n afgeslagte jakkals</i>	He is extremely sensitive, delicate, reluctant
<i>Hy skree soos 'n maer jakkals</i>	He has a strident scream
<i>Jakkals en muishond is vandag ook in tel</i>	Sneeringly refers to people who are considered fit to be part of an organisation; people who were previously unaccounted for, but are now leaders
<i>Jakkals het toe sy eie stert gevang</i>	He got into trouble through his own artifice
<i>Jakkals hou sy lyf hond</i>	Said to someone who is pretending to be someone he/she is not
<i>Jakkals prys sy eie stert</i>	Blow one's own trumpet
<i>Jakkals sê die druiwe is suur</i>	Jokingly said to someone that speaks dismissively about something beyond his/her reach
<i>Jakkals sê: Hardloop is 'n goeie ding, maar dan moet jy betyds begin</i>	If you do not want to get caught, you need to think about plans ahead of time
<i>Jakkals trou met Wolf se vrou</i>	The fairies are baking or a sunshine-shower
<i>Jakkals vee sy spore met sy stert dood</i>	An astute thief always has a way in which he tries to hide his transgressions
<i>Jakkals verander van stert</i>	He is busy making new plans

Table 8.1 Afrikaans idioms and expressions containing the word “jackal” and their English explanations or equivalents (Sources: Kritzinger, de Villiers & Pienaar, 1945:71; Kritzinger & Sabbagha, 1981:135; de Villiers & Gouws, 1988:32; de Wet 2010:204–205; Jaracal, 2014).	
Afrikaans idioms and expressions	English explanation or equivalent
<i>Jakkals waai sy stert wind af</i>	Said when somebody is an embarrassment
<i>Jy probeer jakkals nou vol as smeer</i>	Said when trying to conceal one’s tricks
<i>Kaal jakkals het een haar gekry</i>	Jokingly said when someone who was used to nothing, suddenly got a slightly more advantageous position
<i>Moenie vir Jakkals skaapwagter maak nie</i>	Do not appoint a dishonest person to take care of your valuables
<i>Vang ‘n jakkals met ‘n jakkals</i>	Use someone who him-/herself is astute to catch a thief
<i>Waar het Jakkals al ooit gesê: Ek steel nie vannaand ‘n skaap nie!</i>	If a person is infatuated with something but suddenly says that he/she is not obsessed with it anymore, you should doubt the person.